

Las Vegas Valley Soaring Association

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Tow Pilot Operations Manual

December 2004

(Amend January 2005, Change 1)

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Record of Changes

Date	Document	Notes
December 2004	Original	
January 2005	Amend 1	Pg. 34, Typo, Checklist RPM Pg. 33, Eng. Start Procedure (Magneto, Carburetor)
March 2006	Amend 2	Pg. 11, Engine Primer Operation Pg. 32, Engine Start Procedure Pg. 35, Fuel Limitation, Starter Limitation

_____ Date _____

_____ Date _____

Christopher L. Hanks, President LVVSA

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1. Introduction

1.1. Purpose

The intent of this manual is to provide standardized operating procedures for tow plane operation at Las Vegas Valley Soaring Association (LVVSA). These procedures represent the safest, most practical methods of operation based upon club experience, manufacturer’s data, sport standards, and the best available information. If a situation arises for which these procedures are inadequate or do not apply, the pilot’s best judgment should prevail. Tow pilots are to understand the order of importance of this manual, which is: Safety first (pilots emergency authority as PIC), The Federal Air Regulations (FARs) under which we operate, and then the policy and procedures set fourth in this manual.

1.2. Mission Objective

Club Members provide tows to other club members as a service to the club. All club members should be aware of their tow pilot’s duty day, hazardous weather operations, fueling requirements and hydration levels.

Operation of LVVSA tow planes will be conducted with three goals in mind. In order of importance, they are:

- To conduct the operation as safely as possible;
- To provide the glider pilot with the best service possible; and
- To accomplish this mission as economically as possible.

At no time must safety be sacrificed to advance another objective. Safety must always be first in priority, and shall be paramount in the conduct of all operations.

1.3. Jurisdiction

A. This manual has been prepared using information from a variety of sources. If a conflict is found between material in this manual and other sources, the following sources shall be considered controlling:

- 1) Federal Aviation Regulations;
- 2) Airman’s Information Manual,
- 3) Manufacturers’ Manuals; and
- 4) LVVSA Operations Manual.

B. This manual is issued in addition to the LVVSA Operations Manual. Tow pilots must be familiar with the policies and procedures set forth in the LVVSA Operations Manual, in addition to the policies and procedures contained within this manual.

1.4. Document Control

Maintenance of the Tow Pilot Manual is the responsibility of the Chief Tow Pilot, or if a Chief Tow Pilot has not been appointed, the Chief Pilot. Your comments and suggestions are welcome. If you have any suggestions to improve the procedures outlined in this manual, please provide them to the Chief Tow Pilot or to the LVVSA Board of Directors.

This Manual is effective as of December 1, 2004.

2. Pilot Qualification and Responsibility

2.1. FAR Experience and Instruction Requirements

Tow pilots are required to meet the FAR experience and instruction required by FAR §61.69. This FAR is reprinted on the next page in this manual for reference; however, if the FAR is revised, the current FAR is controlling.

2.2. LVVSA Requirements

- A. Only LVVSA approved tow pilots or tow pilots in training under direct supervision by a designated training pilot will operate LVVSA tow aircraft.
- B. Any tow pilot not meeting the open pilot qualifications of C.1) and C.2) below must be listed as a “named pilot” on the club insurance policy prior to any solo operations in the tow aircraft. Tow pilot candidates for “named pilot” status must have logged at least 200 hours total time in an airplane (powered) with at least 15 hours tail wheel time and have tail wheel (FAR §61.31(i)) and high performance (FAR §61.31(f)) endorsements previously completed.
- C. In addition to the experience and instruction requirements of FAR §61.69, LVVSA requires the following to meet the “open pilot” club insurance qualification.
 - 1) The pilot must have logged at least 500 hours in powered airplanes with at least 100 hours in tail wheel airplanes.
 - 2) At least 10 previous flights in a Pawnee and at least 10 previous flights as a tow pilot.
 - 3) Tail wheel airplane logbook endorsement required by FAR §61.31(i), unless the pilot has logged flight time as pilot in command of tail wheel airplanes prior to April 15, 1991.
 - 4) High performance airplane logbook endorsement required by FAR §61.31(f), unless the pilot has logged flight time as pilot in command of high performance aircraft prior to August 4, 1997.
 - 5) The pilot must maintain all requirements of the FARs, including the flight review requirements of FAR §61.56 and recent experience requirements of FAR §61.69.
- D. All tow pilots will successfully complete the tow pilot checkout in paragraph 2.3 prior to towing.
- E. While acting as Tow pilot, a pilot must have in his physical possession or readily accessible in the aircraft:
 - 1) A current airplane pilot certificate issued to him under FAR §61.
 - 2) A current medical certificate issued to him under FAR §67. In the case of a pilot possessing a pilot certificate issued on the basis of a foreign pilot license under FAR §61.75, evidence of current medical qualification required by FAR §61.75(b)(4).
 - 3) A current drivers license or acceptable government issued picture identification card. (FAR §61.3(a)(2))

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**FAR §61.69. Glider and Unpowered Ultralight Vehicle Towing:
Experience and Instruction Requirements (As amended 1 Sept 2004)**

(a) No person may act as pilot in command for towing a glider or unpowered ultralight vehicle unless that person:

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

(b) Any person who before May 17, 1967, has made and logged 10 or more flights as pilot in command of an aircraft towing a glider or unpowered ultralight vehicle in accordance with a certificate of waiver need not comply with paragraphs (a)(4) and (a)(5) of this section.

(c) The pilot, described in paragraph (a)(4) of this section, who endorses the logbook of a person seeking towing privileges must have:

- (1) Met the requirements of this section prior to endorsing the logbook of the person seeking towing privileges; and
- (2) Logged at least 10 flights as pilot in command of an aircraft while towing a glider or unpowered ultralight vehicle.

(d) If the pilot described in paragraph (a)(4) of this section holds only a private pilot certificate, then that pilot must have:

- (1) Logged at least 100 hours of pilot-in-command time in airplanes, or 200 hours of pilot-in-command time in a combination of powered and other-than-powered aircraft; and
- (2) Performed and logged at least three flights within the 12 calendar months preceding the month that pilot accompanies or endorses the logbook of a person seeking towing privileges —
 - (i) In an aircraft while towing a glider or unpowered ultralight vehicle accompanied by another pilot who meets the requirements of this section; or
 - (ii) As pilot in command of a glider being or unpowered ultralight vehicle towed by an aircraft.

2.3. Tow Pilot Checkout

Active LVVSA tow pilots as of 1 December 2004 are exempt. However, if they allow their FAR§67 (medical) or §61.56 (flight review) to expire for more than 90 days or they allow §61.69, (experience) to expire, they will complete this checkout program for re-certification.

Prospective tow pilots receiving training must hold a Private Pilot, Airplane Single Engine Land rating or better, be current per the FARs, meet the minimum time standards set by the FARs and LVVSA and approved by the Chief Pilot prior to beginning training.

Tow Pilot Checkout will consist of the following:

- A. A review of the pilot's experience to ensure compliance with the FAR and LVVSA experience requirements outlined above.
- B. Completion of the Soaring Safety Foundation on-line Tow Pilot Course. The completion certificate will be placed in the pilots training folder and annotated as ground training received in the pilot's logbook. If unable to complete the on-line course, a club CFIG will administer the course and document the training.
- C. Ground instruction regarding techniques and procedures essential to the safe towing of gliders, including airspeed limitations, emergency procedures, signals used, and maximum angles of bank, in addition to familiarization with the LVVSA towing procedures outlined in this manual. This instruction will be annotated in the pilot's log book IAW FAR §61.69(a)(3).
- D. If a two-seat tow aircraft is available, a minimum of 10 dual tows under the supervision of the Chief Tow Pilot or his designate, including at least three dual tows as sole manipulator of the controls. These tows may be actual or simulated. This requirement may be waived at the discretion of the Chief Tow Pilot if a two-seat tow aircraft is not available or for a pilot that is current and qualified to tow gliders as a result of previous tow experience.
- E. In addition to the required logbook endorsements, satisfactory completion of the checkout will be indicated by a signoff on the pilot's LVVSA membership card in the appropriate space and on the pilots data card in his training folder.
- F. For first time tow pilots, the first three actual solo tow flights require a CFIG in the glider being towed. The CFIG will pre-brief normal tow procedures to expect and will simulate a first time student on tow with difficulty maintaining tow position and will demonstrate giving student glider instruction in boxing the wake and slack line maneuvers. The CFIG may at his discretion conduct student glider training on these flights as long as the tow pilot training objectives are met. The CFIG will de-brief the tow pilot after the training exercise.
- G. To ensure compliance with FAR §61.69, the Chief Tow Pilot or his designate conducting the checkout must:
 - 1) Meet the requirements of this section (be signed off as a LVVSA Tow pilot);
 - 2) Have made and logged at least 10 flights as pilot-in-command of an aircraft towing a glider;

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- 3) Meet the glider towing recency of experience requirements of FAR §61.69; and
- 4) If a designate, be approved as such by a member of the Board of Directors, or the Chief Tow Pilot.

2.4. Pilot In Command Authority

- A. The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft. (FAR §91.3 (a))
- B. While a glider is under tow, the tow pilot is directly responsible for, and is the final authority as to, the towing operation.
- C. The tow pilot, as pilot in command, must ensure compliance with all other FARs applicable to glider towing operations.

