Tango Whiskey
AVIATION

AEROBATICS I

REV 4/20/2026

Aerobatics I

Course Syllabus
Flights in the Super Decathlon and or the Extra 300L

Introduction -

Experience the total freedom and excitement of aerobatic flight as you improve your pilot skills in precision and coordination. Tango Whiskey's Aerobatic I course will make you a safer pilot and it will strengthen your self-confidence. Tango Whiskey's Spin Safety Training is a strong recommendation to take first.

You may take as few or as many lessons as you desire, depending on how far you want to advance your flying skills. Aerobatics I includes training in cross controlled stalls, Spins left and right, spin avoidance and recovery as well as UPRT skills. An introduction to basic aerobatics including Competition Turns, 45 lines, Rolls, Loops, Cuban 8s, Half Cubans, and Immelmanns. Besides having fun the goal of this course is to establish a foundation in controlling an aircraft in any situation while building a foundation of flight in all 3 dimensions.

During your training you will also learn skills in handling a tailwheel aircraft. A tailwheel endorsement is NOT required for this course however we do offer a separate tailwheel endorsement course in our Super Decathlon and we can custom build a course that integrates it into your aerobatic training program.

Your aerobatic lessons are scheduled in 2.0-2.5 hour blocks. We typically fly about 1.0 hour depending on your stamina and what needs to be covered in the syllabus. The remainder of the time includes a thorough question and answer period, preflight briefing, and post flight briefing. We have found that these types of training blocks are most productive for our clients.

The Aerobatics I course syllabus has 5 flight modules. Custom and "a la cart" courses for spin training and aerobatics can also be purchased. We look forward to introducing you to the wonderful world of aerobatics!

-Tango Whiskey Flight Team

Lesson 1

Ground 1:
Copy of your pilot license, medical, photo ID, and signed waiver then establish your goals for this course including physical and mental limitations of aerobatics. We will explore tailwheel characteristics (if you do not have an endorsement). Ground handling (taxi, normal takeoff and landing) including ground-loop avoidance. Review of our Super Decathlon checklists, airspeeds and flows as well as a constant speed prop review or brief.

- Regulations regarding aerobatic flight and parachutes. When do you need to wear a parachute, where can you perform aerobatics?
- Physiological factors including breathing techniques, G-load (what it feels like and what it's doing to your body), gray-out, red-out, confusion, dizziness, nausea including GLOC.
- Parachute operation, aircraft emergency egress
- Introduction to Loops (the foundation of all maneuvers)
- Aerodynamics of a stall spin including entry and recovery, power on/off/accelerated stalls and recovery, spin entry/exit, avoidance will be covered in first lesson.
- Rolls (ballistic, zero lift explanation)

Flight 1:

- Slow Flight and Super D Handling
- Stall Entry/Recovery (Power On/Off/Accelerated)
- Chandelle and Lazy 8s (suggested for Private Pilots)
- Spin Entry and Recovery
- Introduction to Aileron Rolls (Ballistic - Zero lift/Zero G fundamentals)
- Introduction to the Loop

Lesson 2

Ground 2:

- Review of Flight 1
- Geographical features in our practice areas and how to use them to align yourself during maneuvers
- 45 Lines and where to look and understanding the sighting device
- Negative and Positive G-load limits
- Competition turns
- Entry airspeeds and technique for Aileron rolls, Barrel rolls, and Loops
- Recovery (aircraft loss of control) LOOK,UNLOAD,ROLL,RECOVER (from PWAS)

Flight 2

- Steep Turns
- Competition Turns
- 45 Lines
- Aileron Roll
- Barrel Roll
- Loop
- Loop followed by Roll
- Upset Recovery

Lesson 3

Ground 3:

- Ground Review of Flight 2
- Inverted Flight
- Rolling Inverted and Sight Picture
- Half Cuban
- Aresti symbols for maneuvers
- How to put maneuvers together for a sequence

Flight 3

- Half Cuban
- Spins and 1 1/2 Spin Turn
- Immelmann
- String 3 maneuvers together (pre-selected on the ground)

Lesson 4

Ground 4:

- Ground Review of Flight 3
- Rudder control to manage horizontal position
- Discuss Primary Sequence

Flight 4

- Rudder control: Dutch Rolls, draw a triangle/square
- Slow Roll
- Reverse Half Cuban
- Practice Primary Sequence

Lesson 5

Ground 5:

- Ground Review of Flight 4
- Discuss Primary Sequence
- Review Maneuvers

Flight 5

- Cuban 8
- Immelmann
- Split S
- Practice Primary Sequence

ARESTI SYMBOLS

AILERON ROLL

As the name implies, the aileron roll is done with "normal" inputs of aileron and rudder (in contrast to snap rolls). At the point this maneuver is introduced to students in the Tango Whiskey Basic syllabus, no attempt is made to maintain altitude during the roll. The result is a steady transition from climb to descent until the aircraft regains upright flight. This simplified approach to rolling is ideal for beginning aerobatic pilots.

