

Louisiana Tech University
Flight Operations
Cessna 172 RG VFR Maneuvers Guide

Attitude Flying

Attitude + Power = Performance

The desired attitude is obtained by using the outside horizon as a reference in relation to the cowling, dash, or instrument panel of the airplane.

The desired power is obtained using the RPM.

The pilot adjusts the attitude and the power to get the desired performance.

The performance of the aircraft can be seen by looking at the following flight instruments:

- a. Airspeed Indicator
- b. Turn Coordinator
- c. Altimeter
- d. Vertical Speed Indicator
- e. Directional Gyro

Use the integrated method of instruction: using both outside and inside references to obtain desired performance.

TASKS

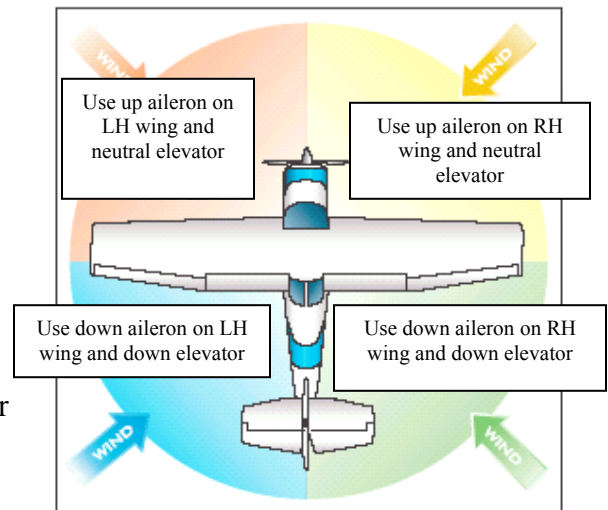
Passenger Briefing

During the before start checklist, each passenger shall be briefed on:

- Seatbelt operations
- Aircraft emergency exits
- Location of emergency equipment (i.e. fire extinguishers)
- No smoking flight

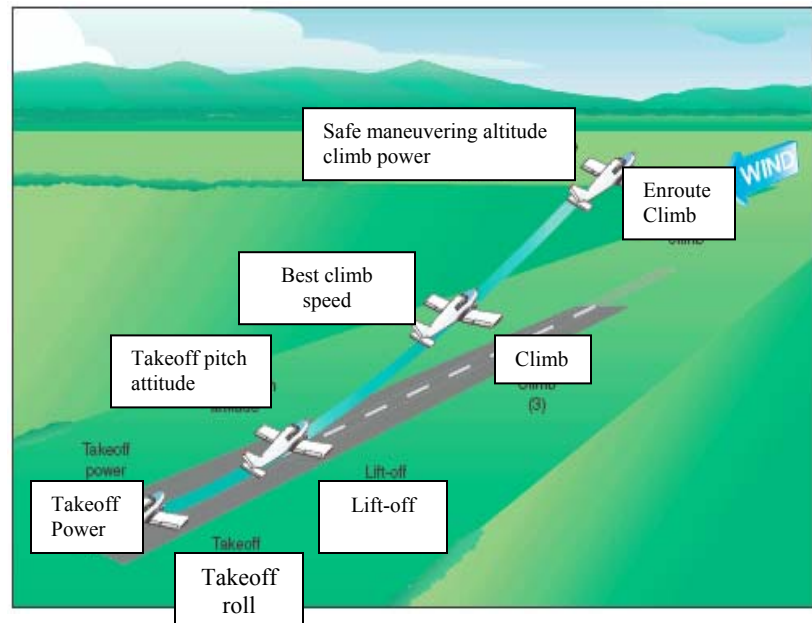
Taxiing

- Before taxiing complete passenger briefing
- Set the proper wind correction before taxiing
- Let the airplane roll forward and then test the brakes to ensure that they work
- Taxi with minimum power required to keep the airplane moving at a brisk walk speed and use the rudder pedals to turn the airplane. Differential braking can be used to tighten the turn.
- Normally the heels of both feet should rest on the floor while taxiing and are only lifted when braking is necessary.
- Taxi using the centerline unless the ground maneuver requires otherwise.



