CAP-USAF FLIGHT MANEUVERS GUIDE

February 2012

Flight Maneuvers Guide

This guide describes and standardizes the instruction and performance of the various flight maneuvers described in Chapter 3 of AFI11-2CAP-USAF, Volume 2, *CAP-USAF Aircrew Evaluation Criteria.* Many techniques are offered to assist the pilot in flying each maneuver. Speeds are in knots indicated airspeed (KIAS).

Additional maneuvers not described in AFI11-2CAP-USAF, Volume 2 are noted with an asterisk prior to the maneuver name. These maneuvers are included to either aid in accomplishing graded maneuvers (i.e. slips) or designed as "confidence" maneuvers (i.e. Lazy Eight).

This guide is primarily for flying the Cessna C-182T with NAV III Avionics – GFC 700 AFCS. If flying other aircraft, pilots should reference the specific Pilot Operating Handbook (POH) for the aircraft to determine the airspeed values, aircraft configuration, carburetor heat usage, etc.

Note 1: "CGUMPS" Check. The "CGUMPS" check may be used as a convenient and safe configuration check during multiple approaches/patterns or prior to conducting area maneuvers. It may also be completed prior to landing as a quick configuration check. The "CGUMPS" check covers the important items of the Before Landing checklist.

- **"C"** – Cowl flaps / Carburetor heat (if applicable). [Technique is to apply carburetor heat whenever the power is reduced below the green arc on the Tachometer]
- **"G"** – Gas. Fuel Selector in BOTH and fuel quantity check
- **"U"** – Undercarriage (if applicable) down
- **"M"** – Mixture. Should normally be full Rich unless POH describes otherwise. I.e. High Altitude.
- **"P"** – Prop. Should normally be high RPM. (push full in).
- **"S"** – Seatbelts and shoulder harness. Secured for all occupants.

Any comments/changes may be sent to HQ CAP-USAF/XOV, DSN: 493-4232
OPR: CAP-USAF/XOV

Sources:

1. FAA-H-8083-3A, *Airplane Flying Handbook,* 2004 Edition
2. Cessna C-182T Skylane Information Manual, 27 October 2006, Rev. 1, 20 December 2007
3. AFI11-2CAP-USAF, Volume 2, *CAP-USAF Aircrew Evaluation Criteria*, 25 December 2009
4. AFI11-2CAP-USAF, Volume 3, *CAP-USAF Operations Procedures*, 25 December 2009

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NORMAL TAKEOFF

1. Complete Before Takeoff checklist.
2. Align airplane with runway centerline with nose wheel straight or centered.
3. Adjust heading indicator(s) as required.
4. Position flight controls for existing conditions.
5. Release brakes and smoothly apply takeoff power.
6. Check normal operating parameters for full throttle engine operation. Engine should run smoothly and turn approximately 2350-2400 RPM.
7. Apply smooth, prompt, positive rudder corrections during the takeoff roll. Engine torque and P-factor tend to pull the nose to the left.
8. At 50-60 KIAS, slowly and smoothly raise the nose to the takeoff attitude.
9. Allow the airplane to accelerate to best rate of climb speed (V_y) and trim. *(Reference Cessna POH, Section 5, Max Rate of Climb charts)*
10. Retract the flaps passing 70 KIAS (safe flap retraction speed) and clear of obstacles.
11. Maintain V_y until reaching a safe altitude (approximately 800-1000 feet AGL), then accelerate to 85-95 KIAS for the enroute climb.
12. Accomplish Enroute Climb (Normal or Maximum Performance) checklist.

CROSSWIND TAKEOFF

1. Complete Before Takeoff checklist.
2. Align airplane with runway centerline with nose wheel straight or centered.
3. Adjust heading indicator(s) as required.
4. Hold aileron control into the crosswind as required to prevent the upwind wing from rising.
5. With aileron into the wind, hold the takeoff path with the rudder as the brakes are released and full power is applied. NOTE: The aircraft will tend to weathervane into the wind so application of downwind rudder is usually required.
6. Check normal operating parameters for full throttle engine operation. Engine should run smoothly and turn approximately 2350-2400 RPM.
7. Apply smooth, prompt, positive rudder corrections during the takeoff roll. Gradually reduce the aileron pressure as the aileron's effectiveness increases. However, some pressure must be maintained throughout takeoff roll to prevent the upwind wing from rising.
8. Accelerate to a speed slightly higher than normal rotation speed to allow the aircraft to leave the ground under more positive control pressure.
9. Maintain adequate drift correction as the main wheels leave the ground.
10. When clear of the ground, establish a turn into the wind to correct for drift.
11. Allow the airplane to accelerate to best rate of climb speed (V_y) and trim. *(Reference Cessna POH, Section 5, Max Rate of Climb charts)*
12. Retract the flaps passing 70 KIAS (safe flap retraction speed) and clear of obstacles.
13. Maintain V_y until reaching a safe altitude (approximately 800-1000 feet AGL), then accelerate to 85-95 KIAS for the enroute climb.
14. Accomplish Enroute Climb (Normal or Maximum Performance) checklist.

SHORT FIELD TAKEOFF [Figure 1]

NOTE: Prior to the flight, review POH, Section 5, Short Field Takeoff Distance charts.

1. Complete Before Takeoff checklist with wing flaps set at 20° (reduces ground roll and total distance over an obstacle by approximately 20%) **Flap deflections greater than 20° are not approved for takeoff.**
2. Position the aircraft from the very beginning of the runway and align the airplane with intended takeoff path. Nose wheel should be straight or centered.
3. Perform a static takeoff by holding the brakes as full takeoff power is smoothly applied.
4. Check normal operating parameters for full throttle engine operation. Engine should run smoothly and turn approximately 2350-2400 RPM.
5. Release the brakes and allow the aircraft to roll with its full weight on the main wheels as it accelerates. Elevator control should be slightly tail low.
6. Approaching best angle of climb speed (V_x) [V_x at sea level is 65 KIAS per the POH], smoothly rotate with back-elevator pressure to an attitude that will enable the aircraft to climb at V_x.
7. Climb out at V_x until all obstacles are cleared or if no obstacles are involved, until 50 feet above the runway is attained.
8. Lower the pitch attitude slightly and continue the climb at V_y. Retract the flaps slowly when the airspeed is more than 70 KIAS.
9. Accomplish Enroute Climb checklist.

