Flight Design CT

Standard Operating Procedures

Disclaimer

The content in this manual is for informational purposes only. The Aircraft Operating Instructions, the manufactures training supplement, and the host country regulations should always be followed and is the final authority to the operation of the aircraft. This document is controlled and solely owned by Copper City Aviation Services LLC, please do not distribute without the permission of Copper City Aviation Services acting managers.

Contents

Section 1-Introduction

General

The procedures contained in this manual are derived from the flight experience of Copper City Aviation in the Flight Design aircraft line, the approved Flight Design Aircraft Operating Instructions and Rotax operating manuals. The Approved Flight and Maintenance manuals should be given the priority over any data contained in this standard operating manual.

Single Pilot Resource Management

Single Pilot Resource management (SRM) is the art and science of managing all available resources as a single pilot to ensure that the successful outcome of the flight is never in doubt.

Even though you are operating a Light Sport Aircraft (LSA) your responsibilities are no less than a pilot flying a high performance technically advanced aircraft. The work load in situations where flying the aircraft, communicating with Air Traffic Control (ATC), configuring avionics and decision making can become overwhelming.

In order to better manage all of these tasks the following procedures should be incorporated in all phases of flight to ensure the highest level of safety at all times.

Priority of Tasks

1. ***Maintain Aircraft Control*** *– The number one priority should be to maintain control of the aircraft. As work load increases it is easy to get distracted and lose focus and possibly control of the aircraft.*

2. ***Navigation –*** *Once aircraft control is assured navigation should be the next task completed. This may include pilotage, GPS programming, radar vectors from ATC, and the use of the autopilot. Regardless of the type of navigation used, it should be closely monitored.*

3. ***Communication –****Communication is very important but should come after the tasks described above. Communicate intentions and requests clearly and concise. Read back instructions accurately.*

Checklist Usage

Checklists are provided to enhance safety be providing a means of ensuring the aircraft is set in the proper configuration for each phase of flight. Checklists also ensure completion of required procedures for transitioning between different phases of flight.

Checklists can be separated into three categories:

> ***Do Lists***—*Do lists are checklists followed step by step reading through the procedure while doing the task. These lists require ample time to execute.*
>
> ***Flow Patterns***—*A flow pattern is a logical path through cockpit items that the pilot will follow along during the completion of a particular checklist. The flow pattern allows timely completion of tasks, but should be verified with a written checklist once completed and time and workload permit.*
>
> ***Emergency Items***—*Emergency items are checklist items that should be committed to memory. These are items that require immediate attention.*

Reference Material

Federal Aviation Regulations (FAR's)

Airman's Information Manual (AIM)

Flight Design CTLS Aircraft Operating Instructions

Avionics guides and manuals

Flight Training Handbook

Handbook of Aeronautical Knowledge

Terms and Abbreviations

AGL-Above Ground Level

BRS-Ballistic Recovery System

ELT- Emergency Locator Transmitter

Contact Information

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Section 2 – Limitations

General Information Flight Design CTLS

Vrot… 0 Flap…… 48KIAS

15 Flap…….....42KIAS

Vso……39 KIAS

Vs……..42 KIAS

Vx……0 Flap.....61 KIAS

15Flap.....55 KIAS

Vy……..-6 Flap ….....78 KIAS

0 Flap.....73 KIAS

15 Flap.....67 KIAS

Enroute Climb(Vcc)....90 KIAS

Best Glide ……..... 63 KIAS

Landing (Engine out)..54 KIAS (Flaps 30-35)

Vfe……0 Flap.....100KIAS

15 Flap.....80KIAS

30-35 Flap.....62KIAS

Va…… ….....98 KIAS

Vpd……..135 KIAS

Vno……..120 KIAS

Vne……..145 KIAS

Max Takeoff and Landing Weight…….1320 lb

Maximum Baggage Weight.....110 lb

Total usable Fuel.....33.0 gal / 198 lb

Oil Min/Max.....2.5-3.1 L

Recommended Airspeeds for:

Traffic Pattern Operations

Downwind.....3800 RPM 80 KIAS

Base.....2800 RPM 60-65 KIAS

Final ….....2800 RPM

Flaps 0.....65KIAS

Flaps 15..... 60KIAS

Flaps 30/35.....54KIAS

Short Field Landing 35 Flaps.....50KIAS

Ground Reference Maneuvers

4800 RPM.....Flaps -6.....95KIAS

Steep Turns

4800 RPM.....Flaps -6.....95KIAS

Load Limits

+4 / -2 gs

Fuel Burn

Climb 7.1gph

Cruise 4.5-5.5gph

Engine Operation Limits

RPM Limits

Idle.....1500-1800RPM

Max 5min.....5800RPM

Max Continuous.....5500RPM

Normal Cruise…….....4800-5200RPM

Temp Limits

Min Oil Temp.....122F

Max Oil Temp.....248F

Max CHT.....248F

Oil Press.....30-70 PSI

Crosswind Limit

Flaps 0.....16kts

Flaps 15.....10kts

Flaps 30-35.....<7kts

24kts max sustained surface winds for any operation

Section 3 – Standard Operating Procedures

Preflight

Overview- The Preflight checklist should be considered a "Do List" following it step by step. The preflight starts in the cabin then moves aft to the tail around the right wing, nose, and left wing ending at the pilot's entry door. Be cautious of the surfaces as you walk around the airplane they can be hazardous to your head. When approaching the aircraft look at the general condition of the exterior.

A. Cabin

1. *Aircraft documents on board*- Part of ensuring the aircraft is airworthy is having the appropriate documents onboard the aircraft. These include the following:
    a. Special Airworthiness Certificate, displayed in sight.
    b. Special Airworthiness Certificate limitations document.
    c. Federal Registration
    d. State Registration
    e. Aircraft operating instructions including training supplement
    f. Weight and Balance Information
2. *Control surfaces free and correct*-Move the flight control stick in a square pattern through the full motion of the stick. Verify the flight controls move in the appropriate directions and there are no indications of binding or sticking. Push the control stick right and left releasing the stick from that point ensuring the spring system returns it to the center position.
3. *Main pins inserted, caps in place and secured*-The main spar pins are located in the upper part of the cabin. These pins secure the wing spars together; they slide forward to aft thru the spars and are secured with a screw and caps on the back side.
4. *Ignition off, key removed*-With the preflight requiring inspection of the engine area, it is necessary to ensure the ignition system is OFF making the engine safe to be around.
5. *Electrical equipment off*-Verify the electrical component switches on the center console are off, reducing the load on the battery when the master switch is turned on.
6. *Avionics switch off*- Verify the avionics master switch on the center console is off.

7. *Battery master switch on*-Push in the battery circuit breaker on the center console. With analog engine gauges verify the needles swing on the CHT, Oil pressure, and Oil temp gauges. The battery voltage gauge should read between 11.5 to 13.2 volts.

8. *Wing flaps extended*-Lower the flaps to 35 deg stopping at each increment ensuring the flaps symmetrically stop at each setting. Listen for signs of slowing or hesitation in the flap motor indicating binding or loose electrical connections.

9. *External Lights ON*-Turn on the Beacon, Position Lights and landing lights ON. Verify the lights are functional around the aircraft. Once lights have been visually checked turn each light switch OFF.

10. *Master switch off*-Turn off lights and electrical equipment followed by the Battery master switch. Pull the battery master circuit breaker out to turn off.

11. *Fuel shutoff valve open*-Position the fuel valve up to open. This step is necessary for draining fuel from the gascolator for inspection.

12. *Doors checked*-Verify the upper hinge pins on both doors are completely inserted, and the safety rings are inserted. Verify the functionality of the three door lock pins on each door.

13. *Windows check*-Inspect all windows for cleanliness, cracks, or signs of crazing. When cleaning windows do not use a dry cloth to wipe away dirt. If available pour water over the plastic first to remove the majority of particles then use a good Plexiglas cleaner. Wipe in a vertical motion when cleaning, not in circles and use only light pressure and a clean soft cloth.

B. Left side of aircraft

1. *Main gear tire, Landing gear fairing check*- Physically ensure the left main gear fairing is secure, and is not damaged. Inspect left main tire for excessive wear or flat spots and proper inflation. If needed move the aircraft slightly forward or back to check the entire tire. The tire pressure should be checked if it seems bulged on the bottom. Tire pressure is 29psi for main gear tires. Verify the brake system is not leaking or worn. Ensure there are no cracks developing in the strut to axle bracket.

2. *Baggage compartment Inspect and Lock*-Open the left side baggage compartment and inspect the baggage area. Inspect the main gear strut attachment points for signs of cracks and movement. Ensure baggage cannot bind the control system in any way and is secured with tie down straps. Inspect the brake reservoir for signs of leaking and adequate fluid level (approx ¾ full). Inspect BRS canister attachment. Ensure the ELT is securely mounted and the switch is set to

ARM. Close the baggage door and ensure it is locked by pressing firmly several times against the top of the door with your palm.

3. *Antennas undamaged*-Verify the upper VHF antenna is secure as well as the ELT and Transponder antennas on the belly of the aircraft.

4. *Static pressure source*-The static pressure port is located on the belly of the aircraft just forward of the ELT antenna. Verify the small hole in the center is free of obstructions. If the aircraft was recently waxed look closely and ensure the port is clear. Use a small piece of safety wire if needed to clear an obstruction. Do not blow into the static port.

5. *Fuselage side no damage-* Visually inspect the fuselage side for signs of delaminating, cracks, bubbles in the surface or punctures.

6. *Rear tie-down remove*- Remove the rear tie down strap if required and stow it appropriately.

7. *Vertical stabilizer check-* Visually inspect the vertical stabilizer for signs of delaminating, cracks, bubbles in the surface or punctures.

8. *Lower Fin check-* Check the security of the lower fin by grasping it underneath and moving back and forth. Inspect the lower fin for damage.

9. *Horizontal stabilizer check*- Inspect the leading edge of the stabilator for abnormalities. Grasp the stabilator at the tip about 6" aft of the leading edge. Lightly move the stab up/down and forward/aft. Ensure there are not any signs of play when force is applied at the tip. Move the stab thru its full range of motion ensuring the Anti-Servo tab moves with it and there are no signs of binding in the control system.

10. *Anti Servo tab check*-Verify the elastic hinge is not cracked on the anti servo tab, best seen from below.

