

Adam's Guide to Private Pilot Maneuvers

Traffic Pattern Operations

Description:

The Traffic pattern is used to establish an orderly flow of traffic for aircraft arriving, departing, and operating in the vicinity of airports. The pattern consists of arrivals at and departures from an airport, while executing proper cockpit duties.

Objective:

Safe and efficient airport arrival and departure procedures.

Arrival Procedures:

- Determine the active runway by the appropriate method.
- Establish pattern entry as appropriate to the arrival airport. Pattern altitude and airspeed must be established prior to entering the pattern.
- Maintain 80KIAS (No slower) on the downwind unless otherwise directed by ATC.
- Abeam the touchdown point reduce power to approximately 1700 RPM, add 10° of flaps and establish 80 KIAS descent attitude.
- Start a turn to the base leg when at approximately 45° past touchdown point.
- Adjust the flaps as necessary (normally 20°). Coordinate the pitch and power to maintain the desired angle and 70 KIAS respectively. Pitch for path, power for airspeed.
- Visually clear the final approach and start your turn to final so as to roll out with the aircraft aligned with runway centerline. (Should roll out at approximately 400-500 feet AGL).
- Adjust the flaps as necessary (normally 30°). Coordinate the pitch and power to maintain the desired approach angle and speed respectively (normally 65 KIAS). Adjust the desired final approach airspeed by adding ½ the gust factor for gusty wind conditions.
- Execute appropriate landing procedure.

Departure Procedures:

If departing the pattern:

- Exit the traffic pattern as appropriate for the departure airport.

For closed pattern operations:

- Start the turn to crosswind leg beyond the departure end of the runway **and** within 300' of pattern altitude.

NOTE: The above procedures assume an ideal pattern situation. Additional traffic, ATC, local pattern restrictions, obstacles, etc. may dictate modification of these procedures. In all cases, the pilot shall exercise good judgment and maintain positive aircraft control.

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook
Current Aeronautical Information Manual

Takeoffs, Landings, and Go-Arounds

Normal and Crosswind Takeoff and Climb

Description:

Transition of the aircraft from taxi to flight using the desired runway.

Objective:

To safely take the aircraft off the ground and depart the runway during normal or crosswind conditions.

Procedure:

- Complete run-up and before takeoff checklists.
- Make appropriate radio calls and visually clear the runway before taxiing across the hold short line.
- Taxi onto active runway and line up with the centerline.
- Position ailerons into the wind.
- Smoothly advance throttle to full while maintaining centerline with rudder steering.
- At V_R , start smoothly rotating the aircraft off the runway.
- Maintain coordination and runway heading with rudder and aileron inputs.
- Climb out at V_Y , until at least 500 feet AGL and beyond the end of the runway before turning on course.
- Continue climb out and complete the after takeoff checklist.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook
C-172 Pilot's Operating Handbook, section 4 & 5

Normal and Crosswind Approach and Landing

Description:

Transition of the aircraft from flight to taxi using the desired runway.

Objective:

To safely and accurately land the airplane on the desired runway, and to properly correct for a crosswind during the landing approach, touchdown, and rollout.

Procedure:

- Complete the approach and before landing checklists.
- Enter traffic pattern at appropriate point and make radio call.
- Abeam Touchdown point:
 - Carb Heat On.
 - Reduce power to 1700 RPM.
 - Select 10° Flaps.
 - Adjust pitch/power for ~500 FPM descent at ~80 KIAS.
- ~45° past touchdown point:
 - Turn base leg and make appropriate radio call.
 - Once on base, Select 20° Flaps.
 - Adjust pitch/power for ~500 FPM descent at ~70 KIAS.
- Turn final to align flight path with centerline and make appropriate radio call.
 - Once on final, Select 30° Flaps.
 - Adjust pitch/power for ~500 FPM descent at ~65 KIAS.
 - Continue descent towards aiming point (prior to touchdown point).
- At appropriate altitude align longitudinal axis of aircraft with centerline with use of rudder and maintain direction with ailerons.
- At appropriate altitude smoothly retard throttle to idle and adjust pitch attitude to flare so that upwind main wheel touches the ground first, followed by the downwind main wheel, and last the nose wheel.

NOTE: Power, pitch, and airspeeds may vary depending on the specific approach, traffic, and ATC requests.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook
C-172 Pilot's Operating Handbook, section 4 & 5

Short Field Takeoff and Climb

Description:

Transition of the aircraft from taxi to flight using the desired runway.

Objective:

To safely take the aircraft off the ground and depart the runway during normal or crosswind conditions.

