



# Great Lakes Operational Rules

N60GL and N3604X

Plus One Flyers | August 2018

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# Welcome

Welcome to the Great Lakes community within Plus One Flyers! These are the fleet's most unique aircraft and, because of that, they have special standards.

This document is a set of rules and guidelines to ensure safe Tailwheel and Aerobatic operations in the Great Lakes. You are required to follow these rules to remain a part of the Great Lakes community and Plus One Flyers itself. We look forward to getting to know you while you enjoy hours of fun flying these amazing airplanes!



## Dual Flights

All Plus One pilots are invited to enjoy the Great Lakes with one of our approved, highly-qualified instructors. While this document is geared towards those wishing to solo the airplane, *all* pilots should read these guidelines. You are expected to know and follow them even on dual flights. Your instructor will review them with you.

## Airmanship

Before you solo, you must demonstrate professional airmanship. The Great Lakes is not tolerant of careless pilots. Errors such as forgetting a GUMPS-B check before landing, incorrect stick position during ground ops, failure to constantly S-turn while taxiing, distractions during taxi or flight, low-level aerobatics, “showing off”, an egotistical attitude, and similar behavior will disqualify you from solo and may result in club membership action, including expulsion from Plus One. Excuses are not tolerated; fly professionally.



As a starting point, you are expected to meet the Commercial Pilot ACS standards for normal maneuvers such as slow flight, stalls, steep turns, landings, and overall airmanship. Failure to consistently meet these standards disqualifies you from solo.

# Common Accidents

NTSB accident reports for the Great Lakes are *a/ways* one of four things:

## 1. Taxi Collisions

A pilot taxis into something because they were not S-turning while taxiing. It's usually another airplane, but often an airport sign or light. You cannot see over the nose on the ground, so you **MUST** S-turn constantly.

## 2. Nose-Over During Run-up

If the stick is allowed to creep forward during run-up, the plane **WILL** nose-over and strike the prop. Guard the stick at all times. If the plane starts to creep forward at run-up power, immediately cut the throttle to idle and **ONLY THEN**, smoothly apply the brakes. If the brakes are “stabbed” to stop forward motion at run-up power, the plane **WILL** nose-over!

## 3. Nose-Over Due To Brakes

The brakes are *powerful*. If you use them while the plane is moving faster than taxi speed, or you forget to clear your passenger's feet before touchdown, the plane **WILL** flip over.

## 4. Loss of Directional Control on Landing

A go-around is *a/ways* an option. Even the most experienced tailwheel pilots sometimes make bad landings. Never try to save one! Remember that the throttle is the “great eraser” in a tailwheel—push it forward and go around.

Do not become the next NTSB report. Learn from other people's mistakes!



*See the smoke behind the tires in the second frame? This is what happens when the brakes are not clear at touchdown: an INSTANT flip.*

*It CAN happen to any of us—the pilot in the photos had 2,700 hours in-type! The only way to prevent accidents is to never get complacent. That's why we have a zero-tolerance policy about “forgetting” procedures.*

# Care of the Great Lakes

Like all fabric airplanes, the Great Lakes is easily damaged. Here's how to avoid that:

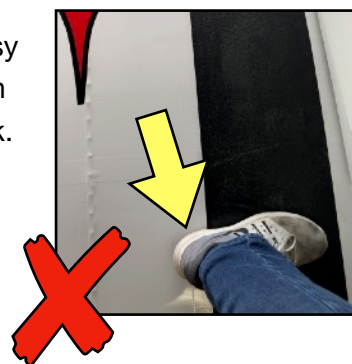
## Passengers

Never turn your back on passengers, even for a second. They will inadvertently damage the plane. Keep them away from the aircraft until you can help them enter/exit. Do not allow them to “explore” on their own or leave them with the plane unattended.

## Wing-walk

Step ONLY on the black area. When leaning into the cockpit, it's easy to let your foot turn so that your heel hangs off, over the fabric. Even small pressure from your heel cracks the paint next to the wing-walk.

Also, mind your toes: it's easy to jab them into the side of the fuselage and damage *that* fabric while stepping on the peg, or moving around. Don't fly in boots or cumbersome footwear.



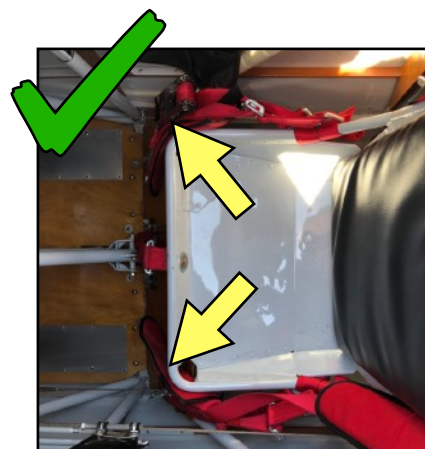
## Shoulder Harnesses

These NEVER leave the cockpit. You may see other pilots (in other planes!) drape them outside to get in. Do NOT do that. The metal parts damage the fabric. Simply move them to the sides of the seat IN THE COCKPIT before you enter. Also, be sure to take the straps off of your shoulders before exiting the cockpit, or they will flop out and the metal ends will damage the fabric and paint.

## Lap Belts

The lap belts have sharp metal parts (especially the ratchets). If you're careless, these metal parts will nick paint and damage the wooden stringers and fabric *inside* the cockpit.

Please loosen your harness for the next pilot. When the lap belts are loosened, lay them gently as shown (beside the seat, hanging over the front support rail) so that the metal parts do not hit the painted airframe or fuselage fabric.





### Jackets, Belts, Zippers, Rings, Watches

When you lean into the cockpit to adjust the harnesses, BE SURE your belt buckle, jacket zipper, or other clothing does not scratch the fuselage! If you wear rings or a watch, make sure you do not use that hand to hit the tail fabric while doing the foreign object test!

### The Turtle Decks

Do not put your weight on any part of the fuselage behind either cockpit. These areas will easily dent if pressed on. NEVER sit on any part of the airplane other than the seats, especially not the top of the fuselage! Your LEGS do 95% of the work of getting in and out of the plane; do not press with your hands or pull your weight with the handle on the upper wing—it cannot support that.



### Hangar Rash

Use the tailwheel carriers to move the planes in and out of the hangar. Trying to push the plane straight—especially by yourself—is an excellent way to bang a wing or tail into something.



### G Meters

Do not reset the G meters at the end of your flight. The next pilot will look at them to verify that the airframe was not overstressed.

### Not a Shelf!

NEVER STACK ANYTHING ON THE PLANE! Jackets, headsets, flight bags, paper, kneeboards, parachutes—LITERALLY. NOTHING. EVER. Anywhere. Even on the wing-walk. Nothing ticks an Owner off faster than treating their plane like a \$20 shelf.



**The planes stay in the club only if they're treated well. Please help us.**

# Solo Tracks

While the Great Lakes *is* an aerobatic aircraft, not every pilot is interested in aerobatics. As such, there are two “tracks” available for solo in the Great Lakes: **Aerobatic** and **Tailwheel**.

## Levels

Each track contains multiple levels with different limitations. The purpose of these levels is to allow pilots of different experience to solo the aircraft in conditions that match their current abilities. You will be assigned to a level during the solo checkout with a Chief Instructor.