11. *Stabilator and Anti-servo tab link check*-Verify the stabilator and Anti-servo tab control linkage connections are secure and the attachment points are not cracked. This can be seen best from underneath the stabilator.

12. *Rudder cables and hinges*-Inspect the control cable attaché points of the rudder as well as the upper and lower hinge brackets. Grab the vertical stabilizer by the leading edge pulling it down to lift the nose wheel off the ground. With the nose wheel off the ground move the Rudder side to side, verify the nose wheel moves accordingly.

13. *Rudder Beacon light check*-Verify the beacon light is secure and the plastic housing is not cracked.

14. *Tail navigation light check*- Verify the tail navigation light is secure and the plastic housing is not cracked.

C. Right side of aircraft

1. *Horizontal stabilizer check*- Inspect the leading edge of the stabilator for abnormalities. Grasp the stabilator at the tip about 6" aft of the leading edge. Lightly move the stab up/down and forward/aft. Ensure there are not any signs of play when force is applied at the tip. Move the stab thru its full range of motion ensuring the Anti-Servo tab moves with it and there are no signs of binding in the control system.

2. *Anti Servo tab check*-Check security of the Anti-Servo tab. Ensure the elastic hinge is not cracked.

3. *Lower Fin check-* Check the security of the lower fin by grasping it underneath and moving back and forth. Inspect the lower fin for damage.

4. *Vertical stabilizer check-* Visually inspect the vertical stabilizer for signs of delaminating, cracks, bubbles in the surface or punctures.

5. *Fuselage side no damage-* Visually inspect the fuselage side for signs of delaminating, cracks, bubbles in the surface or punctures.

6. *Baggage compartment Inspect and Lock-*Open the right side baggage compartment and inspect the baggage area. Inspect the main gear strut attachment points for signs of cracks and movement. Ensure baggage cannot bind the control system in any way and is secured with tie down straps. Inspect BRS canister attachment. Close the baggage door and ensure it is locked by pressing firmly several times against the top of the door with your palm.

7. *Main gear tire, Landing gear fairing check*- Physically ensure the right main gear fairing is secure, and is not damaged. Inspect right main tire for excessive wear or flat spots and proper inflation. If needed move the aircraft slightly forward or back to check the entire tire. The tire pressure should be checked if it seems bulged on the bottom. Tire pressure is 29psi for main gear tires. Verify the brake system is not leaking or worn. Ensure there are no cracks developing in the strut to axle bracket.

D. Right wing

1. *Wing flap check*- Inspect flap leading and trailing edges for abnormalities. Inspect the flap hinge brackets for signs of cracks. Grasp the flap trailing edge and apply light force inboard and outboard ensuring minimal play in the hinge bearing blocks.

2. *Aileron check*- Inspect aileron leading and trailing edges for abnormalities. Inspect the aileron hinge brackets for signs of cracks. Grasp the aileron trailing edge and apply light force inboard and outboard ensuring minimal play in the hinge bearing blocks. Move the aileron trailing edge up and down, ensure the left aileron moves the opposite direction and the control stick moves accordingly.

3. *Wing tip check*- Inspect wingtip for any signs of damage. Verify fuel vent is un-obstructed.

4. *Navigation light-* Check wingtip navigation light is secure and not cracked.

5. *Pitot probe check*-Verify the pitot probe is clear of obstructions and is secure in the leading edge.

6. *Tie-down remove*-Remove the wing tie down if required.

7. *Fuel quantity check*-Open the fuel cap and check the O-ring is intact/serviceable. Using the dipstick dip the fuel tank to verify quantity. It is not recommended to takeoff with less than 4 gals in each tank.

8. *Filler cap tightly closed and tab aft*- Ensure the fuel cap is fully seated and flush with the top of the wing and the tab is fully down to the aft.

9. *Wing leading edge check*- Inspect the leading edge for signs of damage or abnormalities. Ensure the root leading edge stall strip is secure.

E. Aircraft – Nose

1. *Engine cowling remove*-It is recommended to remove the engine cowling before the first flight of the day. Be cautious when loosening the cam locks on the cowling, the screwdriver can easily slip and scratch the cowling or worse cut your finger. If your aircraft is outside and it is windy do not place the cowling on the ground, its best to secure it in the cockpit or other safe location.

2. *Exhaust system check*-Ensure the exhaust is tight by grabbing the exhaust pipe and moving it lightly back and forth. Look for signs of exhaust leaks especially near the joints. Verify the joint springs are secure, not cracked and have backup safety wire (4 on each side).

3. *Nose gear check*- Physically ensure the nose gear fairing is secure, and is not damaged. Inspect nose gear tire for excessive wear or flat spots and proper inflation. If needed move the aircraft slightly forward or back to check the entire tire.

4. *Air inlet check*-Check the cylinder cooling air inlet located on the front right side of the lower cowling. Verify no obstructions are present and the baffling is secure around the engine cylinders.

5. *Fluid lines check*-Inspect fuel, oil, and coolant lines in the engine compartment. Inspect for leaks, chaffing, and security.

6. *Electrical wiring and battery check*-Inspect electrical wiring and ignition system wiring for signs of chaffing, or shorting. Inspect the battery for signs of bulging or leaking.

7. *Fuel drain; no contamination*- From the gascolator drain take a adequate fuel sample (half a cup) and verify the fuel is free of contamination including dirt and water. Verify the fuel is the correct color for the fuel grade being used. Blue for 100LL, straw color for auto fuel. A mix of fuel is also authorized and may cause the color to be a greenish blue.

8. *Landing light check*-Inspect the landing light for security.

   Caution-- Ensure the ignition switch is off before moving the propeller. Do not turn the propeller backwards (clockwise looking from the front). Damage to the engine can occur if engine is rotated backwards.

9. *Propeller check*-Inspect each propeller blade for damage, nicks, de-lamination and security. Minor surface nicks are ok, indentations that reach the composite fibers or expose the fabric would not be airworthy. Any cracks in the propeller blade would also render the propeller un airworthy.

10. *Spinner check*-Ensure the spinner is secure and straight, all screws are installed. Verify the spinner is free of cracks. Never push the plane from the spinner as damage to the spinner may occur.

11. *Oil quantity check*-Remove the oil tank filler cap. Check oil quantity from the oil dipstick. If the oil level is half way on the flat area of the stick, the level is ok. If the level is below half, rotate the propeller several revolutions counter clockwise (looking from the front). Continue rotating until a gurgling noise is heard from the oil tank. Recheck the oil level, if it is still low, add oil. The oil system only holds slightly over 3 qts so add oil in small amounts checking the dipstick frequently. Excess oil will drain from the overflow onto the belly.

12. *Coolant quantity check*- Inspect coolant level in the overflow bottle on the firewall. The coolant level should be between the upper and lower lines on the bottle and will vary with temperature.

13. *Install top cowling*- Carefully reinstall the top cowling. Be cautious when placing it on the aircraft it is very easy to scratch the front windscreen while placing the cowling. Ensure all cam lock fasteners are seated into place before locking each one down. When locking the fasteners it is best to start at the top center and work your way down and forward.

F. Left wing

1. *Wing leading edge check*- Inspect the leading edge for signs of damage or abnormalities. Ensure the root leading edge stall strip is secure.

2. *Fuel quantity check*-Open the fuel cap and check the O-ring is intact/serviceable. Using the dipstick dip the fuel tank to verify quantity. It is not recommended to takeoff with less than 4 gals in each tank.

3. *Tie-down remove*-Remove the wing tie down if required.

4. *Wing tip check*- Inspect wingtip for any signs of damage. Verify fuel vent is un-obstructed.

5. *Navigation light-* Check wingtip navigation light is secure and not cracked.

6. *Aileron check*- Inspect aileron leading and trailing edges for abnormalities. Inspect the aileron hinge brackets for signs of cracks. Grasp the aileron trailing edge and apply light force inboard and outboard ensuring minimal play in the hinge bearing blocks. Move the aileron trailing edge up and down, ensure the right aileron moves the opposite direction and the control stick moves accordingly.

7. *Wing flap check*- Inspect flap leading and trailing edges for abnormalities. Inspect the flap hinge brackets for signs of cracks. Grasp the flap trailing edge and apply light force inboard and outboard ensuring minimal play in the hinge bearing blocks.

Servicing

Fueling- When fueling any aircraft, grounding is an important consideration. Static electricity can build up on aircraft surfaces regardless of if the aircraft is flown or not. Prior to any fueling operation ensure there is an adequate ground between the aircraft, the fuel source, the fueling system and the Earth ground. When fueling with a pump nozzle, make sure the nozzle is in contact with the filling port before pumping fuel. Do not allow the weight of the nozzle to hang from the filler port as damage or loosening of the filler port may occur. When filling from cans, bond the filling container to the aircraft, the funnel if used and the Earth ground to minimize the risk of a static electricity spark.

Fuel dyes can stain the aircraft surface if not promptly cleaned. Keep a rag handy to wipe the aircraft surface in case of a spill. It is not recommended to completely top off the tanks unless required by the flight. Letting the aircraft sit with full tanks may cause fuel venting and staining of the wing surface. Leave expansion room for fuel at the top of the tank. If the aircraft is kept in a humid environment, check the fuel closely for signs of water when the tanks are not completely full. If the aircraft will be stored for long periods of time, drain all auto fuel and replenish the fuel system with 100LL to prevent moisture from collecting.

Adding Oil- Before adding oil to the engine system purge the oil from the engine by rotating the propeller by hand in its normal rotation (counter-clockwise as viewed from the front) until a gurgling noise is heard in the oil tank. The oil system holds about 3 quarts. If required add oil slowly in small amounts, checking the dipstick between increments. The oil level should be brought up to at least mid way up the flat on the dipstick.

Marshalling

One of the best ways to move the CT is from the tail. If you stand in front of the horizontal stabilator, grasp the fuselage just forward of the vertical fin and push forward or aft. You can also push down on the tail at this point to rotate the nose of the aircraft. Be careful when pulling backwards while pushing down on the tail, as the ventral fin could hit the ground, especially if the main wheels hit a slight bump.

If pushing or pulling from the front grasp the propeller near the root, close to the spinner. Do not pull from the propeller tips or push on the spinner itself.

An alternate method of moving the aircraft is from one the doorpost, and using the rudder pedals to steer the aircraft.

