Rainier Flight Service LLC, located at Renton Municipal Airport and holding Air Agency Certificate No. 1B85346L, is owned and operated as:

Rainier Flight Service
800 W Perimeter Rd
Renton, WA 98057

1. Checklist Policy

A vital part in the development of a professional pilot is training in checklist usage and discipline. Pilot deviation from standard operating procedures is the number one crew cause of hull loss accidents. Many of these accidents and incidents are the direct result of improper training or lack of training in checklist usage, thus we will emphasize checklist usage and discipline. This emphasis will help to ensure safe and efficient operations at Rainier Flight Service, in addition to preparation for a professional career.

Most Checklists are to be accomplished using a do/verify method. The principle advantage of this method is redundancy. Configured once by memory and verified via checklist to catch any missed items. This method requires extensive practice to learn the flows.

Consistent with the do/verify philosophy a memorized flow check will be employed whenever completing normal and emergency procedures. The checklist will then be used to back up the flow. A memory guided flow by itself is unacceptable. Visual verification what switches and controls are in the correct position when performing the checklist verification is mandatory.

Checklist Execution

1. **State checklist title (i.e. "Cruise Checklist")**
2. **Complete flow from memory**
3. **Verify completion using flow checklist**
4. **State checklist complete (i.e. "Cruise Checklist Complete")**

In the event that a checklist becomes interrupted, the entire flow and checklist should be repeated. This will prevent an inadvertent missed item from the checklist that could be critical to flight.

Disclaimer: This Standardization manual and RFS checklists are guidelines for safe operations of the aircraft. These are not sole sources of information. The PIC must refer to the appropriate POH for further information. RFS is not responsible for errors or omission from these documents. In all instances the POH for the specific aircraft in question will be considered the final authority concerning safe operations of that aircraft.

2. Takeoffs, Landings and Go-Arounds

Objective
To develop the pilot's proficiency on normal and crosswind takeoffs and landings, short-field takeoffs and landings, go-arounds, and airport traffic patterns.

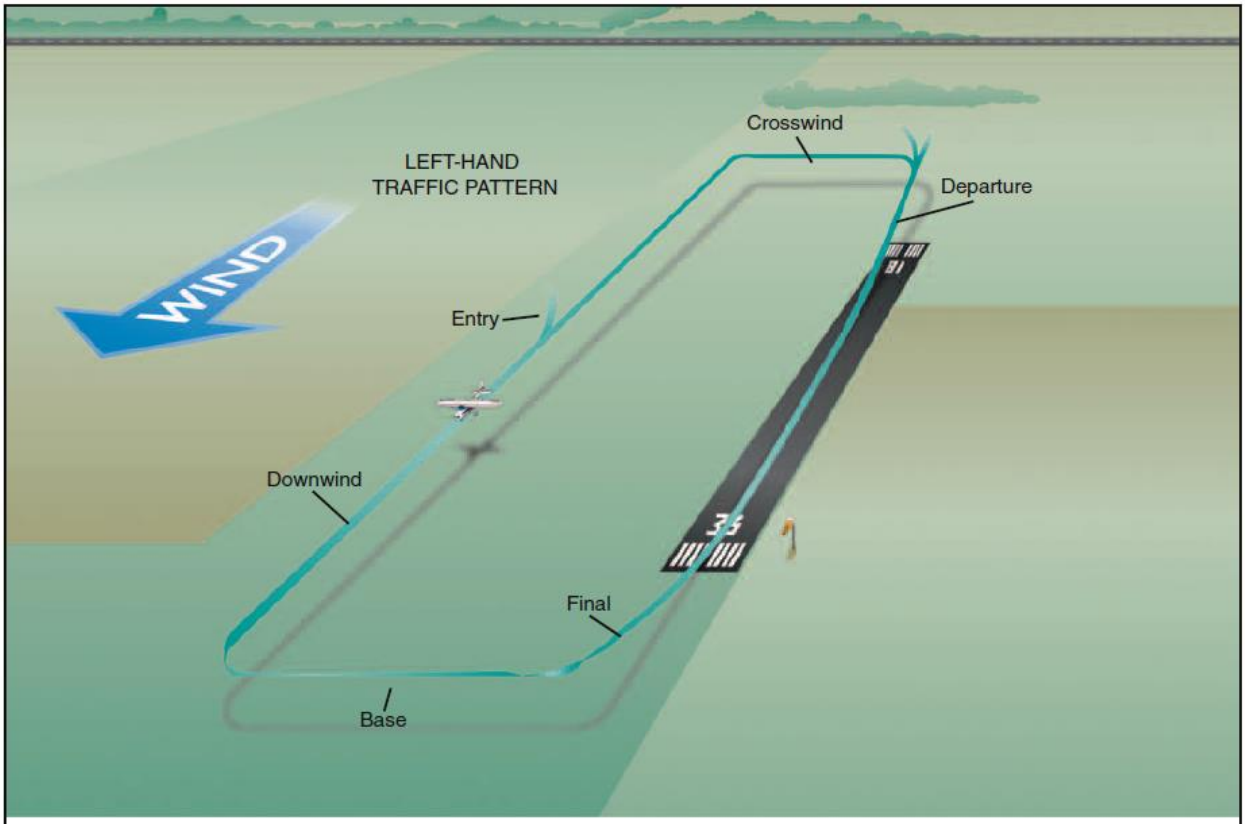
References
- AC 90-66A: Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports without Operating Control Towers
- FAA-H-8083-3A: Airplane Flying Handbook
- Piper Seminole Pilot's Operating Handbook
- Airmen Certification Standards

2.1 MANEUVER: Airport Traffic Pattern

Objective
To develop the pilot's knowledge of the rules and procedures involved with airport traffic patterns.

Description
A traffic pattern has rules and procedures designed to assure that air traffic flows into and out of an airport in an orderly manner. It is established appropriate to the local conditions, including: the altitude to be flown, the wind direction, the direction and placement of the pattern, and the procedures for entering and leaving the pattern. Pilots should make all turns to the left, unless otherwise indicated.

Teaching Considerations
- Division of attention.
- Compliance with ATC instructions.
- Adequate spacing between other traffic operating in the traffic pattern.
- All legs of the traffic pattern should be approximately 3/4 mile from the runway.
- Wind drift correction/ground track considerations.
    - Application of ground reference maneuvers to traffic pattern operations.
- Appropriate radio calls at controlled/uncontrolled airports.
- Use of the Chart Supplement for airport operations.
- Wind shear and wake turbulence.



Set-up

- Determine the Traffic Pattern Altitude (TPA).
- Determine the wind direction, runway, traffic pattern direction, and any existing traffic using any or all of the following:
    - ATIS, ASOS, windsock, etc.
    - Radio communication.
    - Airport overflight at 500 feet above the TPA. Do not descend to TPA until well clear of the pattern.
- Enter the traffic pattern at a 45° angle to the downwind leg at TPA.
- The downwind leg should be approximately 3/4 mile from the runway.
- Apply proper wind correction angle for a ground track parallel to the runway.
- Initiate Before Landing Checklist by mid-field downwind or 2 miles from the runway threshold if entering on base or final leg.
- Select aiming point using the following prioritized criteria.
    - Abeam visual glideslope indicator (PAPI, VASI).
    - Aiming point marking (1,000-foot marker).
    - At least 200 feet beyond threshold, within first 1/3 of the runway.

Execution

- Maintain recommended approach speeds throughout the pattern.
    - Pattern entry (100 KIAS)
    - Downwind (100 KIAS)
    - Base (90 KIAS)
    - Final (75-85 KIAS)
    - Short Final (Speed appropriate for flaps, wind and go-around)

NOTE: Change in airspeed should be continual throughout the traffic pattern.

- Abeam the aiming point - reduce power setting. **Extend gear.**
- The base leg begins 45° from the aiming point. **Check gear.**
- Coordinate final turn to rollout on the runway centerline. **Check gear.**
- **Perform a GUMP Check.**
- Establish a stabilized approach by 200 feet AGL and *verbalize*:
    - A stabilized approach is:

        Check – All checklists are complete
        F – Flight path correct (on centerline)
        L – Landing configuration correct
        A – Airspeed (+5/-0)
        P – Power setting appropriate for aircraft configuration
        S – Sink rate is not abnormal (on glidepath)

NOTE: Changing conditions require adjustments of speed and flap settings, i.e. wind gust factors, ATC.