2.5. Tow Plane Use Limitations

- A. Unless otherwise authorized by the Board of Directors, the use of club tow planes is limited to the following:
 - 1) Tow operations;
 - 2) Flights supporting tow operations including aero retrieves;
 - 3) Flights related to tow plane maintenance;
- B. The following operations require Chief Tow Pilot or Board Member approval and should only be conducted by experienced pilots:
 - 1) Search and Rescue Operations; and
 - 2) Competition Turn-point Photography.
- C. LVVSA aircraft may not be taken more than 55 nautical miles from LVVSA without special preparations, e.g., cross-country flight planning to include NOTAMS, weather briefing and fuel planning.
- D. Cross-country aero tow procedures for repositioning of glider aircraft to another airport or for aero retrieve will be specifically briefed for emergency procedures (rope break), alternate landing locations along the route and fuel requirements.
- E. Operation of any LVVSA aircraft from any non-published or non-charted airport or landing area other than Jean Dry Lake or Roach Dry Lake must be approved by two members of the Board of Directors. Jean Dry Lake or Roach Dry Lake are the only non-airport areas approved for operations. This does not hamper cross-country glider pilots from using dry lakes as emergency landing areas, but it may affect an aero tow recovery from the lake beds.

2.6. Carriage of Passengers

Passengers aboard two-seat tow planes during towing operations are restricted to prospective tow pilots receiving training. Prospective tow pilots will complete all ground training requirements prior to flying.

2.7. Tow Schedule

The tow pilot schedule is posted on the LVVSA web page in the member's only section. The schedule is also mailed (or emailed as requested) to members in the monthly newsletter and posted at the clubhouse. If unable to fly, each tow pilot is responsible to find his replacement. The tow pilot should be ready to fly at 10am and remain until sunset or an agreed ending time if there are no other flyers waiting. Instructors or members requesting tows before 10am need to call the tow pilot and make arrangement in advance.

3. Preflight

3.1. Weather / NOTAMS

The duty tow pilot or Flight Operations Officer (FOO) should call Reno Flight Service Station (1-800-WX-BRIEF) for daily weather and NOTAM information prior to commencing tow operations. (at least get NOTAMS)

- A. The weather information will be logged on the LVVSA Weather Briefing Form (Appendix A) and posted in the clubhouse or with the FOO. The tow pilot may receive weather and NOTAM data from personal sources (such as DUATS) and transfer the information to the LVVSA WX Form.
- B. Airport specific NOTAM information or local area Temporary Flight Restrictions (TFRs) will be discussed between the tow pilot and FOO.
- C. Glider pilots are responsible for their own weather briefing and NOTAM information along their planned route of flight.

3.2. Aircraft Status Board

Prior to acceptance of the aircraft, the tow pilot shall review the Aircraft Status Board in the clubhouse and on the Tow Log in the aircraft. Pay particular attention to the scheduled oil change posted on the status board and in the aircraft, if the scheduled oil change time differs, the time posted in the aircraft takes precedence and alert a Board member or Maintenance officer of the discrepancy. Review of the Aircraft Status Board will help the tow pilot; determine if the aircraft is airworthy, and what open write-ups are present that may affect his flights. Operation of LVVSA aircraft with a known mechanical discrepancy affecting safety of flight is a violation of FAR §91.213 and is strictly prohibited.

3.3. Tow Log

- A. Tow Logs (Appendix C) are kept aboard each tow plane. Tow pilots shall annotate their name and date and log the following events on the Tow Log, noting the engine tach time at each event:
 - 1) Beginning of the towing day;

- 2) Addition of fuel and/or oil;
- 3) Tow pilot changes during the day;
- 4) End of the towing day; and
- 5) Any mechanical irregularities.

B. The tow pilot shall review the Tow Log for pertinent comments and/or discrepancies prior to acceptance of the aircraft.

3.4. Aircraft Line Inspections (Preflights)

The tow pilot shall conduct a thorough origination preflight prior to the first flight of the day or following aircraft maintenance. During the course of the towing day, it is recommended that the tow pilot make at least an abbreviated walk-around following any personal breaks, refueling, or tow pilot changes.

- A. Refer to the appendices of this manual, or to the aircraft flight manual, for aircraft-specific preflight procedures. Entry of the name of the pilot onto the Aircraft Log Sheet constitutes acceptance by the pilot that the aircraft is airworthy.
- B. The oil level will be checked during preflight. Minimum oil quantity for flight in the Pawnee is 9 qts., so anticipate oil consumption and add oil if the quantity is below 9.5 qts. Use a funnel and oil rag when adding oil. Do not fly with less than 9 qts. of oil.

3.5. Engine Starting

Release the parking brake prior to engine start. Do not start the tow plane engine if the tail of the aircraft is oriented towards a hangar, unsecured gliders, personnel, or anything that may be damaged or injured by the resulting prop blast. Use the following procedure to start the Pawnee:

- A. Mixture to the full RICH position. Throttle 1/3 to 1/2 position.
- B. If this is the first start of the day and the outside air temperature (OAT) is less than 50 degrees Fahrenheit (50F), the engine priming maybe required. Four to Six strokes of the primer system should be used. If the temperature is < 80 degrees Fahrenheit (80F), use three throttle pumps to prime the engine. Do not use more than three because raw fuel will pool below the carburetor. If the OAT is between 80F and 95F, use two throttle pumps. Do not prime the engine if the OAT is > 95F or if this is not the first start of the day.
- C. Turn on the LEFT magneto only and the master switch. Loudly call, "Clear prop."
- D. Hit the starter button. On cold days with priming the engine may "catch" and quit, you will need to re-prime the engine with the primer system. When the engine is running, turn on the RIGHT Magneto and reduce throttle setting. Check Oil Pressure. Be sure to monitor starter engagement and cycle limits.

3.6. Engine Run-ups

- A. Prior to the first flight of each day, following aircraft maintenance, and post-flight, a run-up shall be conducted IAW Appendix B, paragraph B.1.D. of this manual, or the aircraft flight manual. The engine should be allowed to warm up before advancing power for the run-up. The oil temperature might not rise off the peg; however, if the

engine has been running for 5-6 minutes and will idle smoothly, a run-up is permissible. The engine manual states that if the engine can accept throttle advancement without “stumbling”, the engine is sufficiently warm. Always face into the prevailing wind for run-ups.

- B. Do not conduct the run-up near the glider staging area. Doing so can result in dangerous prop blast to aircraft or personnel, or can result in a noise level that interferes with preflight preparations on the flight line.
- C. Always consider the prop blast of the tow ship. On our gravel covered areas, DO NOT increase engine RPM anywhere ANY damage may occur to other people, vehicles or aircraft. Also consider possible rock damage to the tow plane propeller and flap, tail area.

3.7. Field Conditions

- A. The tow pilot is the final authority in deciding when the weather has become too hazardous to start or continue towing.
- B. The maximum crosswind component for LVVSA operations is 20 knots or the maximum stated in the flight manual unless the tow pilot establishes a lower limit.
- C. Maximum tailwind component for LVVSA operations is 10 knots unless the tow pilot establishes a lower limit.

3.8. Tow pilot Changes

- A. Tow pilot changes will not be conducted while the tow plane engine is running. Leaving the cockpit while the engine is running is prohibited.
- B. The new tow pilot will write his name on the Tow Log next to his first tow. This signifies the new Tow pilot has accepted responsibility for the tow aircraft and tow operations.

3.9. Taxiing Over Tow Ropes

Taxiing over a tow rope creates a risk of the rope being picked up by, and fouled around, the propeller. Turning the tow plane with the rope under the main tire will chafe and weaken the rope. Tight 180 degree turns could foul the tow rope in the tail wheel and cut the rope. For these reasons, taxiing over tow ropes should be avoided at all times.

4. Staging and Takeoff

4.1. Tow Log

- A. The tow pilot and glider pilot are responsible to coordinate the formation flight. Major items include, airspeed, release location and altitude and any special instructions pertinent to the flight (pattern tow, box wake, slack line, tow initiated release, etc.).
- B. The tow pilot shall record on the Tow Log the glider identification and glider pilots name.

4.2. Ground Signals / Radio Communications

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- A. LVVSA uses the standard SSA Tow Signals (see Chapter 10: Communications). They shall be used during launch operations. In addition, radio communications on frequency 122.9 MHz shall be used whenever possible to increase communication and operational safety.
- B. Tow pilots are to be familiar with the communication requirements of AIM Section 4-1-9, and the radio calls and traffic pattern requirements for uncontrolled airports of AIM Section 4-3-2, 4-3-3 and FAR §91.126 (also review Chapter 10 of this manual).

4.3. Fuel Status

Prior to each takeoff, the tow pilot shall verify that sufficient fuel remains to complete the tow, including the 30 minute day VFR fuel reserve required by FAR §91.151. At no time will a tow or takeoff commence when the fuel gauge is below the red line (7 gallons).