Cockpit Layout

Primary Flight Display

Engine Monitoring System

Engine Start

The engine start checklist should be considered a "Do List"

1. *Preflight inspection complete*- The preflight checklist should be completed prior to continuing.

2. *Parking brake set*-Set the parking brake valve to ON, then pull the brake handle several times to lock pressure against the brakes.

3. *Carburetor heat off*-Verify the carburetor heat knob is pushed all the way in.

4. *Circuit breakers all in*- Check that the electrical circuit breakers on the right side panel are all in. If a white band is visible, the breaker is popped.

5. *Avionics Master switch off*- Confirm the avionics power switch is OFF. Power spikes can cause damage to the avionics if the power switch is not off when the engine is started.

6. *Batt Master C/B IN/ON*- Push the battery circuit breaker in to apply power from the battery to the electrical system.

7. *Beacon ON*- The beacon should be turned on anytime the engine is in operation, or is going to be in operation regardless if it is day or night.

8. *Fuel shutoff valve ON/(up)*-Turn the fuel valve ON by pushing it to the up position. It needs to be all the way up for adequate fuel flow to reach the engine.

9. *BRS Safety Pin Remove*- The Ballistic Recovery System needs to be available in-flight in a one step process. Remove the BRS safety pin once pilot and passenger are seated and seat belts are secured. Stow the BRS pin in the center console tray.

10. *Ignition key IN*-Insert the ignition key, but leave it in the OFF position.

11. *Choke as required*- If it is the first start of the day, or temperatures are below 40F, apply ½ to ¾ choke for starting. If the engine has already been run during the day or temps are higher the choke can remain OFF for starting.

12. *Throttle set for start*- When performing a start with the choke ON, set the throttle at idle stop. When starting without the choke, open the throttle about a ¼" above the idle stop.

13. *Propeller area clear*- Visually clear the propeller area, left, right, and ahead. Check behind as well to ensure no one is approaching the aircraft. Open the side vent window and yell out "Clear Prop!" prior to engaging the starter.

14. *Ignition key turn to start then release*- Turn and hold the ignition key to the start position until the engine starts, then release the key to the "1+2" position. Limit cranking time to less than 10 seconds. If engine does not start try adding more choke and verify the fuel valve is all the way open.

15. *Throttle adjust for 2000-2400RPM*-For the initial warm up adjust the throttle for around 2200rpm. Having the choke ON increases the RPM of a given throttle setting.

16. *Choke adjust, then OFF (forward) as engine warms*- As the engine warms up the choke can be slowly turned OFF to keep the engine running smoothly. As the choke is turned OFF increase the throttle as necessary to maintain the RPM between 2000-2400RPM.

17. *Oil pressure check*- Verify the oil pressure is greater than 30 psi within 10 seconds after start during warm weather and 30 seconds after start in cold weather. If the oil pressure does not rise into the normal operating range shut the engine down by turning the ignition switch to OFF.

18. *Gen Master C/B IN/ON (alt lamp out)*- Push the Generator master circuit breaker on the center console IN, verify the voltage meter shows an increase to 13-14volts. Check that the Generator failure lamp is not illuminated.

19. *Avionics Master switch ON*- Turn the Avionics master switch ON, verify the Transponder, VHF radio, GPS and Dynon EFIS panel power up. Remain stationary while the Dynon AHRS aligns. Once the altitude display bar is shown on the EFIS it is ok to taxi.

20. *Wing flaps retract*-Retract the flaps to the 0 or -6 position. Use -6 position during higher winds to reduce the lift potential of the wing. Verify the flaps retract symmetrically and with little load to the electrical system.

21. *Throttle maintain 1900-2000*- Maintain an RPM sufficient for taxi, but above 1800rpm. RPMs below 1800 can cause increased wear to the clutch/gearbox system.

Before Taxi

The before taxi checklist can be completed as a flow pattern starting from the Left side console moving right and down to the center console. It is recommended to have all navigation and communication settings selected prior to taxi. Utilize the taxi diagram available on the GPS for added situational awareness. Be aware of Hot Spot locations on airfields and remain vigilant of taxi instructions and hold short locations.

PFD and Avionics set as required –The Dynon EFIS should be initialized and set in full screen mode. Select any of the four center buttons on the EFIS panel then select "Lists". From the displayed menu items select the "On Ground" button. The "On ground" checklist menu items should be displayed above the EFIS buttons. Select and complete the taxi checklist as follows.

Select the intended waypoint or flight plan in the GPS. Verify the "On Course" heading to the waypoint or destination. Set the XM radio as desired. Set the GPS to the map page, zoom in for taxi diagram if available.

In the Active side of the VHF radio set CTAF or Ground frequency as required. In the standby side set the nearest weather or Tower frequency as required.

The transponder should be set with the VFR code (1200) or as assigned. In some high traffic volume airports the transponder will be set to ALT during taxi.

Lights ON as required-Ensure the beacon is ON anytime the engine is in operation. Use the position lights during operations between sunset and sunrise. The landing light should be used during taxi at night.

Brakes check A brake functional check should be performed early in the taxi to ensure both brakes are functional and brake pressure is adequate. Release the parking brake, roll forward slightly, then re-apply brake pressure via the brake handle.

Steering check-While moving forward ensure nose wheel steering is functional in both directions as rudder pedal inputs are made. Do not try to push the rudder pedals while the aircraft is not moving as this can cause damage to the rudder system.

Taxi should be accomplished using the minimum power setting required to maintain a speed not more than a fast walking pace. The minimum RPM should be kept above 1800, using brakes to manage the taxi speed.

During taxi, minimize distractions such as organizing the cockpit, setting avionics, reading checklists or clearances. Maintaining a high situational awareness while taxing can reduce the risk of runway incursions and damage to personnel/equipment.

Before Takeoff

The before takeoff checklist should be considered a "Do List" and should be completed prior to entering the active runway. If able turn to position the aircraft nose into the prevailing wind, and with clear area behind. Avoid run-up while people or other aircraft are directly behind you. During cold weather ensure the engine is at the proper temperature (above 122F oil temp) prior to performing the engine run-up.

Parking brake set-Set the parking brake and apply pressure several times to the brake handle to ensure adequate pressure is applied to the brakes.

Seats Locked-Verify the pilot and passenger seats are locked.

Safety harnesses lap tight, shoulders snug-Verify the pilot and passenger safety belts and shoulder harnesses are snug and in the correct position. Shoulder harnesses should allow enough freedom of movement for the pilot to reach all cockpit controls. The lap belt should snug across the hips.

Doors Closed and Locked-Verify both doors locking handles are in the full forward position in the detent.

Control surfaces free and correct-Check the full motion of the ailerons and elevator. Ensure the controls move in the proper direction. Its best to make a box pattern with the control stick so that the full range of motion is checked.

Flight Instruments Set and Verified- Determine the altimeter setting from the nearest reporting station. If an AWOS/ASOS or ATIS information is available at your departure field use its reported altimeter setting. It can also be found using the nearest function of the 796/696/496/396 GPS with the XM weather subscription. Set the altimeter setting in the EFIS and backup altimeter, verify the reported altitude is within 75' of the field elevation. In the absence of a altimeter setting, adjust the barometric setting so that the altimeters read field elevation. Verify the magnetic heading on the EFIS matches the compass reading and that the airspeed is <20.

Choke OFF-Confirm the choke is all the way OFF, full forward.

Engine warm up complete-Allow the engine to warm up using an RPM of 2400, until the oil temperature is above 122F.

Throttle 3500 rpm- Increase the throttle to achieve an RPM of 3500. Ensure the parking brake is holding the aircraft from moving forward.

Ignition #1 check max. drop 300 rpm-Turn the ignition switch to position #1. This verifies the engine can remain running on only 1 ignition module. The RPM will decrease slightly since only 1 set of sparkplugs are firing. The RPM drop should not exceed 300rpm. Excessive RPM decrease or rough running could be the result of fouled or failed sparkplugs. After check return the ignition to the 1+2 position.

Ignition #2 check max. drop 300 rpm- Turn the ignition switch to position #2. The RPM will decrease slightly but not more than 300RPM. The maximum difference in RPM drop between ignition 1 and ignition 2 is 120RPM. After check return the ignition to the 1+2 position.

Carb Heat Check- Pull the Carb Heat knob out fully and observe a slight decrease in RPM. This occurs due to less dense warm air entering the carburetors causing a decrease in performance. Verify the engine remains running smooth then return the carb heat knob to fully forward (closed), verify rpm returns to pre-check setting.

Engine gauges check Green-Verify the engine gauges are in the Green, normal operating range. The Oil temperature may not reach the Green arc until inflight during cold weather operations. It is ok to takeoff as long as the Oil temperature is above 122F.

Alternator lamp off-Verify the alternator failure lamp is not illuminated.

Throttle idle, verify 1600-1800-Set the throttle to the idle position. The RPM should remain between 1600 and 1800 RPM and the engine should run smoothly.

Throttle set 2000-Adjust the throttle to maintain 2000RPM.

Trims set for takeoff-The pitch trim should be set slightly nose down of neutral position for takeoff. Aileron and rudder trim should be set slightly right of center.

Radios set-The VHF radio should be switched to CTAF, or Tower frequency in the active side, and Departure frequency in the standby side as appropriate.

Transponder ALT-Verify the correct transponder code is set, press the ALT button to turn the transponder ON with altitude encoding.

Landing Light ON-The landing light should be turned ON when operating within 10 miles of an airport of arrival or departure regardless of daytime or night time conditions. Use of the landing light can help make your aircraft more visible to others reducing the risk of collisions.

Passenger briefing complete-Ensure your passenger has been briefed on all safety items including the operation of seatbelts, doors, vents and the BRS system. Also verify they know the location of the fire extinguisher and the motion sickness bags.

Approach & departure clear-Visually confirm the approach and departure areas are clear. This may include a 360 deg turn at a non-controlled airfield.

Parking brake release-Release the parking brake and verify the valve is fully OFF.

Take-Off

Prior to entering the runway, review the appropriate takeoff procedure and confirm the aircraft is configured accordingly. A takeoff briefing should be performed at this time as a review of the takeoff process and the actions necessary for an abnormal/emergency procedure.