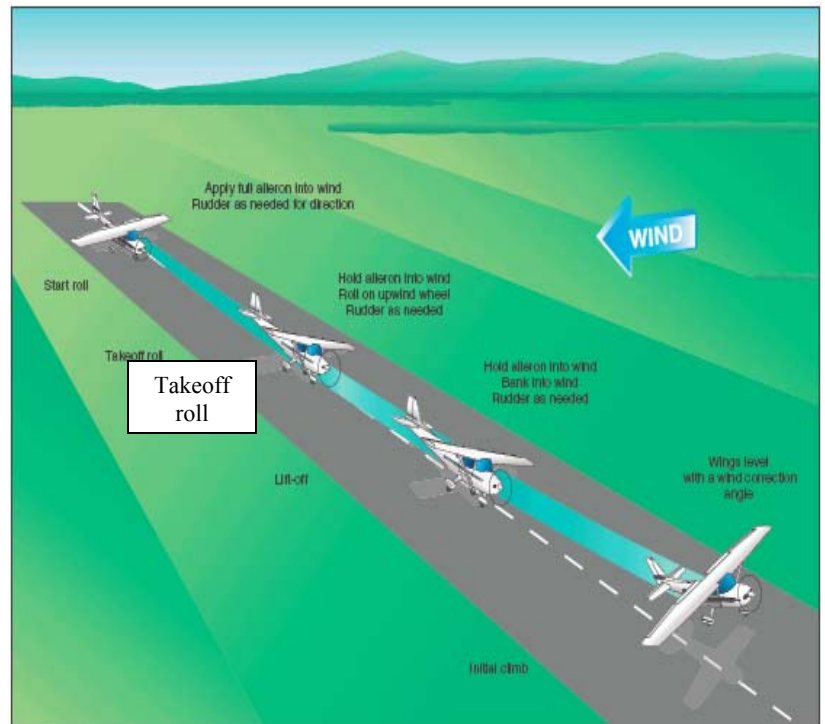
Normal Take-Off and Climb

- Finish before takeoff briefing
- Taxi on the runway centerline with proper wind correction
- Advance the power smoothly to full
- Rudder - to maintain runway centerline
- Check engine instruments
- Carb Heat - Cold
- Cowl Flaps - Open
- Rotate - 55 kts
- Climb - 70 - 80 kts
- Brakes - Apply
- Gear - Up after positive rate of climb, obstacles clear, and no available runway
- Normal Climb Checklist



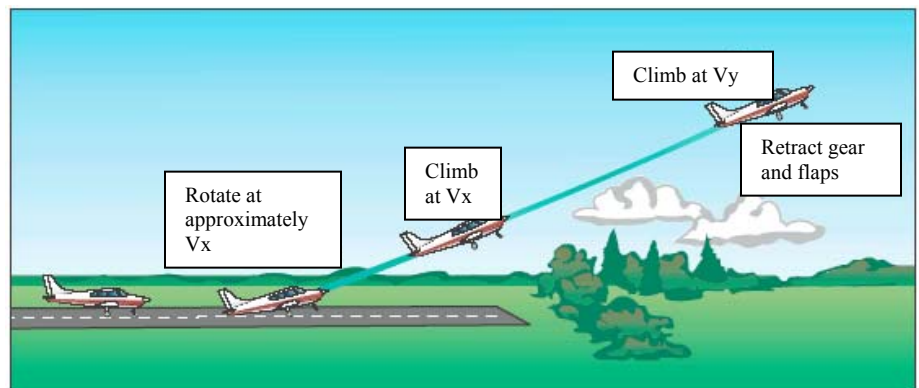
Crosswind Take-Off and Climb

- Finish before takeoff briefing.
- Taxi on the runway centerline with proper wind correction.
- Position the aileron full deflection into the wind and as the airplane accelerates, gradually reduce the deflection into the wind.
- Rotate at 55 kts with the upwind wheel first.
- Roll into a crab into the wind after a positive rate of climb is established.
- Climb out at V_x if an obstacle exists or 70 – 80 kts if no obstacles exist.
- Brakes - Apply
- Gear - Up after positive rate of climb, obstacles clear, and no available runway
- Climb Checklist



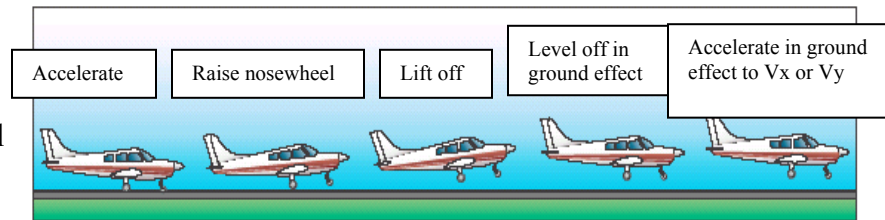
Short Field Take-Off and Maximum Performance Climb