4.4. Distance Available

The tow pilot and the glider pilot are both responsible for ensuring that sufficient distance is available for takeoff and obstacle clearance. Consider the wind, temperature, and weight of the glider in planning the takeoff. At LVVSA:

- A. Runway 20L, the glider shall stage north of the north cross taxiway “D”. (Distance remaining approximately 3,000ft)
- B. Runway 02R, glider staging will be abeam the south end tie down cable, and no farther north than the north end of the south end cable. (Distance remaining approximately 3,200ft)
- C. Heavy two seat or water ballasted gliders should consider staging as close to the runway threshold as possible. (Full length distance, 3,700 ft)

4.5. Takeoff Direction

- A. The tow pilot and glider pilot will determine and agree on the best direction for takeoff. Standard operations are normally to the south, Rwy 20L. The area south of the airport is safer in the event of a premature termination of tow (PTT).
- B. The tow pilot and glider pilot may agree to a downwind takeoff with wind speeds below 10 knots with careful consideration to glider weight and density altitude. A tailwind (1) reduces glider control effectiveness at the beginning of the take off (slow air speed), (2) drastically increases the required takeoff distance, and (3) markedly decreases the safe altitude attained when reaching the departure end significantly reducing the glider options in the event of a PTT.
- C. Exercise extreme caution with opposite direction landing / departing traffic on the parallel runway. If downwind and opposite direction traffic continue; change take off direction. Wind direction dictates runway choice, if parallel runway traffic continues downwind operations, politely advise them that glider tow operations dictate “into the wind” for safety and request they alter their runway choice to the same direction.

4.6. Towing Mirrors

To be able to monitor the glider properly during the tow, the tow pilot shall confirm that the mirrors on the tow plane are properly adjusted before each takeoff.

4.7. Normal Takeoff Procedure

- A. The tow pilot, glider pilot and wing runner (ground crew) are jointly responsible for ensuring that the pattern is clear of landing aircraft prior to takeoff, including verification that the departure path is clear of aircraft landing downwind. While waiting on the runway, the tow pilot will monitor the downwind for landing traffic and alert the ground crew.
- B. The tow pilot shall position the aircraft in front of the glider, leaving sufficient slack for ease of hookup. Use extreme caution when approaching the front of the glider where the ground crew is operating to prevent propeller injury. Minimum power shall be used to minimize risk of prop blast to aircraft and personnel.
- C. The ground crew (wing runner) shall advise the tow pilot of any special instructions pertinent to the flight. Retrieve the towrope, check to ensure the ring attaching the towrope to the tow plane tow release has not snagged over the release mechanism or rear tire, and hook up the glider when the glider pilot is ready.
- D. The ground crew may then give the “Take Up Slack” signal, at which time the tow pilot will remove all slack from the tow rope, but care must be taken not to tension the tow rope before the glider pilot signals that he is ready.
- E. When the glider pilot is ready, the wing runner shall check the traffic pattern and adjacent runway and call “PATTERN CLEAR” (thumbs up to the glider pilot), upon receiving a return “thumbs up”, the wing runner shall level the wings and monitor the glider and tow pilot rudders.
- F. When the glider pilot is ready, he will give the “Begin Takeoff” rudder waggle signal. The tow pilot will visually verify the glider canopy and spoilers are closed and complete his own pre take-off checks. The tow pilot may begin take-off roll upon seeing the “Begin Takeoff” signal (or radio communication) from the glider pilot and/or the “Begin Takeoff” signal from the wing runner.
- G. The tow pilot will remain alert at all times for the “Hold/Stop” signal from the ground crew. Even if the tow pilot has received the “Begin Takeoff” signal via radio, he will continue to watch the wing runner for, and will respond to, further signals.
- H. A gradual application of power is required to prevent slamming the glider fuselage tail on take-off for gliders with nose skids or nose wheels on the ground while awaiting tow (such as the Schweizer 2-33, 1-26 gliders and the Grob 103). Power application should be strong enough for the glider pilot to gain flight control in a reasonable distance.

4.8. Unassisted Takeoff Procedure

This procedure shall be used when no ground crew is available to assist in launch operations. A radio will be used if at all possible.

- A. The tow pilot and glider pilot are jointly responsible for ensuring that the pattern is clear of landing aircraft prior to takeoff, including verification that the departure path is clear of aircraft landing downwind.
- B. The tow pilot shall position the tow aircraft in front of the glider, leaving sufficient slack for ease of hookup, and parked at an angle to easier view the glider preparation.

The tow pilot shall park off the runway and shut down the tow plane's engine if required to leave the cockpit.

- C. The tow pilot shall coordinate with the glider pilot as to who will hook up the glider. Special care must be taken if the glider pilot connects the towrope and the tow plane has the engine running. In the case of a two-seat glider, one of the glider pilots may accomplish this. At no time will the tow pilot exit the tow plane with the engine running to connect a towrope.
- D. When the glider pilot signals that he is ready for launch, the tow pilot shall gently take out slack until the rope is taut. If in radio contact the glider pilot could call distance remaining until slack is out, be aware to not block radio calls of other aircraft in the area.
- E. When the glider pilot is ready and the towrope is taut, he will call on the radio or give the "Begin Takeoff" rudder waggle signal. The tow pilot will visually verify the glider canopy and spoilers are closed and complete his own pre take-off checks.
- F. The tow pilot may begin takeoff roll upon seeing the "Begin Takeoff" signal (or radio communication) from the glider pilot.
- G. Radio communications will be used to the fullest extent possible to increase safety.

5. Tow and Release

5.1. Flight Path

- A. Safety is the most important consideration at all times, this is especially critical for glider tow operations.
- B. The tow pilot will stay within a safe glide distance to the airport for the glider at all times. After takeoff, turns to the east into the traffic pattern area will normally not be commenced until passing through 300-500 feet AGL unless a lower altitude is required to maintain a safe glide distance to the airport for the glider.
- C. On takeoffs made to the north, Rwy 02R, give careful consideration to wind strength and ridge/rotor effect prior to turning crosswind. Be aware of rising terrain northeast of the field and keep the glider in a position for a possible emergency landing. Rotor effect or lee down sloping winds can result in a negative climb rate.
- D. Watch crosswind drift during climb out. LVVSA tows will maintain extended centerline ground tracks to the first crosswind turn. Parallel runway operations at LVVSA do not allow any drift towards the other runway. LVVSA flight operations will honor the "No Transgression Zone" (AIM fig 4-3-3) between the runways. There is only 300ft between runway centerlines (233ft of gravel).
- E. Drifting downwind on climb out may be a desirable practice at some airports to allow the glider to turn into the wind to return to the runway in the even of a rope break, but not at LVVSA with parallel runways. It is not an accepted practice to force the glider to turn towards other traffic on the parallel runway in the event of a rope break (PTT)

- because the tow pilot allowed the tow to drift too far downwind for a safe turn away from the parallel runway and return to the airport.
- F. Unless otherwise specified by the glider pilot, the flight path should be planned to keep the glider upwind and within easy gliding range of the airport.
 - G. Strength of the wind and performance of the glider should be considered when adjusting the flight path. Position the glider so that it is upwind and no farther than two miles laterally per thousand feet of altitude towed.
 - H. The flight path should be adjusted to avoid over flight below 1000 ft. AGL of the prison NE of the airport. However, do not endanger tow operations with a north wind and rotor effect from the ridge to avoid the prison.
 - I. Ensure that the flight path will provide compliance with all VFR cloud clearance and visibility minimums.
 - J. As the tow plane / glider combination is less maneuverable than an individual aircraft would be, maintain a good scan for traffic and plan early to avoid potential conflicts. High tows when the wind is from the north have a higher potential for traffic conflict due to aircraft arrivals into the Las Vegas Class B airspace with early descents for McCarran Runway 1 approach operations.
 - K. Avoid towing directly into low or dazzling sun or glare. Keep it to one side of the windshield.
 - L. Exercise caution when towing along the ridge line or between the ridge and the downwind traffic pattern area for other traffic either ridge soaring, thermalling or preparing to enter the downwind for landing.
 - M. Try to reach release altitude in or near a thermal so the glider may release in lift. Thermal locations noted during previous tows can be useful. If possible, approach the thermal from the left so that the glider will fly into the thermal after releasing and turning right.
 - N. Plan the flight path to allow an expeditious return to the airport using the proper descent profile for engine cooling and planning for proper sequencing with other aircraft already established or entering the traffic pattern.

5.2. Towing Speed

- A. Towing airspeed will be adjusted based upon the type of glider and the glider's use of water ballast.
- B. Schewizer 2-33 and 1-26 glider tow at 55 knots. Grob 103 tows best at 60-65 knots.
- C. Heavier two seat gliders or water ballasted gliders tow best at 70 knots or as requested by the glider pilot.
- D. Tow pilots should note any special towing airspeed requests and honor these requests to the fullest extent possible. If unclear on the units used (mph vs. knots), or if the requested speed cannot be maintained, clarify the request before taking off.
- E. On tow, speed should be maintained as steadily as possible. This is best accomplished by maintaining a constant pitch attitude, and not by chasing the airspeed fluctuations.

5.3. Angle of Bank

During the tow, a normal bank angle of about 15 to 20 degrees should be used. 30 degrees is the maximum bank recommended during normal towing operations. Increased angles of bank beyond these limits should only be used with experienced pilots and only after the pilots have briefed the anticipated increase in bank angles. Turns should be entered and recovered from gently, and should not be made unnecessarily. Note that instructors may desire extra turns for student practice.