- Complete Before Landing Checklist prior to 200 feet AGL.
- If a stabilized approach is not attained by 200 feet AGL, a go-around must be conducted.

Closed Traffic Procedures

- Continue the upwind leg until reaching a point beyond the departure end of the runway and within 300 feet of TPA.
- Continue with specified traffic pattern procedures listed above.
- If leaving the pattern, the pilot should continue straight ahead or depart by making a 45° left turn (right turn for right hand pattern) after reaching TPA.

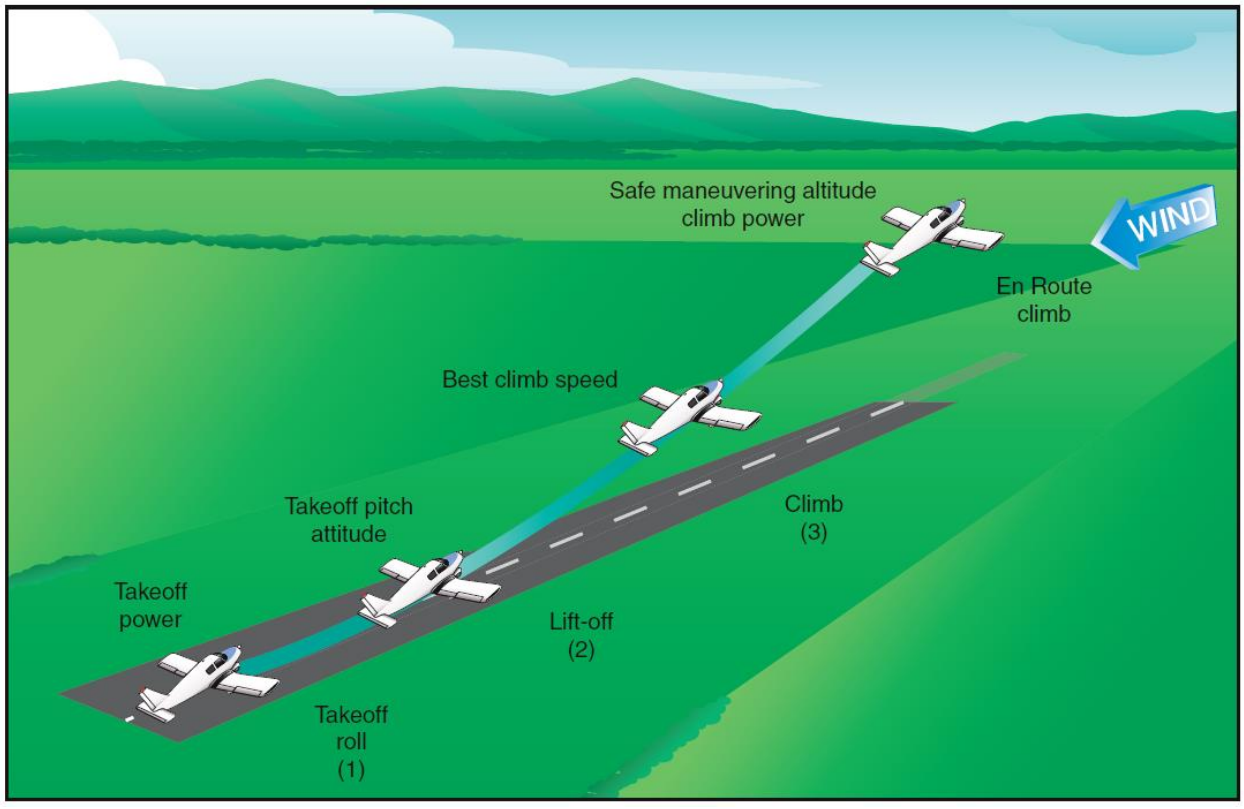
NOTE: When operating at a tower-controlled airport, ATC may alter standard traffic pattern operations.

2.2 MANEUVER: Normal/Crosswind Takeoff and Climb

Objective
To develop the pilot's proficiency on normal and crosswind takeoffs, and climbs.

Description
The takeoff and climb involves the movement of the airplane from its starting position on the runway to the point where a positive climb to a safe maneuvering altitude has been established.

Teaching Considerations
- PAVE Checklist
- Planning and orientation.
    - Runway length, width, and surface condition.
    - Effect of density altitude.
    - Appropriate climb airspeed.
- Calculation and use of takeoff performance data.
- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Aborted takeoff before and after liftoff.
- Wind shear and wake turbulence.
- Importance of completing checklists.
- Methods for checking for traffic used in a high wing aircraft.



Set-up

- Set the wing flap setting to 0°.
- Adjust the mixture, obtaining maximum engine performance for the existing conditions (full rich below 3,000 feet, leaned for best power above 3,000 feet pressure altitude).
- Review takeoff performance capabilities and consider obstructions and conditions.
- Verify the final approach and takeoff path are clear of other aircraft.
- Align the airplane on the runway centerline.
- Verify that the heading indicator is aligned with the runway heading.
- Confirm that the runway heading corresponds with the intended runway of use.
- Apply aileron deflection properly for crosswind conditions.

Execution

- Advance the throttles smoothly to maximum power.
- Check engine instruments and annunciators.
- Adjust aileron deflection during acceleration.
- Liftoff at computed airspeed.
- Establish the pitch attitude for and accelerate to Vy or appropriate speed for altitude.
- With positive rate of climb and no useful runway remaining, retract the gear.
- Maintain directional control and proper wind drift correction throughout the takeoff and climb.
- At 1,000 feet AGL verify the climb flow pattern/checklist complete.

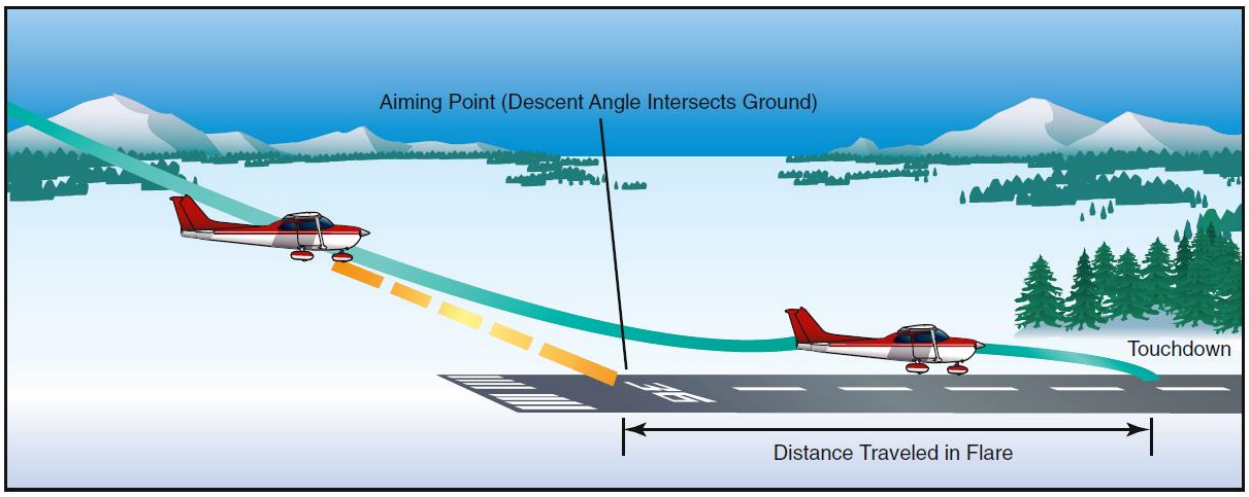
2.3 MANEUVER: Normal/Crosswind Approach and Landing

Objective
To develop the pilot's proficiency on normal and crosswind approaches and landings.

Description
The landing involves the transition from the airport traffic pattern to the end of the landing roll.