Take-off Briefing

This will be a _____(Normal, Short, Soft) takeoff from Runway _____. The density altitude is _____ feet so the takeoff distance will be _____ feet. There is _____feet runway available for takeoff. Rotation speed will be _____Knots. A takeoff abort will be performed for any failures prior to rotation. If an engine failure occurs after rotation I will land on the available runway or land straight ahead if below 750 feet. The BRS system is available at 500' agl which is an MSL altitude of _____ft.

Normal Takeoff

Normal takeoffs are performed using 0° flaps. Once aligned on the runway position the control stick slightly aft of neutral and ailerons deflected into the crosswind if applicable. Apply full power in a smooth steady motion. It should take approximately 4 seconds to transition from idle to full power. Check the engine and airspeed indications early in the takeoff roll. If there are abnormal indications abort the takeoff. Maintain directional control with rudder, maintain crosswind control until rotation. As the airspeed reaches 45kts smoothly add aft stick pressure to raise the nose. The aircraft should leave the ground at approximately 50kts. Adjust the pitch attitude so that the bottom of the windscreen is on the horizon (7-8deg), this should yield a Vy climb of 73kts. Adjust pitch to maintain Vy and maintain coordination with rudder. When ask to maintain runway heading on departure do not correct for wind, maintain the runway magnetic heading.

Wing flaps 0°- Verify the flaps are set to the 0° position.

Carburetor heat Off- Ensure the carb heat knob is pushed all the way in.

Choke Off- Verify the choke is OFF, full forward position.

Throttle full- Smoothly advance the throttle lever to the full forward position. The throttle has a long travel so make sure it reaches the forward stop.

Take-off rpm 4700 – 5000 rpm- Early in the takeoff roll, verify the engine RPM is greater than 4700. If it is less, the engine is not developing full power and the takeoff should be aborted. Check the other engine gauges for signs of abnormal engine performance.

Best rate-of climb- Adjust pitch attitude to intercept the appropriate Vy climb speed for the configuration.

60 kts (flaps 15°)

73 kts (flaps 0°)

78 kts (flaps -6°)

Short Field Takeoff

Short Field takeoffs are performed using 15° flaps in order to maximize takeoff performance. Once aligned on the runway, position the control stick neutral and ailerons deflected into the crosswind if applicable. Apply the parking brake. Apply full power in a smooth steady motion. Release the parking brake. Check the engine and airspeed indications early in the takeoff roll. If there are abnormal indications abort the takeoff. Maintain directional control with rudder, maintain crosswind control until rotation. When the airspeed reaches 42kts smoothly add aft stick pressure to raise the nose to the Vx climb attitude (5°). The aircraft should leave the ground at approximately 44kts. Adjust pitch to maintain Vx climb speed of 55kts until obstacles are clear. Adjust pitch to maintain Vy of 60kts, then retract flaps to 0° once above 150' agl. Once flaps are retracted a normal Vy climb speed of 73kts should be maintained.

Wing flaps 15°-Set the flap selector to the 15° position, verify both flaps are in position.

Parking brake set- Set the parking brake once aligned with the runway centerline.

Choke Off-Confirm the choke is OFF, full forward position.

Carburetor heat off-Verify the carb heat is OFF, pushed all the way in.

Throttle full-Smoothly apply full throttle. RPM should be >4700.

Parking brake release- Rotate the parking brake knob to the OFF position to release the brakes.

Rotation 42 kts- When airspeed reaches 42Kts, apply aft stick pressure smoothly to rotate the nose to the Vx pitch attitude.

Accelerate to Best angle of climb 55kts- After rotation accelerate to 55kts and maintain that speed until obstacles are cleared.

Clear of Obstacles Best rate of climb 67kts- Once clear of obstacles increase airspeed to 67kts, retract the flaps to 0° then accelerate to 73kts.

Soft Field Takeoff

Soft Field takeoffs are performed using 15° flaps in order to maximize takeoff performance. Once aligned on the runway, position the control stick nearly full aft and ailerons deflected into the crosswind if applicable. Care should be taken not to fully stop on the runway as debris could damage the propeller or the aircraft could sink into soft runway material. Gradually apply power in a smooth steady motion allowing the nose to rise slightly off the ground. Maintain this pitched up attitude as the aircraft accelerates. Check the engine and airspeed indications early in the takeoff roll. If there are abnormal indications abort the takeoff. Maintain directional control with rudder; maintain crosswind control until the aircraft is airborne. The aircraft will become airborne at a low speed due to ground effect, be ready to reduce the pitch attitude in order to accelerate in ground effect to Vx speed of 55kts. Adjust pitch to maintain Vx climb speed of 55kts until obstacles are clear, and then adjust pitch to maintain Vy of 60kts. Retract flaps to 0° once above 150'agl and obtain a normal Vy climb speed of 73kts. A pitch attitude of approximately 7.5 degrees will yield a Vy climb at 0 or -6 flaps.

Wing flaps 15°-Set the flap selector to the 15° position, verify both flaps are in position.

Choke Off-Confirm the choke is OFF, full forward position.

Carburetor heat off-Verify the carb heat is OFF, pushed all the way in.

Control Stick aft- Position the control stick nearly full aft during taxi and the initial start of the takeoff roll.

Throttle full-Smoothly apply full throttle. RPM should be >4700.

Pitch reduce- When aircraft becomes airborne reduce pitch and accelerate in ground effect.

Accelerate to Best angle of climb 55 kts- After rotation accelerate to 61kts and maintain that speed until obstacles are cleared.

Clear of Obstacles Best rate of climb 60kts- Once clear of obstacles increase airspeed to 60kts, retract the flaps to 0° then accelerate to 73kts.

En-Route Climb

The Climb checklist can be completed as a "flow checklist".

The climb checklist should be completed once above 1000'agl and departing the traffic pattern area. Climbs are performed at full throttle unless engine temperatures preclude operation at maximum rpm. If engine temperatures increase into the caution range, decrease throttle to around 4500 and increase airspeed to 90KIAS for additional cooling. For obstacle clearance use full throttle and the best rate of climb airspeed.

best rate-of-climb v_y = 73 kts flaps 0

best rate-of-climb v_y = 78 kts flaps -6

Cruise-climb v_{cc} = 90 kts flaps -6

Wing flaps -6°-For en-route climbs set the flaps to the *-6° setting. This increases forward visibility, and aids in engine cooling.*

Rpm max. 5500 rpm-If engine temperatures allow use full throttle. Rpm should be greater than 4700 but less than 5500 while climbing at full throttle.

Engine Temps Monitor- Ensure oil temperature and Coolant temperatures remain below redline during climbs. If either are increasing into the middle of caution range reduce throttle setting to 4800 and increase airspeed to 85-90kts.

Auto Pilot Set-If equipped with a vertical speed hold or altitude preselect autopilot wait until the aircraft is at a safe altitude before engaging the autopilot. Adjusting autopilots or programming avionics can distract the pilot from maintaining visual separation from terrain and other aircraft. Push and hold the autopilot disconnect button for 2secs then release. The Tru Track autopilot will maintain the current vertical speed and current ground track. Press the mode button to switch to GPS Nav mode as desired. Monitor airspeed and adjust vertical speed command accordingly to maintain best climb speed.

Cruise

The Climb checklist can be completed as a "flow checklist".

Throttle <5500rpm>4800rpm- Once level at the desired cruise altitude (even +500' westbound, odd +500 eastbound), adjust the RPM to the desired cruise setting between 4800 and 5500 rpm. RPM settings below 4800 should not be used for prolonged periods during cruise especially if operating on 100LL Avgas.

Fuel level and Engine parameters – Monitor the fuel level often to ensure adequate supply. Do not operate with less than 1hr reserve fuel, approx 6 gallons. Monitor the engine parameters routinely during cruise and ensure all parameters are within normal limits.

Rough Air, reduce speed to < 98 KIAS-If experiencing moderate turbulence or greater, reduce airspeed to less than 98KIAS to be below Maneuvering speed.

Verify flaps -6 above 100 KIAS-Ensure the flaps are set to the -6 position for cruise. Airspeeds above 100KIAS with flaps at 0 can cause excess load on the flap system.

Autopilot mode set and trimmed-Set the autopilot to the appropriate mode for navigation, GPSS mode for tracking a GPS course. TRK mode to set ATC directed headings (note the TRK mode is based on ground track so it may not match the magnetic heading desired, adjust accordingly). Monitor the pitch trim indication on the autopilot, adjust the trim as required to keep the autopilot within its torque limits.

Descent

The descent checklist can be completed as a "flow checklist".

In general a 400-600 fpm descent is adequate if proper descent planning is performed. Because the CT has a very clean airframe it gains speed rapidly during descent. If moderate or greater turbulence is encountered reduce airspeed to below maneuvering speed of 98KIAS. Use the glide slope indicator on the GPS and Dynon panel to aid in planning the descent. The GPS is set for a 500fpm descent rate, and to obtain an altitude of 1000' above the selected waypoint 2 miles before the waypoint. When equipped with a vertical speed hold autopilot, set the fpm descent rate as the GPS glide path indicator intercepts center or as directed by ATC.

Throttle, maintain <5500 rpm-During the descent it will be necessary to reduce the throttle to maintain less than 5500 rpm. RPMs of 5000-5200 will yield an indicated airspeed of approximately 110-115kts with a 500fpm descent. The pitch attitude at this setting is approximately -3 deg.

Carburetor heat as required-If the engine seems to be running rough and losing rpm gradually then carburetor icing may be present. If carburetor icing is suspected, pull the carb heat knob fully out. The engine may initially sound more rough and lose rpm as water is ingested into the engine as the ice melts.

Altimeter set-Obtain the local altimeter setting via ATIS, AWOS, or XM WX on the GPS. Tune the appropriate frequency into the standby position of the Garmin radio. Push the MON button to listen to AWOS/ATIS while still maintaining communication on the active frequency. The nearest altimeter setting can be obtained from the GPS with the XM weather subscription. Using the cursor pad place the cursor on the nearest weather flag. It can also be found on the data display page or from the nearest weather selection.

Landing light On as required-To make your aircraft more visible in high traffic areas, turn on the landing light within 10nm of the destination airport or in high traffic areas.

Throttle set 4500 rpm 1-2 miles out-In order to get the CT slowed down for the downwind leg and below the 100kt 0 flap speed, reduce the RPM to 4500rpm 1-2 miles from the destination airport.