5.4. Thermalling on Tow

- A. DO NOT circle in a thermal in the traffic pattern area below 1,500ft AGL.
- B. Circling in thermals on tow is permissible only with prior arrangement and with radio communication. As turn radius is larger during tow and vertical component of lift is reduced in a turn, it is not economical to attempt to circle in a weak or narrow thermal.
- C. The tow pilot should consider the glider pilots experience level when thermalling on tow, pilots with less experience may encounter difficulty when the tow pilot decides to attempt to circle in a thermal. If the thermal strength, diameter, or the glider pilot's experience level is in doubt, do not circle in thermals during tow.
- D. Turning in thermals at the appropriate amount of bank based on the glider pilot's experience is acceptable.

5.5. Air Signals

LVVSA uses the standard SSA Tow Signals (see Chapter 10: Communications). They shall be used during launch operations. In addition, radio communications on frequency 122.9 MHz shall be used whenever possible to increase good communication and operational safety. The tow pilot shall maintain vigilance for any signals from the glider pilot in the event of radio failure.

5.6. Normal Release

After positively verifying that the towrope has released, the tow pilot shall initiate at least a 90-degree descending left turn. Turn and descent entry shall not be made abruptly, as damage can occur if the towrope has not released properly.

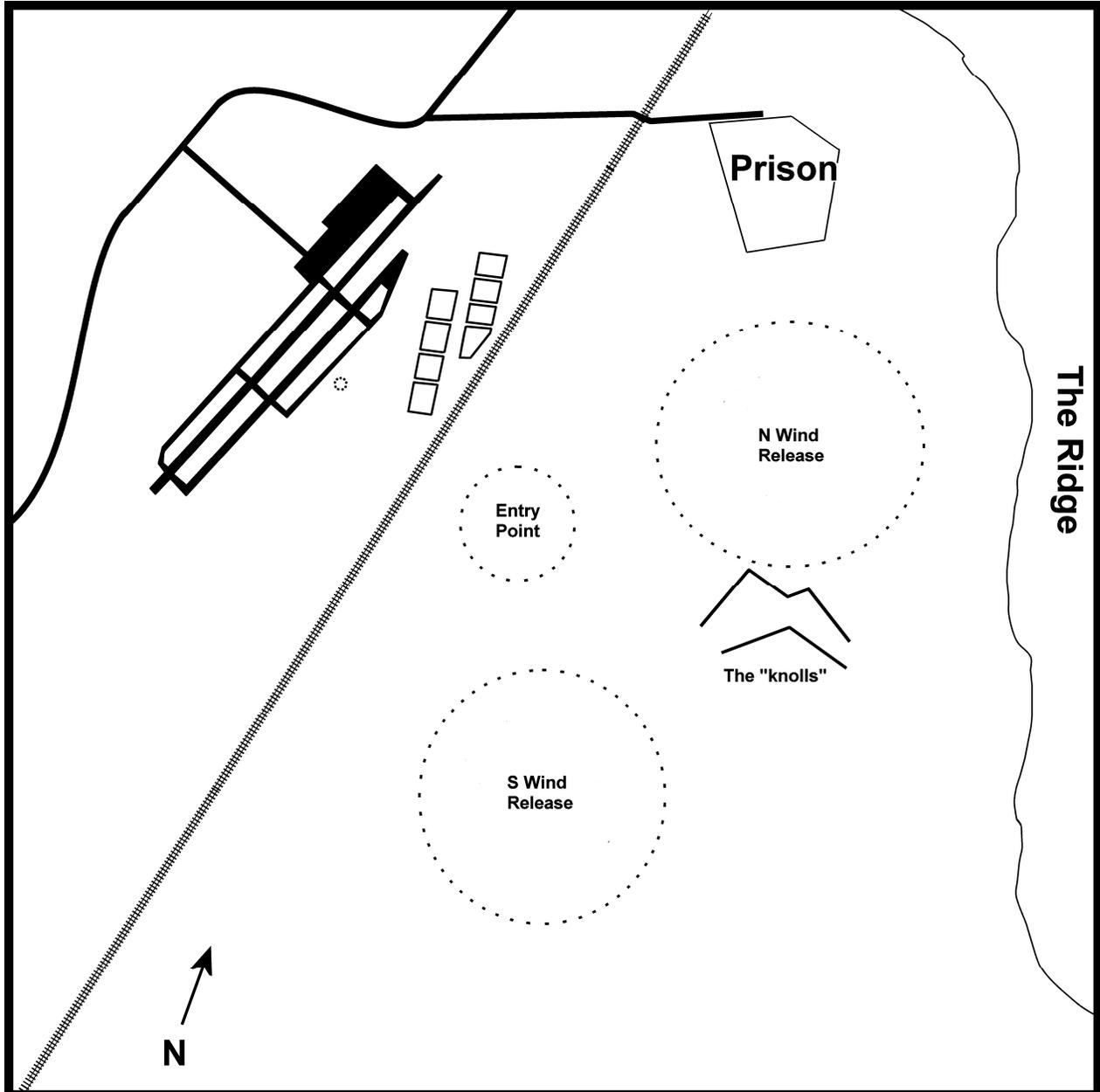
5.7. Pattern Tows

Whenever possible, pattern tows should be conducted in a manner that will allow the tow plane to precede the glider to the airport. In order to allow training in a safe and efficient manner, the following standardized patterns shall be followed as closely as safety permits. It is not recommended for the glider or tow plane to complete 360-degree turns on the downwind leg. This also allows the glider pilot to keep the tow plane in sight while maneuvering, and avoids potential conflict with other unseen aircraft entering the traffic pattern.

A. Landing South, Runway 20L

- 1) After takeoff, the tow pilot will climb to approximately 300-500' AGL as performance requires before making the crosswind turn.
- 2) Extend upwind and crosswind turns as required reaching 800 to 1,000ft AGL at the appropriate release area. At no time should the tow take the glider beyond safe return distance to the airport.

- 3) At release, the glider pilot will make a right 30-degree turn away from the tow plane, and once clear a left turn to the downwind leg. The tow pilot will confirm release before making a descending slight left turn then right turn when clear of the glider onto a close in downwind leg and will precede the glider to the airport.



- 4) Note that the first turns are in the normal direction following release. The tow pilot should expedite the traffic pattern and adjust his touchdown spot depending on the wind. In light winds or with a tailwind, plan on landing long to exit the runway at the mid-field taxiway "C". This will allow the glider to make a normal approach and landing at the runway threshold.

- 5) The tow can return to the staging area via the paved taxiways “C”, “G” and “D” or back-taxi on the runway after the glider has stopped movement for repeated traffic pattern operations.
- 6) If at any time the tow pilot is not sure of the glider location or is uncomfortable with his position, he shall exit the traffic pattern area to the north if on downwind by extending his downwind leg without climbing. When well clear he may climb and re-enter the traffic pattern behind the glider.

B. Landing North, Rwy 02R

- 1) After takeoff, the tow pilot will climb to approximately 300-500’ AGL as performance requires before making the crosswind turn. The tow pilot should evaluate the north wind and the rotor effect from the ridge when planning the crosswind turn.
- 2) Extend upwind and crosswind turns as required reaching 800 to 1,000ft AGL at the appropriate release area. At no time should the tow take the glider beyond safe return distance to the airport.
- 3) At release, the glider pilot will make a right 45 to 90 degree turn towards the downwind and fly a normal traffic pattern leg. The tow pilot should be able to execute a descending left turn, clear the glider, then right turn to the downwind or base leg and land ahead of the glider.
- 4) Note that the first turns are in the normal direction following release. The tow pilot should expedite his traffic pattern and plan on landing long to exit the runway at the mid-field taxiway “C”. This will allow the glider to make a normal approach and landing at the runway threshold.
- 5) The tow pilot can then back-taxi on the runway for repeated pattern tow operations when it is safe to do so. Back-taxi on the runway is preferred rather than repeated taxing across the gravel area.
- 6) If at any time the tow pilot is not sure of the glider location or is uncomfortable with his position, he shall exit the pattern area to the south by extending his downwind leg without climbing. When well clear he may climb and re-enter the traffic pattern behind the glider.

5.8. Boxing the Wake

The glider pilot should communicate prior to launch when he intends to box the wake. This maneuver will not start below 1,500’ AGL. The glider descending through the wake is the normal “non-radio” indication that the “box” maneuver has started. The tow pilot should adjust the flight path to allow a straight flight not into the sun during this maneuver to the fullest extent possible. If the maneuver is to be accomplished more than one time, the tow pilot should make any required turns between maneuvers.

5.9. Cross-Country Towing

Determine the glider’s maximum aero tow speed before departure. Level-off and power adjustments should be made gradually. Descents while towing cross-country will also be gradual, so plan ahead to ensure cloud clearance requirements can be met. The tow position to be used

(high vs. low), emergency airfields and fuel requirements shall be briefed prior to departure so both pilots will know what to expect during the tow.

5.10. Off-Field Landing Practice

- A. The glider instructor and the tow pilot shall brief the planned training requirements before departure to allow efficient conduct of the practice session. Intentional off field landing training will only be conducted with a CFIG in the glider.
- B. Glider off field landing practice may be conducted at the Jean Dry Lake or Roach Dry Lake areas after careful evaluation of their condition by the tow pilot and CFIG. Current weather, recent rain and other activity on the lake bed should be considered.
- C. Intentional glider ferry to lake bed areas for club activities may be accomplished by student pilots with CFIG approval. The aero tow to and from the lake bed will be briefed between the tow pilot and glider pilot the same as any cross-country tow.