Procedure:

- Complete run-up and before takeoff checklists.
- Make appropriate radio calls and visually clear the runway before taxiing across the hold short line.
- Taxi onto active runway and line up with the centerline.
- Position ailerons into the wind.
- Smoothly advance throttle to full while maintaining centerline with rudder steering.
- At V_R , start smoothly rotating the aircraft off the runway.
- Maintain coordination and runway heading with rudder and aileron inputs.
- Climb out at V_Y , until at least 500 feet AGL and beyond the end of the runway before turning on course.
- Continue climb out and complete the after takeoff checklist.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook
C-172 Pilot's Operating Handbook, section 4 & 5

Short Field Approach and Landing

Description:

Transition of the aircraft from flight to taxi using the desired runway.

Objective:

To safely and accurately land the airplane on the desired runway, and to properly correct for a crosswind during the landing approach, touchdown, and rollout.

Procedure:

- Complete the approach and before landing checklists.
- Enter traffic pattern at appropriate point and make radio call.
- Abeam Touchdown point:
 - Carb Heat On.
 - Reduce power to 1700 RPM.
 - Select 10° Flaps.
 - Adjust pitch/power for ~500 FPM descent at ~80 KIAS.
- ~45° past touchdown point:
 - Turn base leg and make appropriate radio call.
 - Once on base, Select 20° Flaps.
 - Adjust pitch/power for ~500 FPM descent at ~70 KIAS.
- Turn final to align flight path with centerline and make appropriate radio call.
 - Once on final, Select 30° Flaps.
 - Adjust pitch/power for ~500 FPM descent at ~65 KIAS.
 - Continue descent towards aiming point (prior to touchdown point).
- At appropriate altitude align longitudinal axis of aircraft with centerline with use of rudder and maintain direction with ailerons.
- At appropriate altitude smoothly retard throttle to idle and adjust pitch attitude to flare so that upwind main wheel touches the ground first, followed by the downwind main wheel, and last the nose wheel.

NOTE: Power, pitch, and airspeeds may vary depending on the specific approach, traffic, and ATC requests.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook
C-172 Pilot's Operating Handbook, section 4 & 5

Performance Flight Maneuvers

Steep Turns

Description:

Maintain a constant 45° angle of bank turn while maintaining a constant altitude and airspeed. Roll out should be to a predetermined heading and demonstrated in both directions with each turn encompassing 360° of heading change.

Objective:

To turn the airplane at steep angles of bank while maintaining altitude, controlling over banking tendencies and simultaneously dividing attention inside and outside the cockpit.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- Establish 95 KIAS (or appropriate V_A speed).
- Establish visual references.
- Roll the airplane in the desired direction and establish 45° of bank with coordinated use of rudder and aileron.
- Maintain altitude and bank angle with coordinated use of aileron, elevator, and rudder.
- Adjust power to maintain entry airspeed.
- Adjust trim as necessary to alleviate control pressures.
- A minimum of one complete 360° turn will be accomplished or as specified by the instructor.
- Rollout rate will be equal to roll-in rate, and both rollout and roll-in will be executed with proper coordination.
- The rollout should be started at a point prior to the predetermined heading in order to assure that the turn is stopped at the appropriate heading (½ the bank angle for rollout).

NOTE: This maneuver will be completed at an altitude not lower than 1500' AGL.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook

Maneuvering During Slow Flight (MCA)

Description:

The aircraft is maneuvered at an airspeed such that controllability is minimized to the point where any further increase in angle of attack or load factor would result in an immediate stall. The maneuver should be accomplished in straight flight, turns, climbs, and descents using various flap settings.

Objective:

To develop the pilot's ability to recognize differences in turn radius, changes in aircraft flight characteristics, and control effectiveness at slow airspeeds in various configurations.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- At or before the completion of the clearing turns the power will be reduced to approximately 1700 RPM.
- After completing the clearing turns, maintain heading and altitude while slowing to Minimum Control Speed (MCA will vary with weight and is defined as the speed at which any further increase in the angle of attack or load factor would result in an immediate stall).
- Extend flaps in increments to full down when the airspeed enters the flap operating range.
- As airspeed approaches MCA, pitch and power are now adjusted to maintain the airspeed and altitude, respectively, as desired.
- Increase throttle to approximately 2000-2100 RPM once MCA is obtained. Throttle will control altitude and pitch will control airspeed. This is the region of reverse command.
- While maintaining MCA, a series of turns, climbs, and descents using various flap settings and bank angles of 10° or less are performed as directed by the instructor.
- Recovery is initiated by:
 - Applying full power (Carb heat off)
 - Adjusting pitch attitude to maintain altitude
 - Retract flaps to 20°
 - Above 60 KIAS retract flaps to 10°
 - Above 70 KIAS retract flaps to 0°
- Resume normal cruise or as directed.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook

Power Off Stalls

Description:

The aircraft is maneuvered to approach airspeed in straight or turning flight, in a normal landing configuration. Control pressures will be applied to result in an increased angle of attack, until the imminent or the full stall occurs.