Flaps 0 deg below 100 kts- Prior to entering the traffic pattern, set the flaps to the 0 deg position. This will improve the visibility over the instrument panel and help slow the aircraft to 80-90kts on the downwind leg

Traffic Pattern and Approach Procedures

Before Landing

The before landing checklist can be completed as a "flow checklist".

Safety harnesses tight- Verify you and your passenger's lap belt is tight across the lap and shoulder harnesses are snug.

Check brake pressure-Verify the brakes have adequate pressure to stop the aircraft once on the ground by pulling on the brake handle. The brake handle should have pressure prior to moving half the allowable travel. If the brake handle does not have pressure a failed brake landing will need to be performed.

Throttle set 3800 rpm downwind-At or before the mid-downwind position the throttle should be reduced to 3800rpm, this will aid in establishing an airspeed slightly below 80 knots.

Flaps 15 deg below 80Kts- Prior to the abeam point of the touchdown zone the flaps should be lowered to the 15 deg position for a normal landing. This allows for a stabilized descent to begin abeam the touchdown point. 0 deg flaps can also be used and is recommended if crosswinds are greater than 10 knots.

Abeam the touchdown zone throttle to 2800rpm- Starting the descent abeam the touchdown point reduce throttle to approximately 2800rpm. When established at a 500fpm descent rate this power setting will yield approximately 60-65 knots indicated airspeed. The same power setting can be used for 0 deg flap approaches, the airspeed will be between 70-80 knots during descent.

Normal Landing

Normal landings are performed with 15 degrees of flaps and an approach speed of 55-60KIAS. In smooth air an rpm setting of approximately 2800 rpm will yield a stabilized 500fpm descent rate at the target approach speed. An approach is considered stabilized when the aircraft is on glideslope, at the target airspeed, at an appropriate descent rate with an appropriate power setting. The aircraft must also be aligned with the runway and maintaining alignment with minimal deviations. At anytime a stabilized approach cannot be maintained or the aircraft will not touchdown on the first third of the available runway, a go around should be executed.

Nose alignment relative to the centerline is difficult to perceive in the CT due to its tremendous visibility and lack of visual aids when seated in the cockpit. A very good device for detecting nose alignment is the ridge in the instrument panel. This ridge is parallel to the longitudinal axis of the airplane but off centered. When the aircraft is placed and aligned with the runway centerline the centerline will appear left of the ridgeline in the instrument panel, but parallel with it as shown below. You can also think of your right leg following the centerline when seated in the left hand seat. If your right leg is pointed down the centerline you are straight and over the centerline.

Due to the rapid curvature of the cowling and windscreen the correct longitudinal alignment is deceiving. When seated in the left seat the nose will appear as if it is well to the right of center, however this awkward visual is required to line up the longitudinal axis correctly. The centerline should look as if it is running between your feet, and the nose will look well right of centerline.

Another landing issue related to the spectacular visibility of the CT is a tendency to begin the landing round out at a very high altitude. This can lead to a loss of speed high above the runway followed by a very hard landing if power is not added. The round out should begin at approximately 5-7feet and end with the aircraft not higher than 2 feet above the runway for the start of the flare maneuver. The flare maneuver begins as the aircraft comes to level flight at the 2ft or less altitude above the runway. The flare is a continuous decrease in airspeed while maintaining a very low altitude above the runway (a few inches to not more than 1-2ft). The decrease in airspeed will require a continuous increase in pitch attitude ultimately ending in a stall as the main wheels are touching the ground. In gusty winds and higher crosswinds the touchdown speed should be higher than stall.

Approach airspeed for a normal landing-On final, maintain a stabilized approach speed of 60KIAS with 15 deg flaps. For 0 flap approaches maintain 70KIAS.

Flaps 0 to15° as required-Normal landings are performed with 15 deg of flaps, in crosswinds greater than 10 knots or gusty conditions a 0 flap approach should be used.

Airspeed on short final- During a normal 15 deg flap landing, plan on crossing the threshold at approximately 55kts. Using a 0 flap approach, plan to cross the threshold at approximately 65 kts.

Flare smoothly, nose not too high-Begin the round out from the approach descent to the flare at approx 5-7feet, ending the round-out at not more than 2 feet above the ground. The pitch can be sensitive during the flare so be aware of ballooning. If a balloon occurs and is greater than 5 feet high, execute a go around. Continue the flare for a main wheel touchdown, as power is reduced to idle. Be cautious of flaring to high, as it is possible to strike the ventral fin on the runway. If the descent rate seems to require a high pitch attitude, add some power to reduce the pitch up requirement to stop the descent.

After touchdown stick back smoothly-After touchdown DO NOT neutralize controls. Continue to hold back pressure and increasing crosswind input as required.

Apply braking smoothly-Once the nose wheel touches down apply braking smoothly as required. If the brake system seems soft a couple pumps of the brake lever may increase effectiveness.

Typical Traffic Pattern (No Wind)

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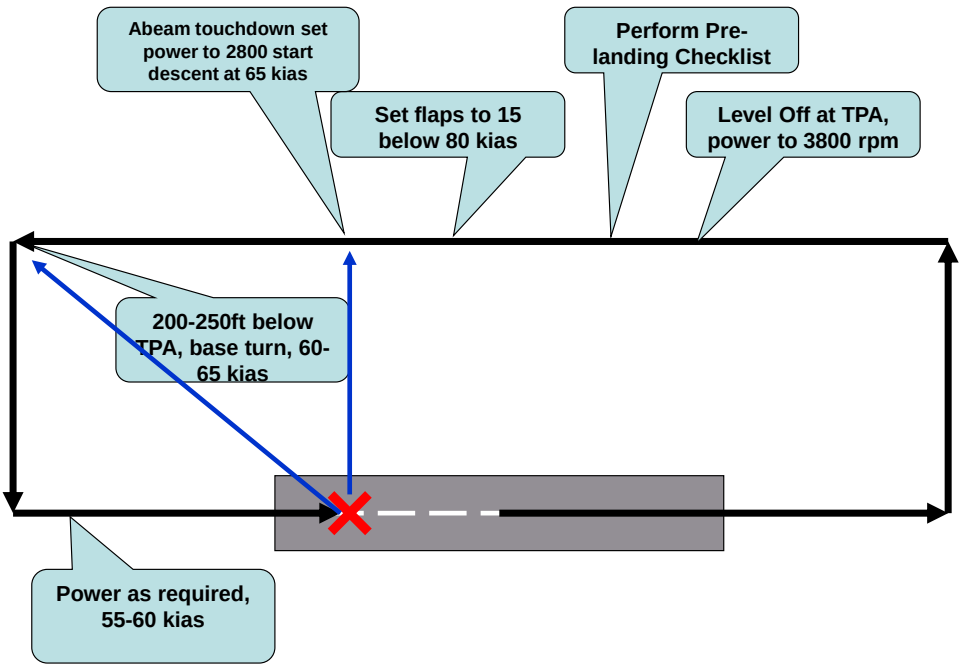


Crosswind Landings

Crosswind landings can be quite challenging in the CT, especially if conditions are gusty. The CT airframe is very light and easily disrupted by turbulence. Attempt to find the most favorable runway at your destination, even if it means requesting a different runway then the active from ATC. Minimal flap settings should be used to ensure adequate control authority throughout the flare and touchdown. Higher approach speeds (approx ½ the gust factor increase) should be used, and a go around should be anticipated at anytime.

The CT has plenty of control authority to land in crosswinds up to the published demonstrated crosswind component of 16kts. If crosswinds exceed 10kts a 0deg flap landing should be performed. Using lower flap settings increases the approach speed so control authority for correcting drift and nose alignment is higher. The -6 flap setting can be used as well, however using 0 flaps, then switching to -6 after touchdowns will help reduce the chance of the aircraft becoming airborne again during rollout.

During approach maintain a crab angle until short final, when crossing the threshold add rudder input first to align the longitudinal axis of the aircraft with the runway centerline. Aileron input will be added naturally in order to correct for drift right and left. Continue to hold the side slip maneuver thru the touchdown. Increase the aileron inputs as the aircraft slows down after touchdown and maintain directional control with

rudder inputs. Relax the pitch input slightly after touchdown to allow for nose wheel contact for better directional control. Decreasing the flap setting to the -6deg position can aid in preventing drift and increase directional control.

Short Field Landings

Short field landings can be accomplished with 15, 30 or 35 deg flap settings depending on wind conditions. Using flap settings greater than 15 deg is only recommended when winds are light and/or oriented directly with the runway heading. The approach speeds with 30 or 35 deg flaps is very slow and therefore directional control is reduced. Be cautious of gusty conditions when using higher flap settings especially in the flare. The CT's light weight combined with the high drag of 30-35deg flaps can dissipate speed rapidly. If a gust causes a balloon greater than 2 ft during the flare add power immediately. Execute a go around if the balloon is excessive.

Flaps 15°-30°-35°as required- Short Field landings are performed with 15, 30 or 35 deg of flaps, in crosswinds or gusty conditions a minimal flap approach should be used.

Airspeed on short final- During a short field approach with 30 or 35 deg flap setting, plan on approach speed of 54kts and crossing the threshold at approximately 50kts. When performing and obstacle clearance landing, maintain an approach speed of 54kts until clear of the obstacle, reduce power then maintain 50kts until starting the roundout for flare. If the descent rate is high and airspeed is slow, power will be required to arrest the descent rate.

Flare smoothly, nose not too high- When using 30 and 35 deg flaps, the roundout should begin at a slightly lower altitude as energy is lost much quicker. Begin the round out to flare at approx 3-5 feet, beginning the flare maneuver approx 2 feet above the ground. The pitch can be sensitive during the flare so be aware of ballooning. If a balloon occurs at slow speed with 30-35deg flaps add power immediately. Execute a go around anytime a balloon is excessive. Continue the flare for a main wheel touchdown; be cautious of flaring to high, as it is possible to strike the ventral fin on the runway. If the descent rate seems to require a high pitch attitude, add some power to reduce the pitch up requirement to stop the descent.

After touchdown nose down smoothly-After touchdown DO NOT neutralize crosswind correction controls. Allow the nose to touchdown smoothly before braking.

Brakes apply after touchdown- Apply brakes smoothly and continuously after nose wheel touchdown.

Flaps retract to increase braking effect-Flaps can be retracted to increase the weight on the main wheels therefore increasing brake effectiveness.