Teaching Considerations

- Planning and orientation.
  - Runway length, width, and surface condition.
  - Effect of density altitude on landing distance.
  - Obstructions or hazards.
  - Landing performance data and limitations.
- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Wind shear or wake turbulence.
- Effect of flaps on approach and landing.
- Effective use of brakes consistent with safety.
- Timely execution of go-around, if necessary.
- Importance of completing checklists.
- Importance of adjusting seat to appropriate position.
- Appropriate speed for turning off the runway.



Set-up

- Establish the recommended approach and landing configuration and airspeed (see Airport Traffic Pattern).
- Select an aiming point using the following prioritized criteria.
    - Abeam visual glideslope indicator (PAPI, VASI).
    - Aiming point marking (1,000-foot marker).
    - At least 200 feet beyond threshold, within first 1/3 of the runway.

Execution

- Apply proper crosswind correction for landing.
- Establish a stabilized approach by 200 feet AGL and *verbalize*:
    - A stabilized approach is:

        Check – All checklists are complete
        F – Flight path correct (on centerline)
        L – Landing configuration correct
        A – Airspeed (+5/-0)
        P – Power setting appropriate for aircraft configuration
        S – Sink rate is not abnormal (on glidepath)

NOTE: Flight control inputs on final are used to maintain an already stabilized approach path.
NOTE: Changing conditions require adjustments of speed and flap settings, i.e. wind gust factors, ATC.

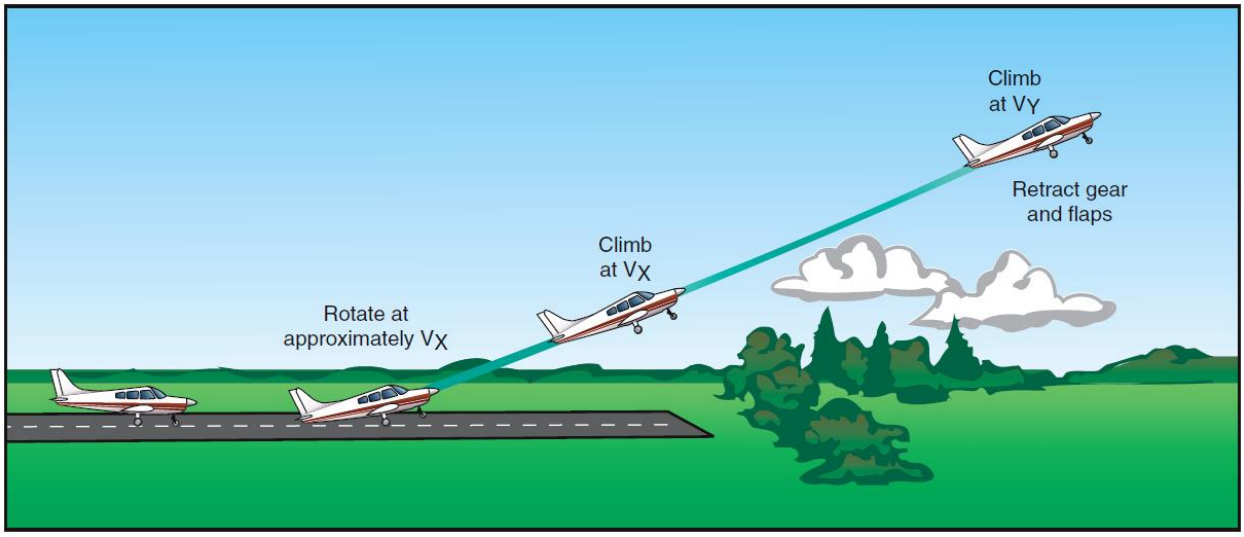
- Begin the round out at approximately 10–20 feet above the ground, smoothly transitioning to a landing pitch attitude and decrease airspeed.
- Touchdown on main gear first at approximate stalling speed with no drift and with the airplane's longitudinal axis aligned with the runway/landing path.
- Maintain centerline using proper crosswind technique.

2.4 MANEUVER: Short-Field Takeoff and Climb

Objective
To develop the pilot's ability to obtain maximum performance from the airplane while performing a short field takeoff and clearing all obstacles in the departure path safely.

Description
Takeoffs and climbs from fields where the takeoff area is short or restricted by obstructions require that the airplane be flown at the limit of its takeoff performance capabilities.

Teaching Considerations
- Planning and orientation.
  - Runway length, width, and surface condition.
  - Effect of density altitude.
  - Appropriate climb airspeed.
- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Aborted takeoff before and after liftoff.
- Wind shear and wake turbulence.
- Importance of completing checklists.



Set-up

- Select the wing flaps to POH recommended setting.
- Adjust the mixture, obtaining maximum engine performance for the existing conditions (full rich below 3,000 feet, leaned for best power when above 3,000 feet pressure altitude).
- Review takeoff performance capabilities considering obstructions and conditions.
- Verify the final approach and takeoff path are clear of other aircraft.
- Position the airplane for maximum runway availability and align it with the runway centerline.
- Verify that the heading indicator is aligned with the runway heading.
- Confirm that the runway heading corresponds with the intended runway of use.
- Apply aileron deflection properly for crosswind conditions.

Execution

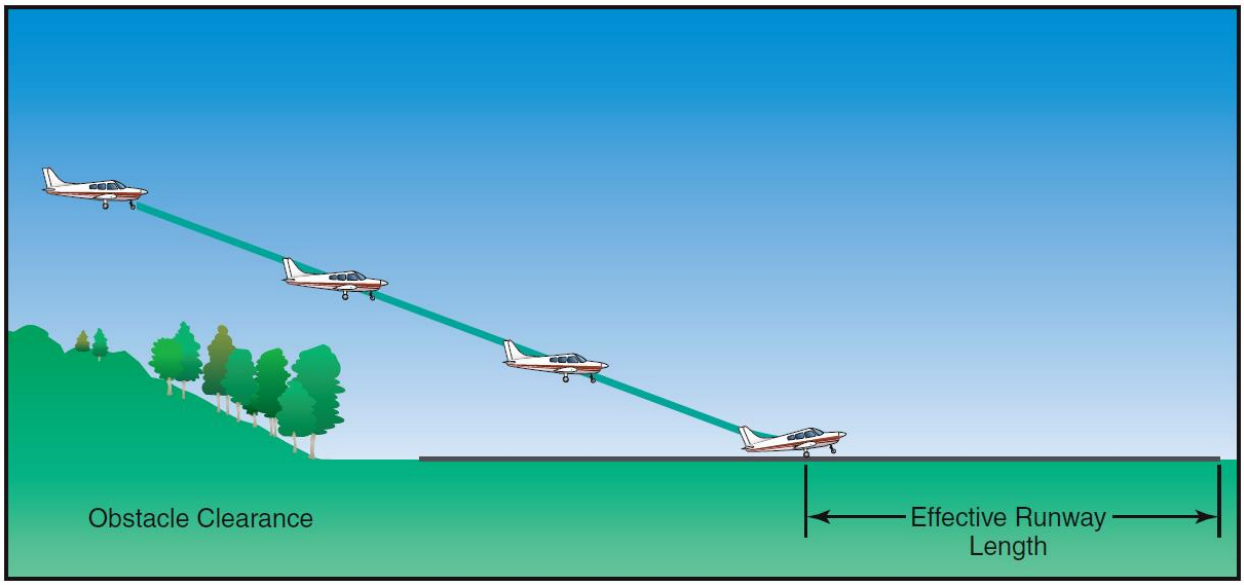
- Apply brakes and advance the throttles smoothly to maximum power.
- Check engine instruments and annunciators.
- Release brakes.
- Adjust aileron deflection during acceleration, as required.
- Liftoff at POH computed airspeed.
- Verify positive rate of climb, retract the landing gear.
- Accelerate and climb at POH computed airspeed until obstacle is clear, or at least 50 feet AGL.
- After clearing the obstacle, establish the pitch attitude for and accelerate to Vy during the climb.
- Retract the wing flaps to up, when the airspeed is above Vy, at a safe altitude and after a positive rate of climb is established.
- Maintain directional control and proper wind drift correction throughout the takeoff and climb.
- At 1,000 feet AGL verify the climb flow pattern/checklist complete.