- Finish before takeoff briefing.
- Flaps - 0°
- Taxi on the runway centerline with proper wind correction
- Hold the brakes, add full power, check engine instruments, and release the brakes
- Rotate - 55 kts
- Climb - 63 kts until obstacle clear (V_x)
- Gear - Up after positive rate of climb, obstacles clear, and no available runway
- Set pitch attitude for 70 - 80 kts
- Climb Checklist



Soft Field Take-Off and Climb

- Finish before takeoff briefing.
- Flaps - 10° (below 2550 lbs)
- Taxi on the runway centerline with proper wind correction
- Smoothly advance the throttle to full power
- Hold enough back pressure to keep the nosewheel slightly off the ground
- Stay in ground effect until 70 - 80 kts or 63 kts (V_x) to clear obstacle
- Climb – 70 – 80 kts. or 63 kts (V_x) until clear obstacle
- Gear – Up: Positive rate of climb, clear obstacles, and no more available runway
- Flaps- 0°, set pitch attitude for 70 – 80 kts
- Climb Checklist



Normal and Crosswind Approach and Landing

Altitude - TPA 1000 ft AGL, before landing checklist complete before entering the traffic pattern or on downwind if remaining in the pattern.

1. Downwind abeam point

- Carb heat - on, power 15" MP,
- Props - full fwd, 10° flaps down below 130 kts
- Maintain 75 kts with the power and with proper wind correction

2. Base (Turn when 45° from an end of runway) - CGUMPS

- Flaps - 20° or as below 100 kts (V_{fe})
- Maintain 70 kts with the power and with proper wind correction

3. Final (Approximately 500 ft AGL) - CGUMPS

- Flaps - 30° or as required, maintain stabilized approach with sideslip if needed to the centerline
- Maintain 65 kts with the power and with proper wind correction

4. Roundout and flare - Transition from approach attitude to landing attitude

- Start roundout about 10~20 ft above the ground
- Gradually, reduce power and increase pitch attitude until touchdown and maintain wind correction and directional control of the airplane



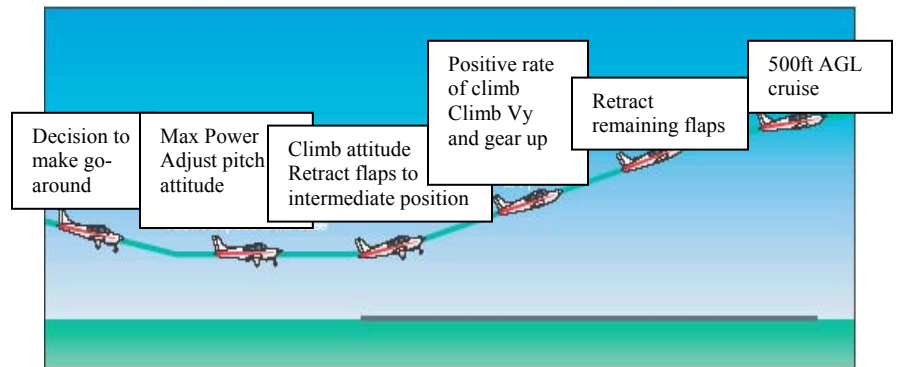
180° Accuracy Power-Off Approach and Landing

Altitude – TPA 1000 ft AGL, **before landing checklist complete** before entering the pattern or on downwind if remaining in the pattern.

1. Abeam the specified touchdown point closes throttle and establishes appropriate glide speed.
2. Completes final airplane configuration.
3. Touches down in a normal landing attitude, at or within 200 feet beyond the specified touchdown point.

Go-Around/Rejected Landing

- Ensure props are full forward
- Power - maximum, 10° flaps retract with positive rate of climb and control of the airplane
- Check engine instruments
- Carb heat - off, cowl flaps – open
- Climb Speed – 55 kts
- Wing Flaps – Retract slowly after reaching 65 kts
- Positive Rate of Climb – Gear up after obstacles clear
- Airspeed - 65 kts and positive rate of climb, retract remaining flaps slowly
- Maneuver to side of runway
- Climb checklist



Short Field Approach and Landing

Altitude - TPA 1000 ft AGL, before landing checklist complete before entering the traffic pattern or on downwind if remaining in the pattern.