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### WARNING

Compliance with level limitations is absolutely mandatory. Performing maneuvers or flying in conditions outside of your authorized limits WILL result in expulsion from the Great Lakes and *may* result in expulsion from Plus One itself.

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## Tailwheel Track

This track allows general flying, but prohibits all aerobatic figures, including spins. It contains these levels:

### 1. Basic Tailwheel

**Wind limit:** 10 knots total including gust factor, 5 knots max crosswind.

**Currency requirement:** at least 3 Great Lakes landings and 1 hour in the last 30 days.

### 2. Intermediate Tailwheel

**Wind limit:** 15 knots total including gust factor, 8 knots max crosswind.

**Currency requirement:** at least 3 Great Lakes landings and 1 hour in the last 45 days.

*Actual* crosswind landings must be demonstrated during solo checkout.

### 3. Advanced Tailwheel

**Wind limit:** 25 knots total including gust factor, 12 knots max crosswind. (This is the IAC competition wind limit and maximum demonstrated crosswind for the plane.)

**Currency requirement:** at least 3 Great Lakes landings and 1 hour in the last 60 days.

*Actual* crosswind landings must be demonstrated during solo checkout.

# Aerobatic Track

Pilots in this track may fly aerobatic figures authorized by their current level. No pilot will be approved for a level without first demonstrating to a Chief Instructor mastery of every figure contained in both that level and all lower levels.

Pilots above Basic Aerobat *must* fly an appropriate IAC competition sequence in addition to single figures. A Chief Instructor may authorize an aerobatic pilot to fly additional, specific figures as appropriate. Aerobatic pilots' wind limits will be set during checkout to an appropriate *Tailwheel Track* level.

## 1. Basic Aerobat

May perform: ballistic rolls, loops, wingovers, barrel rolls. No sequencing of figures is allowed.

## 2. Primary Aerobat

May perform: aileron slow rolls, positive spins, half-cuban eights, competition turns.

## 3. Sportsman Aerobat

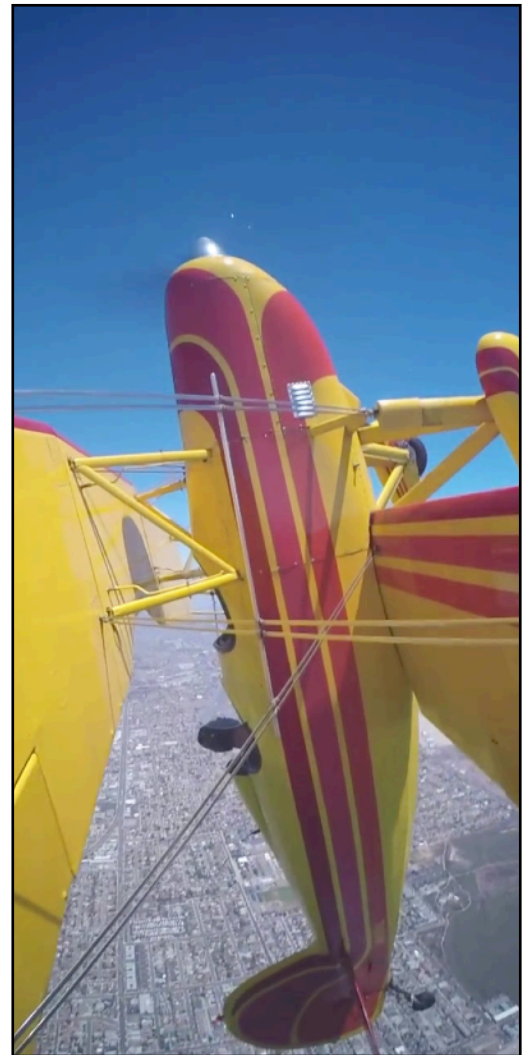
May perform: hammerheads, Immelmans, wedges, full cuban eights, humpty bumps, hesitation rolls, sustained inverted flight/turns.

## 4. Intermediate Aerobat

May perform: inverted spins, positive snap rolls. (Snap rolls must be specifically authorized by the Owner of each Great Lakes before EACH FLIGHT where they are to be performed. The pilot will inspect the engine mount after each flight involving snaps and report findings to the Owner. Snaps are prohibited without pre-flight permission.)

## 5. Unlimited Aerobat

May perform any Aresti Catalog figure approved by the Great Lakes Aircraft Information Manual AND not prohibited by these operating rules. May fly variations of figures and add decorators as appropriate for their skill and the aircraft's limitations. Pilots at this level have demonstrated a mastery of both aerobatics and aeronautical decision-making related to aerobatics. They will exercise good judgment in figure variations and decorator selection.





# Aerobatic Figure Variations

Aerobatic figures have dozens of variations. Each one can be further customized by adding new “decorators” such as rolls and spins. Because it is not practical to list every possible variation and decorator on each figure, this rule applies:

## Variations Rule

No pilot, except Unlimited Aerobats, may fly solo any major variation of a figure nor add additional “decorators” (K) to an approved figure before demonstrating that variation to a Chief Instructor and receiving approval to fly it solo.

## Examples

This is not an exhaustive list; it is meant to guide you when evaluating figures.

- (A) Approval for a loop does NOT include approval for an *outside* loop, where you begin inverted and push rather than pull around the loop. (Major variation)
- (B) Approval for a normal two-point hesitation roll does NOT grant approval to perform that roll on a vertical downline or at the apex of a loop. (Additional decorator)
- (C) Approval for a half-cuban does NOT include approval for a reverse half-cuban or full cuban eight. (Major variation)
- (D) Approval for a hammerhead does NOT include a hammerhead with a 45° up-line entry. (Major variation)
- (E) Approval to fly positive spins DOES allow any amount of spin, from one turn up to the IAC limit of two turns. (Minor variation)
- (F) Approval to fly a 180° competition turn DOES allow competition turns of any amount, up to 360°. (Minor variation)

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## WARNING

If you are unsure whether you are allowed to fly a certain figure or variation, **ask** the Chief Instructor beforehand. If you fly an unapproved variation or add additional decorators, you may permanently lose solo privileges.

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## Prohibited Actions

Intentional performance of these actions will result in immediate expulsion from flying the Great Lakes, without exception:

### Tail Slides

No pilot or instructor will ever perform intentional **TAIL SLIDES**. This figure can catastrophically damage the tail and render the airplane uncontrollable. It poses a risk to pilots who fly after you, since hidden damage won't be visible during a pre-flight. If an *accidental* tail slide results from a botched figure, the flight **MUST** be discontinued immediately and the incident reported to the Owner so that an inspection can be done.

### Unauthorized Snap Rolls

No pilot or instructor will perform **SNAP ROLLS** without explicit permission from the Owner of the airplane before each specific flight. (Note: Until advised otherwise, snap rolls are permanently prohibited in 3604X because that plane does not have a reinforced engine mount.)

### Low-Level or Unsafe Aerobatics

Any form of low-level aerobatics, “buzzing”, or “showing off” is prohibited. Any aerobatic flight without a parachute is prohibited, even though the FARs allow solo aerobatics without one. Violation of this rule will *almost certainly* result in expulsion from Plus One Flyers.