5.11. Tows to Aerobatic Box

- A. Club gliders will not be used for aerobatic flights. On occasion a private owner or visitor may request to be towed to the acrobatic area in his own glider.
- B. Tows for glider aerobatic flights shall position the glider in the published acrobatic box at the altitude requested by the glider pilot. The published box is outside of the west down wind for Jean Airport and depicted by white marker panels on the ground.
- C. As the tow requires transitioning to the west of the airport, the tow pilot should plan the flight path with initial turns to the east of the airport to avoid crossing the parallel runway departure path. At a safe altitude above the traffic pattern, the tow pilot may transition across the airport to the west. The tow pilot shall exit the briefed acrobatic box expeditiously after release and not begin descent until well clear.
- D. The glider pilot is responsible for all coordination and approval with Clark County Department of Aviation for use of the acrobatic box

5.12. Dual Tows

Dual glider tow operations require authorization by the Chief Tow Pilot or the LVVSA board of directors.

6. Approach and Landing

6.1. Letdown Procedure

- A. A safe, efficient, and expeditious return to the airport is the goal. An ideal descent would allow the tow plane to enter the pattern on the standard 45degree downwind entry leg just at the end of the descent.
- B. Descent must be done in a manner that will result in the least risk of engine wear due to shock cooling. Use of the approved descent profile for each tow plane (found in the appendices) is required to minimize shock cooling and the resultant engine wear.

- The Pawnee letdown procedure is accomplished by reducing power gradually after release. The initial setting should be to 2300RPM, then gradually to 2000 RPM during descent.
- Increasing the airspeed during descent will increase the descent rate while maintaining RPM. At no time should the Pawnee be “slipped from altitude” to increase the descent rate. Slipping disrupts the normal airflow over the engine.
- A good rule of thumb is to stay at 2300 RPM for KIAS > 90. Reduce to 2000 RPM when leveling off as KIAS drops to 80 or less. Shock cooling is usually not a problem when < 80 KIAS.
- The procedure will normally yield a 1000-1500 fpm descent, and will keep the engine from cooling faster than the 30°/min rate maximum recommended by Lycoming. Carburetor heat is normally left cold during descent.
- Flight path and traffic pattern entry should be planned to not require a marked increase in engine power (RPM) to complete the pattern and landing. Other traffic ahead in the pattern may alter planning. If power is required to climb, such as in a go-around situation, ensure that the mixture is RICH.

6.2. Vigilance

Although the watch for conflicting traffic must be maintained throughout the flight, it is most important upon return to the airport and entry to the traffic pattern. Maintain a heightened traffic awareness level during this phase of flight.

6.3. Traffic Pattern

The normal tow plane traffic pattern at LVVSA is east of the airport for Runway 20L/02R and is shared with the glider traffic. The width of the traffic pattern and altitude flown may be varied within reason by the tow pilot to increase visibility for collision avoidance. The tow pilot will use standard AIM procedures for non-towered airports. Avoid over flight of the prison if possible and honor the “No Transgression Zone” (AIM Fig 4-3-3) between the runway extended centerlines.

6.4. Right of Way

Plan ahead before pattern entry to allow safe and efficient sequencing with other glider and tow plane traffic. Carefully search for glider traffic between the ridge and the airport prior to entering the traffic pattern. Many gliders will descend just outside the normal downwind ground track. If safe sequencing of the tow plane with gliders in the pattern is ever in doubt, yield right of way, remain well clear and re-sequence into the traffic pattern when safe. Remember the towrope, do not fly over another aircraft within 500ft vertically.

6.5. Tow Rope Clearance

The towrope will hang lower than the tow plane’s altitude, depending on airspeed. Cross the airport boundary, and any surrounding obstacles (power lines, fence, etc.) at an altitude no lower than the tow rope length (e.g., 200’ AGL for a 200’ rope). Be aware of power poles along the road, the radio towers near the prison and railroad crossing and allow a minimum of 200ft above those obstructions. Ensure that the flight path on landing is not over any person, aircraft, or vehicle to prevent damage or injury by the rope to those on the ground.

6.6. Landing Direction

Landings should not be made against the normal takeoff direction, except in an emergency, for training purposes with very light winds, or when the takeoff direction is downwind. It is the responsibility of the pilot landing against the normal takeoff direction to ensure that his aircraft does not conflict with any other aircraft taking off, in the pattern, or landing.

6.7. Go-Around / Balked Landing

If a go-around is performed, make sure the mixture is RICH before reaching full power. Remember the towrope trailing behind the tow plane. Consider any obstacles along the flight path. Expedite the climb until satisfactory clearance is assured.

6.8. Runway Use

- A. The tow aircraft will always land on the paved surface of the runway. At no time should the threshold in the gravel “under-run” be considered the normal landing area.
- B. If cross winds increase to the point that the tow pilot feels that the extra “comfort” and utility of landing in the gravel short of the runway is warranted, then serious consideration should be given to ceasing towing operations until the cross wind subsides.
- C. The tow aircraft normally uses the same “glider runway” for operations. Local thermal and wind conditions may warrant that the tow pilot land “opposite direction” to avoid a tailwind landing. Extreme care should be exercised to not interfere with glider traffic.
- D. The tow pilot may elect to use the “power” or west runway. The power runway (Rwy 20R/02L, 4600x75) has threshold and side runway lighting that could entangle the towrope. Consider dropping the rope on the glider side well clear of people and gliders before transitioning to the other runway. Use standard AIM traffic flow patterns to transition to the other runway. (AIM Fig 4-3-3)
- E. Under extreme cross wind conditions, the tow pilot may elect to land across the gravel infield on the glider side or on the center cross taxiway “C”. The tow pilot will make a low pass down the glider runway to drop the towrope prior to executing a pattern to land on an alternate landing area. If this procedure is required, further tow operations will cease until the crosswind subsides. Tow pilot should be aware of obstructions on west end of Taxiway “C”.
- F. If landing on the infield is required, contact LVVSA glider operations by radio to (1) clear vehicles that may be between the club parking area and the taxiway “G”, and (2) to advise others and keep the approach and landing area clear. Terminate tow operations until the crosswind subsides.
- G. Landing or high speed taxiing on gravel areas can cause damage to the propeller and aircraft fabric from stones tossed by the tires against the underside of the wings, flaps and elevator. Any tow pilot that continuously chooses to land or high speed taxi in gravel areas will be counseled and can expect to assist monetarily to repair the damage.
- H. When operating on Rwy 02R (north departure) there is not a suitable paved area at the south end to keep the tow plane off the gravel. Use low power and slow speed on the gravel. For continuous operations, it may be best to land long and exit at the mid field

taxiway “C”, wait for the glider to land and then back taxi on the runway for glider hook up. Avoid a parked, engine idling situation over gravel as this will pick up stones into the propeller causing damage.

6.9. Tow Log Completion

The tow pilot shall fill in the release altitude rounded to the nearest hundred feet AGL after landing and when safely stopped. The tow pilot may transmit the information via radio to the Flight Operations Officer during descent.

6.10. Leaving the Aircraft

The tow plane will be tied down any time the tow pilot leaves the aircraft for personal breaks or a lull in operations. The north end staging area has a dedicated tie down area for the tow plane. The tow plane will need to be parked “on the glider line” on the south end. Both wings will be tied down to preclude a dust devil or winds causing the tow plane to weathervane. Any time the tow plane is temporarily parked on pavement (refueling, etc) the parking brakes will be set. The parking brakes will be released after the tow plane is tied down. Parking brakes should not be left locked for the week in the normal parking spot.

7. End of Day

7.1. Fueling: Prior to returning the tow plane to the tie down at the end of the towing day, fill the tow plane with fuel as outlined below.

- A. Set the aircraft parking brakes before leaving the cockpit. A grounding wire will be connected to the aircraft prior to the start of fueling, and will remain in place until fueling is complete.
- B. Some air space (about 1”) is to be left in tank when fueling to prevent fuel overflow due to heat expansion.
- C. Following fueling, ensure the fuel cap is securely fastened, and retrieve the fuel slip to give to the FOO.
- D. The oil level will be checked when adding fuel. Wait until fueling is complete because an accurate reading cannot be taken until a few minutes after shutdown. Use a funnel and oil rag when adding oil. Minimum oil quantity for the Pawnee is 9 qts. Do not fly with less than 9 qts.
- E. Log the quantity (gallons) of fuel and oil (qts) added, along with the tach time on the Tow Log.

7.2. Post Flight: All tow pilots will complete an “end of day” engine runup and post-flight inspection of the aircraft to ensure an airworthy aircraft for the next pilot. Magneto and Master Battery switches will be confirmed off.

- A. All mechanical discrepancies encountered during flight or postflight inspection will be noted on the Tow Log. The maintenance officer or a Board Member will be notified. It is the tow pilots responsibility to leave the aircraft in an airworthy condition or report any mechanical discrepancy so that we always have an airworthy aircraft. This will prevent “surprises” found by the subsequent tow pilot.