1. Downwind abeam point

- Carb heat - on, Power 15" MP,
- Props - Full fwd
- Flaps - 10° down below 130 kts,
- Determine obstacle. Pitch to establish a glide path over the obstacle to a point on the runway. This point on the runway is your aiming point.
- Maintain 75 kts with the power and with proper wind correction

2. Base (45° from an end of runway)

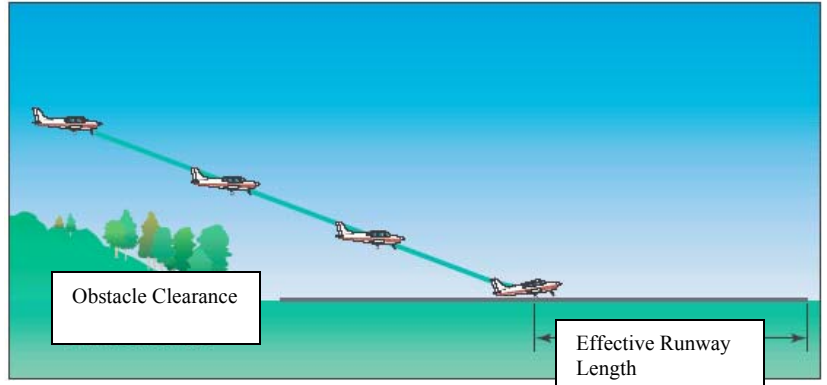
- CGUMPS
- Flaps - 20° or as required below 100 kts (Vfe)
- Adjust pitch as necessary to maintain glide path to your aiming point.
- Maintain 70 kts with the power and with proper wind correction

3. Final (Approximately 500 ft AGL) – CGUMPS

- Flaps - 30° or as required, maintain stabilized approach with sideslip if required to the centerline.
- Adjust pitch as necessary to maintain glide path to your aiming point.
- Maintain 63 kts with the power and with proper wind correction
- Once obstacles are clear, power idle, maintain wind correction and directional control, and continue to aiming point

4. Roundout and flare - Transition from approach attitude to landing attitude

- Start roundout about 10~20 ft above the ground
- Touchdown - Apply brake then retract flaps, maintain runway centerline



Soft Field Approach and Landing

Altitude - TPA 1000 ft AGL, before landing checklist complete before entering the traffic pattern or on downwind if remaining in the pattern.

1. Downwind abeam point

- Carb heat - on, Power 15" MP
props full fwd, 10° flaps down
below 130 kts
- Maintain 75 kts with the power
and with proper wind correction

2. Base (45° from an end of runway)

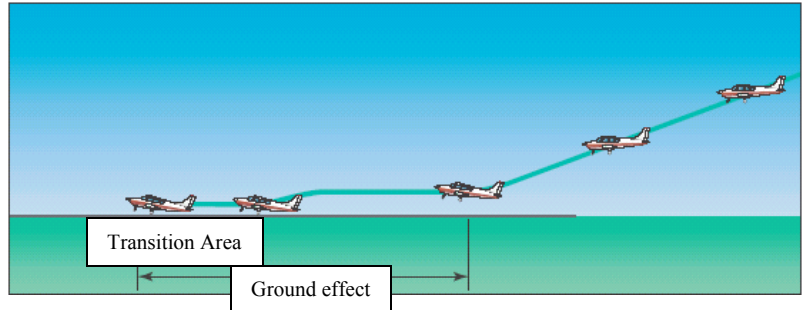
- CGUMPS
- Flaps - 20° or as required below
100 kts (Vfe)
- Maintain 70 kts with the power and
with proper wind correction

3. Final (Approximately 500 ft AGL) - CGUMPS

- Flaps - 30° or as required, maintain stabilized approach with sideslip if required to the centerline
- Maintain 65 kts with the power and with proper wind correction

4. Roundout and flare - Transition from approach attitude to landing attitude

- Start roundout about 10~20 ft above the ground
- Gradually, increase pitch attitude until touchdown and increase power as necessary to hold the nose off the ground.



Straight-and-Level Flight

Straight and level flight occurs when a constant heading and altitude are maintained. To achieve straight flight: Use outside visual reference points directly ahead of the airplane.