MANEUVER DISCUSSION:

The objective is to rotate to the appropriate pitch attitude at (or near) V_x. Some aircraft will have a tendency to lift-off well before reaching V_x and it will be necessary to allow the aircraft to lift off in ground effect and then reduce the pitch attitude to accelerate to V_x with the main wheels clear of the runway surface. This method is preferable to forcing the aircraft to remain on the ground with forward elevator pressure as this may result in 'wheelbarrowing". Common errors are attempting to pull the aircraft off the ground prematurely or climbing too steeply which may cause the airplane to settle back onto the runway or the obstacle.

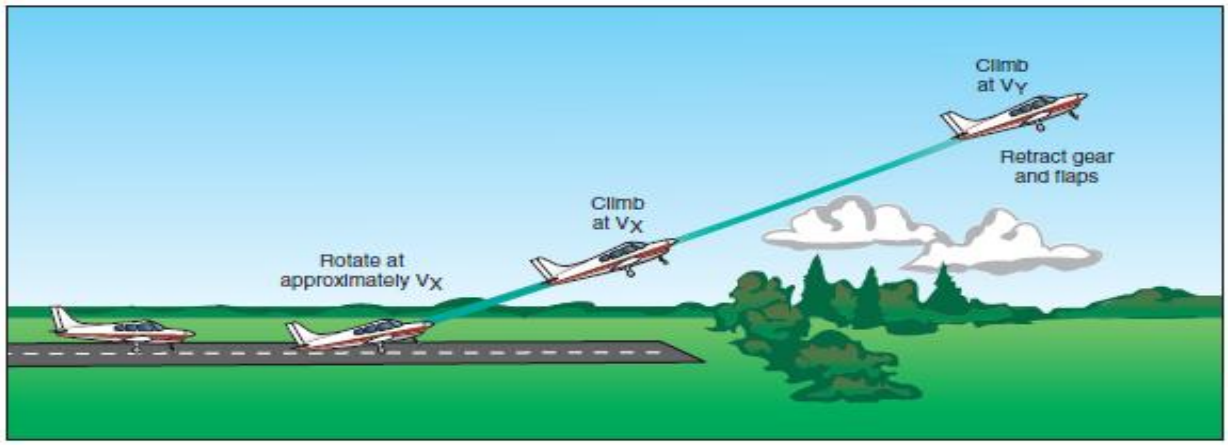

Figure 1

SOFT FIELD TAKEOFF [Figure 2]

NOTE: Soft field takeoff procedures may be practiced on hard surface runways. Soft field takeoff procedures are NOT in the Cessna POH. Prior to the flight, review Cessna POH, Section 5, Short Field Takeoff Distance chart with emphasis on the distance penalties incurred when operating on grass runways, etc.

1. Complete Before Takeoff checklist with wing flaps set at 20°.
2. While lining up for takeoff and to avoid bogging down on soft surfaces, sufficient power should be applied to keep the aircraft in continuous motion.
3. As the aircraft becomes aligned with the runway, full takeoff power should be applied as smoothly and as rapidly as the engine will accept without faltering.
4. Check normal operating parameters for full throttle engine operation. Engine should run smoothly and turn approximately 2350-2400 RPM.
5. As the aircraft accelerates, apply enough back-elevator to establish a positive angle of attack and reduce the weight supported by the nose wheel.
6. As speed increases and lift develops, maintaining this attitude will relieve more and more weight off of the main wheels as the aircraft flies into ground effect.
7. Once airborne, gently lower the nose, with wheels clear of the runway and accelerate to V_y, or V_x if trying to clear an obstacle. Remain in ground effect until at least V_x is reached. *NOTE: This requires a very fine control touch to avoid over controlling the aircraft as control pressures change with acceleration.*
8. Retract the flaps once V_y is attained. If clearing an obstacle, refer to steps 7 and 8 of Short Field Procedures.
9. Accomplish Enroute Climb checklist.

MANEUVER DISCUSSION:

Common errors are climbing too steeply after lift-off, excessive elevator control while attempting to level-off in ground effect, allowing the aircraft to settle resulting in an inadvertent touchdown and attempting to climb out of ground effect without sufficient climb speed. [Figure 2]

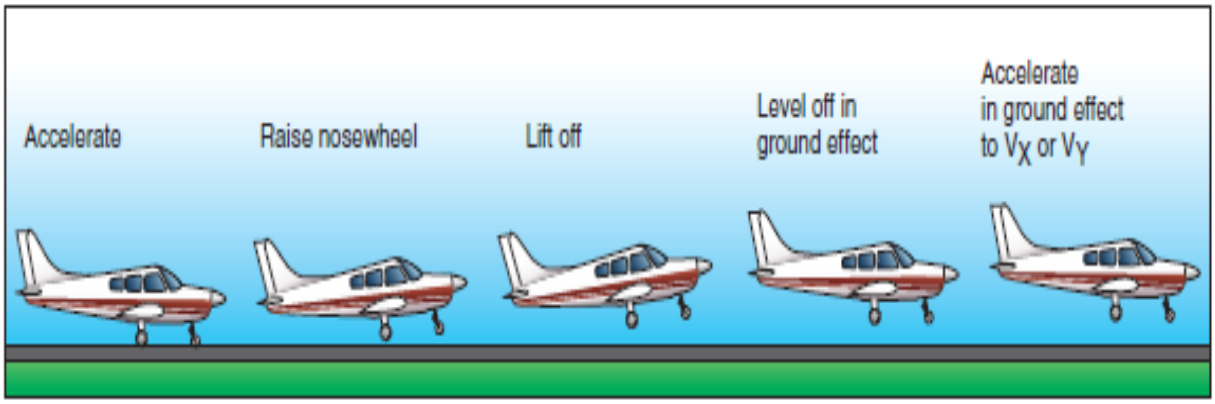

Figure 2

STEEP TURNS

1. Clear the area using at least 180° of turn.
2. Maintain minimum altitude IAW CAP-USAF Air Force Instructions (AFIs).
3. Perform "CGUMPS" check.
4. Establish aircraft at or below aircraft's designed maneuvering speed (V_A). Technique is to start the steep turn at either 90 or 100 KIAS. NOTE: V_A changes based on aircraft weight.
5. Smoothly roll into a coordinated 45° (or 60°) banked turn (+/- 10^o). Back elevator pressure should be smoothly applied to increase the angle of attack and compensate for the increasing load factor. Anticipate holding approximately 2 Gs for a 60° bank turn. Reference nose on the horizon. NOTE: From the left seat, drag the mag compass across the horizon for a right turn and top left corner of windscreen for a left turn. From the right seat, use the same references in reverse.
6. Coordinate the use of throttle and flight controls to maintain airspeed within 10 knots and altitude within 100 feet. Small increases/decreases of 1° to 3° of bank angle may be used to control small altitude deviations.
7. Use sufficient rudder to remain coordinated throughout the maneuver.
8. Roll out within 10° of original heading. Back elevator is gradually released and power reduced as required to maintain altitude and airspeed.