- B. Ensure that all discrepancies encountered during the towing day are noted on the Status Board. Also, make an entry on the next Tow Log to alert the next pilot of any discrepancies. Log the “end tach” time on the Tow Log.
- C. Any pilot making any write up will personally contact either the maintenance officer or a Board member. Voice mail or e-mail are acceptable but are not to be considered complete until a response is received. If a response is not received within 24hours, the tow pilot will attempt contact again and, if unable, then contact a different board member until the information is passed. Do not allow a second 24hr period to pass without contact. Saturday tow pilots must contact someone immediately with no 24hr grace period.
- D. In the event of a write-up that grounds the aircraft, a “down-arrow” will be marked on the Aircraft Status Board.

7.3. Aircraft Tie Down: After fueling the tow plane, park it in a west facing tie down due to prevailing winds.

- A. Ensure that wheel chocks are installed, tail tie down chain is placed through the tow hook and secured, and both wing chains are snug. Use a simple half hitch in the chain after passing it through the wing tie down fitting and secure the end with the hook to keep it from swinging. The combination lock will be secured through one wing chain tie down.
- B. The stick will be tied back with the seat belt. Apply full nose up trim to release spring tension on the trim system. Confirm aircraft parking brakes are released.
- C. Flaps will be locked up with external control locks tied to the lift struts. In the event the external control locks are not available or are in disrepair, the flaps will be deployed to the second position. Not locking the flaps with the control lock or not extending them is unsafe because there is only slight tension with the flaps retracted to keep them from moving in the wind. Alert the maintenance officer or a Board Member that the flap locks are missing or need repair.

7.4. Tow Log: Ensure that the applicable blanks for which the tow pilot is responsible have been completed in the Tow Log. Log the “start time” on the next tow log and any required maintenance information for the next pilot and return the completed days Tow Log to the FOO. If no FOO is assigned for that day, store the tow log with the daily FOO sheet in the safe.

8. Emergency / Abnormal Operations

8.1. Aborted Takeoff

- A. If a takeoff is aborted for tow plane problems, the tow plane should use minimum braking to prevent the glider from over-running the tow plane. The tow pilot shall maneuver the tow plane to the left, allowing the glider to overshoot to the right if necessary. Note that both aircraft move in the same direction as a normal release.
- B. If the glider aborts the takeoff during the takeoff roll by releasing the tow rope, the tow plane should continue the take off giving the glider the maximum runway area to stop without concern for the tow plane being an obstruction.

8.2. Emergency Communication

When an emergency or abnormal situation occurs, radio communications on frequency 122.9 MHz shall be used whenever possible to alert all personnel and local area air traffic to the nature of the situation and to coordinate appropriate responses as necessary. LVVSA / SSA Tow Signals shall also be used as appropriate.

8.3. Premature Termination of a Tow (PTT)

- A. If the tow terminates prematurely on or close to the ground, the tow pilot shall continue the takeoff for maximum aircraft separation, allowing the glider the maximum use of the runway.
- B. In the event of a low altitude rope break, the tow plane will maintain climb power and maneuver clear by following his normal climb profile until he can see that the glider is well clear.
- C. The tow plane may enter the normal downwind or return to land behind the glider. Caution should be exercised should the glider stop short or not clear the runway on rollout.
- D. Judicious use of the radio in emergency situations is encouraged.

8.4. Airbrakes / Spoilers Extended

Upon noting that the glider's airbrakes / spoilers are extended, either before takeoff or during tow, the tow pilot shall use the "rudder waggle" signal or radio call to inform the glider pilot that the glider's airbrakes / spoilers are not stowed.

- A. This signal / call is not required if the glider pilot has informed the tow pilot of his intention to begin takeoff roll with airbrakes / spoilers out. However, the airbrakes / spoilers should be stowed during takeoff, and the glider pilot should be alerted if they are not when both aircraft are in the air. Unless the glider pilot stows the airbrakes / spoilers, the tow pilot will remain in the vicinity of the airport to allow the glider pilot to return to the airport for an immediate landing.
- B. Be aware that full spoiler deployment on many gliders can preclude takeoff or cause a dangerous low-altitude situation after takeoff. If a normal climb cannot be attained after liftoff, consider releasing the tow rope and allow the glider to land on the remaining runway.

8.5. Release of Tow Rope from Tow Plane

If the safety or controllability of the tow plane is ever in doubt, do not hesitate to pull the emergency release immediately. Even if an inexperienced glider pilot is faced with landing in a strange field as a result of being released, he will much likely do better on his own than trying to cope with a confused situation involving two aircraft.

8.6. Glider Release Failure

The glider pilot will advise the tow pilot if he is unable to release the rope. The tow pilot should be aware of the SSA "Failure to Release" signal in the event of radio failure.

- A. The glider pilot will advise the tow pilot that a release failure has occurred either by radio or by moving to the left side of the tow plane and rocking the glider's wings.

- B. Use caution as the towrope may inadvertently release at any time. Remain within gliding distance of the field if possible.
- C. The tow pilot will acknowledge by radio and/or by rocking his wings, then will continue the climb and will position the glider over the airport.
- D. When over a remote portion of the airport, the tow pilot will release the tow plane end of the rope. The tow pilot should confirm that the glider is in a normal or high tow position prior to releasing his end so the rope will not entangle the glider. Release over a remote area of the airport to avoid injury on the ground as the towrope may back release from the glider.
- E. If the tow pilot cannot release the glider, the Double Release Failure procedure shall be followed.

8.7. Double Release Failure

- A. Use caution as the towrope may inadvertently release at any time. Remain within gliding distance of the field if possible.
- B. If the tow pilot is unable to release a glider which is unable to release, the tow pilot will advise the glider pilot that the tow plane release mechanism has failed by radio or by yawing (fishtailing) the tow plane (no radio).
- C. The glider pilot will acknowledge the tow pilot by fully opening the airbrakes / spoilers (no radio). The glider pilot will continually adjust his spoilers are required for descent and landing with the tow plane. The glider pilot will exercise extreme caution when deploying the spoilers with tension on the towrope to not decrease the tow planes airspeed or increase the tow planes rate of descent.
- D. Once established in the descent, the glider pilot may move into the low tow position to prepare for final approach, extreme care is required as the towrope may release at anytime from the tow plane and go over the top of the glider.
- E. The tow pilot will make a pattern so that the landing by the tow plane will occur at approximately the midpoint of the field. Consider obstacle clearance requirements of the glider in the low-tow position and the shallow approach angle used. The pattern will have to be flown very wide with gradual turns and descents. With the glider in low tow position, the tow pilot must ensure the glider will be landing on the airport.
- F. Once in the pattern, neither the tow pilot nor the glider is to attempt to release the towrope. In most wind conditions, the rate/angle of descent of the tow plane and glider mean that, in the latter stages of the pattern, the glider may be out of gliding distance of the field.
- G. After touchdown the tow pilot will allow the tow plane to come to a gradual stop, and may start a gentle turn to the left if necessary. The glider pilot shall keep clear to the right of the tow plane after landing. The tow plane may feel the glider braking through the towrope. In no case should the tow plane stop on the runway, he should clear to the left in case the glider has braking problems.
- H. In the event of a go-around, the glider pilot will slowly close the airbrakes / spoilers, then resume the high tow position once the climb is established. The tow pilot shall

climb back to altitude and shall signal the start of a new approach radio or by yawing (fishtailing) the tow plane.

- I. When possible, both visual and radio communications will be used. Neither pilot should assume that the radio is operational or that communications have been understood unless specifically acknowledged. For all critical radio communications, the commands or instructions should be repeated as part of the acknowledgment.

9. Aerotow Retrieves

9.1 The tow pilot will coordinate with the FOO for aerotow retrieves. Short distance retrieve from Jean or Roach Dry Lake should be completed expeditiously to return the glider to service. Long distance aero retrieves should be completed near the end of the flying day with proper consideration to landing both aircraft before sunset.

9.2. The responsibility for determining the safety of an aerotow retrieve rests with the tow pilot.

9.3. The retrieve will be carried out only when the Flight Operations Officer determines that it will not interfere with normal towing schedules, and when it is certain that the retrieve will be completed before sunset.

9.4. Aerotow retrieves may only be made from published operational airports or from privately owned airports approved by the Board of Directors.

9.5. Retrieves from unprepared fields other than Jean Dry Lake or Roach Dry Lake require Board or Chief Pilot approval.

9.6. The provisions of this paragraph shall not apply to practice off-field landing training with a CFGI at Jean Dry Lake or Roach Dry Lake. Off field training will be conducted so as not to interfere with normal operations at LVVSA.

10. Communications

10.1. Standard signals

A. Notes on LVVSA Tow Signals:

- 1) Standard SSA signals will be used in accordance with the LVVSA Operations Manual.
- 2) The “Tow Plane Ready” signal, wagging the rudder, is also the signal for “Warning: Check Glider”. Wagging the rudder at the glider should follow with take off radio calls. If there is indeed a problem with the glider, communicate by radio with the glider or FOO. If unable, then release the tow rope and clear the runway until the tow pilot is satisfied the glider is ready. If the tow plane is not ready, the takeoff simply will not commence.
- 3) During the early stages of the climb, while still at a low altitude, consider delaying the “Waggle Rudder” signal, the “Release Now” signal, or rope release if a satisfactory rate of climb has been established and the safety and controllability of the aircraft are not in doubt. This will prevent a low altitude

glider release that could endanger the glider. If possible, a climb to a safe release height prior to signaling allowing the glider to return to the field is preferable.