Objective:

To develop the pilot's ability to recognize the indications of an imminent or full stall during power off situations and to make prompt, positive and effective recoveries with a minimum loss of altitude.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- Reduce power to approximately 1700 RPM while slowing to approach speed.
- Once airspeed is in the flap operating range, lower flaps to the approach flap setting or as directed.
- Once approach airspeed is obtained, establish a glide at final approach speed.
- At a pre-selected altitude, maintain altitude with increasing pitch to achieve a stall.
- **For turning stalls**, establish 20° of bank and remain coordinated throughout the stall.
- **For imminent stalls**, maintain altitude until the first buffet, horn, or a rapid decay of control effectiveness is experienced.
- **For full stalls**, maintain altitude until a sudden loss of control effectiveness, excessive sink rate with full up elevator, or uncontrollable pitching occurs.
- Recovery is initiated by **simultaneously:**
 - Decreasing the angle of attack to break the stall
 - Applying full power and leveling the wings

Once positive recovery is assured

 - Adjust pitch attitude to minimize altitude loss
 - Retract flaps to 20°
 - Above 60 KIAS retract flaps to 10°
 - Above 70 KIAS retract flaps to 0°
- Climb back to entry altitude and accelerate to cruise or as directed.

NOTE: By definition a spin is an uncoordinated stall. The pilot must maintain vigilance to ensure that the aircraft remains in coordinated flight throughout any stall procedure to avoid a potential spin. Maneuver must be done above 1500' AGL.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook
Pilot's Operating Handbook, section 4

Power On Stalls

Description:

The aircraft will be slowed to V_R+5 in straight or turning flight, simulating a takeoff environment. Control pressures will be applied to result in an increased angle of attack, until the imminent or the full stall occurs.

Objective:

To develop the pilot's ability to recognize the indications of an imminent or full stall during takeoff situations and to make prompt, positive and effective recoveries with a minimum loss of altitude.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- Reduce power to approximately 1700 RPM.
- Maintain altitude and heading while slowing to V_R+5 .
- At V_R+5 , simultaneously increase pitch to stall attitude and apply full power (Avoid excessively high pitch attitudes).
- **For turning stalls**, establish 15° of bank and ensure to remain coordinated throughout the stall.
- **For imminent stalls**, maintain stall pitch attitude until the first buffet, horn, or a rapid decay of control effectiveness is experienced.
- **For full stalls**, maintain stall pitch attitude until a sudden loss of control effectiveness, excessive sink rate with full up elevator, or uncontrollable pitching occurs.
- **Recovery is initiated by simultaneously:**
 - Decreasing the angle of attack to break the stall
 - Leveling the wings
 - Once positive recovery is assured
 - Adjust pitch attitude to maintain V_Y and climb.
- Climb back to entry altitude and accelerate to cruise or as directed.

NOTE: By definition a spin is an uncoordinated stall. The pilot must maintain vigilance to ensure that the aircraft remains in coordinated flight throughout any stall procedure to avoid a potential spin. Maneuver must be done above 1500' AGL.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook
Pilot's Operating Handbook, section 4

Ground Reference Maneuvers

Wind Drift Circle

Description:

A constant medium bank 360° turn which when completed will give an indication of the direction and strength of the wind at that altitude.

Objective:

To recognize the effect of wind on the aircraft's ground track; also to give the pilot a method to determine wind direction and strength while in flight.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- Maneuver the aircraft at 1000 feet AGL directly over a straight-line reference at cruise airspeed.
- Determine a field to be used in the case of an engine out off airport landing.
- Upon reaching any prominent reference along the straight-line reference perform a 30° bank; 360° turn in either direction.
- During the turn, it is important to keep the bank angle, airspeed, and coordination consistent.
- Immediately after rollout note the aircraft position relative to the starting point reference. Any difference between the start and finish position indicates the approximate wind direction and strength.

NOTE: The maneuver should be performed at normal traffic pattern altitude (1000' AGL), but no lower than 500' above obstacles.