### Camera Mounts

No camera mounts of any kind may be attached, even temporarily, to ANY PART of the aircraft without the Owner's prior approval. If you break this rule, there will be photo/video proof!

### Unimproved Airports

No pilot or instructor may land the Great Lakes on any surface other than pavement without permission from the Owner. Unimproved runways damage paint, fabric, and the prop.

### Maintenance and Repairs

No pilot or instructor may perform any work on the Great Lakes without the Owner's permission. If you have to pick up a screwdriver, a wrench, or any other tool: call the Owner first. This includes “simple” work such as opening a cowl, or tightening a wheel pant. This rule applies regardless of your qualifications (A&P, etc.)

# Currency Requirements

## Tailwheel Pilots

The currency requirements for solo *Tailwheel Track* pilots are listed above, under each level.

## Aerobatic Pilots

No pilot may fly solo aerobatics without at least one aerobatic flight in the Great Lakes within the last 60 days. This is an upper limit only—pilots are encouraged to set lower personal limits and recognize that G-tolerance and aerobatic performance are perishable skills.

If your currency lapses, you **MUST** fly with an Authorized Instructor before soloing.

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### NOTE

If there is ANY doubt in your mind about your proficiency, contact an Authorized Instructor. If you are worried about the expense, contact a Chief Instructor or Owner, who will fly with you **at no charge for instruction** to re-establish your comfort level.

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## Currency Log

A complete list of qualified solo pilots will be displayed in each Great Lakes hangar. This list will include each pilot's competency level, wind restrictions, and last flight date. Pilots **MUST** update the date of their *last* flight on this list before each new flight. This information will be verified with Schedulmaster to ensure that no pilot flies outside of their currency.



# Instructors

There are two categories of Great Lakes instructors:

## 1. Tailwheel Instructor

- a. Must meet the standards for *Advanced Tailwheel*.
- b. Must demonstrate complete mastery of the aircraft from both front and rear cockpits, including a demonstrated ability to recover from faulty landings and approaches.
- c. Must demonstrate superior knowledge of tailwheel fundamentals, airmanship, and care of the Great Lakes, along with an ability to teach this information to students.
- d. Authorized to perform introductory flights, tailwheel instruction, and Great Lakes transition training. No aerobatic instruction is allowed.
- e. May conduct spin training if authorized to do so by a Chief Instructor.
- f. NOT authorized to approve any pilot for solo or promotion to a new level.
- g. **Currency requirement:** at least one Great Lakes flight in the past 90 days.

## 2. Aerobatic Instructor

- a. Must meet the standards for *Tailwheel Instructor*.
- b. Authorized to conduct all operations of *Tailwheel Instructor*.
- c. Authorized to provide aerobatic instruction matching their level of experience in International Aerobatic Club (IAC) competition. Aerobatic Instructors with no IAC experience may teach only the *Basic Aerobat* figures. Aerobatic Instructors with Primary IAC experience may teach only *Primary Aerobat* figures, etc. (A Chief Instructor may individually authorize Aerobatic Instructors to teach specific figures above their IAC competition experience.)
- d. NOT authorized to approve any pilot for solo or promotion to a new level.
- e. **Currency requirement:** at least one Great Lakes aerobatic flight in the past 90 days.

# Chief Instructors

Chief Instructors manage the Great Lakes fleet and:

- a. Are selected by, and report to, the Great Lakes Owners.
- b. Must meet the standards for *Aerobatic Instructor*.
- c. Are authorized to conduct all operations of *Aerobatic Instructor*.
- d. Are responsible for supervising both *Aerobatic* and *Tailwheel* Instructors. This includes periodically flying with instructors to verify continued competency.
- e. Are authorized to conduct checkrides to approve new Tailwheel and Aerobatic Instructors. However, the Owner of each Great Lakes has the right, at their option, to meet, fly with, and/or *personally* approve new instructors before they give instruction in that Owner's aircraft. The Owner may prohibit that instructor from instructing in their aircraft for any reason.
- f. Are authorized to conduct checkrides to approve new pilots for solo and promote existing Great Lakes pilots to new levels, as appropriate. However, the Owner of each Great Lakes has the right, at their option, to meet, fly with, and/or *personally* approve new pilots before they solo that Owner's aircraft. The Owner may prohibit a pilot from solo in their aircraft for any reason.
- g. Are required to maintain an accurate, current list of all Great Lakes pilots and instructors, including their assigned levels, privileges, and contact information, and furnish that list to each Owner and the Plus One Safety Officer.
- h. Are responsible for revising the Great Lakes Operational Rules (this document) as necessary and directly informing all Great Lakes pilots of changes.
- i. Must fly, at no charge for instruction, with any Great Lakes solo pilot who expresses doubt about their currency and cannot afford to pay an instructor. No pilot will abuse this privilege to acquire free flight instruction.
- j. If necessary, investigate and decide if a Great Lakes pilot or Instructor has violated these Operational Rules. If a violation occurs, the appropriate remedy (including expulsion from flying the Great Lakes) is at the discretion of the Chief Instructors.
- k. Are the final authority on the standard operating procedures for the Great Lakes, except that Chief Instructors shall coordinate with Owners to ensure that all procedures meet the standards and preferences of each Owner.



# Standardized Procedures

Every pilot has their own technique, but certain procedures shall be standardized across all Great Lakes pilots. Failure to follow these procedures will result in a loss of solo privileges.

## Last Chance Walk-Around

Just before getting in the cockpit, perform a 360° walk-around of the plane. Look for tow bars, chocks, loose items, open oil doors, pitot tube covers, open baggage doors, etc. If you get back out of the cockpit for any reason, perform a new walk-around.

## Fuel Cap Check

As you climb into the cockpit, put your hand on the fuel cap and verify it's secure. Do *not* leave your life in the hands of the fuel truck driver! Also use this vantage point to scan the top wing for damage—you may not have seen it from the ground during pre-flight.

## Engine Start

This technique produces smooth, easy starts that are gentle on the engine:

Cradle the stick inside your right elbow and hold it FULL AFT. Place your right hand on the mixture control. For a cold engine, push the throttle and mixture FULL FORWARD. Turn on the Master switch. Turn on the Aux Fuel Pump while watching the fuel-flow gauge. When the needle moves, count “1-GreatLakes-2-GreatLakes”, then turn the Aux Pump OFF.

Move the Mixture to FULL LEAN. Move the Throttle to FULL IDLE, then crack it one-half inch. Check the area and call “CLEAR”. Hold the brakes. With your right hand on the Mixture, turn the ignition switch with your left hand. WAIT to release the key and bring the Mixture forward until the engine fires steadily. If you react at the very *first* firing, the engine will not start smoothly—in general, the right moment is about 1-2 seconds after the first firing.

Lean the Mixture roughly halfway for taxi. For a hot engine, follow the same procedure but skip the Aux Pump priming. Your instructor will review the procedure for starting a flooded engine. Do not flood the engine.

## Blind Spot Check

Every time you start rolling forward from a stop, start an IMMEDIATE turn to verify that nothing stopped in front of you. You cannot see them! (Multiple Great Lakes in San Diego have hit other airplanes while starting to taxi because they did not do this.)