MANEUVER DISCUSSION:

This is a visual maneuver and the focus should be primarily outside the aircraft. Steep turns may be flown in either direction using 45° or 60° of bank angle with at least 360° of turn. Steep turns should be performed at an airspeed that does not exceed the airplane's design maneuvering speed (V_A) because of high load factors.

If you are losing altitude in the maneuver, remember to reduce the bank angle before raising the nose. Failing to do so will cause the turn rate to tighten and possibly over stress the wings.

POWER-ON STALLS [Figure 3]

1. Clear area using at least 180° of turn.
2. Maintain minimum AGL altitude IAW AFI11-2CAP-USAF, Volume 3.
3. Perform "CGUMPS" check.
4. Power-on stalls can be entered from takeoff speed up to cruise speed.
5. Smoothly apply full takeoff power for a takeoff stall or the recommended climb power for a departure stall. As power is being applied, establish a climb attitude.
6. After climb attitude is established, smoothly raise the nose of the aircraft to 15° to 25° nose high. Typically, elevator control must be moved progressively further aft to maintain a stall attitude.
7. Hold the stall attitude until a loss of control effectiveness occurs. Loss of control effectiveness is defined as an uncommanded nose drop or roll.
8. Recover by releasing back-elevator pressure to positively reduce the angle of attack while smoothly advancing the throttle to max allowable power.

9. The nose should be lowered as necessary to regain flying speed with minimum loss of altitude.
10. As flying speed returns, stop the descent and establish a climb attitude.
11. Climb at V_y (raise flaps if down).
12. The maneuver is complete when level at desired altitude with power and trim set.

MANEUVER DISCUSSION:

Power-on stalls are practiced from straight climbs and climbing turns with 15°- 20° bank, to simulate an inadvertent stall on takeoff or departure. Power-on stalls may be practiced with flaps in the takeoff configuration or in a clean configuration.

Be aware of the position of the ball in the slip/skid indicator. Slipping or skidding at the moment of stall will have an increased tendency to fall off on one wing or another, or even enter into a spin. If a spin is encountered, reduce the stall and yaw by neutralizing the controls.

Pilots should avoid entering a secondary stall on recovery and remain in coordinated flight through the maneuver. The objective is to minimize altitude loss during recovery.

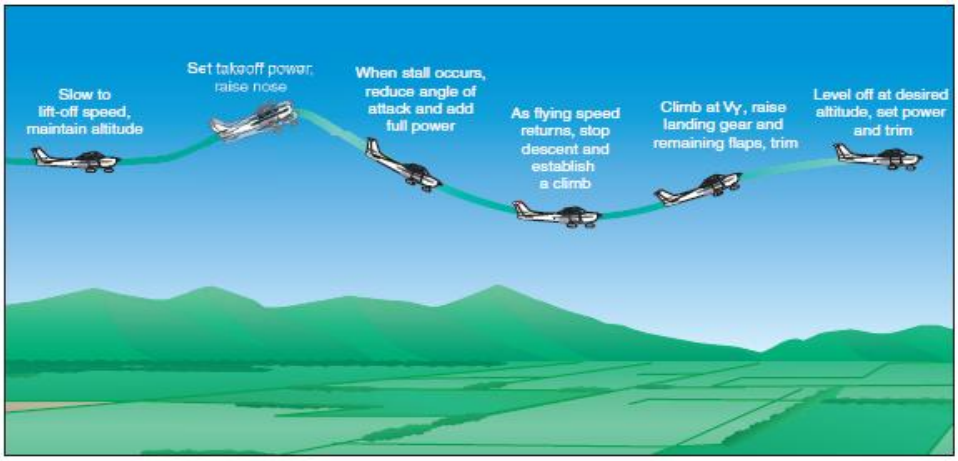

Figure 3

TRAFFIC PATTERN (POWER-OFF, ACCELERATED & UNACCELERATED) STALLS

Power-Off (Approach to Landing Stall)

1. Clear area using at least 180° of turn.
2. Maintain minimum altitude IAW CAP-USAF AFIs.
3. Initiate a simulated traffic pattern with appropriate airspeeds
   a. Perform “CGUMPS” check.
   b. Flaps settings may be zero, partial or full.
4. Adjust throttle as required to slow the aircraft.
5. When airspeed falls below maximum flap extension speed, lower full flaps and adjust pitch attitude to maintain airspeed.
6. Establish final landing speed and trim.

7. Reduce throttle to idle and slowly and smoothly increase pitch attitude to induce a stall.
8. Maintain pitch attitude by slowly increasing back pressure until impending stall indications occur. Do not climb.
9. Recover immediately using the following procedures:
   a. Reduce the angle of attack by releasing back elevator pressure.
   b. Smoothly advance throttle to maximum power.
   c. Right rudder may be required to overcome engine torque effects.
   d. Raising the flaps to go-around setting may be required if full flaps were used.
10. Stop descent (avoiding a secondary stall) and establish a positive rate-of-climb.
11. Climb at V_y (raise flaps if down) and trim.
12. The maneuver is complete when level at desired altitude with power and trim set.