2.5 MANEUVER: Short-Field Approach and Landing

Objective
To develop the pilot's ability to obtain maximum performance from the airplane while performing a short field landing and clearing all obstacles in the approach path.

Description
Approaches and landings to fields where the landing area is short or restricted by obstructions require that the airplane be flown at the limit of its landing performance capabilities.

Teaching Considerations
- Planning and orientation.
  - Runway length, width, and surface condition.
  - Effect of density altitude and required landing distance.
  - Obstructions or hazards.
  - Landing performance data and limitations.
- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Wind shear or wake turbulence.
- Effect of flaps on approach and landing.
- Effective use of brakes consistent with safety and controllability.
- Timely execution of go-around if necessary.
- Importance of completing checklists.
- Importance of adjusting seat to appropriate position.



Set-up

- Establish the recommended approach and landing configuration and airspeed (see Airport Traffic Pattern).
- Select an aiming point using the following prioritized criteria.
    - Abeam visual glideslope indicator (PAPI, VASI).
    - Aiming point marking (1,000-foot marker).
    - At least 200 feet beyond threshold, within first 1/3 of the runway.

Execution

- Apply proper crosswind correction for landing.
- Establish a stabilized approach by 200 feet AGL and *verbalize*:
    - A stabilized approach is:

        Check – All checklists are complete
        F – Flight path correct (on centerline)
        L – Landing configuration correct
        A – Airspeed (+5/-0)
        P – Power setting appropriate for aircraft configuration
        S – Sink rate is not abnormal (on glidepath)

NOTE: Flight control inputs on final are used to maintain an already stabilized approach path.
NOTE: Changing conditions require adjustments of speed and flap settings, i.e. wind gust factors, ATC.

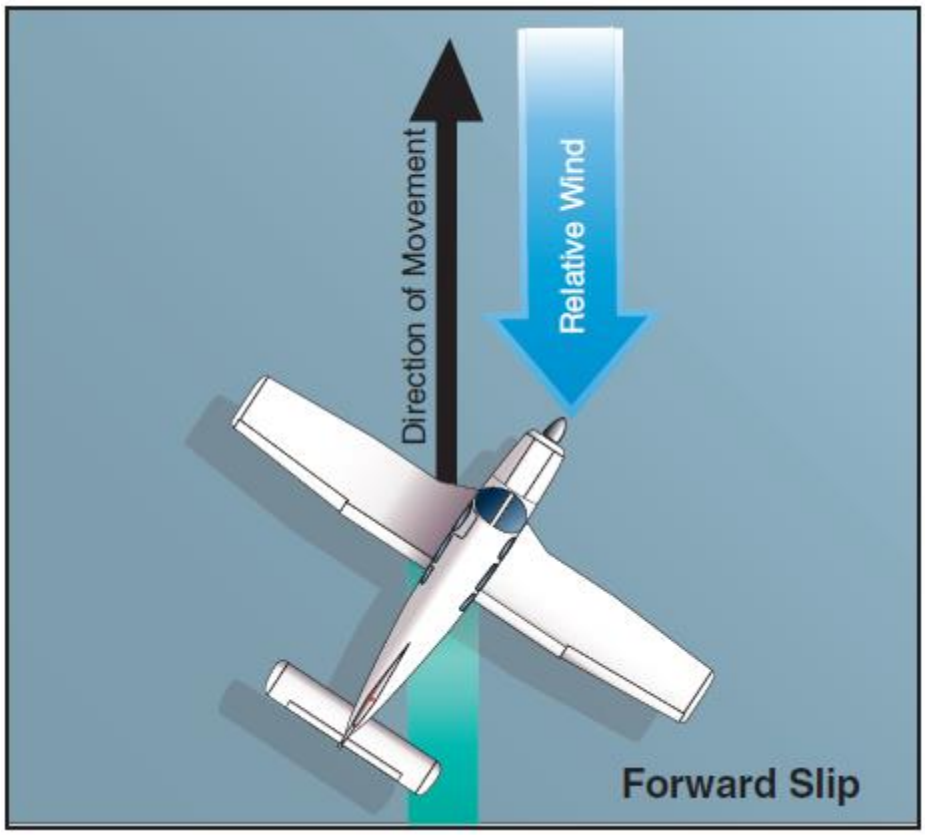
- Begin the round out at approximately 10–20 feet above the ground, smoothly transitioning to a landing pitch attitude.
- Touchdown on main gear first with no drift and with the airplane's longitudinal axis aligned with the runway/landing path.
- Maintain centerline using proper crosswind technique.
- Smoothly apply optimum disc and aerodynamic braking to stop in the shortest possible distance consistent with safety and controllability.

2.6 MANEUVER: Forward Slip to a Landing

Objective
To develop the pilot's proficiency at performing a forward slip to a landing.

Description
Forward slips are used to dissipate altitude without increasing airspeed.

Teaching Considerations
- Obstructions or hazards.
- Importance of maintaining airspeed.
- Aircraft limitations.



Execution
- Reduce throttles to idle.
- Establish the recommended approach and landing configuration and airspeed (see Airport Traffic Pattern).
- Lower upwind wing.
- Apply opposite rudder to prevent the airplane from turning in the direction of the lowered wing.
- Allow the nose of the airplane to be pointed away from the runway.
- Maintain a ground track aligned with the runway centerline.
- Once an acceptable altitude has been attained, the slip may be discontinued.
- Continue with a normal, short-field, soft-field, or power-off landing.

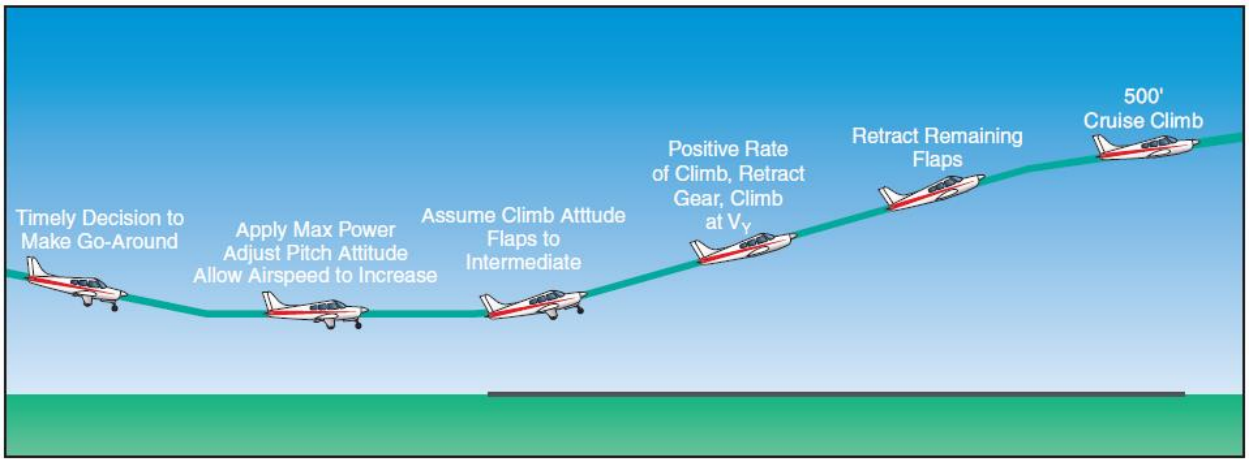
2.7 MANEUVER: Go-Around/Rejected Landing

Objective
To develop the pilot's ability to safely execute a go around from an unsafe landing.

Description
Whenever landing conditions are not satisfactory, a go-around is warranted. The go-around is not strictly an emergency procedure. It is a normal maneuver that may at times be used in an emergency situation. Although the need to discontinue a landing may arise at any point in the landing process, the most critical go-around will be one started when very close to the ground. A go-around/rejected landing must be executed if a stabilized approach is not achieved by 200 feet AGL.

Teaching Considerations

- An immediate go-around must be executed if any of the following condition are encountered:
  - Over/undershooting runway or aim point
  - Aircraft/Vehicle/People/Objects on runway
  - ATC instructions
  - High round out
  - Late or rapid round out
  - Excessive floating
  - Ballooning
  - Bouncing
  - Porpoising
  - Windshear
  - Any other factor placing successful landing in doubt.
- Prompt decision making.
- Anyone may make a call to abort a landing and must be adhered to.
- Failure to apply full power.
- Failure to control pitch to slow or stop descent.
- Wind shear or wake turbulence.
- Stall/spin awareness.
- Importance of completing checklists.