Soft Field Landing

Soft field landings can be accomplished with any flap setting, however 15 and 30 deg flap settings provide the best results depending on wind conditions. Using flap settings greater than 15 deg is only recommended when winds are light and/or oriented directly with the runway heading. The approach speeds are consistent with other landing approaches, 60kts with 15 deg flaps and 54kts with 30 deg flaps. In order to minimize the descent rate at touchdown and ensure a main gear only touchdown, a slight amount of power should be maintained throughout the flare. Be cautious of gusty conditions when using higher flap settings especially in the flare. The CT's light weight combined with the high drag of 30 deg flaps can dissipate speed rapidly. Execute a go around if the balloon is excessive.

Flaps 15°-30°as required- Soft Field landings are performed with 15 or 30 deg of flaps, in crosswinds or gusty conditions a minimal flap approach should be used.

Airspeed on short final- During a soft field approach maintain a 60kt approach with 15 deg of flaps and 54 kts with 30 deg flap setting. A power setting of approximately 2800rpm should yield these speeds while maintaining a 500fpm descent rate. The 2800 rpm setting can be held throughout the flare and touchdown.

Flare smoothly, nose not too high- Using a flap setting of 0 deg along with power can cause a very nose high attitude during landing. The pitch attitude can be high enough to strike the ventral fin. Begin the round out to flare at approx 3-5 feet, beginning the flare maneuver approx 2 feet above the ground. The pitch can be sensitive during the flare so be aware of ballooning. Execute a go around anytime a balloon is excessive. Continue the flare with a slight amount of power for a main wheel touchdown.

After touchdown nose down smoothly- Continue to increase the back pressure on the control stick keeping the nose wheel off the ground until speed is reduced to the point where it touches down on its own. Power can be reduced to idle after touchdown to minimize landing roll out. After touchdown DO NOT neutralize crosswind correction controls. Allow the nose to touchdown smoothly before braking.

Brakes apply after touchdown- Apply brakes sparingly on soft surfaces to avoid excess weight on the nose wheel.

Go Around Procedures

The go around checklist is completed as a flow checklist. A go around should be performed anytime a stabilized approach cannot be established or maintained, an excessive balloon is encountered during flare, directional control cannot be maintained during a crosswind, or there is risk of a runway incursion.

Throttle full-When the decision to go around has been made, increase the throttle to full. Do not attempt to go around at low power settings.

Establish a climb attitude-Adjust the pitch attitude to establish a climb. With flaps extended the pitch attitude will be relatively low, 3-5 deg.

Carburetor heat off- If the carburetor heat was on during the approach, push the carburetor heat in to maximize engine performance.

Wing flaps 15°-Retract flaps to 15 deg once a positive rate of climb and a safe altitude and airspeed have been established.

Airspeed 60 kts/Flaps retract to 0°-Adjust the pitch attitude to maintain 60kts. Flaps can be retracted to 0 deg above 150' agl. *Airspeed 73kts*-Adjust pitch attitude to maintain a flaps up Vy climb of 73kts.

After Landing

The after landing checklist can be completed as a flow checklist. The after landing procedure should only be performed once the aircraft is clear of the active runway (entire airframe past the hold short lines).

Throttle 1800-2000 rpm-In order to reduce wear in the gearbox system the engine rpm should be increased to above 1800rpm.

Brakes as required –It is recommended to set the parking brake while performing cockpit items unless traffic dictates otherwise.

Wing flaps retract-Wing flaps should be retracted to the 0 or -6 position to increase visibility and reduce the risk of gusty winds lifting the aircraft.

Landing light off-Unless required for taxi the landing light can be shut off.

Transponder STBY-Unless required by ground control set the transponder to standby.

Carburetor heat off-If the carb heat was used during landing push the carb heat back in to turn it off.

Shutdown Procedures

The shutdown checklist can be completed as a Do List.

Parking brake set-To ensure the aircraft does not move while setting items in the cockpit, set the parking brake.

Avionics master switch off- Turn off the avionics by setting the Avionics master switch off. The EFIS panel and the GPS will remain on battery power for 30secs.

Electrical equipment off-If any additional electrical equipment is on such as the position lights, landing light, intercom etc, turn them off. This does not include the beacon light, it should remain ON until the engine has been shutdown.

Gen Master C/B Out/Off-Pull the generator circuit breaker out to disable the generator output.

Throttle to Idle-Set the throttle to idle.

Ignition Switch Off and key removed-Turn the ignition switch to the OFF position. The engine should stop, if not use the fuel valve to shut the engine off.

Beacon OFF- Turn OFF the beacon switch.

Batt Master C/B Out/Off-Pull the battery circuit breaker out.

Fuel Valve OFF-Set the fuel valve to the OFF position. This is required to prevent overflow of the float bowls in the carburetors from fuel gravity feeding.

Recovery system lock (pin in)- Re-install the BRS safety lock pin prior to exiting the aircraft.

ELT check off-From the remote mounted ELT control, verify the ELT has not been activated, The red LED will be flashing if the ELT has been activated.

Section 4- Maneuvers

This section describes the setup and recovery procedures for various maneuvers required for certification of Sport and Private Pilots. The setup procedures described is based on our experience in the CTLS.

Slow Flight

Slow flight is a maneuver practiced in order to develop a feel for the aircraft at low airspeeds which will be encountered during the takeoff and landing phase. Slow flight can be performed at all flap settings from -6 to 35 deg, however the lowest airspeed is obtained using the 30deg flap setting. Climbs, turns and descents can be practiced during slow flight. Prior to performing the slow flight maneuver verify altitude is at least 1500ft AGL and the area has been cleared of all traffic.

The setup for slow flight begins with setting the throttle to approximately 4000 rpm while maintaining altitude. At this point clearing turns can be performed as the aircraft slows down and the flaps can be extended from -6 to 0 once below 100 KIAS. Remember that as the airspeed decreases with a given flap setting the pitch attitude required to maintain altitude will have to increase. During the clearing turn perform the pre maneuvering checklist and continue to configure the aircraft while being vigilant looking for traffic. Once airspeed is below 80 knots flaps can be extended to 15 deg. RPM will decrease as airspeed decreases and should be adjusted back to approximately 3800rpm. Slow flight with 15deg of flaps will be between 45-48KIAS, with rpms near 3800. Flaps can be increased to 30 and 35 deg reducing the slow flight speed to between 42-45KIAS, rpm will need to be increased to approximately 4000RPM with the higher flap settings. In slow flight use a coordinated input of pitch and power to maintain altitude and speed. Turns can be performed in slow flight up to 20deg of bank. Slight power should be added as the turn is entered to maintain airspeed. If a climb is desired, power should be increased to maximum available while pitching to maintaining the slow flight speed. Additional right rudder will be required with added power. Descents at slow flight are obtained by reducing throttle to approximately 2800RPM as it would be during a approach to landing, pitch will be adjusted to maintain airspeed. Left rudder may need to be added as power is reduced.

Power Off Stalls

Power off stalls should not be performed below 1500' agl. Power off stalls can be performed at all flap settings from -6 to 35 deg, however the lowest airspeed is obtained using the 30deg flap setting.

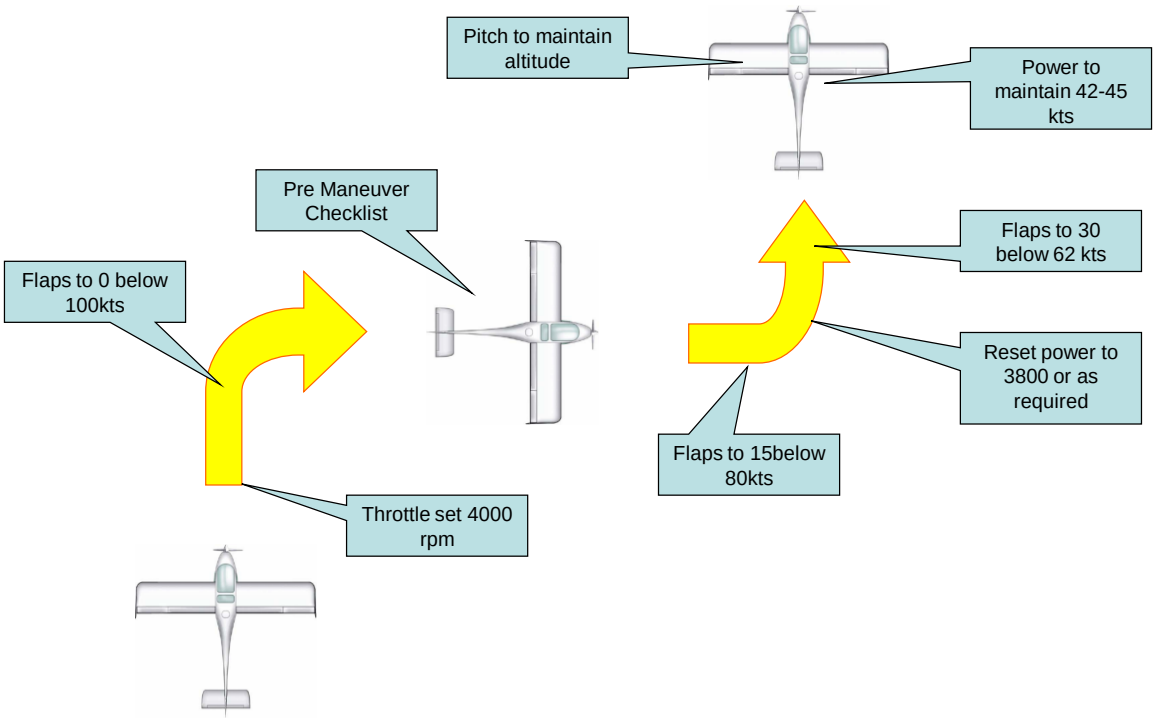
The setup for power off stalls begins in the same manner as with slow flight. There are several methods of performing power off stalls . The Approach to landing stall should be performed from an approach configuration descent. Once the desired flap setting

has been obtained, adjust rpm to 2800 and begin a 500fpm descent to the target stall altitude above 1500'agl. As the aircraft approaches the target altitude reduce the throttle to idle. Pitch should be increased to level off from the descent maintaining altitude until the stall occurs. A stall has occurred when there is a feeling of a mild break or bobble in pitch, possibly accompanied by a slight wing drop. The rate of descent will increase to approximately 600fpm and the nose may appear to porpoise up and down slightly. Stall recovery is performed by pitching the aircraft down slightly, increasing rpm to max, then returning to wings level flight at the assigned altitude and heading. An excessive nose down attitude is not required to recover from the stall, use a mild pitch down to reduce the amount of altitude loss. Power off stall speed with 15deg of flaps will be between 40-42KIAS. With 30 and 35 deg flaps the power off stall speed will be approximately 38-40KIAS. Power off stalls can also be performed from level flight without a descent as well as in a turn left or right. For level flight power off stalls configure the aircraft at the desired flap setting then simply reduce the throttle to idle while maintain altitude until the stall occurs. For power off stalls in turns, configure the aircraft as desired, roll the aircraft to a bank angle of not more than 20deg then reduce the throttle to idle. During stalls in turns pay particular attention to coordination. Once the stall occurs make sure to reduce pitch to recover from the stall prior to rolling wings level.