Traffic Pattern (Accelerated) Stalls

1. Clear area using at least 180° of turn.
2. Maintain minimum AGL altitude IAW AFI11-2CAP-USAF, Volume 3.
3. Initiate a simulated traffic pattern with appropriate airspeeds
   a. Perform "CGUMPS" check.
   b. Flaps settings may be zero, partial or full.
   c. Turn 90^o to simulated base leg.
   d. Maintain appropriate simulated base leg airspeed.
4. From a simulated base, make a steep turn as if overshooting final to induce the stall.
   a. Power - idle.
   b. Make a level turn and do not climb.
   c. Approximately 45^o of bank.
5. Maintain turn and increase back pressure until approach to stall/indications of impending stall occurs.
6. Recover immediately using the following procedures:
   a. Reduce the angle of attack by releasing back elevator pressure.
   b. Smoothly advance throttle to maximum power.
   c. Raising the flaps to go-around setting may be required if full flaps were used.
   d. Return to straight-and-level flight with coordinated control pressures.
7. Stop descent (avoiding a secondary stall) and establish a positive rate-of-climb.
8. Climb at V_y (raise flaps if down) and trim.
9. The maneuver is complete when level at desired altitude with power and trim set.

Traffic Pattern (Unaccelerated) Stalls

1. An additional traffic pattern stall is flown simulating an undershooting final to induce the stall.
   a. Power – Idle
   b. Level turn
   c. Approximately 10° of bank
2. Continue with Step 5 procedures of Accelerated Stall until maneuver is complete.

<u>MANEUVER DISCUSSION</u>:

Traffic pattern (power-off) stalls are flown to practice retaining (or regaining) full control of the aircraft immediately upon recognizing the aircraft is almost stalled or a stall is about to occur if timely action isn't taken. Recovery from practice traffic pattern (power off) stalls will be initiated when the first indication of a stall occurs. The stall warning horn will sound between 5 and 10 knots above the stall in all configurations.

SLOW FLIGHT/MANEUVERING AT MINIMUM CONTROLLABLE AIRSPEED

1. Clear area using at least 180° of turn.
2. Maintain minimum AGL altitude IAW AFI11-2CAP-USAF, Volume 3.
3. Perform "CGUMPS" check.
4. Gradually reduce the throttle from cruise flight setting.
5. Maintain level flight by increasing pitch attitude as airspeed decreases.
6. Trim nose-up as necessary.
7. Adjust throttle as necessary to maintain 1.2 x V_S with flaps up or down. This speed is based on the Stall Speed chart in the POH and translates to approximately 70 KIAS for no-flap slow flight, 60 KIAS for partial flap slow flight and 50 KIAS for full flap slow flight.
8. Airspeeds should be maintained at -0 to +5 KIAS with +/- 50' of selected altitude. Utlilizing outside references, turns should be initiated left and right not to exceed 15° of bank.
9. Accelerate to normal cruise airspeed by performing a simulated go-around (Reference Go-around/Balked Landing on p. 11 of this guide) while maintaining a constant altitude.

MANEUVER DISCUSSION:
This maneuver demonstrates the flight characteristics and degree of controllability of the aircraft at its minimum flying speed. Flight at minimum controllable airspeed means a speed at which any further increase in angle of attack or load factor or reduction in power will cause an immediate stall. This maneuver will require lots of rudder to maintain directional control as well as remain in coordinated flight.

SFL AREA

1. Simulate a significant loss of thrust by retarding the throttle to idle.
2. Immediately establish best-glide airspeed (+/- 10 knots) and trim to maintain that airspeed.
3. Execute appropriate critical action procedures.
4. If possible, determine the MSL altitude of the surrounding terrain.
5. Select an appropriate landing area by considering winds, nearby obstacles (i.e. power lines, fences, etc) and a suitable surface (flat, plowed fields, direction of furrows, etc).
6. Consider the possibility of an actual forced landing.
7. Attempt to determine reason for the simulated malfunction and discuss the possibilities of a restart.
8. Plan and follow a flight pattern to selected landing area while monitoring High Key, Low Key and Base Key altitudes (see Maneuver Discussion).
9. Complete required checklists.
10. Place the aircraft in a position to safely land the aircraft in a suitable area.
11. Go-around IAW AFI11-2CAP-USAF, Volume 3 minimum altitudes.

MANEUVER DISCUSSION:

Common errors are diving for the field in an eagerness to get down or arriving at the selected landing area with too much speed and/or altitude to make a safe landing. Carbureted engines should be kept warm and periodically cleared by running the engine power up (technique is every 500' of descent). High Key is generally around 1,000-1,500 ft AGL. Low Key is approximately 600-800 ft AGL. Base Key is normally 400-600 ft AGL. Pilots should also reference the POH, Section 3, Emergency Procedures, Forced Landings for additional information.

TRAFFIC PATTERN OPERATIONS (non-towered airports) [Figure 4]

Note: Review Airport Traffic Patterns in Chapter 7 of the Airplane Flying Handbook. In addition, review Traffic Patterns in the AIM. [Figure 4]