Execution

- Smoothly apply maximum power, level the wings, and transition to a climb pitch attitude that will slow or stop the descent.
- Retract the flaps to 25°, if fully extended.
- Establish a positive rate of climb, while accelerating to Vx. Retract the landing gear.
- After reaching Vy, retract the flaps to up (0°).
- Adjust trim as required.
- Maintain maximum power to a safe maneuvering altitude.

3. VFR Flight Maneuvers

Objective
To develop the pilot's proficiency on VFR flight maneuvers including: stalls, slow flight, commercial maneuvers, and multi-engine maneuvers.

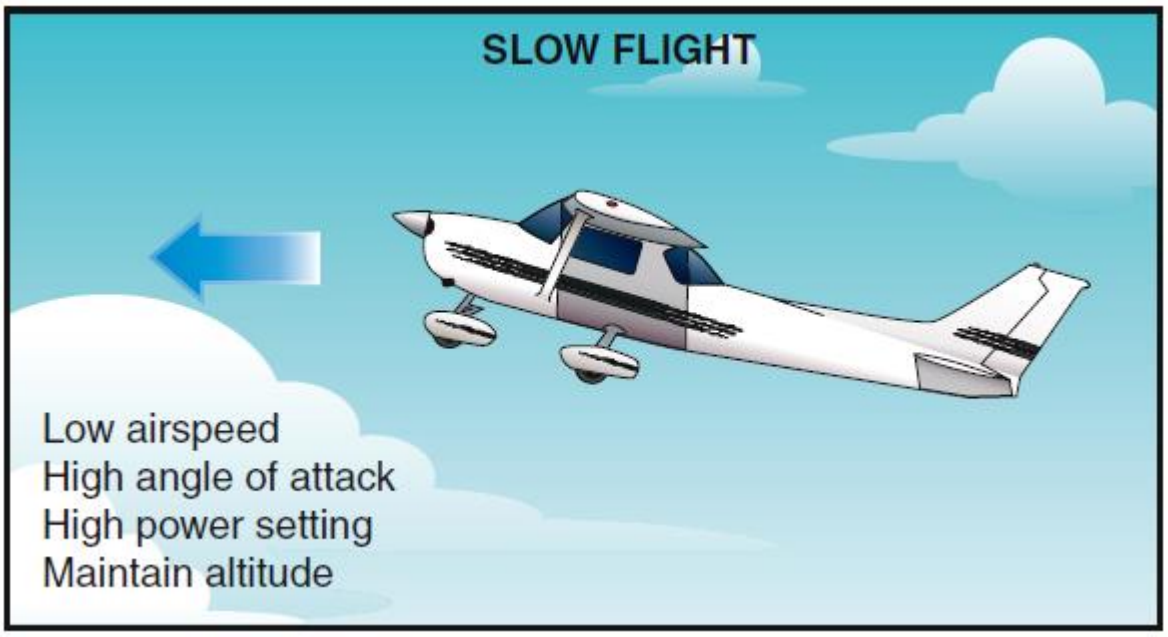
References
- AC 61-67C: Stall and Spin Awareness Training
- FAA-H-8083-3A: Airplane Flying Handbook
- Piper Seminole Pilot's Operating Handbook
- FAA-H-8083-25A: Pilots Handbook of Aeronautical Knowledge
- Airmen Certification Standards

3.1 MANEUVER: Maneuvering During Slow Flight (Minimum Controllable Airspeed)

Objective
The objective of maneuvering during slow flight is to develop the pilot's sense of feel and ability to use the controls correctly, and to improve proficiency in performing maneuvers that require slow airspeeds.

Description
This maneuver demonstrates the flight characteristics and degree of controllability of the airplane at its minimum flying speed. The term "flight at minimum controllable airspeed" means a speed at which any further increase in angle of attack, load factor, or reduction in power will cause an immediate stall.

Teaching Considerations
- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Relationship of configuration, weight, Center of Gravity (CG), maneuvering load, bank angle, and power to flight characteristics and controllability.
- Correlation of the maneuver to critical flight situations.
- Compensation for left turning tendencies.
- Region of reverse command/back side of the power curve.



Set-up

- Select an entry altitude that allows the recovery to be completed no lower than the Minimum Recovery Altitude.
    - MRA 1,500 feet AGL
- Clear area with two 90° turns.

Execution

- Gradually reduce the throttles from cruising position.
- While airspeed is decreasing, the position of the nose in relation to the horizon should be noted and raised as necessary to maintain altitude.
- As the airspeed reaches the maximum allowable for flap operation, flaps should be lowered, and the pitch attitude adjusted to maintain altitude.
    - Flap and gear setting as specified by the instructor; extend within flap operating range.
- Below Vlo extend landing gear as specified by the instructor.
- Apply rudder as necessary to maintain coordinated flight.
- Establish and maintain an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in an immediate stall.
- Maintain heading and altitude while changing flap configurations.

Recovery

- Increase power to cruise setting.
- Maintain coordination.
- Retract wing flaps to 25°, while accelerating to Vy.
- After positive rate of climb, retract the gear.
- After reaching Vy, retract the wing flaps to up, one increment at a time.
- Adjust pitch as necessary to maintain level flight.
- Return to cruise power setting when the airplane is in normal level flight.

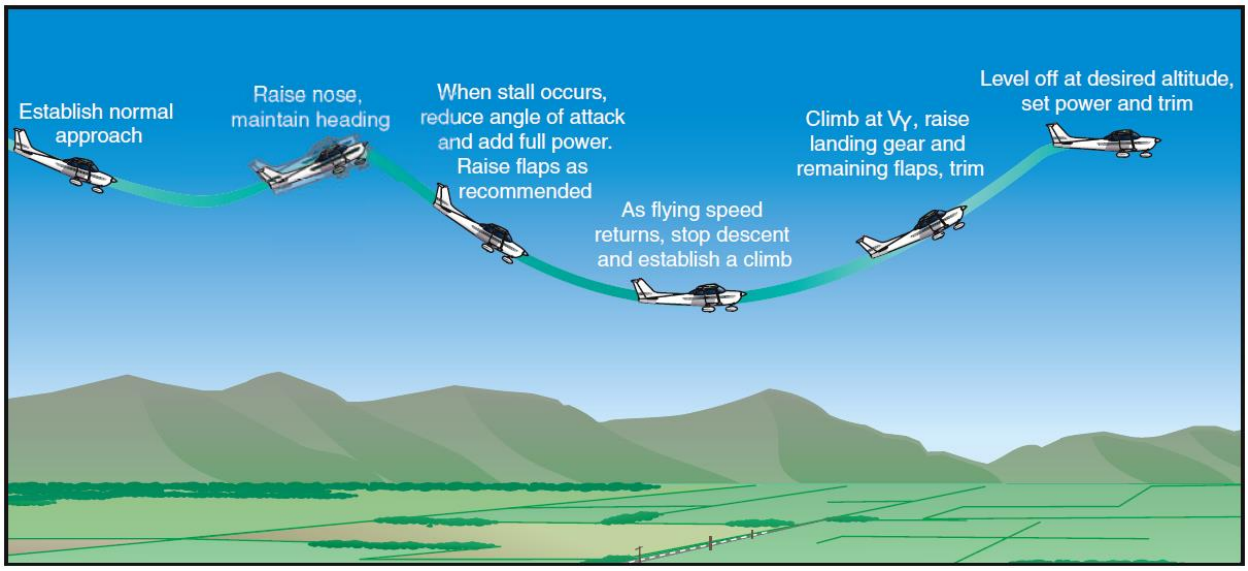
3.2 MANEUVER: Power-Off Stalls – Full or Imminent

Objective
To familiarize the pilot with the conditions that produce power-off stalls, to assist in recognizing an approaching stall, and to develop the habit of taking prompt preventive or corrective action to minimize altitude loss.