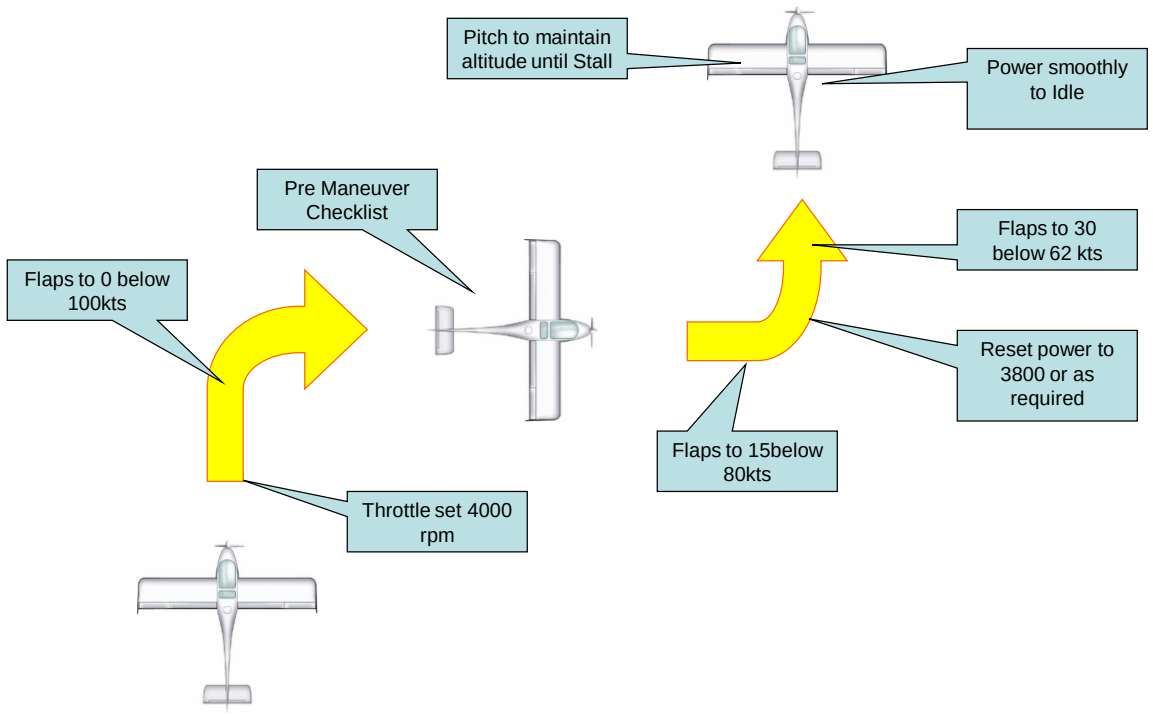
Power On Stalls

Power on stalls should not be performed below 1500' agl. Power on stalls should be performed at 0 and 15deg flap settings and full throttle to simulate a stall during departure. Setup for power on stalls begins by reducing power to 3000rpm and performing clearing turns to clear the area of traffic. The pre-maneuvering checklist should be performed during the clearing turn to ensure the aircraft systems are setup correctly. Once the speed is below 100 KIAS the flaps can be set to the 0 deg setting. Pitch should gradually increase as speed is reduced in order to maintain altitude. As speed is reduced to near 60KIAS continue to increase pitch while increasing power to full. Right rudder will need to be added as power is increased. Pitch will need to be increased more than double the normal Vy climb attitude to pitch of approximately 15-18deg nose up.

Slow flight setup



Power Off Stall setup Straight ahead



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Power On Stall setup Straight ahead

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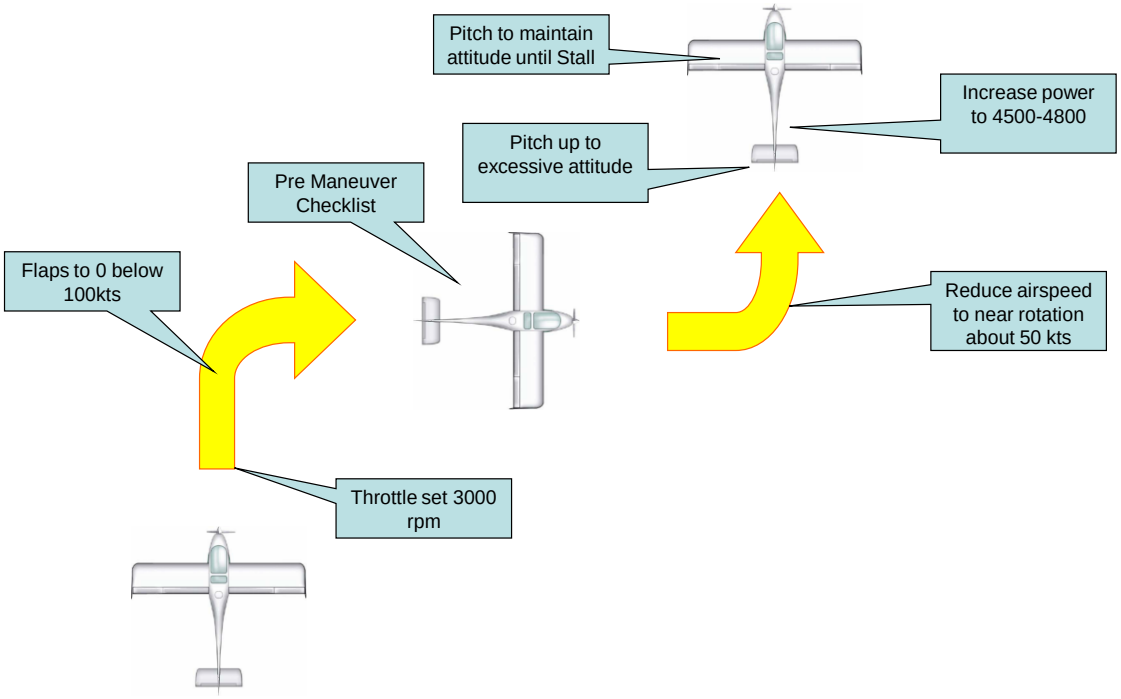


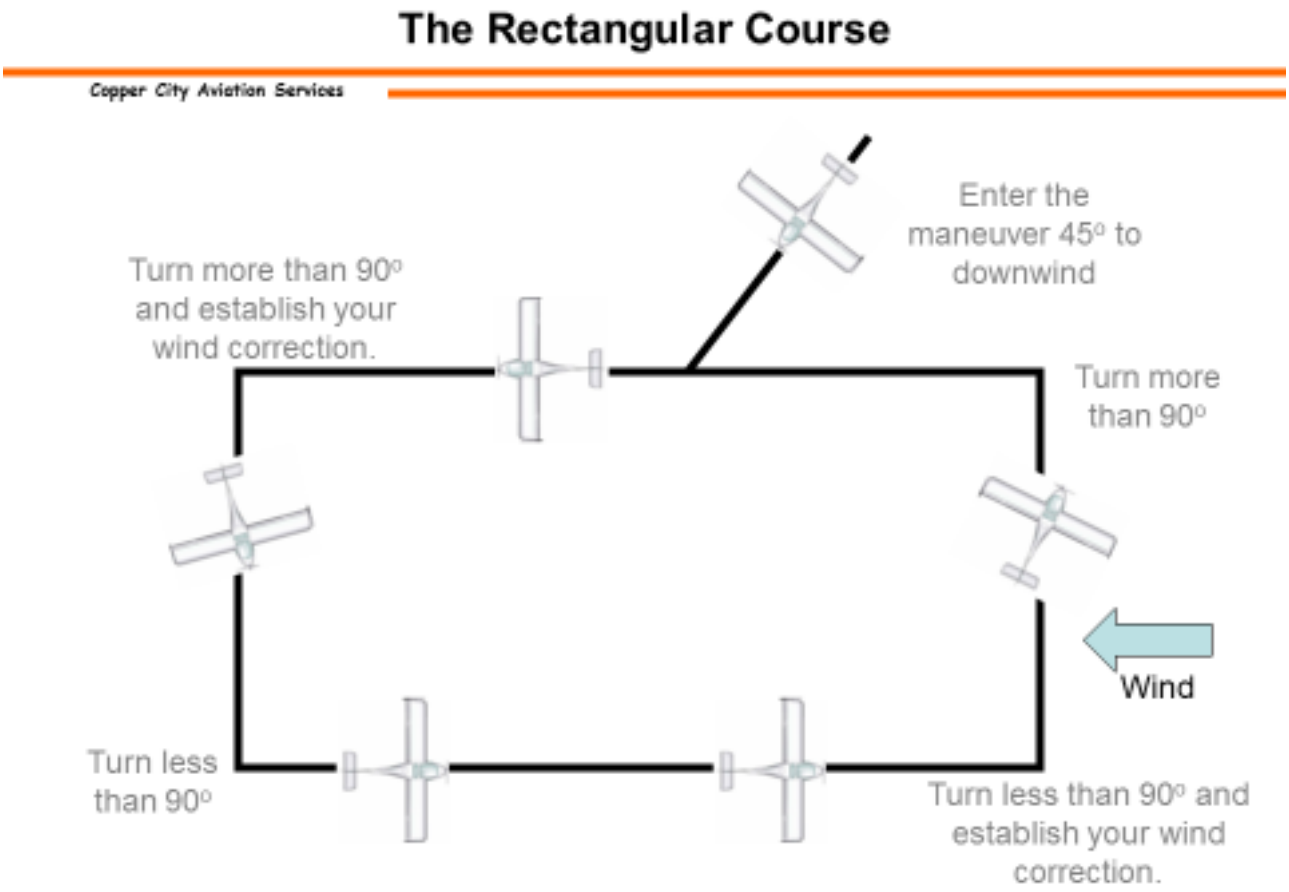
Steep Turns

Steep turns are started with a power setting of 4800rpm and flaps at the -6 position. This sets the CT up at an airspeed near maneuvering speed of 98KIAS. After performing clearing turns find a reference point on the horizon to start from or select a heading. Gradually increase the bank angle to 45 deg while adding slight back pressure. Watch for over-banking tendency once passing 30 deg of bank. It is important to find a reference point on the aircraft that the horizon intercepts while banked in order to help manage the pitch control to maintain altitude. For example when turning to the left and seated in the left seat try to use the center GPS antennas on the dash as a reference point for the horizon. When turning to the right while seated in the left seat use the left corner of the windscreen and instrument panel intersection as a reference point for the horizon. These reference points will vary slightly based on how high you're sitting in the cockpit. Once the bank angle is established the throttle should be increased to 5000rpm in order to maintain the desired airspeed. Monitor the outside referenced pitch attitude, rate of climb, altitude and bank angle during the maneuver. You should plan on rolling out of the maneuver with the same heading you entered. This will require leading the rollout by approximately 15-20 degrees prior to the desired heading.