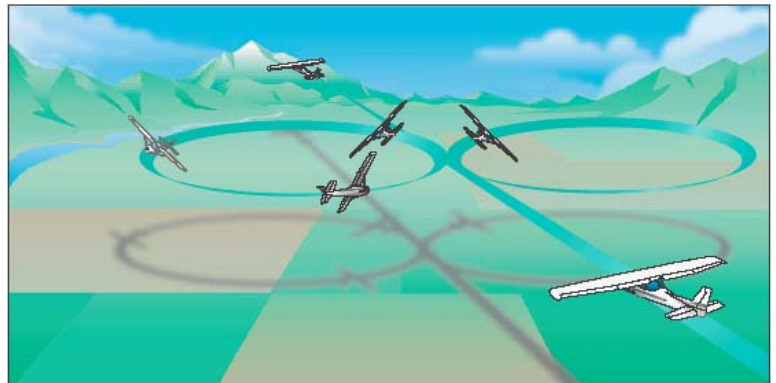
Constantly, check with your Heading Indicator

To achieve level flight: Use airplane's nose as a reference point with trim set

Constantly, check with your Altimeter

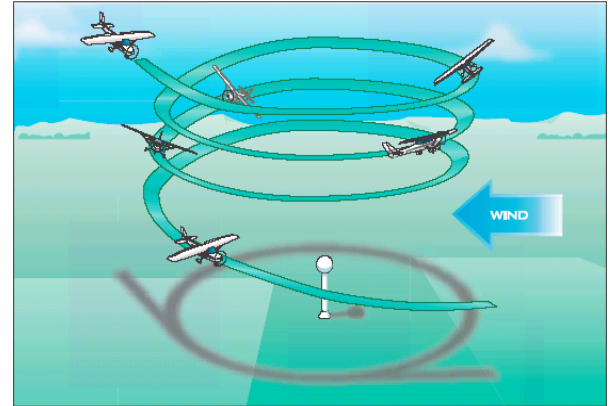
Steep Turns

- Altitude - at least 1500 ft AGL, Check fuel valve on both, mixture rich, cowl flaps closed, and clearing turn
- Power - 19 - 21" MP, 2300 RPM (below Va)
- Reference point on horizon or heading
- Add 1" MP to maintain airspeed
- Bank - 50° maintain $\pm 5^\circ$ and roll out the entry heading $\pm 5^\circ$



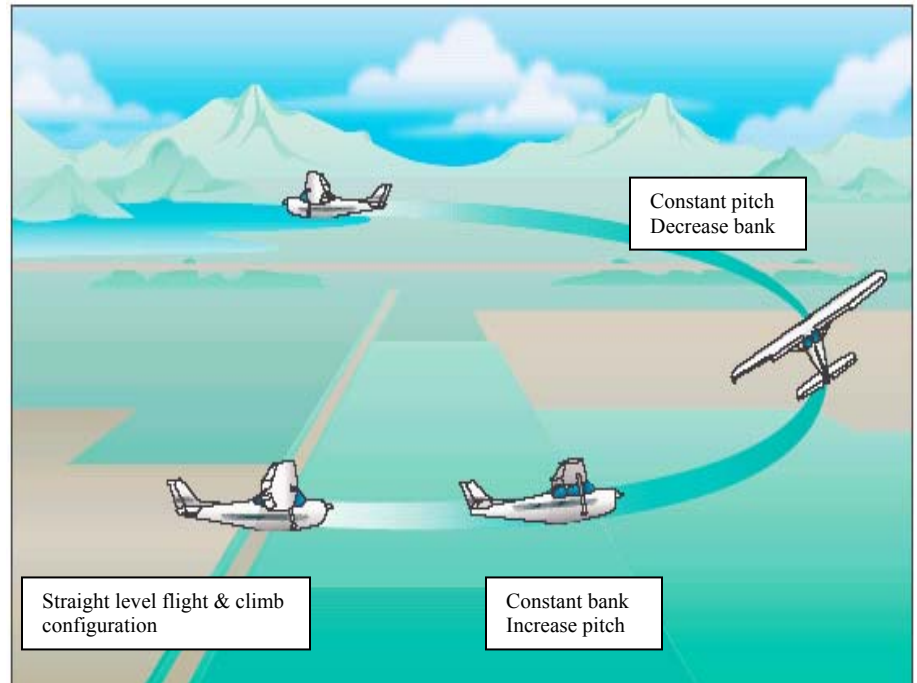
Steep Spirals

- Altitude – sufficient to complete three 360° spirals.
- Check fuel valve both, mixture rich, cowl flaps closed, and clearing turn
- Abeam reference point
- Carb heat - On, power - idle (clear engine occasionally)
- Airspeed - 73 kts (Vg)
- Maintain distance from reference point by varying bank
- Bank - 60° max.
- Rollout - At specified altitude