Description
Power-off stalls are performed in normal landing configuration to simulate an accidental stall occurring during the approach to landing.

Teaching Considerations

- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Factors affecting stall speed:
  - Weight
  - Load factor
  - Center of gravity location
  - Configuration
- Stall/Spin awareness considerations:
  - Flight conditions where unintentional stall may occur and procedures for recovery.
  - Aerodynamic factors related to spins.
  - Awareness that an aircraft can stall at any airspeed and attitude.



Set-up

- Select an entry altitude that allows the recovery to be completed no lower than the Minimum Recovery Altitude.
    - MRA 1,500 feet AGL
- Clear area with two 90° turns.

Execution

The instructor shall specify full or imminent stall, bank angle, and flap setting.

- Reduce the throttles to idle.
- After reducing power, maintain a constant altitude in level flight while decelerating to 1.3 Vso.
- Pitch the airplane down to establish a normal approach attitude.
- Set flaps - up to full, as specified. Extend the landing gear.
- Establish a stabilized descent while maintaining a specified heading and/or bank angle.
- Establish and maintain a coordinated landing pitch attitude.

Recovery

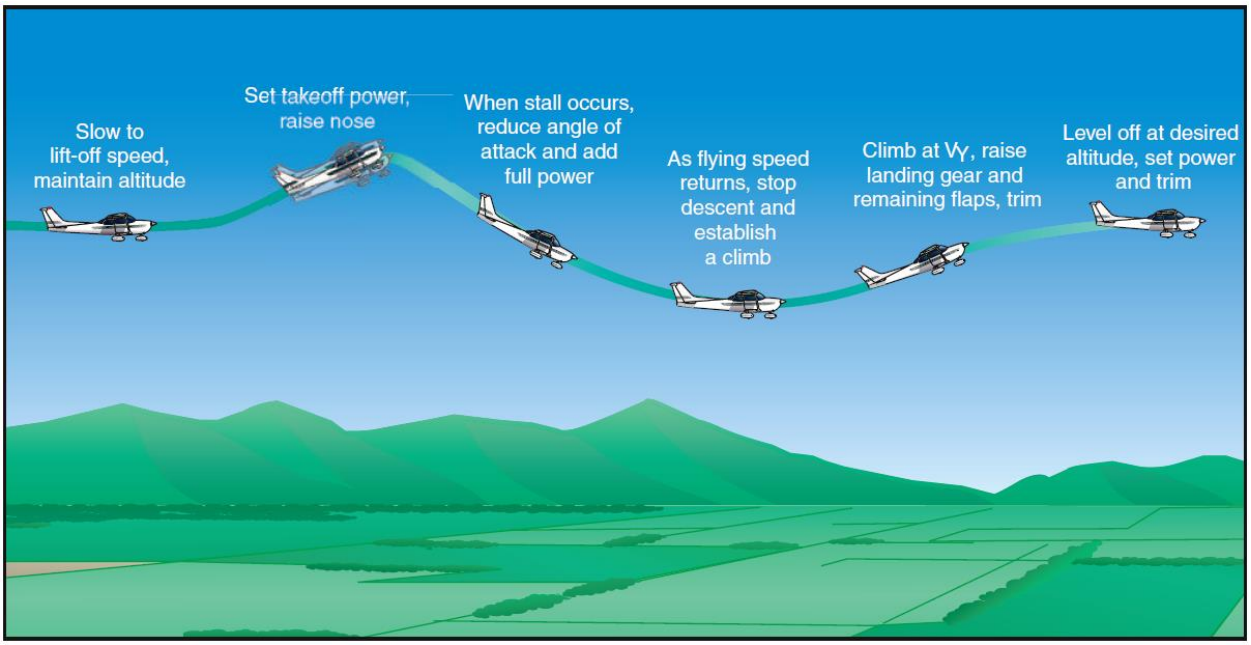
- Recognize stall indications and recover promptly with a minimum loss of altitude:
    - Reduce the angle of attack by releasing control wheel back pressure.
    - Advance the throttles to maximum power.
    - Level the wings.
    - Maintain coordinated flight.
- Retract the flaps to 25°, if fully extended.
- Establish a positive rate of climb, while accelerating to Vy.
- After a positive rate of climb, retract the landing gear.
- After reaching Vy, retract the flaps to up, one setting at a time.
- Return to cruise power setting when the airplane is in normal level flight.

3.3 MANEUVER: Power-On Stalls - Full or Imminent

Objective
To familiarize the pilot with the conditions that produce power-on stalls, to assist in recognizing an approaching stall, and to develop the habit of taking prompt preventive or corrective action to minimize altitude loss.

Description
Power-on stalls are performed in normal takeoff configuration to simulate an accidental stall occurring during takeoffs.

Teaching Considerations
- Common errors as per the Airplane Flying Handbook and the CFI PTS
- Factors affecting stall speed.
  - Weight
  - Load factor
  - Center of gravity location
  - Configuration
  - Power Setting
- Stall/Spin awareness considerations.
  - Flight conditions where unintentional stalls may occur and procedures for recovery.
  - Aerodynamic factors related to spins.
  - Awareness that an aircraft can stall at any airspeed and attitude.



Set-up

- Select an entry altitude that allows the recovery to be completed no lower than the Minimum Recovery Altitude.
    - MRA 1,500 feet AGL
- Clear area with two 90° turns.

Execution

The instructor shall specify full or imminent stall, and airplane configuration.

- Maintain a constant altitude in level flight while decelerating to POH computed lift-off speed.
- Set flaps - as specified by instructor.
- Apply full power and establish a normal coordinated climb attitude.
- Smoothly increase the pitch attitude to one that induces a full or imminent stall in straight climbing flight or a climbing turn (maximum bank angle is 20°).

Recovery

- Recognize stall indications and recover promptly with a minimum loss of altitude:
    - Reduce the angle of attack by releasing control wheel back pressure.
    - Level the wings.
    - Maintain coordinated flight.
- When airspeed is above Vy, retract the flaps to up (0°). Retract the gear if extended.
- Return to cruise power setting when the airplane is in normal level flight.

3.4 MANEUVER: Accelerated Stalls – Imminent

Objective
The objective of demonstrating accelerated stalls is to learn how they may occur, to develop the ability to recognize such stalls immediately, and to take prompt and effective recovery actions.

Description
This stall is performed at normal cruise airspeed. Bank the aircraft to a minimum of 45°. After turn and bank are established, back-elevator pressure should be firmly increased until a definite stall occurs.

Teaching Considerations
- Common errors as per the Airplane Flying Handbook and CFI PTS.
- Factors affecting stall speed.
    - Weight
    - Load factor
    - Center of gravity location
    - Configuration
- Entry techniques.
    - Excessive pitch attitude to induce the stall.
    - Failure to recognize indications of a stall.
    - Recognize difference between imminent/full stalls.
- Stall/Spin awareness consideration.
    - Flight conditions where unintentional stall may occur and procedures for recovery.
    - Aerodynamic factors related to spins.
    - Awareness that an aircraft can stall at any airspeed and attitude.

Set-up

- Select an entry altitude that allows the recovery to be completed no lower than the Minimum Recovery Altitude.
    - MRA 1,500 feet AGL
- Clear area with two 90° turns.

Execution

- Establish and stabilize cruise airspeed while maintaining altitude.
- Set wing flaps and landing gear to up.
- Enter the maneuver by establishing a bank of approximately 45° while increasing control wheel back pressure to maintain altitude.
- After the turn and bank are established, smoothly, firmly, and progressively increase the angle of attack until a stall occurs.