References:

Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook

Rectangular Course

Description:

The procedure consists of maneuvering the aircraft over a predetermined rectangular ground track. The pilot will maneuver the aircraft utilizing necessary wind corrections to parallel the sides of the rectangle at a uniform distance.

Objective:

To develop the pilot's ability to maneuver the airplane over a predetermined ground path while compensating for wind using crab angles and bank angles for varying ground speeds.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- Determine the wind direction.
- Determine a field to be used in the case of an emergency landing.
- Establish traffic pattern speed (Approximately 80 KIAS) and altitude (1000' AGL).
- Select a prominent rectangular field bounded by four reference lines whose sides are approximately equal to a typical traffic pattern. The downwind reference line of the rectangle should be approximately parallel to the wind direction.
- It is recommended to enter the maneuver 45° to the downwind at traffic pattern airspeed (80 KIAS) and altitude (1000' AGL). However, be expected to be able to enter the maneuver from any direction regarding wind.
- Establish the proper crab angle to maintain a uniform distance of approximately ½ mile from the reference lines.
- Vary the bank angle to maintain a constant radius during the turns. (Higher ground speed = Steeper bank angle; lower ground speed = shallower bank angle).
- Exit the maneuver after crossing the reference line on the downwind leg at pattern airspeed and altitude.

NOTE: The maneuver should be performed at normal traffic pattern altitude (1000' AGL), but no lower than 500' above obstacles.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook

S-Turns Across A Road

Description:

This procedure consists of maneuvering the aircraft through a series of alternating 180° turns changing direction with each crossing of a predetermined reference line. The ground path should be a series of symmetrical half circles alternately executed on the downwind and upwind sides of the reference line. Wings should be level only when crossing the reference line.

Objective:

To develop the pilot's ability to maneuver the airplane over a predetermined ground path by compensating for a changing ground speed by varying bank angle while dividing attention inside and outside the airplane. Additionally, to develop the concept of rudder coordination while varying bank angles during transition.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- Determine the wind direction.
- Determine a field to be used in the case of an emergency landing.
- Establish traffic pattern speed (Approximately 80 KIAS) and altitude (1000' AGL).
- Select a road or straight reference line running approximately perpendicular to the wind.
- It is recommended to enter the maneuver on the downwind on a ground track perpendicular to the reference line. However, be expected to be able to enter the maneuver from any direction regarding wind.
- At a point directly over the reference line, initiate a 180° constant radius turn, modifying the bank angle as necessary to compensate for wind drift. (Higher ground speed = Steeper bank angle; lower ground speed = shallower bank angle).
- At the completion of the turn, the aircraft will be directly over the reference line and longitudinal axis of the aircraft will be perpendicular to the reference line with wings level.
- Upon completion of the first turn, begin an identical turn in the opposite direction. Do not stop in the wings level position. The aircraft should roll through level flight as the reference line is passed.
- Bank should be adjusted as necessary throughout the maneuver to achieve two complete semicircles of equal radius.

NOTE: The maneuver should be performed at normal traffic pattern altitude (1000' AGL), but no lower than 500' above obstacles.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook

Turns Around A Point

Description:

Flying at 1000' above ground level a constant distance will be maintained from a prominent reference point. The resulting ground track will be a circle.

Objective:

To develop the pilot's ability to compensate for changing ground speed by varying bank angle and to maneuver the aircraft over a predetermined ground path while dividing attention inside and outside the cockpit.

Procedure:

- Clear the area and complete the necessary pre maneuver flows.
- Determine the wind direction.
- Determine a field to be used in the case of an emergency landing.
- Establish traffic pattern speed (Approximately 80 KIAS) and altitude (1000' AGL).
- Select a small but prominent reference point.
- It is recommended to enter the maneuver on the downwind. However, be expected to be able to enter the maneuver from any direction regarding wind.
- Enter the turn with a bank appropriate for the ground speed.
- Maintain approximately ½ mile distance from the point.
- Adjust the bank angle as necessary to correct for the effects of wind so as to maintain a constant radius turn. (Higher ground speed = Steeper bank angle; lower ground speed = shallower bank angle).
- Accomplish one 360° turn.
- Plan to depart on the downwind unless otherwise instructed.

NOTE: The maneuver should be performed at normal traffic pattern altitude (1000' AGL), but no lower than 500' above obstacles.

Completion Standards:

Meets Private Pilot PTS Standards

References:

Current Private Pilot Practical Test Standards
Current Jeppesen Private Pilot Maneuvers Guide
Current FAA Airplane Flying Handbook