Chandelles

- Altitude - At least 1500 ft AGL, Check fuel valve on both, mixture rich, cowl flaps – open, and clearing turn
 - Maneuvers into the wind (starts at crosswind), pick a reference at 90° point
 - Power - 19 - 21" MP, 2500 RPM (below Va)
1. First 90°
 - Roll in and maintain constant bank - 30° Max.
 - Increase power to 25" MP
 - Increase pitch at constant rate
 - Max pitch up at 90° point
 2. After 90°
 - Constant pitch
 - Begin rollout of bank
 3. At 180°
 - Wings level at MCA without stalling and with minimal loss of altitude
 4. Cruise checklist



Lazy Eights

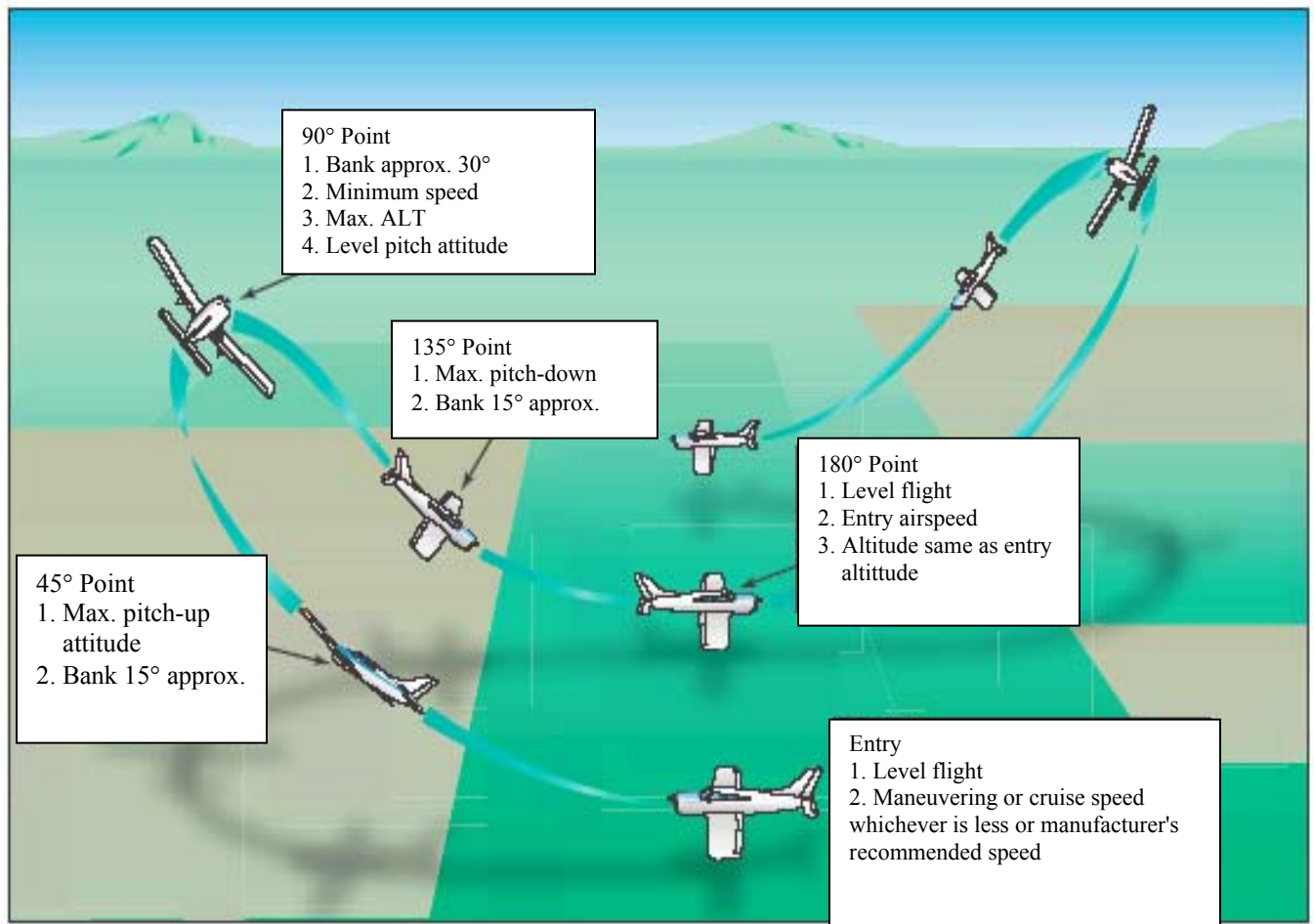
Altitude - At least 1500 ft AGL, Check fuel valve on both, mixture rich, cowl flaps closed, and clearing turn