A further development of basic rolling technique introduces forward elevator (and negative G) to eliminate altitude loss while inverted. The result is a **Slow Roll**. Once mastered, slow rolls completely replace aileron rolls in the repertoires of most pilots.

Aileron Rolls

Aileron rolls are flown with the rudder and elevator in the neutral position during the roll. The aileron is fully deflected in the direction of the roll. This is the easiest of the rolls to fly.

The aileron roll is started by pulling the nose up to 20 - 30 degrees above the horizon. The elevator is then neutralized and the aileron fully deflected in the direction of the roll. The controls are maintained in that position till the roll is completed. After the roll is completed the nose is usually 20 - 30 degrees below the horizon.

Slow Rolls

(K=10)

(K=7)

Slow rolls are flown normally on a straight line (one exception is rolls flown at the top of a loop). The roll rate has to be constant and the flight path must continue in a straight line. This requires constantly changing rudder and elevator control inputs throughout the roll. Hesitation or point rolls include stops at certain roll angles. Two-, four-, and eight-point rolls are allowed. A notation such as **2x4** denotes two points of a four-point roll. A number by itself (**2**, **4**, or **8**) means a full 360º roll with the specified number of hesitations. If no points are specified, rolling is done without hesitations. A roll symbol that starts at the line denotes a half roll (see description of the Immelman). A roll symbol that crosses the line specifies a full roll (first figure).

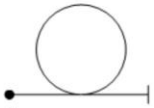
Source IAC (https://www.iac.org/aerobatic-figures)

LOOP

The loop is the best known and most easily recognized of all basic aerobatic maneuvers (it is also arguably the most difficult to fly well).

Loops (and portions of loops) form the basis of hundreds of recognized figures, and their early mastery is essential for continuing aerobatic improvement.

Loops



This is one of the most basic maneuvers, but not easy to fly well. It has to be perfectly round, entry and exit have to be at the same altitude. To achieve this, the pilot must adjust for ever-changing speeds and G-loads, as well as wind drift.

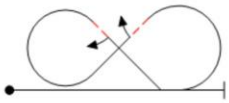
The maneuver starts with a pull-up of about 3 to 4 G. Once past the vertical, the back pressure on the elevator is slowly relaxed to float over to top of the loop to keep it round. Past the top, the back pressure is slowly increased again throughout the back part till horizontal flight. The plane has to stay in one plane with the wings perpendicular to the flight path. Rudder is used to maintain a constant heading throughout figure and ailerons are used to maintain the orientation of the wings.

Source IAC (https://www.iac.org/aerobatic-figures)

HALF CUBAN (Cuban 8, reverse Cuban)

As the name suggests. the Half Cuban owes its existence to another, larger maneuver--the "Cuban 8." Despite this apparent stepchild relationship, the Half Cuban is a full-fledged maneuver in its own right, performed with much greater frequency than its namesake. The Half Cuban belongs in the "interrupted loop" series, along with the Immelmann and 3/4. Loop, and is a valuable turn-around tool. When needed. 1/2 Cubans provide an easy way to rebuild airspeed, as it is not mandatory to begin and end at the same altitude.

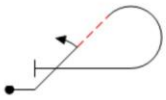
Cuban Eight



Two Half Cuban Eights can be combined to form a Cuban Eight or Lay-down Eight. In this figure in competition the two looping parts have to be flown at the same altitude with the same radius. The exit has to be at the same altitude as the entrance to the figure.

(K=27)

Reverse Half Cuban Eight

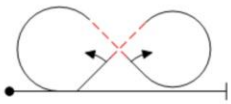


This figure starts with a pull to a 45° up-line. Centered on this line is a half roll from upright to inverted. Five-eighths of a loop complete the figure to horizontal flight.