### **Cruise & Lean**

After reaching 1,000' AGL, speed up your climb from  $V_y$  (75mph) to 85-90mph to provide adequate engine cooling. Try to keep cylinder head temperatures below 400°F. Never exceed 415°F. Never lean during climb. Never lean below 10GPH fuel-flow in cruise. These engines work hard in aerobatic flight; they must be treated well.

### **HALT**

This series of verbal callouts MUST be made before beginning aerobatics:

#### **H—Harness**

Visually check that buckles are fastened and straps are tight. Fly a harness check.

#### **A—Altitude**

Verify altitude is sufficient and that the view outside matches what the gauge says.

#### **L—Loose Items Secure**

Anything loose is about to depart the plane—check your headset battery box!

#### **T—Traffic**

Clearing turns complete, area clear, announcement made on 122.75. Use the word “aerobatics” in your announcement—other pilots take that more seriously than simply “maneuvering”. Provide a generous altitude block such as “3000 to 7000”.

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### **NOTE**

Our practice areas are in high-traffic environments. No more than one aerobatic sequence or three individual figures may be flown before new clearing turns are performed and a new traffic announcement made. Constantly scan for threats and remember that many pilots do not monitor 122.75

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## GUMPS-B

This series of verbal callouts **MUST** be made at least once *before* short final on EVERY landing. Pilots are encouraged to do this check twice—once on base, once on final:

### **G—Gas**

ON and, if not a full-stop landing, quantity sufficient for a touch-and-go.

### **U—Undercarriage**

DOWN and LOCKED. (To build a habit for retractable airplanes.)

### **M—Mixture**

RICH.

### **P—Prop**

FULL FORWARD in preparation for a go-around.

### **S—Stabilized Approach + Seatbelts & Shoulder Harnesses**

If the approach is not completely stabilized (hands-off), GO AROUND. Check that seatbelts and shoulder harnesses are secure.

### **B—BRAKES CLEAR**

VISUALLY verify that your feet are clear of the brakes. Get a VERBAL confirmation from the front seat passenger that their brakes are clear.

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## **WARNING**

The brakes check is a **zero-tolerance item**. You will ask the front seat passenger to confirm they are clear of the brakes **EVEN** when that passenger is an instructor. If you forget even once, you are immediately disqualified from solo pending additional dual instruction and a new checkout.

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### Shutdown Procedure

All pilots will shutdown the plane the same way so that we never leave it in a dangerous state:

1. **Avionics—OFF** (switches on the left panel: turn off first to avoid surge damage)
2. **Mixture—FULL LEAN** (make sure engine is at 1000 RPM first to clear fuel lines)
3. **Mags—OFF** (double-check key position to avoid leaving hot mags!)
4. **Master—OFF**

### Hangar Closing

Just before leaving the hangar, all pilots will double-check:

1. **Mags—OFF**
2. **Master—OFF**
3. **Airplane—SECURE** (chocked, aerobatic sight covered)

If you find the airplane in an unsatisfactory state when you arrive, call the last pilot on the schedule and tell them what was not done correctly—even *if* that pilot is an instructor or Owner! We must all hold each other accountable to these standards, with no exceptions.



# Aerobatic Practice Areas

There are three locations authorized for aerobatic flights, as shown:

No pilot may fly aerobatics in any other location without prior authorization from a Chief Instructor.

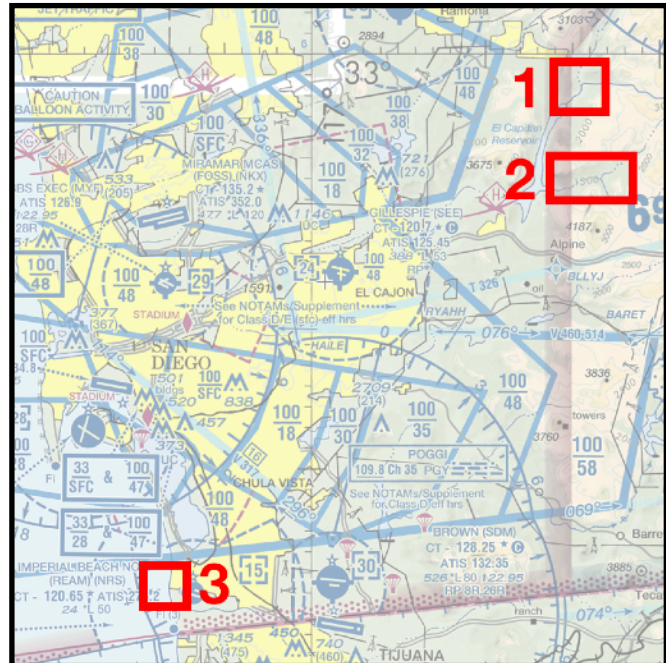
## Locating From The Air

Your instructor will show you how to identify each location from the air and where the exact boundaries are.

## Minimum Altitudes

Each practice area has a different

“Aerobatic Floor”, which is the absolute minimum altitude that **MUST NOT** be violated during any aerobatic sequence or figure. These apply to every aerobatic pilot of every level. Pilots are encouraged to set higher personal minimums.



## Area 1

**Floor: 3,500' MSL**

Just northeast of the El Cap reservoir, over a small grassy field where two dirt roads intersect. This is a high-traffic area; clear it often and do not fly over the reservoir; that is a common route for transiting aircraft

**WARNING:** the field is at a lower elevation than the surrounding hills. Maintain situational awareness of where you are in relation to the field!

## Area 2

**Floor: 5,000' MSL**

Valley just north of Viejas Mountain, three miles east of the El Cap reservoir, west of Cuayamaca Peak, where two dirt roads intersect.

**WARNING:** the surrounding mountains are much higher terrain. Maintain situational awareness of where you are in relation to the valley.

## Area 3

**Floor: 1,500' MSL**

Immediately off the coast of Imperial Beach, over the water south of the jetty. Do not fly aerobatics directly over the beach—that would be a violation of the FARs.

**WARNING:** this area is available **ONLY** when the Imperial Beach military airport is closed. That is normally Saturday and Sunday, but always CHECK NOTAMS!





## The Solo Checkout

You'll notice that this checkout is more extensive than that of any other Plus One plane. That's by design. The Great Lakes are *competition aerobatic biplanes*. Earning the chance to solo them might take some work, but it's a real accomplishment and something to be proud of!

### Attitude

During the checkout, your attitude and overall approach to flying are just as important as your performance in the cockpit. The best pilots are those who constantly want to improve both their skill and knowledge. Who never feel like they're done learning. Who humbly acknowledge weaknesses, then work like hell to eliminate them. The most dangerous pilots are those who feel like they're hot stuff. Who think they can handle anything. Who make excuses instead of acknowledging weaknesses. The extreme capabilities of the Great Lakes require that we prevent the second type of pilot from soloing.

### Commercial Competency

It is assumed that you already operate all aircraft to the Commercial Pilot ACS standards. We omit things such as radio fluency, airspace knowledge, flight planning, NOTAMS, and general airmanship from the tables below. However, those items are absolutely being evaluated during your checkout. If any deficiencies are noted, you will not be approved for solo. You must be comfortable in the environment, NOT task-saturated, and always "ahead of the aircraft."

# Tailwheel Track Performance Standards

For a *Tailwheel Track* solo checkout, these are the tasks you'll perform.