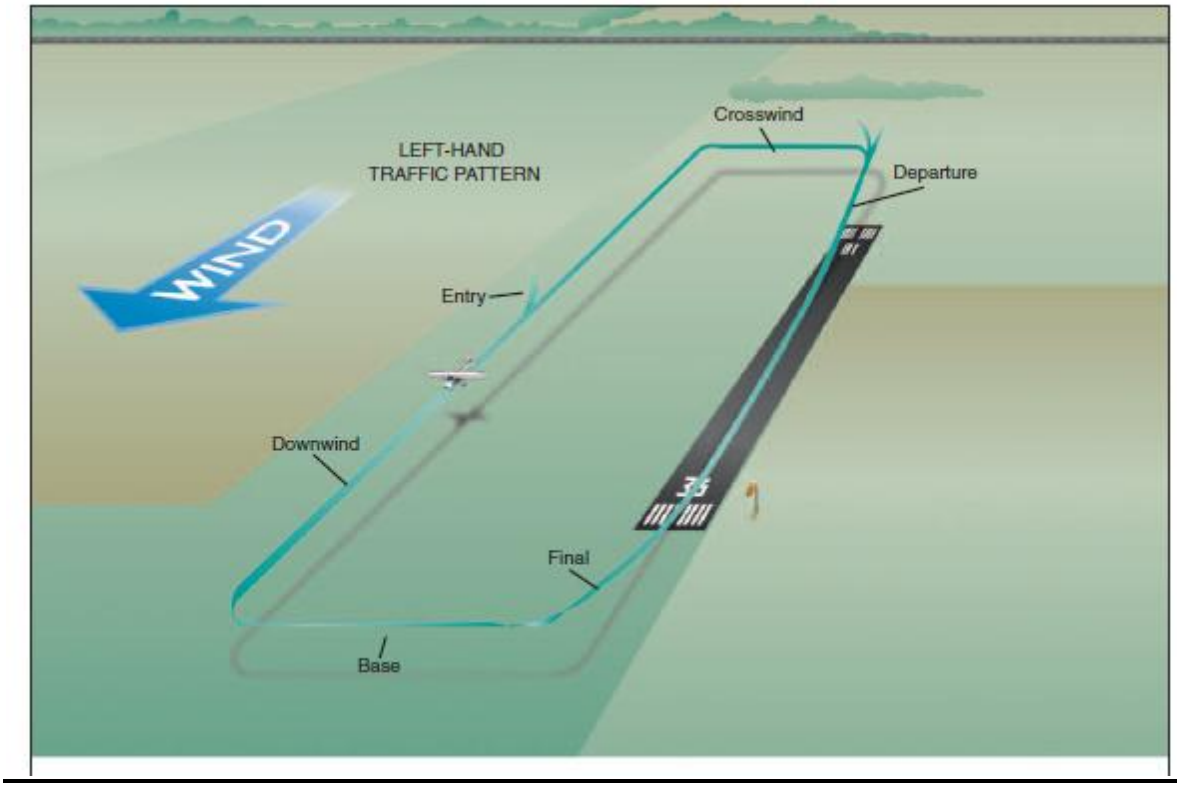

Figure 4

Pattern Altitude
Traffic pattern altitude is usually 1,000 feet above the airport surface elevation.

Pattern Entry
Unless otherwise directed by airport Unicom Operator or Airfield Facility Directory guidance, all traffic patterns are flown using left hand turns. Approaching from the pattern side, enter the downwind at mid-field from a 45° angle. The entry leg should be of sufficient length to provide a clear view of the entire traffic pattern.

Aircraft approaching from the non-pattern side should overfly the field at the midpoint of the runway at a minimum altitude 500' above the pattern altitude. Passing the runway, one technique is to fly outbound for 2 minutes for spacing. Begin a 180° turn to the right (so other traffic entering the pattern from a 45° entry will be in front of your aircraft) towards the approach end of the runway, and begin your descent to pattern altitude.

NORMAL LANDINGS

Note: Normal landing procedures apply to all final flap configurations. The patterns should be adjusted accordingly for planned flap settings and weather conditions. In addition, pilots should read Airport Traffic Patterns in the Airplane Flying Handbook.

1. Enter the traffic pattern IAW standard procedures.
2. Establish the downwind leg approximately ½ mile from the side of the runway at 1000 feet AGL (or as published). From the pilot's perspective (left seat), the runway will appear to be ½ to ¾ the way up the wing strut (1/3 of the way up the strut from the right seat). Pattern altitude should be maintained until abeam the approach end of the landing runway.
3. Establish crab angle as necessary to maintain proper downwind spacing.
4. Maintain appropriate airspeed (90 KIAS is recommended) on downwind leg (throttle as required).
5. Complete Before Landing checklist (CGUMPS for multiple patterns) well prior to the base leg turn. At the midpoint of downwind, pull carburetor heat on (if required).
6. Abeam your landing point, reduce power as required and maintain level flight until the airspeed drops into the White Arc of the Airspeed Indicator.
7. Extend flaps 10° (if used) and slow to 80 KIAS (recommended). Confirm that all items on the Before Landing checklist have been accomplished prior to turning base. Technique: Flaps may be extended to 20° rather than incrementally as described.
8. When the touchdown point is approximately 45° behind the wing tip, extend flaps (if used) an additional 10° (if not previously set to 20°) and begin a descending turn to base leg.
9. Maintain 80 KIAS on base leg. The turn to final should be approximately 300ft AGL and approximately ½ NM. Be sure to lead the turn to final compensating for wind.
10. Extend full flaps on final approach (if used), or sooner if needed to adjust glide path. Maintain final approach speed of 70 KIAS. In gusty wind conditions, consider only using partial flap approaches and add no more than one-half the gust factor to the final approach speed. Adjust pitch as necessary to maintain proper glidepath and power as necessary to maintain proper airspeed.
11. Use crab or wing-low method to maintain runway centerline alignment. If a crab is used, the pilot must transition to wing-low method prior to touchdown to prevent excessive gear side loading. *Note: Additional information regarding crosswind approach and landing techniques are available in the Airplane Flying Handbook under "Crosswind Approach and Landing".*
12. In a normal descent, the roundout should be started within 10 to 20 feet above the ground. Back elevator pressure should be smoothly applied to increase the pitch attitude and angle of attack. A proper final approach speed is critical.

13. Touch down on the main wheels beyond and within 200 feet of a specified touchdown point, with power at idle. Pitch attitude at touchdown should be slightly higher than the pitch attitude used for takeoff.
14. Maintain back pressure during landing roll and allow the nose wheel to settle slowly and smoothly to the runway as speed decreases. Maintain directional control.

SHORT-FIELD APPROACH AND LANDING

Note: Pilots should read Short Field Approach and Landing in the Airplane Flying Handbook. The objective of a short field approach and landing is to produce an approach that will clear any obstacles, result in little or no floating during the roundout and permit the aircraft to be stopped in the shortest possible distance

1. Enter the pattern and fly a wider than normal downwind leg so the aircraft can be properly configured and trimmed.
2. Fly a normal base leg and the final approach should be started at least 500' higher than the touchdown area.
3. Fly a normal final approach, maintaining 60 KIAS with full flaps. In gusty wind conditions, add no more than one-half the gust factor to the final approach speed.
4. The short field landing is an accuracy approach to a spot landing and a stabilized approach is critical. Technique is to pick an aiming point 200-300 feet before the intended point of touchdown.
5. Adjust power and pitch attitude to maintain the proper descent angle and airspeed.
6. After obstacles are cleared, reduce power but avoid an excessively low airspeed.
7. The roundout or flare must be accurately judged and a lack of floating during the flare, with sufficient control to touchdown properly, is one verification that the approach speed was correct.
8. Touch down on the main wheels beyond and within 200 feet of a specified point with minimum float and no drift.
9. Immediately after touchdown and retarding the throttle, lower the nose wheel to the runway, retract the flaps and apply appropriate braking while holding up elevator pressure. SIMULATE AS NECESSARY. USE CAUTION NOT TO SKID THE TIRES!
10. For maximum braking effectiveness, hold full nose-up elevator while brakes are being applied.