B. Instructor signals to tow pilots for Aerotow Training.

- 1) The glider instructor (CFIG) will coordinate with the tow pilot any special towing signals or training events desired (i.e., low power climbs, wave off, spoiler open, etc.) prior to launch. This may be relayed through a trusted wing runner.
- 2) The tow pilot will not deviate from the request except for safety. An event may occur after launch that the tow pilot feels may require deviation to a higher altitude or delaying the “training signal” until clear of other traffic. At no time will the tow pilot initiate the “training signal” at an altitude below that desired by the CFIG.
- 3) The tow pilot will alert the CFIG via radio if a TRUE EMERGENCY exists, either with the tow plane or the glider. If unable to communicate via radio, the exaggerated and repeated visual signal should alert the CFIG.
- 4) The CFIG will communicate by radio to CANCEL a pre-coordinated training event. The CFIG must be prepared to handle the training event in case of radio failure or the transmission is blocked by other radio traffic.
- 5) A TRUE EMERGENCY cancels any previously coordinated training at any time.

10.2. Radio Communications

A. To improve communications and enhance safety, radio communications shall be used to the fullest extent possible.

B. The following frequencies are used at LVVSA:

122.9 MHz -- Common Traffic Advisory Frequency and Line operations.

As this is a shared frequency, air to ground communications should be held to the minimum required.

123.3 MHz and 123.5 -- Crew Communications

125.6 MHz (Jean Area) and 125.9Mhz (Mt Potosi / Red Rock Area) -- Las Vegas Approach Control

132.4 Mhz -- McCarran ATIS: weather, runway in use and climb window information.

122.35 Mhz – Reno FSS Remote Communications Outlet (RCO) at Mt Potosi

C. Tow pilots are to be familiar with the communication requirements in AIM Section 4-1-9, and the traffic pattern requirements for airports in AIM Section 4-3-2, 4-3-3 and FAR §91.126 (also review Chapter 10 of this manual).

- 1) Tow pilots will make all proper and pertinent radio calls so that the local traffic on the CTAF will know that glider operations are in progress.

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- 2) Proper, complete, and professional radio procedures by our tow pilots will set the example for other operations. By using concise, descriptive radio communications, other aircraft on the CTAF will know precisely what is happening. This will encourage all club pilots and others to rise to the same level of professionalism by the examples that the tow pilots set.
- 3) Remember the radio is not a required to be used (or possessed) piece of equipment at a CTAF airport. It will only improve safety if it is used properly. All tow pilots should always fly a proper traffic pattern. This is the best possible chance of seeing and avoiding other traffic that may or may not be flying a pattern or using a radio.
- 4) The elements of communication at a CTAF airport are: “Who you are calling, who you are, where you are, and what you are doing”. (Nothing more, nothing less).

Example Radio Transmissions

- 1) “Jean Traffic, Glider Tow 11Z, two zero left, staging for glider launch”
- 2) “Jean Traffic, Glider Tow 11Z, two zero left, departing with glider in tow”
- 3) “Jean Traffic, Glider Tow 11Z:
 - inbound for left traffic, two zero left.”
 - on a 45, left traffic, two zero left.”
 - left downwind, two zero left.”
 - left base, two zero left / final two zero left.”
- 4) “Jean Traffic, Glider Tow 11Z,:
 - clearing two zero left.”
 - back taxing, two zero left.
 - two zero left, staging for glider launch”

10.3. Transponder Usage (FAR 91.215): The transponder including Mode C in the tow plane must be operational at all times on VFR code 1200 or as assigned by ATC.

10.4. ATC Coordination: Las Vegas Approach Control (Class B Airspace) is aware of glider activity at LVVSA. The climb window agreement is in effect at all times. In the event of an emergency the Desk Supervisor can be reached at 262-5925. The number is written over the counter in the operations trailer.

10.5. Reporting Adverse Conditions: The tow pilot is in an excellent situation to monitor changes in weather and field conditions. Alert the FOO or CFGI on the field of any conditions that will affect operations, especially bad weather.

10.6 Debriefing of Instructors: The tow pilot is able to monitor the performance of solo student pilots during tow. Discussing student performance with the student’s instructor can improve training quality through feedback.

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APPENDIX A: Daily Weather and NOTAMs

To be accomplished by Tow pilot or FOO at the beginning of each flying day.

Call FSS for a weather briefing and NOTAMs (1-800-WX-BRIEF)
1-800-992-7433

"This is the Las Vegas Valley Soaring Assoc. at Jean NV, requesting local area/airport NOTAMS and weather forecast for local flying with the winds aloft forecast from 6000 to 15000MSL."

The briefer will ask for a tail number, N7211Z is the tow plane.

Jean NV, 0L7 (Zero-Lima-Seven) DATE: _____

Synopsis: (High Pressure, Frontal Passage, Rain, Thunderstorm, etc)

Forecast: (Cloud conditions, wind direction and velocity)

5am-11am _____

 Wind Direction _____ Velocity _____ Gusts _____

11am-2pm _____

 Wind Direction _____ Velocity _____ Gusts _____

2pm-5pm _____

 Wind Direction _____ Velocity _____ Gusts _____

Winds Aloft:

Altitude	Morning	Afternoon
6,000	_____	_____
9,000	_____	_____
12,000	_____	_____
15,000	_____	_____

NOTAMs

Appendix B: Piper Pawnee Operations

B.1. Operation

A. Preflight

1) Flaps.....Remove Flap Control Lock

2) Cockpit:

Cockpit Switches.....OFF

Fuel SelectorON

Elevator TrimNeutral

Flaps.....Extend

3) Exterior:

Left Aileron & Flap HingesInspect

Left Nav Light.....Inspect

Pitot Tube.....Uncover / Inspect

Left Wing / StrutInspect

Left Landing Gear / Tire / Brake Pads.....Inspect

Oil LevelCheck

NOTE: Observe oil quantity limitations and recommendations
(See Limitations Section below)

Left Cowl Area.....Inspect

Left Cowl FastenersVerify Secure

Fuel Strainer.....Drain / Test

Air Filter.....Inspect

Propeller.....Inspect

Right Cowl AreaInspect

Right Cowl Fasteners.....Verify Secure

Fuel TankVerify Fuel Level Visually

Right Landing Gear / Tire / Brake PadsInspect

Right Wing / Strut.....Inspect

Stall Warning Vane.....Inspect

Right Nav LightInspect

Right Aileron & Flap Hinges.....Inspect

Fuselage & Tail SurfacesInspect

Tail Surface Flying Wires.....Ensure Taut

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- Elevator & Rudder Hinge Bolts.....Inspect
- Tail Wheel / Springs / Tow HookInspect
- Tail Position LightInspect
- Windshield / Windows.....Inspect / Clean

B. Before Starting Engine

- Seat Belt / Shoulder Harness.....Fasten / Adjust
- Seat.....Adjust / Lock
- Cockpit Switches.....Off
- Circuit BreakersCheck
- Primer (do not use).....Closed and Locked
- Parking Brakes.....Check Released
- Brakes.....ON
- Fuel SelectorON
- Trim TabTest / Set for Takeoff
- Flaps.....Test / Then Up
- AltimeterSet

C. Starting Engine

- Master SwitchON
- Mixture.....RICH
- Carb HeatCOLD
- Propeller Area.....Clear
- Magneto Switches.....(Start on Left Mag Only).....LEFT MAG ON
- Prime As required for cold days, 4-6 strokes
- Starter.....Engage

NOTE: Observe starter duty cycle limitations
(See Limitations Section below)

- Propellor.....Count four blades
- Throttle.....Pump twice (warm engine) or Max 3-4 until start (cold engine)

CAUTION: DO NOT FLOOD Engine, raw fuel will drain from
Carburetor and could cause engine fire.

D. After Engine Start

- RIGHT MAG.....ON
- Oil Pressure.....Verify Rising

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Warmup (if required)800-1200 RPM

E. Run-up

Brakes.....Test / Set

Controls.....Free / Correct

Flight Instruments....Set / Checked

Throttle.....IDLE

Mags.....Verify that one mag OFF does not shut engine down
Check both OFF momentarily to ensure correct grounding

Throttle.....2000 RPM

Magneto Check 125 RPM Max Drop, 50 Max Difference

Carb Heat CheckNote Drop

Throttle Idle.....800-1200 RPM

F. Before Takeoff

Flaps.....Up

Carb HeatCOLD

Trim..... Set for Takeoff

Fuel Selector.....ON

Fuel Quantity.....Above Red Line

Mixture.....RICH

Instruments.....Checked

Engine Instruments, (oil pressure, RPM) responding with power application.

G. In Flight

Instruments.....Monitor

Leaning during climb to slightly rich of peak RPM is recommended above
5000 ft density altitude.

H. Before Landing

Mixture.....RICH

Carb HeatAs Required

Flaps.....As Required

Do not use flaps when landing on gravel

B.2. Recommended Towing Airspeeds

A. Schweizer gliders – 55 knots

- B. Grob 103 – 60-65 knots
- C. Glass gliders – 60-70 knots
- D. Gliders with water ballast – 70 knots or as desired by glider pilot

B.3. Descent Profile

- The Pawnee letdown procedure is accomplished by reducing power gradually after the tow is over. The initial setting should be to 2300RPM, then gradually to 2000 RPM during descent.
- Increasing the airspeed during descent will increase the descent rate while maintaining RPM. At no time should the Pawnee be “slipped from altitude” to increase the descent rate. Slipping disrupts the normal airflow over the engine.
- A good rule of thumb is to stay at 2300 RPM for KIAS > 90. Reduce to 2000 RPM when leveling off as KIAS drops to 80 or less. Shock cooling is usually not a problem when < 80 KIAS.
- The procedure will normally yield a 1000-1500 fpm descent, and will keep the engine from cooling faster than the 30°/min rate maximum recommended by Lycoming. Carb heat is normally left cold during descent.
- Flight path and traffic pattern entry should be planned to not require a marked increase in engine power (RPM) to complete the pattern and landing. Other traffic ahead in the pattern may alter planning. If power is required to climb, such as in a go-around situation, endure that the mixture is RICH.