## 1. Preflight

G1	Explain the major points of the Great Lakes Operational Rules, with a special emphasis on <u>common accidents</u> and <u>prohibited actions</u> .
G2	Explain the common ways to damage the Great Lakes while outside of the cockpit. Demonstrate how to handle passengers around the airplane.
G3	Explain how the constant-speed prop system works. Explain correct settings for takeoff, climb, maneuvering, and landing.
G4	Explain the requirements for engine cooling, including airspeeds, when to lean and not lean, and what fuel-flow you should expect to see.
G5	Explain the Great Lakes performance data, including V-speeds, best-glide speed, minimum-sink speed, useful load, useable fuel, fuel-burn rates, and takeoff/landing distances.
G6	Demonstrate a thorough pre-flight inspection, including how to check the tail for foreign objects.
G7	Demonstrate a thorough passenger briefing, including a discussion of the danger posed by the brake pedals, use of the 7-point harness, signals to use in case of intercom failure, the push-to-talk system, etc.
G8	Perform the last chance walk-around and fuel cap check <u>without prompting</u> .

## 2. Startup & Taxi

F1	Demonstrate the correct starting procedure for the engine's state, <u>including</u> proper stick positioning prior to start.
F2	Demonstrate <u>constant</u> S-Turns while taxiing, including an <u>immediate</u> clearing turn anytime motion begins. <b>ZERO-TOLERANCE: If you forget this <u>even once</u> or require prompting to do it, you fail the checkout. No exceptions; no excuses. This is the most common way a Great Lakes is wrecked.</b>
F3	Demonstrate correct aileron/elevator positioning for the relative wind <u>and</u> prop-wash from aircraft while passing behind them.

### 3. Run-up

F1	Demonstrate proper use of the run-up checklist. Verbalize each step.
F2	Maintain correct stick position and brakes throughout the run-up. If the aircraft begins to creep forward, move the throttle to IDLE <u>before</u> adding brakes. <b>ZERO-TOLERANCE:</b> If the Chief Instructor must intervene, you fail the checkout. No exceptions; no excuses. Run-up nose-overs are too common.
F3	Abort plan: <u>verbally</u> explain what you will do and where you will go if the engine fails at each critical point from power-up to 1,500' AGL.

### 4. Takeoff

Takeoffs and landings must be demonstrated on a narrow runway (27L).

F1	Smoothly apply power and maintain runway centerline <u>at least</u> between the main gear. Verify engine instruments GREEN and airspeed ALIVE.
F2	Smoothly pick up the tail at the correct time, establish $V_y$ after liftoff, and maintain runway centerline in flight with <u>complete</u> rudder coordination.
F3	Set engine power to 25 <sup>2</sup> at 1000' AGL, speed up climb to 85-90mph for engine cooling <u>without prompting</u> . Effortlessly maintain coordinated flight and constant airspeed throughout the traffic pattern.
F4	Perform smooth, shallow S-Turns during climb-out to clear the airspace ahead

### 5. Basic Maneuvers

F1	Select <u>and clear</u> a suitable practice area.
F2	Demonstrate fully coordinated steep turns in both directions to the Commercial ACS standard. ( $\pm 50$ ft, $\pm 10$ mph, $\pm 10^\circ$ on rollout)
F3	Demonstrate maneuvering in slow-flight. Demonstrate full power-off, power-on, and turning ( $30^\circ$ bank) stalls. All to the Commercial ACS standards.
F4	Demonstrate lazy-eights to the Commercial ACS standard. ( $\pm 100$ ft difference between entry and exit altitudes, $\pm 10$ mph, $\pm 10^\circ$ heading error) Maintain fully coordinated flight throughout.
F5	Demonstrate a simulated engine failure, including the "ABCDE" flow and proper (simulated) procedures to diagnose/restart the engine.

## 6. Approach

<b>F1</b>	Maintain a safe, higher-than-normal approach altitude in case of engine failure.
<b>F2</b>	Establish and maintain a stabilized approach at the correct, constant airspeed.
<b>F3</b>	Verbally conduct a <b>GUMPS-B</b> check at the appropriate time. <b>ZERO-TOLERANCE:</b> if you forget <u>any part</u> of this check even once, on <u>ANY</u> landing approach, you fail the checkout. No exceptions; no excuses.
<b>F4</b>	Verbally clear the front passenger's brakes and receive an affirmative response. <b>ZERO-TOLERANCE:</b> if you forget this even once, on <u>ANY</u> landing approach, you fail the checkout. No exceptions; no excuses.
<b>F5</b>	Demonstrate mastery of the airport environment, including ATC calls, collision avoidance, runway incursion avoidance, etc. Manage distractions safely.

## 7. Landings

It is not possible to quantify *exactly* what makes a good landing. Perfect “greasers” are not required. However, landings must be consistently gentle on the airplane. (Again, these are competition aerobatic aircraft.) Landings must be demonstrated on a narrow runway (27L).

<b>F1</b>	Demonstrate multiple wheel landings.
<b>F2</b>	Demonstrate multiple 3-point landings.
<b>F3</b>	Touchdown in the first 1/3 of the runway, on centerline, and maintain centerline <u>at least</u> between the main gear. Lower the tail at the appropriate time for a wheel landing.
<b>F4</b>	NEVER apply brakes before the aircraft is at Taxi speed. Even if a tailwheel shimmy occurs, or if ordered by ATC to make a certain taxiway (report “UNABLE”), etc. <b>ZERO-TOLERANCE:</b> If you apply brakes before taxi speed, you fail the checkout. No exceptions; no excuses. This is how flips happen.
<b>F5</b>	If required, demonstrate recovery from a botched landing with an immediate go-around. NEVER attempt to save a landing. <b>ZERO-TOLERANCE:</b> If you fail to <u>immediately</u> go-around from a poor landing, you fail the checkout. No exceptions; no excuses.
<b>F6</b>	Taxi safely to the hangar, with constant S-Turns, and demonstrate the correct shutdown procedure.

# Aerobatic Track Performance Standards

If you are not already approved to solo the Great Lakes, you will also be responsible for all tasks in *Tailwheel Track Performance Standards* (above) during your aerobatic checkout.

NOTE: for any level above Basic Aerobat, you will fly the current IAC Known Sequence for the aerobatic level you seek *and* any additional figures that are not part of that sequence. Basic Aerobats are limited to flying one figure at a time; no sequencing of figures is allowed.

## 1. Initial Checkout Tasks

If this is your first aerobatic checkout, these tasks **MUST** be performed, regardless of level.