Maneuvers into the wind (starts at crosswind)

Pick references at 45°, 90°, 135° point

Power - 19 - 21" MP, 2000 - 2300 RPM (below Va)

1. Entry to 45°
Simultaneously increase pitch to max. and gradually bank for 15°
2. 45° to 90°
Continue to steepest bank (30°), and decrease pitch for horizon (level pitch)
3. 90° to 135°
Pitch max. down, and decrease bank for 15°
4. 135° to 180°
Gradually pitch for level and bank for straight flight same as entry
5. Cruise checklist



Eights-on-Pylons

This is the only maneuver that La Tech Aircraft will be allowed to descend below 1,000 AGL

Check fuel valve both, mixture rich, cowl flaps closed, and clearing turn.

Power: 20" MP, 2300 RPM, straight and level flight

Altitude: Pivotal altitude = $(GS^2/11.3)$ ft AGL

Pick two points that are perpendicular to the wind, are a reasonable distance apart, and also have emergency landing field available.

Enter the maneuver on a 45° to downwind between two pylons with the first turn to the left.

Once the wing tip is abeam the first point, start a left turn around the point and hold the wing on the point (the line of sight).

If the point moves back on the wing, pitch back to bring the wing back even with the reference point.

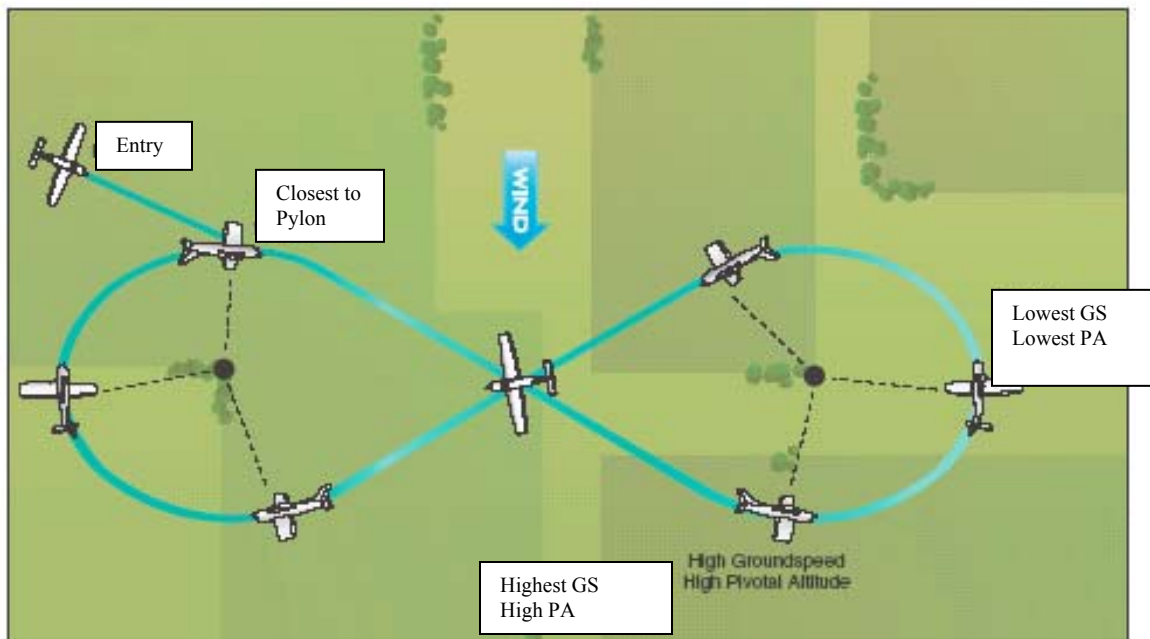
If the point moves forward on the wing, pitch forward to bring the wing back even with the reference point.

When on a 45 to downwind again, roll straight and level with a crab into the wind and head towards the second reference point (3~5 sec) Climb back to pivotal altitude if not already there.