Recovery

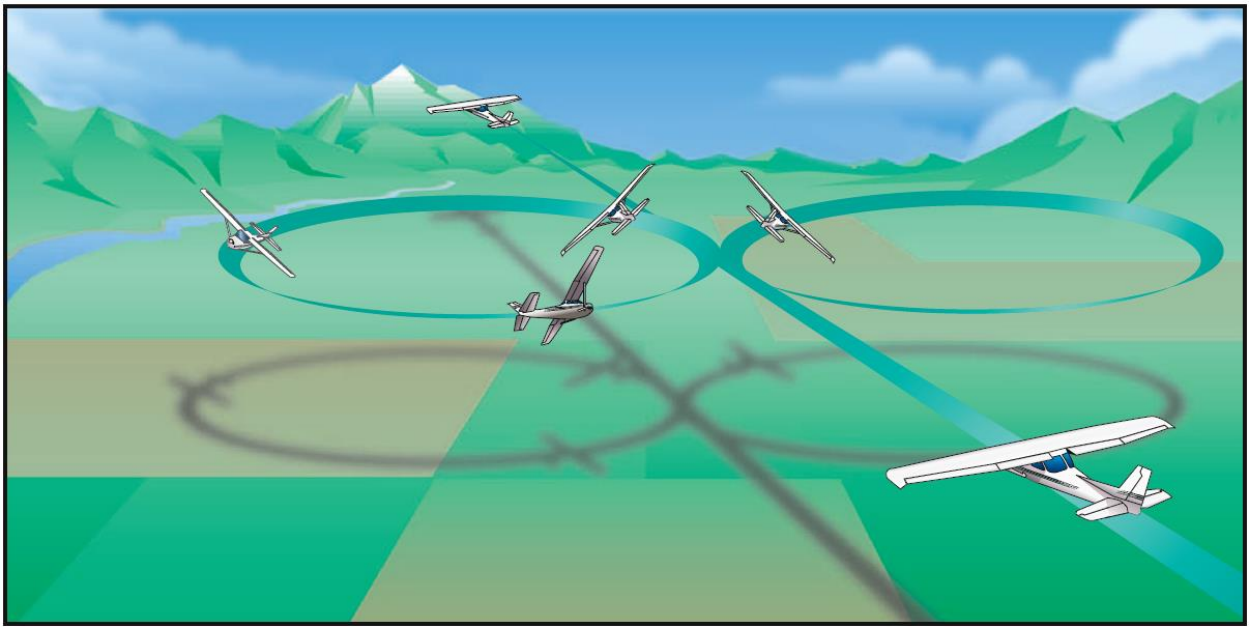
- Recognize imminent stall indications and recover immediately with a minimum loss of altitude:
    - Reduce the angle of attack by releasing control wheel back pressure.
    - Advance the throttles to maximum power.
    - Level the wings.
    - Maintain coordinated flight.
- Establish a positive rate of climb while accelerating to Vy or Vx, as appropriate.
- Return to cruise power setting when the airplane is in normal level flight.

3.5 MANEUVER: Steep Turns

Objective
To develop the pilot's smoothness, coordination, orientation, division of attention, and control techniques while executing maximum performance turns.

Description
The steep turn maneuver consists of a turn in either direction, using a bank angle steep enough to cause an "over banking" tendency during which maximum turning performance is attained and relatively high load factors are imposed.

Teaching Considerations
- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Overbanking tendencies.
- Load factors caused by steep turns.
- Maneuvering speed in relationship to high load factors.
- Turning performance: radius vs. rate.
- Load factor and stall speed.
- Increase in induced drag requires an increase in power.



Set-up

- Select an entry altitude that allows the recovery to be completed no lower than the Minimum Recovery Altitude.
    - MRA 1,500 feet AGL
- Clear area with two 90° turns.
- Adjust power setting to attain an airspeed of 110 KIAS.

NOTE: During operations at density altitudes which lower the aircraft's performance capability, a lower speed may be used.

Execution

- Smoothly roll into a coordinated bank angle of 50°.
- As the turn is being established, control wheel back pressure should be smoothly increased to increase the angle of attack.
- Adjust power to maintain airspeed and pitch to maintain selected altitude.

Recovery

- Rollout on the entry heading by releasing control wheel back pressure, reducing power, and maintaining coordination.
- Return to cruise power setting when the airplane is in normal level flight.

3.6 MANEUVER: Vmc Demonstration

Objective
To develop the pilot's ability to recognize the indications of loss of directional control due to attempted flight below Vmc with an engine inoperative and the execute a proper recovery procedure.

Description
The airplane is maneuvered with the critical engine inoperative and wind milling to an airspeed at which directional control cannot be maintained or indications of a stall are encountered. Recovery is initiated in a manner that allows control to be regained within 20° od heading change with minimum loss of altitude.

Teaching Considerations
- Common errors as per the Airplane Flying Handbook and the CFI PTS.
- Maneuvering speed in relationship to high load factors.
- Increase in induced drag requires an increase in power.

Set-up
- Select an entry altitude that allows the recovery to be completed no lower than the Minimum Recovery Altitude.
    - MRA 4,000 feet AGL
- Clear area with two 90° turns.
- Position cowl flaps and trim to take-off position.
- Set propeller controls to full RPM.

Execution
- Reduce power on the simulated inoperative engine to idle.
- Increase power on the operating engine to take-off setting.
- Adjust the pitch attitude to a single-engine climb attitude and establish a bank towards the operating engine (up to 5°) for best performance.
- Reduce airspeed slowly (approx. 1 knot per second) while controlling heading with the rudder.

Recovery
- If a loss of directional control occurs, simultaneously reduce power on the operating engine and reduce the angle of attack as necessary to regain directional control and airspeed. Upon recovering airplane control set the power on the operating engine to maximum allowable and adjust the pitch attitude to achieve Vise with minimum altitude loss.
- If stall indications are encountered, decrease the angle of attack, set the Vyse pitch attitude and accelerate to Vyse with minimum altitude loss.
- Smoothly apply power back to the simulated inoperative engine. Return to cruise settings.

3.7 MANEUVER: Maneuvering One Engine Inoperative

Objective
To develop the student's ability to respond appropriately to engine failures occurring in flight and to maintain control of the airplane while maneuvering with one engine inoperative.

Description
The student will respond to a simulated failure of an engine including troubleshooting and engine feathering an appropriate. Coordinated control of the airplane will be maintained and a turn initiated towards the nearest suitable airport. Subsequent maneuvering will be performed as directed by the instructor. When directed, engine restart will be accomplished in accordance with prescribed procedures.

Teaching Considerations
- Common errors as per the Airplane Flying Handbook and the Commercial ACS.
- Increase in induced drag requires an increase in power.

Set-up
- The instructor simulated an engine failure.
- Establish control inputs for best performance.
- Complete appropriate engine failure procedures.

Execution
- Initiate a turn towards the nearest suitable airport
- Monitor the operating engine and adjust the engine controls as necessary.
- Secure inoperative engine if time and situation permit.
- Make turns, climbs, and descents within the performance capabilities of the airplane as directed by instructor.

Recovery
- Restart the inoperative engine and return to cruise.

4. IFR Flight Maneuvers

Objective
The objective of this section is to develop the pilot's knowledge, ability, confidence, professionalism and competence in performing IFR flight maneuvers and the associated instrument approaches in an aircraft.

References
- Federal Aviation Regulations
- Aeronautical Information Manual
- FAA-H-8083-15A: Instrument Flying Handbook
- FAA-H-8261-1A: Instrument Procedures Handbook
- AC 61-134: General Aviation Controlled Flight into Terrain Awareness
- Airmen Certification Standards
- RFS Safety Policies and Procedures (FOM)
- Piper Seminole Pilot's Operating Handbook
- Piper Seminole Checklist

4.1 MANEUVER: Instrument Cockpit Check

Objective
During preflight, before and during taxi, and before takeoff, flight instruments, avionics, and navigation equipment are checked for currency and proper operation by following the established flow patterns/ checklists.

Teaching Considerations
- VOR check procedures
- GPS database currency
- Inspection dates
    - Altimeter
    - Pitot/Static
    - Transponder

Execution
- Ensure all required inspections have been completed.
- Determine that the flight instruments, avionics, and navigation equipment are in a condition for completion of a safe instrument flight.
- Perform the preflight, before taxi, taxi, run-up, and before takeoff flow patterns/checklist items.

4.2 MANEUVER: Straight-and-Level

Objective
To develop the basic skill and knowledge of attitude instrument flying as it relates to straight-and-level flight.

Description
A standardized system by which the pitch, bank, and power control instruments are integrated to maintain desired altitude, heading, and airspeed.