MANEUVER DISCUSSION

Common errors are diving for the field in an eagerness to get down or arriving at the runway with too much speed and/or altitude to make a safe landing. The best technique to reduce your energy is to slow the aircraft to 60 KIAS as soon as practical and use the excessive drag created by a full flap approach and slip (see pg 13 for slipping techniques) the aircraft as necessary.

SOFT-FIELD APPROACH AND LANDING

Note: Pilots should read Soft Field Approach and Landing in the Airplane Flying Handbook. The objective of a soft field landing is to touch down as smoothly as possible at the slowest possible landing speed. A stabilized approach is critical.

1. Enter the pattern and fly a normal downwind leg.
2. Fly a normal base leg and final approach. Maintain 60 KIAS with full flaps on final. Pick an aiming point which will allow a touchdown on the numbers (if available).
3. During a soft field landing, the airplane is held 1 to 2 feet off the surface in ground effect as long as possible. This allows a more gradual dissipation of forward speed to allow the wheels to touch down at a minimum speed.
4. Power may be used throughout the level-off and touchdown to ensure a touch down at the slowest possible airspeed. The airplane should be flown onto the ground.
5. Touch down at the slowest possible airspeed with the airplane in a nose-high attitude.
6. Reduce throttle to idle after touchdown and hold sufficient back pressure to keep the nose wheel off as long as possible. A slight addition of power usually will aid in easing the nose wheel down.
7. Leave flaps extended during the landing roll and avoid the use of brakes as much as possible.
8. Continue to provide increasing aft yoke as the aircraft slows to taxi speed to prevent the nose wheel from digging in. CAUTION: EXCESSIVE AFT YOKE COULD RESULT IN A TAIL STRIKE AT HIGH TAXI SPEEDS.

NOTE: Touch-and-go's are not authorized from an actual soft field runway per AFI11-2CAP-USAFI, Volume 3.

MANEUVER DISCUSSION

Common errors are diving for the field in an eagerness to get down or arriving at the runway with too much speed and/or altitude to make a safe landing. The best technique to reduce your energy is to slow the aircraft to 60 KIAS as soon as practical and use the excessive drag created by a full flap approach and slip (see pg 13 for slipping techniques) the aircraft as necessary.

SFL IN THE PATTERN

1. Select a suitable runway IAW AFI11-2CAP-USAF, Volume 3.
2. Simulate a significant loss of thrust by retarding the throttle to idle.
3. Immediately establish best-glide airspeed (+/- 10 knots) and trim to maintain that airspeed.
4. Execute appropriate critical action procedures.
5. Determine your pattern position and maneuver the aircraft as necessary to setup for landing.
6. If time permits, attempt to determine reason for the simulated malfunction and discuss the possibilities of a restart.

7. Plan and follow a flight pattern to the runway while monitoring High Key, Low Key and Base Key altitudes (see Maneuver Discussion).
8. Complete required checklists.
9. Place the aircraft in a position to safely land the aircraft on the runway.

MANEUVER DISCUSSION:

Common errors are diving for the field in an eagerness to get down or arriving at the selected landing area with too much speed and/or altitude to make a safe landing. High Key is generally around 1000-1500 ft AGL. Low Key is approximately 600-800 ft AGL. Base Key is normally 400-600 ft AGL. Pilots should also reference the POH, Section 3, Emergency Procedures, Forced Landings for more information. Additional techniques in regards to SFL patterns and landings are available through HQ CAP-USAF/XOV.

TOUCH AND GOs

1. After touchdown, maintain runway alignment using rudder, nose wheel steering, and ailerons as needed.
2. Reset flaps directly to 20°. No-flap touch-and-go's don't require a flap reset.
3. If applicable, push carburetor heat in to full cold.
4. Reset trim to takeoff position.
5. Smoothly advance throttle to takeoff power.
6. Rotate at specified rotation speed and execute normal takeoff and climb out.

GO AROUND (BALKED LANDING) [Figure 5]

1. Smoothly advance throttle to maximum power.
2. If applicable, push carburetor heat in to full cold.
3. Immediately retract extended flaps to the 20° position.
4. After attaining a positive climb, climbout should be at 55 KIAS.
5. After clearing any obstacles, retract the flaps passing 70 KIAS and allow the airspeed to accelerate to normal climb speed.

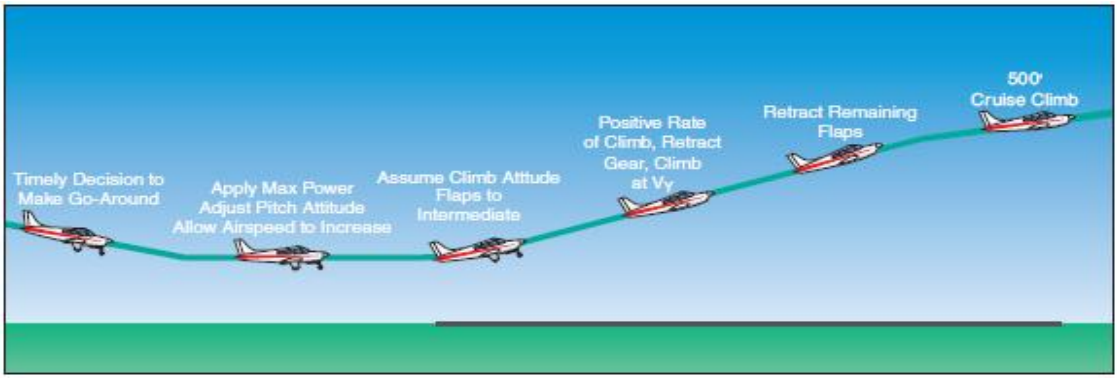

Figure 5

* SLIPS

MANEUVER DISCUSSION:

Intentional slips are used to dissipate altitude without increasing airspeed, and/or to adjust airplane ground track during a crosswind. Intentional slips are especially useful in forced landings, and in situations where obstacles must be cleared during approaches to confined areas. A slip is a combination of forward and sideward movement and the airplane is in fact flying sideways. This results in an increase in drag and allows the aircraft to descend rapidly without an airspeed increase.