This again is one of the maneuvers that have been used to reverse direction while preserving altitude and airspeed

(K=16)

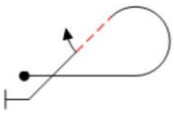
Reverse Cuban Eight



Like the Cuban Eight, a Reverse Cuban Eight can be formed by flying two Reverse Half Cuban Eights back to back.

(K=31)

Half Cuban Eight



Five-eighths of a loop to a down-line at a 45° angle. The plane is inverted at this point. Centered on this downline is a half roll from inverted to upright. A pullout to horizontal completes the figure.

This is another one of the maneuvers that reverse direction. The downline can be used to adjust the altitude and speed at the end of the figure.

Source IAC (https://www.iac.org/aerobatic-figures)

IMMELMANN

The Immelmann carries the name of the pilot credited with its invention: Max Immelmann, a German WW I flyer. Although there is some question whether aircraft of his era had the horsepower and agility needed to actually perform the maneuver as a perfect-half loop, it is certain that some version of this unique method of getting turned around found merit with early fighter pilots.

Immelmanns belong in the "interrupted loop" series, along with Half Cubans, Cuban Eights and 3/4 loops. They are commonly used for course reversal and serve as an quick way to lose speed prior to performing snap rolls, spins, and other slower speed figures.

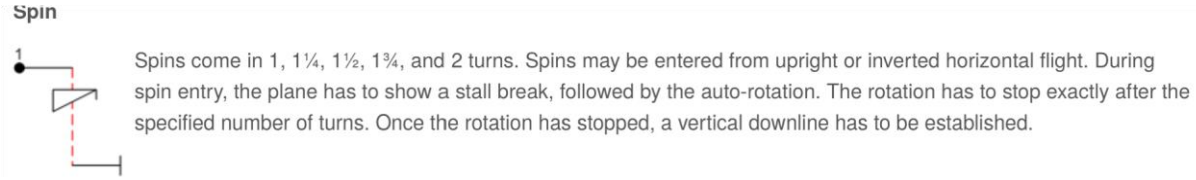
Source IAC (https://www.iac.org/aerobatic-figures)

SPIN

Spin instruction is the standard starting point for all beginning aerobatic programs. In addition to providing an essential basic maneuver, the training greatly increases safety and confidence for pilots denied exposure to spins during primary instruction.

A spin is a natural "autorotation" that builds from other, more desirable, design characteristics of fixed wing aircraft. Any airplane that can be stalled can be
spun. When pilots view spins with mistrust, it is due to the fact that not every spin is recoverable--a circumstance usually traceable to inadequate control surfaces.

This animation traces spin development through the first full turn; all certificated single-engine aircraft in the US are capable of recovery at this point. In
subsequent rotations, the nose will continue to rise until stabilizing approximately 60° below the horizon. At that stage, recovery is not possible for all aircraft.
Aerobatic airplanes are naturally built with the controls necessary for recovery at any stage of spin development, and spins are a standard figure at every level of competition.



Source IAC (https://www.iac.org/aerobatic-figures)

Other Aresti Symbols

A small circle at one end of a figure indicates the maneuver starting point.

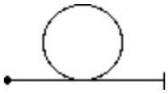
A short vertical line at the other end of the figure indicates the maneuver end point.

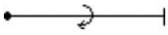
Horizontal segments represent level flight paths (flown left to right in this example).

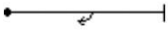

Vertical segments indicate vertical flight paths.
The corners are intended to be flown as 1/4 loops, not right angles.

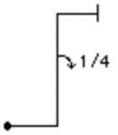

Segments angled 45° indicate flight at a 45° angle from the vertical.

Dashes used to draw lines indicate inverted flight (negative G).


Circles (and portions of circles) indicate loops (and loop portions).


Short arcs (approx. 180°) drawn to intersect lines indicate full rolls.

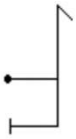

Portions of arcs (approx. 90°) drawn on one side of a line indicate portions of rolls.
As drawn, the figure depicts a 1/2 roll performed in horizontal flight.

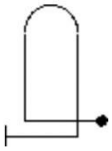


Fractional notations next to roll symbols indicate roll portions greater or smaller than 1/2. As drawn, the figure depicts a quarter roll flown on a vertical up-line.


Right triangles indicate spins.


Equilateral triangles indicate snap rolls.


Hammerhead Turn


Humpty Bump

Source IAC (https://www.iac.org/aerobatic-figures)