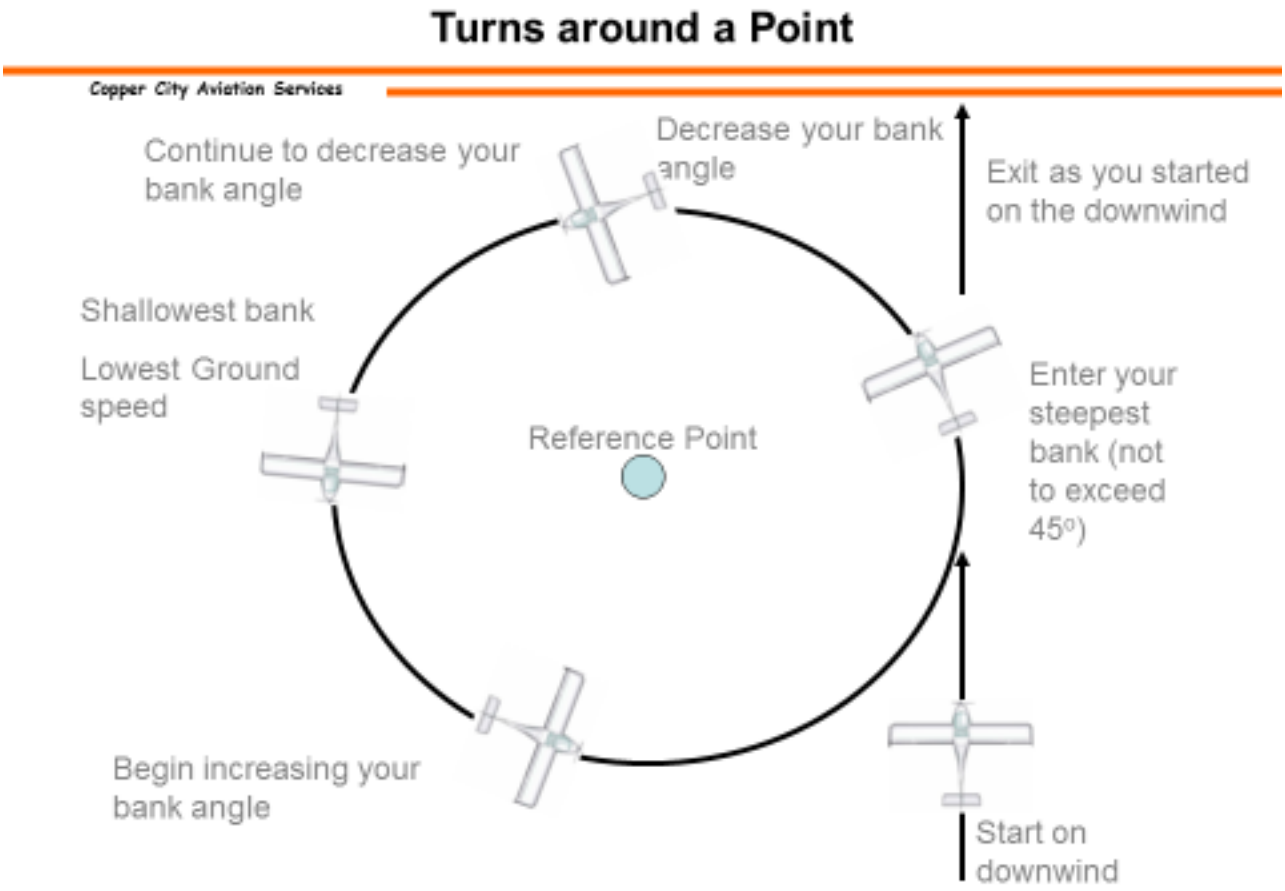
Ground Reference Maneuvers

Ground reference maneuvers are performed at a power setting of 4800RPM and a flap setting of -6 degrees. This establishes the aircraft at a speed near maneuvering speed of 98KIAS. Ground reference maneuvers are typically performed at altitudes of 800ft to 1000ft above ground level. Maneuvers are entered from the upwind side (traveling downwind) so the highest groundspeed is encountered during the first entry into the maneuver.

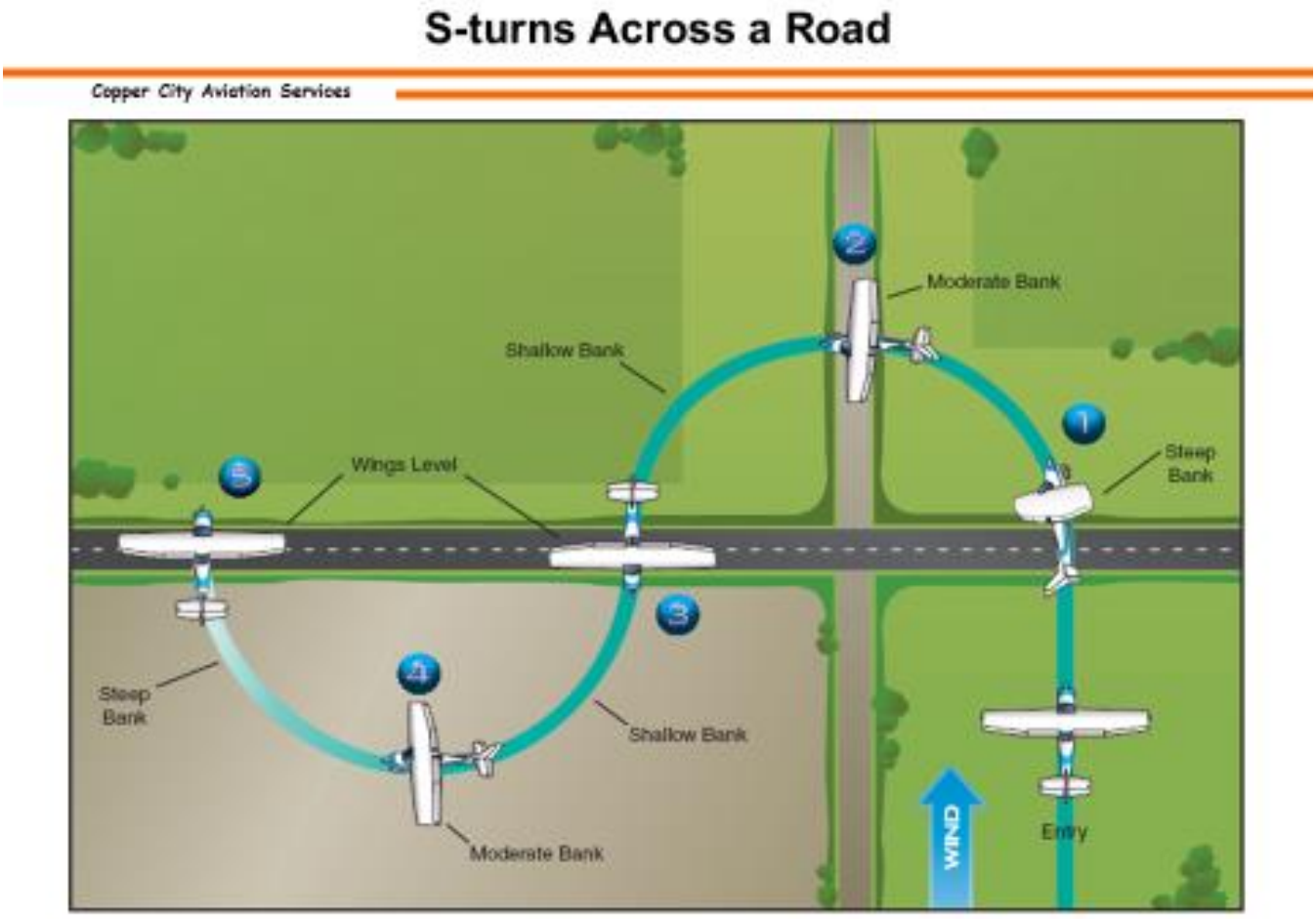
Rectangular Course



Turns around a point



S-Turns across a road



Aircraft Fires

During Start

In the unlikely event an engine fire occurs during start it is important to remove the fuel supply to the engine and exit the aircraft as quickly as possible. To accomplish this the key will need to be set to the OFF position, removed and then the fuel valve can be placed in the OFF position.

Key OFF and removed

Fuel Valve OFF

Exit aircraft

Use external fire extinguisher if available

Stay upwind of fire

Contact emergency services as required

Inflight

Key OFF and removed

Fuel Valve OFF

Slip away from flames

Emergency Descent

Engine Out Landing

Emergency Descent

Throttle Idle

Airspeed pitch for 120 to 145

Engine out procedures

During Takeoff

After Takeoff

Inflight above 500'

Electrical failures

Alternator Failure

Battery Failure

Equipment malfunctions

PFD Failure

EMS Failure

Flap Failure

Section 6-Performance

Calculating performance for Takeoff, Climb, Cruise Descent and landing.

Section 7- Supplementary Information