Once the wing tip is abeam the second point, start a right turn around the point and hold the wing on the point using the same procedure as above.

Exit the maneuver on a 45 to downwind, the same way you entered it.

Cruise checklist



Maneuvering During Slow Flight

Altitude - At least 1500 ft AGL, Airspeed – MCA

Landing

1. Entry

Fuel valve – Both

Cowl flaps - Open

Gear - Down below 140 kts

Carb heat - On

Power - 15" MP and maintain altitude by pitch

Props - Full forward

Mixture - Rich

Flaps set below 100 kts (Vfe)

Slow to MCA

Maintain altitude by power and airspeed by pitch

2. Recovery

Power - Maximum, 10° flaps retract with positive rate and positive control of the airplane

Carb heat – Off

Gear – up with positive rate of climb

Airspeed - 65 kts, Slowly retract remaining flaps

Cruise checklist

Clean

1. Entry

Fuel valve – Both

Cowl flaps – Open

Carb heat – On

Power – 15" MP and maintain altitude by pitch

Props – Full forward

Mixture – Rich

Slow to MCA

Maintain altitude by power and airspeed by pitch

2. Recovery

Power – Max

Carb heat – Off

Cruise checklist

Power-On Stalls (Takeoff)

Can be done with up to 20° bank

Altitude - At least 1500 ft AGL

1. Entry

Fuel Valve – Both

Cowl flaps - Open

Gear – Down below 140 kts

Carb heat - On

Power - 15" MP, maintain altitude by pitch

Props - Full forward

Airspeed - 55 kts with the same pitch hold

Power - Max, maintain a continuous pitch attitude that will induce a stall

Carb heat - Off

2. Recovery

If simulating max power, do not apply throttle

Pitch - Decrease pitch attitude to level pitch

Wing - Level with positive control of the airplane

Positive rate of climb, gear up

Airspeed – 70 - 80 kts, positive rate of climb

Cruise checklist

Power-On Stalls (Departure)

Can be done with up to 20° bank

Altitude - At least 1500 ft AGL

1. Entry

Fuel Valve - Both

Carb heat - On

Props – Full Forward

Power - 15" MP, maintain altitude by pitch

Airspeed - 55 kts with the same pitch hold

Power – Max (simulated-max power at 21" is acceptable), maintain a continuous pitch attitude that will induce a stall.

Carb heat - Off

2. Recovery

If simulating max power, do not apply throttle

Power – Full and simultaneously decrease pitch attitude to level pitch

Wing - Level with positive control of the airplane

Airspeed – 70 – 80 kts, positive rate of climb

Cruise checklist

Power-Off Stalls

Can be done with up to 20° bank

Altitude – Sufficient to complete the maneuver above 1500 ft. AGL

1. Entry

Fuel Valve - Both

Gear – Down below 140 kts

Carb heat - On

Power - 15" MP, maintain altitude by pitch

Props - Full forward

Mixture - Rich

Flaps - 30° below 100 kts (Vfe)

Maintain stabilized approach path at 65 kts with constant pitch attitude

Power - idle and transition to a pitch attitude that will induce a stall

2. Recovery

Power - Full and simultaneously decrease pitch attitude to level pitch

Carb heat - Off

Retract 10° flaps with positive rate and positive control of the airplane

Gear up with positive rate of climb

Above 65 kts, retract flaps slowly

Cruise checklist

Spins (Stall with rotation)

Spin Recovery

1. Power to idle
2. Aileron in neutral position
3. Full opposite rudder to stop rotation
4. As rotation stops, briskly apply forward pressure to break the stall
5. Gradually, pull back flight control for level flight
6. Cruise checklist

Emergency Approach and Landing

Set the pitch attitude for best glide speed 61~73 kts (V_g)

Ensure that the flaps and gear are up to minimize drag

Select a suitable landing field

NOTE: An engine failure will be simulated by retarding the throttle to idle. Never kill the engine for an emergency approach and landing except for during stage checks with an MOI team member. The maneuver should terminate at 1000 ft AGL unless over an airport.

Engine restart procedures if altitude and time permits

Pull the prop out to the high pitch to increase gliding distance

Complete the forced landing checklists

Always maintain positive control of the airplane

Establish circling procedures between the touchdown and key downwind position (preferred)

Maneuver to be abeam the landing point (Key downwind position) on downwind at 1000ft. AGL