<b>G1</b>	Explain the FARs related to aerobatic flight.
<b>G2</b>	Explain the Great Lakes Operational Rules related to aerobatic flight.
<b>G3</b>	Explain the Great Lakes inverted systems <u>and their limitations</u> .
<b>G4</b>	Describe normal oil pressure readings for upright and inverted flight, expected oil loss during aerobatics, and which figures maximize oil loss.
<b>G5</b>	Explain the Great Lakes G limits, the situations in which they are most easily exceeded, and how to avoid those situations.
<b>G6</b>	Explain G-LOC, blacking/redding-out and tunnel vision. Explain when this is most likely to occur. Demonstrate the physical actions to brace for $\pm G$ .
<b>G7</b>	Explain the relationship between G and energy (airspeed). Explain why figures should be flown with the minimum amount of G required.
<b>G9</b>	Demonstrate an aerobatic brief for a passenger. Explain what to do if a passenger panics, feels nauseous, etc. Discuss how to gradually expose someone to aerobatics for the first time.
<b>G10</b>	Discuss FARs related to parachutes; demonstrate a pre-flight inspection.
<b>G11</b>	Explain the bail-out procedure + parachute deployment, control, & landing.
<b>G12</b>	Brief each figure or sequence to be flown, using the standards below.
<b>F1</b>	Meet all <i>Tailwheel Track Performance Standards</i> in the previous section.
<b>F2</b>	Locate the practice area unaided. Select a safe initial altitude. Complete the HALT checklist <u>without prompting</u> and adequately clear the area.



## 2. Aborted Maneuvers

You will perform each task that applies to the figures in the level you seek.

(Example: Primary Aerobats will not demonstrate recovery from a vertical line, as no vertical lines are authorized.)

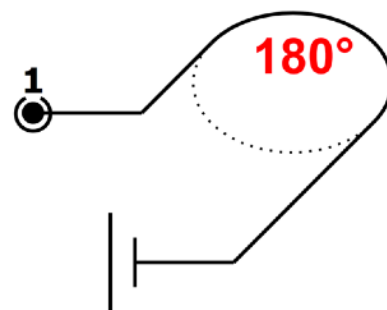
<b>G1</b>	Explain general procedures for recovering lost control from any attitude and any botched figure.
<b>G2</b>	Explain the extreme danger posed by attempting to pull-through a botched maneuver while nose-low and inverted (flying a split-S). Discuss how to not panic in this situation. Explain the “ <i>nearest horizon in current attitude</i> ” rule for recoveries.
<b>F1</b>	Demonstrate pushing out of an inverted, nose-low attitude to level-inverted flight, then rolling upright.
<b>F2</b>	Demonstrate rolling out of an inverted, nose-low attitude, then recovering to level flight without exceeding G limits or $V_{ne}$ .
<b>F3</b>	Demonstrate aborting a loop at any point indicated by the Chief Instructor, without stalling, and with minimum loss of altitude.
<b>F4</b>	Demonstrate aborting a vertical up-line by pulling or pushing to level flight, as appropriate.

## 3. Individual Figures

The remainder of the aerobatic solo checkout involves flying aerobatic figures to the standards on the following pages.

# Wingover

Figure	K	Total K
0.0	8	8



## On the ground, explain:

1. The proper entry airspeed, technique, and control inputs for a wingover.
2. The most common errors and reasons for lost control in a wingover.
3. How to recover lost control from a botched wingover.

## In flight, demonstrate:

1. Multiple 180° wingovers to both the right and left.
2. Ability to maintain positive control, avoiding both stalling and rolling.
3. Recovering to the specified heading,  $\pm 10^\circ$  without exceeding G limits or  $V_{ne}$ .

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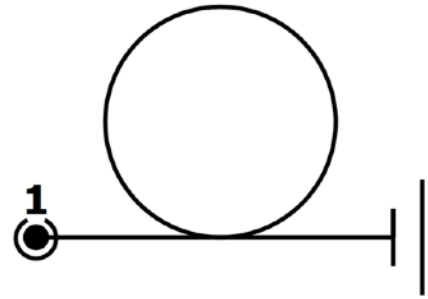
### NOTE

Pilots approved for wingovers may fly the figure with any amount of turn up to 270°.

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# Loop

Figure	K	Total K
7.4.1.1	10	10



## On the ground, explain:

1. The proper entry airspeeds and control inputs for a loop.
2. The different types of loops (competition, “granny”) and which one you should fly with passengers new to aerobatics.
3. The most common errors and reasons for lost control in a loop.
4. How to recover lost control from a botched loop.
5. The expected energy state at the end of a loop.

## In flight, demonstrate:

1. Multiple inside loops.
2. Maintaining the primary axis  $\pm 15^\circ$  throughout the figure.
3. Ability to finish the loop at the same altitude as entry,  $\pm 200\text{ft}$ .

## Ballistic Roll

Figure	K	Total K
-	-	-



### On the ground, explain:

1. The proper entry airspeed and control inputs for a ballistic aileron roll.
2. The difference between this figure, barrel rolls, and aileron slow rolls.
3. How to recover lost control from a botched ballistic roll.

### In flight, demonstrate:

1. Multiple ballistic aileron rolls to both the right and left.
2. Establishing a proper up-line of 30-40° and correctly unloading the wings before rolling.
3. Ability to finish each roll on the same heading  $\pm 15^\circ$ .
4. Ability to maintain a constant +1 G throughout the roll (excluding pulls).

# Barrel Roll

Figure	K	Total K
-	-	-



## On the ground, explain:

1. The proper airspeed and control inputs for a barrel roll.
2. The difference between this figure, ballistic rolls, and aileron slow rolls.
3. The importance of the “gate” at the apex of the roll and why it is critical to have 180° of roll completed at this point.
4. How to recover lost control from a botched barrel roll.

## In flight, demonstrate:

1. Multiple barrel rolls to both the left and the right.
2. Ability to consistently set the same off-angle of 60° in each roll.
3. Ability to finish each roll at the same altitude  $\pm 200\text{ft}$ , on the same heading  $\pm 15^\circ$ , and at the same airspeed  $\pm 10\text{mph}$ .
4. Ability to maintain positive G throughout the roll.

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### NOTE

Barrel rolls may be flown only on horizontal lines.

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## Aileron (Slow) Roll

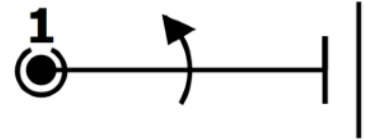


Figure	K	Total K
1.1.1.1	2	10
9.1.3.4	8	

### On the ground, explain:

1. The proper airspeeds, control inputs, and sequencing for a slow roll.
2. The aerodynamics of an aileron roll, with a special emphasis on adverse yaw and fuselage lift.
3. The “sacred circle”.
4. How to recover lost control from a botched aileron roll.

### In flight, demonstrate:

1. Multiple aileron rolls to the left and to the right at normal cruise airspeed.
2. Rolls on each type of line on which you want to fly them solo (horizontal, 45° up-line, 45° downline, vertical up, vertical down).
3. For rolls on horizontal lines: finishing at the same altitude as entry  $\pm 200$ ft.
4. Maintaining heading  $\pm 15^\circ$  throughout the roll.
5. An ability to consistently draw the “sacred circle” above a reference point.

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### NOTE

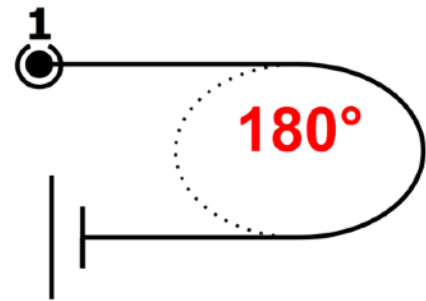
Pilots wishing to fly *linked rolls* must demonstrate a 720° linked roll to both the right and left. The same performance standards apply. Linked rolls in excess of 720° (IAC limit) are prohibited.