B.4. Limitations

- A. No acrobatic maneuvers, including spins, are approved.
- B. Operations with the windows open in flight are prohibited.
- C. The stall warning system is inoperative with the master switch off.
- D. Airspeed Limitations:

Never Exceed Speed (Vne).....	135 knots
Maximum Structural Cruise Speed (Vno).....	108 knots
Maneuvering Speed (Va).....	104 knots
Maximum Flaps Extended Speed (Vfe).....	95 knots

E. Engine Limitations

Configuration	RPM	Oil Pressure (psi)	Oil temp (°F)
Within 30sec of engine start	--	Visible Rise	--
Warmup	1200	Min 25	--
Magneto Check Max Drop 125 Max Diff 50	2000	60-90	Min 40
Normal Operation	2575 (Max)	60-90	120-245

F. Fuel Limitations / Recommendations

Typeminimum 80/87, Recommended 100LL

NOTE: DO NOT USE AUTO FUEL,

Pawnee has STC for 250HP that does not allow auto fuel.

Recommended Minimum Fuel for Takeoff7 gal.

G. Oil Limitations / Recommendations

TypeAeroShell W100 (50 wt)

Minimum For Flight.....9 qt

Minimum in Hot Weather.....10 qt

Recommended Maximum Fill Level11 qt

Maximum.....12 qt

H. Starter Duty Cycle Limitations: SKYTEC STARTER

- 1) Do not crank the starter for more than 10 seconds.
- 2) If the engine fails to start, wait 20 seconds for cooling before each subsequent start attempt.
- 3) After 6 start attempts, wait 30 minutes for cooling before making another start attempt.

PROTECT YOUR STARTER

This aircraft is equipped with a high performance Sky-Tec Flyweight™ starter.

DO NOT CRANK FOR MORE THAN 10 SECONDS!

Allow 20 seconds to cool-down between attempts. Repeat up to 6 times. Then let starter cool for 30 minutes.

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Appendix C: Tow Log

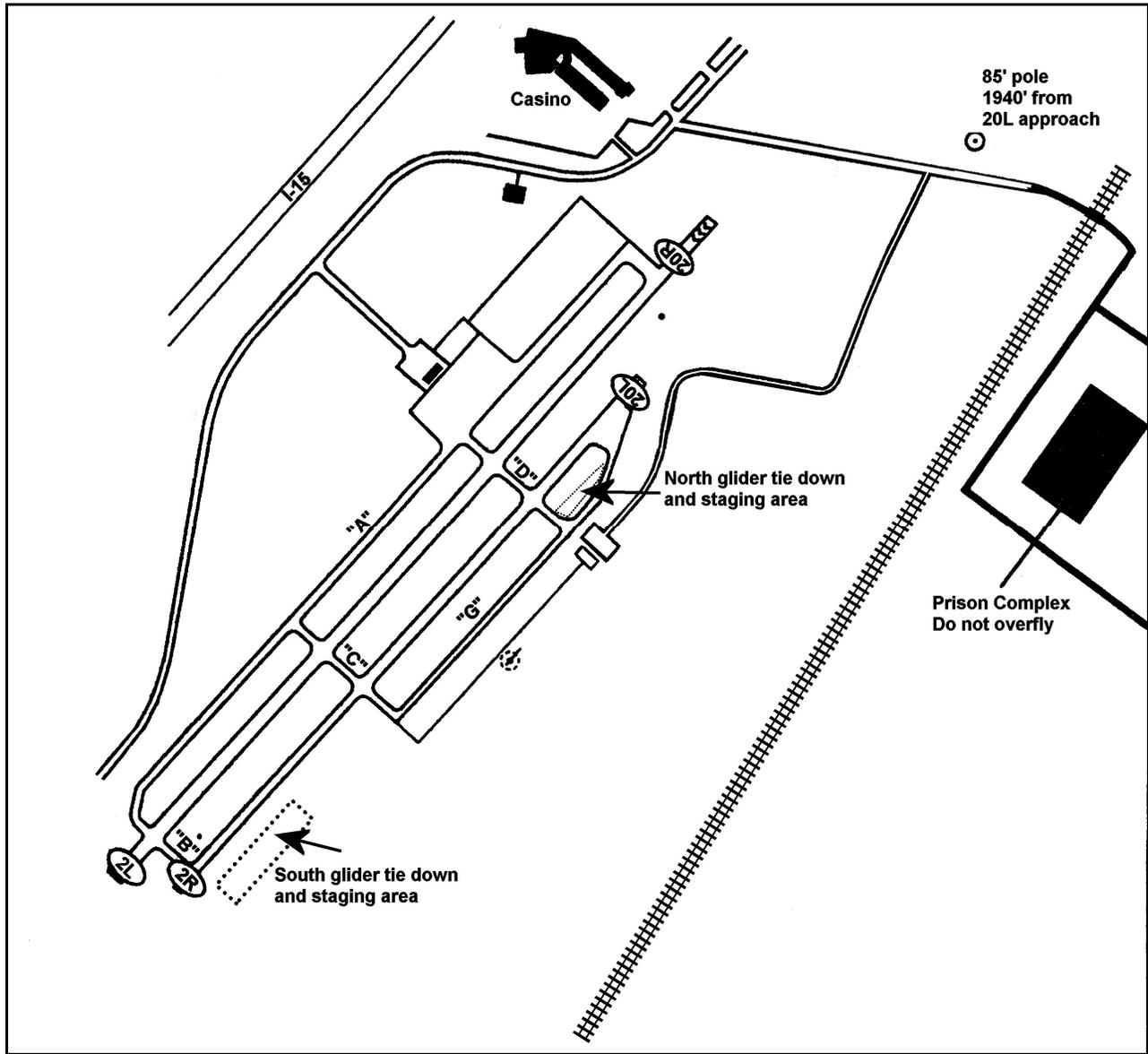
Tow Pilot

Date:

Number	Pilot	Glider	Release Alt	Remarks:	
1					TACH STOP:
2					TACH START:
3					HOBBS STOP:
4					HOBB START:
5					
6					Maintenance Notes:
7					
8					
9					
10					Fuel Added:
11					
12					
13					
14					Oil Added:
15					
16					
17					
18					
19					
20					

**REPORT ALL MAINTENANCE ITEMS TO THE
MAINTANANCE OFFICER or BOARD**

Appendix D: Jean Airport Diagram



Runway 20R/02L, West or "Power" Runway, 4,600 ft x 75 ft, lighted, Traffic Pattern on West Side
 Runway 20L/02R, East or "Glider" Runway, 3,700ft x 60 ft, unlighted, Traffic Pattern on East Side
 West Parallel Taxiway: "A", East Parallel Taxiway: "G" or "Glider"
 Cross Taxiway Names, South to North, B, C, D (in front of clubhouse)

Runway 20L data (3700ft x 60ft):

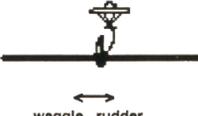
- North End to Taxi D, 700 ft
- Taxi D to South End, 3000 ft
- Taxi D to C, 1450 ft
- Taxi C to South End, 1550 ft

Runway 02R data: (estimated that south end staging area is 500ft long)

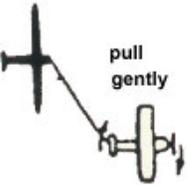
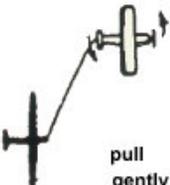
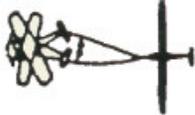
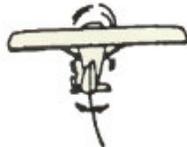
- Staging to north end, apx 3200 ft
- South End to Taxiway C, 1550 ft
- Taxi C to D, 1450 ft
- Taxi C to North end, 2250 ft
- Taxi D to North end, 700 ft

Appendix E: SSA Tow Signals

RECOMMENDED STANDARD AMERICAN SOARING SIGNALS

<p>1. CHECK CONTROLS</p> 	<p>2. OPEN/CLOSE</p>  <p>TOW RELEASE</p>	<p>3. TAKE UP SLACK</p> 	<p>4. HOLD</p> 	<p>5. PILOT READY, LEVEL WINGS</p> 
<p>6. BEGIN TAKE-OFF</p>  <p>GROUND CREW</p>	<p>7. BEGIN TAKE-OFF</p>  <p>waggle rudder GLIDER PILOT</p>	<p>8. STOP ENGINE/ RELEASE TOWLINE</p> 	<p>9. STOP OPERATION</p>  <p>EMERGENCY!</p>	<p>10. TOWPLANE READY</p>  <p>waggle rudder</p>

ON GROUND

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

IN AIR