A "sideslip" is entered by lowering a wing and applying just enough opposite rudder to prevent a turn. In a sideslip, the airplane's longitudinal axis remains parallel to the original flight path, but the airplane no longer flies straight ahead. A "forward slip" is one in which the airplane's direction of motion continues the same as before the slip was begun. In a forward slip, the amount of slip, and therefore the sink rate, is determined by the bank angle. The steeper the bank – the steeper the descent.

In most light airplanes, the steepness of a slip is limited by the amount of rudder travel available. A point may be reached where full rudder is required to maintain heading even though the ailerons are capable of furthering the bank angle. This is the practical slip limit.

Forward Slip [Figure 6]

1. Assuming the airplane is originally in straight flight, the wing on the side toward which the slip is made should be lowered by the use of ailerons.
2. Simultaneously, the airplane's nose must be yawed in the opposite direction from the bank by applying opposite rudder so that the airplane's longitudinal axis is at an angle to its original flight path.
3. The degree to which the nose is yawed in the opposite direction from the bank should be such that the original ground track is maintained.
4. If there is a need to descend more rapidly at the practical slip limit, lowering the nose will increase the sink rate and airspeed. The increase in airspeed increases rudder effectiveness and steepens the slip. Conversely, raising the nose decreases rudder effectiveness and the bank angle must be reduced.
5. Discontinue a slip by leveling the wings and simultaneously releasing the rudder pressure while adjusting the pitch attitude to a normal glide attitude. Releasing the rudder too quickly will cause the nose to swing too quickly into line and the airplane will tend to acquire excess speed.

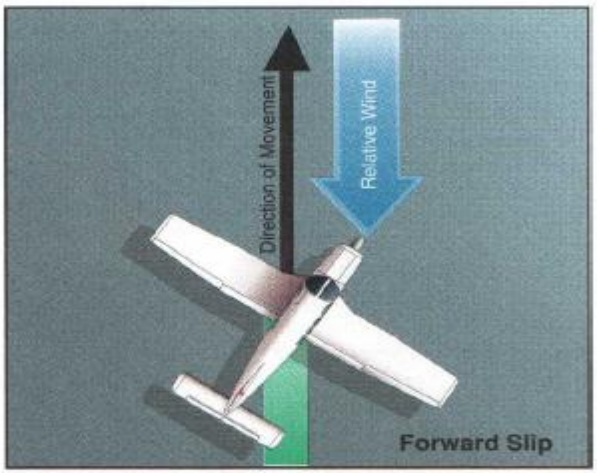

Figure 6

*** LAZY EIGHTS** [Figure 7]

Note: Lazy Eights are described in the Airplane Flying Handbook and are within the maneuver limits of the C-182T as described in the POH. It is a confidence maneuver.

MANEUVER DISCUSSION:

The Lazy Eight maneuver is designed to develop perfect coordination of controls through a wide range of airspeeds and altitudes so that certain accuracy points are reached with planned attitude and airspeed. It is a maneuver in which the control forces do not remain constant and aids in development of subconscious feel, planning, orientation, coordination and speed sense.

The maneuver consists of two 180° turns, in opposite directions, while making a climb and descent in a symmetrical pattern during each of the two turns. The maneuver is a climbing turn of ever steepening bank (up to 30° maximum) until the 90° point of turn. The next 90° of turn consists of a shallow diving turn of ever decreasing bank, passing through wings level at the 180° point. The maneuver is then repeated in the opposite direction. At no time in the maneuver is the airplane flown straight-and-level but is instead rolled directly from one bank to the other with the wings level only at the moment the turn is reversed at the completion of each 180° change in heading. The maneuver should be symmetrical throughout, nose being the same number of degrees below the horizon descending as above the horizon climbing.

1. Select reference points at 45°, 90°, and 135° from direction in which the maneuver begins.
2. Perform a clearing turn.
3. Enter the maneuver from straight-and-level flight at cruise power and at the airplane's design maneuvering speed (V_A). Reference Airspeed Limitations in POH.
4. First 45° of turn. Slowly increase the pitch to about 20° (steepest pitch) and slowly increase bank to approximately 15°. The climbing turn should be planned and controlled so that the maximum pitch-up attitude is reached at the 45° point. The rate of rolling into the bank must be such as to prevent the rate of turn from becoming too rapid. *NOTE: Unless the maneuver is begun with a slow rate of roll, the combination of increasing pitch and increasing bank will*

cause the rate of turn to be so rapid that the 45° reference point will be reached before the highest pitch attitude is attained.

5. At the 45° point. The pitch attitude should start to decrease slowly toward the horizon and the 90° reference point. Since the airspeed is still decreasing, right-rudder pressure will have to be applied to counteract torque.

6. Second 45° of turn. Slowly increase bank to 30°and hold the pitch steady. At the 90° point, allow the nose to fall through the horizon and the bank angle should be 30°. Due to the decreasing airspeed, a slight amount of opposite aileron pressure may be required to prevent the bank from becoming too steep.

7. At the 90° point. The bank should be at the maximum angle (approximately 30°), the airspeed should be at its minimum (5 to 10 knots above stall speed), and the airplane pitch attitude should be passing through level flight. Lazy eights should be performed with no more than approximately 30° bank. As the pilot's reference line passes through the 90° point, the bank should be decreased gradually, and the airplane's nose allowed to continue lowering.

8. Third 45° of turn. Slowly decrease the bank angle to 15° at the 135° point. The nose should be lowered to approximately 20° at the 135° point. When the airplane has turned 135°, the nose should be in its lowest pitch attitude. The airspeed will be increasing during this descending turn, so it will be necessary to gradually relax rudder and aileron pressure and to simultaneously raise the nose and roll the wings level.

9. Final 45° of turn. Slowly continue to reduce the bank. Note the amount of turn remaining and adjust the rate of rollout and pitch change so that the wings become level and the original airspeed is attained in level flight just as the 180° point is reached.

10. Upon returning to the starting altitude and the 180° point, a climbing turn should be started immediately in the opposite direction toward the selected reference points to complete the second half of the eight in the same manner as the first half.