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# Competition Turn

Figure	K	Total K
2.2.1.1	4	4



## On the ground, explain:

1. The difference between this figure and traditional steep turns.
2. The proper airspeed and control inputs for a competition turn.
3. The expected energy-loss during a competition turn.
4. The fundamentals of accelerated stalls and how to recover from them.

## In flight, demonstrate:

1. Multiple 180° competition turns to both the left and right.
2. Establishing 60-90° of bank before turning begins (uncoordinated entry).
3. Maintaining altitude  $\pm 100\text{ft}$ .
4. Maintaining bank angle  $\pm 10^\circ$ .
5. Stopping the turn before changing the bank angle (uncoordinated exit).
6. Stopping the turn on the correct heading  $\pm 10^\circ$ .

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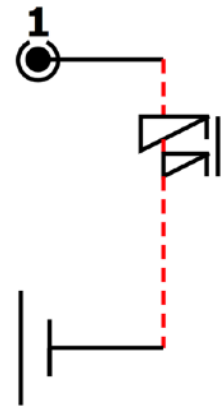
### NOTE

Pilots approved for competition turns may fly any IAC turn between 90° and 360°. Competition turns in excess of 360° are prohibited.

---

# Positive Spin

Figure	K	Total K
1.1.6.3	10	13
9.11.1.6	3	



## On the ground, explain:

1. The fundamental aerodynamics of spins—a CFI-level mastery of this material is required to fly aerobatics; you should be an expert on spins.
2. Pro-spin and anti-spin effects of all controls (power, aileron, rudder, elevator).
3. Proper entry technique.
4. Proper recovery technique, including emergency and competition recoveries.
5. The dangers of crossover spins, how to recognize if one has occurred, and how to avoid them.

## In flight, demonstrate:

1. Multiple 1.5-turn positive spins to both the left and the right.
2. A fully-stalled entry (no spiral dives).
3. Both recovery techniques: emergency (PARE) and competition recovery.
4. Ability to stop the spin on correct heading  $\pm 45^\circ$  without aileron cheating.
5. Recovering to level flight without exceeding G limits or  $V_{ne}$ .

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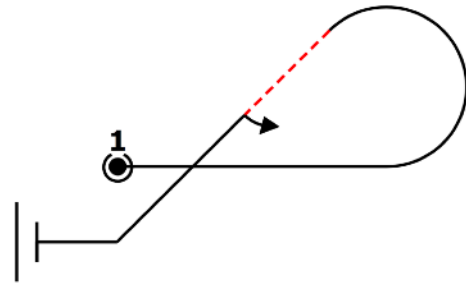
### NOTE

Pilots approved for positive spins may fly any IAC competition spin between one and two turns. Spins in excess of two turns ( $720^\circ$ ) are prohibited.

---

# Half-Cuban Eight

Figure	K	Total K
8.5.6.1	10	14
9.1.4.2	4	



## On the ground, explain:

1. Proper entry airspeed and control inputs for a half-cuban.
2. The expected altitude loss and energy state at the end of a half-cuban
3. The importance of energy management in this figure, how to avoid over-speeding the aircraft in the downline, and how to recover if it happens.

## In flight, demonstrate:

1. Multiple half-cuban eights.
2. Consistent energy management so that the aircraft is in a low-energy state and at less than 1G at the apex of the looping segment.
3. Consistently pinning the aircraft on a 45° inverted downline and holding that line throughout the roll,  $\pm 0^\circ$ .
4. Maintaining the primary axis  $\pm 15^\circ$  throughout the figure.
5. Recovering to level flight without exceeding the aircraft G limits or  $V_{ne}$ .

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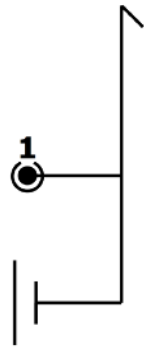
### NOTE

Pilots who wish to fly full cuban eights will demonstrate that figure during checkout. The same standards apply to full cubans and half-cubans

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# Hammerhead

Figure	K	Total K
5.2.1.1	17	17



## On the ground, explain:

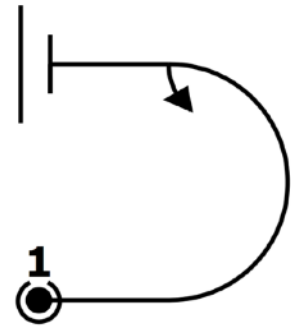
1. Proper entry airspeed and control inputs for a hammerhead.
2. The expected altitude loss and energy state at the end of a hammerhead.
3. The aerodynamics of a hammerhead, with special emphasis on why increasing rudder pressure is required in the up-line and why opposite aileron is required during the pivot.
4. Why this figure, flown incorrectly, commonly leads to an unintentional inverted spin and how to avoid that.
5. The proper way to abort and recover from an incorrect vertical line.
6. The importance of “flying” the vertical line and what that means.
7. How to time the “kick” and how to ensure this figure never becomes a unintentional tail slide.

## In flight, demonstrate:

1. Multiple hammerheads turning WITH the engine. (Hammerheads *against* the engine require separate approval.)
2. Consistent ability to establish and maintain a safe, correct vertical line.
3. Consistent ability to kick at the correct moment, without prompting.
4. A clean pivot, with no more than 15° of torque and zero nose-up tendencies.
5. Establishing a vertical downline with no more than 20° of pendulum motion, maintaining the downline as appropriate, and then recovering to level flight without exceeding G limits or  $V_{ne}$  finishing on a 180° reciprocal heading  $\pm 15^\circ$

# Immelman

Figure	K	Total K
5.2.1.1	17	17



## On the ground, explain:

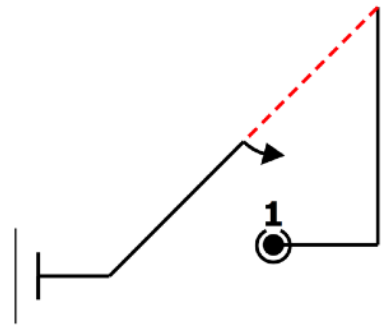
1. Proper entry airspeed and control inputs for an Immelman.
2. How and why this figure must be flown differently than a half-loop.
3. Why this figure is prone to loss-of-control involving inverted stalls or unintentional inverted spins at the top and how to avoid that.
4. Why opposite rudder is initially required as aileron is introduced to roll upright.
5. How to recover from a botched Immelman.

## In flight, demonstrate:

1. Multiple Immelmans.
2. Ability to pin the airplane at level-inverted before rolling—no combining of the looping and rolling segments.
3. Ability to arrive at the top of the looping segment with enough energy to complete a controlled half-roll upright (no dishing out or “flopping” upright).
4. Maintaining the primary axis  $\pm 15^\circ$  throughout the figure.

# Wedge

Figure	K	Total K
1.2.7.1 9.1.4.2	13 4	17



## On the ground, explain:

1. Proper entry airspeed and control inputs for a wedge.
2. The importance of “flying” the vertical line and what that means.
3. The proper way to abort and recover from an incorrect vertical line.
4. Why this figure is prone to over-speeding on the 45° downline and how to avoid it.

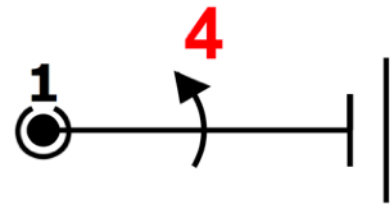
## In flight, demonstrate:

1. Multiple wedges.
2. Consistent ability to establish and maintain a safe, correct vertical line.
3. Pulling from the vertical line at the appropriate time, without prompting.
4. Consistently pinning the aircraft on a 45° inverted downline  $\pm 0^\circ$ .
5. Maintaining the primary axis  $\pm 15^\circ$  throughout the figure.
6. Recovering to level flight without exceeding G limits or  $V_{ne}$ .



# Hesitation Roll

Figure	K	Total K
1.1.1.1 9.4.3.4	2 11	13



*Note: These standards apply to all hesitation rolls (2x4, 4x8, 2-point rolls, etc.) During the checkout, you will demonstrate the exact hesitation rolls you want to fly solo.*

## On the ground, explain:

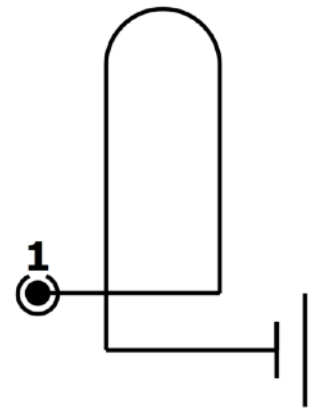
1. The aerodynamics of hesitation rolls with special emphasis on adverse yaw and fuselage lift.
2. The correct entry airspeed and proper control inputs for a hesitation roll.
3. The “sacred circle”.
4. How to recover lost control from a botched hesitation roll.

## In flight, demonstrate:

1. Multiple hesitation rolls of the types you wish to fly solo.
2. Hesitation rolls on each type of line on which you want to fly them solo (horizontal, 45° up-line, 45° downline, vertical up, vertical down).
3. Consistent ability to stop on appropriate points,  $\pm 10^\circ$ .
4. Consistent ability to maintain heading  $\pm 15^\circ$  throughout the roll.
5. For rolls on horizontal lines: an ability to maintain altitude  $\pm 200\text{ft}$ .
6. Positive control of the aircraft throughout the figure.

# Humpty Bump

Figure	K	Total K
8.4.1.1	13	13



## On the ground, explain:

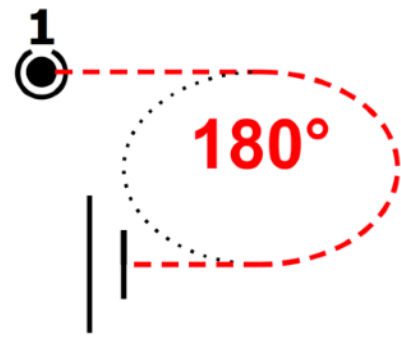
1. The correct entry airspeed and proper control inputs for a humpty.
2. The meanings of “closing early” and “closing late”.
3. The importance of “flying” the vertical line and what that means.
4. The proper way to abort and recover from an incorrect vertical line.
5. How to recover control from a botched humpty.

## In flight, demonstrate:

1. Multiple humpty bumps.
2. Consistent ability to establish and maintain a safe, correct vertical line.
3. Consistent ability to pull for the half-loop at the correct moment, without prompting.
4. Closing the half-loop correctly (neither early nor late).
5. Establishing and maintaining a clean vertical downline.
6. Maintaining the primary axis  $\pm 15^\circ$  throughout the figure.
7. Recovering to level flight without exceeding G limits or  $V_{ne}$ .

# Inverted Flight and Turns

Figure	K	Total K
2.2.1.2	5	5



## On the ground, explain:

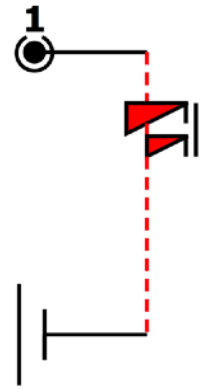
1. The aerodynamics of inverted flight, including symmetrical vs. non-symmetrical wings, why inverted stalls tend to be “sharper”, and how adverse yaw changes during inverted turns compared to upright ones.
2. The danger of panicking and “pulling” to recover from an inverted attitude.
3. How to safely recover from botched inverted maneuvering.
4. The limits of the Great Lakes’ inverted systems.

## In flight, demonstrate:

1. A half-roll to inverted from cruise, maintaining heading  $\pm 10^\circ$  and altitude  $\pm 50$  ft.
2. A verbal callout of oil pressure and fuel flow once established inverted.
3. Straight-and-level inverted flight, maintaining altitude  $\pm 50$  ft and heading  $\pm 10^\circ$
4. Constant airspeed inverted climbs and descents, as specified by the Chief Instructor.
5. Inverted stalls as specified by the Chief Instructor.
6. Multiple inverted turns to the right and the left, ending on headings specified by the Chief Instructor, to the same standards as upright competition turns.
7. A consistent comfort with inverted flight and a mastery of the proper control inputs to maneuver in that environment, as requested, without hesitation.

# Inverted Spin

Figure	K	Total K
1.1.6.3	10	15
9.12.1.6	5	



## On the ground, explain:

1. The fundamental aerodynamics of inverted spins, including why they generally recover faster and more easily than positive spins.
2. Pro-spin and anti-spin effects of all controls (power, aileron, rudder, elevator).
3. Proper recovery technique, including emergency and competition recoveries.
4. The dangers of crossover spins and why these are more easily entered during recoveries from inverted spins as opposed to positive spins.

## In flight, demonstrate:

1. Multiple 1.5-turn inverted spins to both the left and the right.
2. A fully-stalled entry (no spiral dives).
3. Both recovery techniques: emergency (PARE) and competition recovery.
4. Ability to stop the spin on correct heading  $\pm 45^\circ$  without aileron cheating.
5. Recovering to level flight without exceeding G limits or  $V_{ne}$ .

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### NOTE

Pilots approved for inverted spins may fly any IAC competition inverted spin between one and two turns. Spins in excess of two turns ( $720^\circ$ ) are prohibited.

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## Positive Snap Rolls

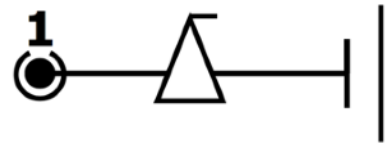


Figure	K	Total K
1.1.1.1 9.9.3.4	2 11	13

### On the ground, explain:

1. The fundamental aerodynamics of snap rolls, including how they differ from aileron (slow) rolls.
2. The proper control inputs and sequencing for a positive snap.
3. The proper entry airspeed and G-loading for a snap and why snapping above that speed can damage the airplane.
4. How to recover control from a botched snap roll.

### In flight, demonstrate:

1. Multiple one-turn positive snap rolls to both the left and the right.
2. Ability to correctly establish autorotation and then apply correct control inputs to take advantage of conservation of angular momentum and accelerate the snap.
3. Stopping after  $360^\circ$  of rotation,  $\pm 15^\circ$  without aileron cheating.
4. Maintaining heading  $\pm 15^\circ$  throughout the snap.
5. Maintaining altitude  $\pm 200\text{ft}$  throughout the snap.