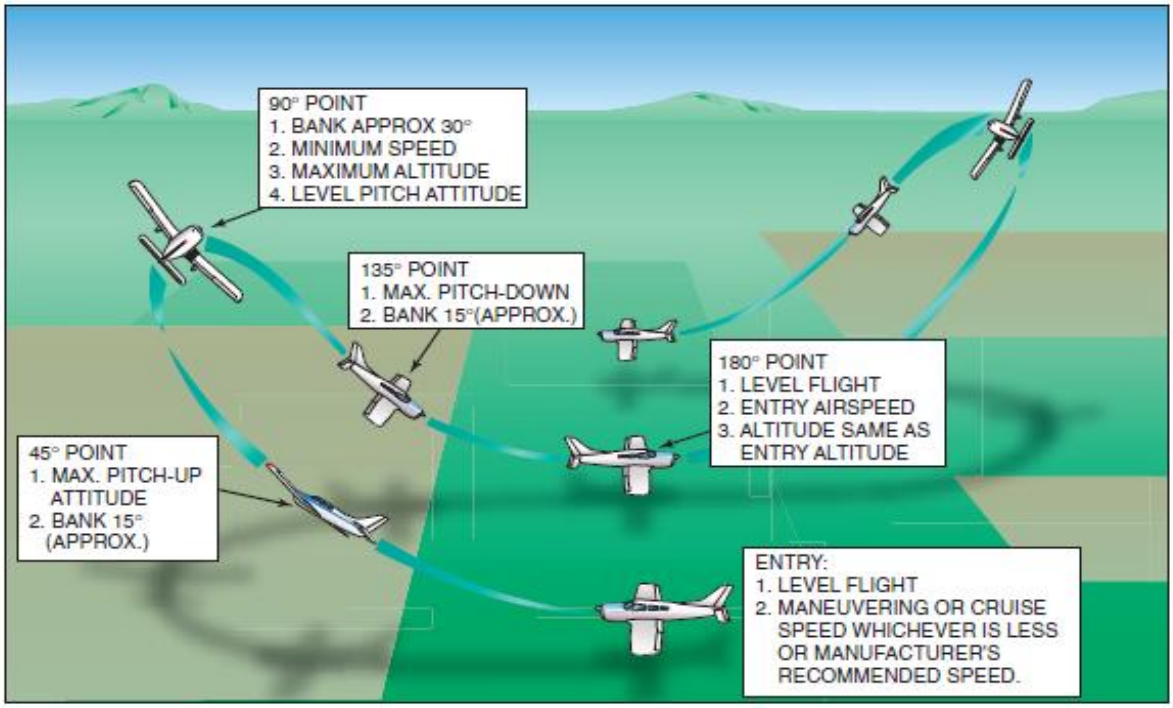

Figure 7

*** CHANDELLES** [Figure 8]
Note: Chandelles are described in the Airplane Flying Handbook and are within the maneuver limits of the C-182T as described in the POH. It is a confidence maneuver.

MANEUVER DISCUSSION:

The objective of this maneuver is to develop pilot coordination, orientation, planning, and accuracy of control during maximum performance flight.]

A chandelle is a maximum performance climbing turn beginning from approximately straight-and-level flight, and ending at the completion of a precise 180° of turn in a wings-level, nose-high attitude at the minimum controllable airspeed. The maneuver demands that the maximum flight performance of the airplane be obtained; the airplane should gain the most altitude possible for a given degree of bank and power setting without stalling. This is a coordinated flight exercise so use the rudder while in slow flight and keep the ball centered.

1. Perform a clearing turn. Establish visual references off the nose and each wingtip.
2. Enter the maneuver from straight-and-level flight at cruise power and below the airplane's design maneuvering speed (V_A) . Reference Airspeed Limitations in POH.
3. First 90°. Smoothly enter an angle of bank of approximately 30°. After the appropriate bank is established, a climbing turn should be started by smoothly applying back-elevator pressure to increase the pitch attitude at a constant rate and to attain the highest pitch attitude as 90° of turn is completed.
4. Second 90°. Maintain established pitch and slowly roll out of the bank. Roll out to wings level at V_{SO} at the 180° point. The pitch attitude should be held momentarily while the airplane is at the minimum controllable airspeed.
5. Gently reduce the pitch attitude to return to straight-and-level cruise flight.

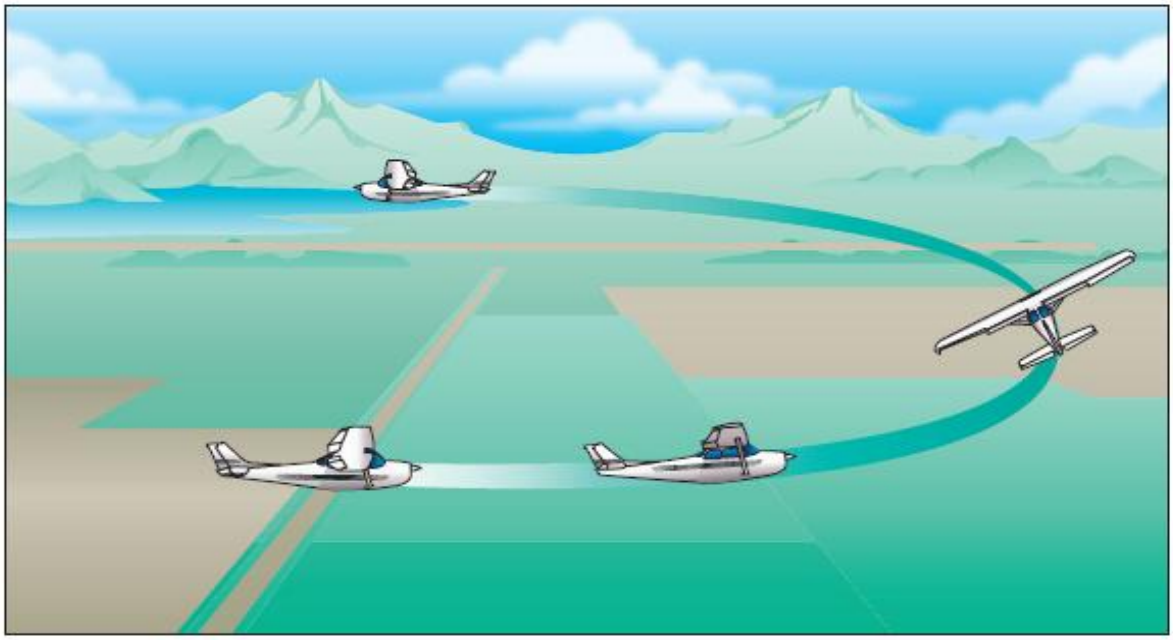

Figure 8