Teaching Considerations
- Cross-check, instrument interpretation, and aircraft control.
- Fixation, omission, and emphasis errors.
- Over-controlling and failure to trim the aircraft.
- Primary and supporting, or control and performance methods.

Execution
Pitch
- Maintain altitude using the primary and supporting, or control and performance methods.
    - To return to the desired altitude, make an attitude change that results in a vertical speed rate that is approximately double the error in altitude not to exceed 200 feet per minute.
    - For errors less than 100 feet, increase/decrease the pitch attitude 2°.
    - For errors of more than 100 feet, increase/decrease the pitch attitude 4°.

Bank
- Maintain heading using the primary and supporting or control and performance methods.
- Make corrections to the desired heading by using an angle of bank no greater than the number of degrees to be turned. Limit bank corrections to an angle no greater than that required for a standard rate turn.

Power
- Set the power as necessary to maintain the desired airspeed.

4.3 MANEUVER: Change of Airspeed

Objective
To achieve the skill and knowledge of the elements relating to basic attitude instrument flying during changes of airspeed in straight-and-level flight and in turns.

Description
When power is changed to vary airspeed, the airplane tends to change attitude around all axes of movement. Therefore, control pressures will change in proportion to the change in power.

Teaching Considerations
- Cross-check, instrument interpretation, and aircraft control.
- Fixation, omission, and emphasis errors.
- Over-controlling and failure to trim the aircraft.
- Relationship between power, altitude, airspeed, and attitude.
- Primary and supporting, or control and performance methods.

Execution
- For changes in airspeed, vary the pitch, bank, and power to maintain the desired altitude, heading, and bank angle.
    - To increase airspeed, smoothly increase power to the approximate setting necessary to achieve the desired airspeed.
    - To reduce airspeed, smoothly decrease power to the approximate setting necessary to achieve the desired airspeed.
    - As the aircraft changes speed adjust pitch and trim as needed to maintain the desired attitude.

4.4 MANEUVER: Constant Airspeed Climbs and Descents

Objective
To achieve the skill and knowledge of the elements related to basic instrument flying during constant airspeed climbs and descents.

Description
A standardized system by which the pitch, bank, and power control instruments are integrated to maintain a constant airspeed climb or descent.

Teaching Considerations
- Cross-check, instrument interpretation, and aircraft control.
- Fixation, omission, and emphasis errors.
- Over-controlling and failure to trim the aircraft.
- Relationship between power, altitude, airspeed, and attitude.
- Primary and supporting, or control and performance methods.

Execution
- Add or reduce power as needed to initiate a climb or descent.
- Increase or decrease the pitch attitude to an approximate level that allows the airplane to climb or descend at the predetermined airspeed. The attitude indicator is the primary instrument for pitch during the transition period.
- To maintain a constant airspeed, climb or descent, the primary instruments are:
    - Pitch – Airspeed.
    - Bank – HIS/DG during straight flight, turn indicator and bank angle indicator during a turn.
    - Power –Tachometer.
- Re-trim the aircraft to hold the appropriate attitude.
- To level off from a climb/descent lead the altitude by 10 percent of the vertical speed.
- Adjust the pitch on the attitude indicator for level flight and smoothly adjust power to achieve the desired airspeed.
- Re-trim the airplane.

4.5 MANEUVER: Constant Rate Climbs and Descents

Objective
To achieve the skill and knowledge of the elements related to basic attitude instrument flying while performing constant rate climbs and descents.

Description
A standardized system by which the pitch, bank, and power control instruments are integrated to maintain a constant rate climb or descent.

Teaching Considerations
- Cross-check, instrument interpretation, and aircraft control.
- Fixation, omission, and emphasis errors.
- Over-controlling and failure to trim the aircraft.
- Relationship between power, altitude, airspeed, and attitude.
- Primary and supporting, or control and performance methods.

Execution
- Add or reduce power as needed to initiate a climb or descent.
- Increase or decrease the pitch attitude to an approximate level that allows the airplane to climb or descend at the predetermined rate. The attitude indicator is primary for pitch during this transition period.
- To maintain a constant rate climb or descent, the primary instruments are:
    - Pitch – Vertical speed indicator.
    - Bank – HIS/DG during straight flight, turn indicator and bank angle indicator during a turn.
    - Power – Airspeed.
- Re-trim the aircraft to hold the appropriate attitude.
- To level off from a climb/descent lead the altitude by 10 percent of the vertical speed.
- Adjust the pitch on the attitude indicator for level flight and smoothly adjust power to achieve the desired airspeed.
- Re-trim the airplane.

4.6 MANEUVER: Turns to Headings

Objective
To achieve the skill and knowledge of the elements related to basic attitude instrument flying to establish a standard rate turn and rollout on predetermined headings.

Description
A standardized system by which pitch, bank, and power control instruments are integrated to turn to a specific heading.

Teaching Considerations
- Cross-check, instrument interpretation, and aircraft control.
- Fixation, omission, and emphasis errors.
- Over-controlling and failure to trim the aircraft.
- Relationship between power, altitude, airspeed, and attitude.
- Primary and supporting, or control and performance methods.

Execution
- To enter the turn, apply coordinated aileron and rudder pressure in the desired direction of the turn.
- A standard rate turn shall be maintained with a bank angle equal to 15 percent of the TAS.
- Use the bank angle indicator on the attitude indicator to bank approximately 15° then use the turn indicator to make small corrections for a standard rate turn by aligning the aircraft wing indication of the turn indicator to the standard rate turn mark.
- Use the Skid/Slip indicator to maintain coordination. By keeping the floating ball in the center of the indicator in line a coordinated turn shall be maintained.
- To maintain a turn to a heading, the primary instruments are:
    - Pitch – Altitude.
    - Bank – Turn indicator.
    - Power – Airspeed.
- Adjust power and pitch as necessary to maintain the desired airspeed and altitude.
- For rollout, lead the desired heading by one-half the number of degrees of bank being used.
- Use the attitude indicator during rollout to return the aircraft to straight flight, reference the HSI/DG to rollout on the desired heading.
- On completion of the rollout adjust pitch, bank, power, and trim as necessary.

4.7 MANEUVER: Timed Turns to Magnetic Compass Headings

Objective
To achieve the skill and knowledge necessary to turn to a desired compass heading in the event of a HIS/DG failure.

Description
A turn in which the clock and the turn indicator (or bank angle indicator) are used to change heading a definite number of degrees in a given time.

Teaching Considerations
- Cross-check, instrument interpretation, and aircraft control.
- Fixation, omission, and emphasis errors.
- Over-controlling and failure to trim the aircraft.
- Relationship between power, altitude, airspeed, and attitude.
- Failure to compute the correct time.
- Compass errors.
- Primary and supporting, or control and performance methods.

Execution
- Determine the number of degrees to be turned and divide that number by 3 (i.e. 90°/3 = 30 seconds).
- Start the roll-in while noting the time on the clock and hold the turn at the calibrated standard rate indication (or half-standard rate for small heading changes).
- If no standard rate indication is available use the bank angle indicator on the standby attitude indicator. A standard rate turn shall be maintained with a bank angle equal to 15 percent of the TAS.
- Begin the rollout when the computed number of seconds has elapsed. If the rates of roll-in and rollout are the same, the time taken during entry and recovery does not need to be considered in the time computation.
- Use the magnetic compass at the completion of the turn to check turn accuracy, taking compass deviation errors into consideration.
- Control pressures throughout the entry, turn, and recovery are the same as full panel turns to headings.
- To maintain a timed turn to a magnetic compass heading, the primary instruments are:
    - Pitch – Altimeter.
    - Bank – Attitude indicator.
    - Power – Airspeed indicator.

4.8 MANEUVER: Steep Turns

Objective
To achieve the skill and knowledge necessary to control the airplane with bank attitudes more than those normally used during instrument flight. To enable the pilot to react smoothly, quickly, and confidently to unexpected abnormal flight attitudes under instrument flying conditions.

Description
The steep turn maneuver consists of a turn in either direction, using a bank that results in a greater than standard rate turn.

Teaching Considerations
- Technique
    - Improper pitch correction during banking.
    - Power application, during roll in and rollout.
    - Rollout (suggested is 1/2 of the bank angle).
- Overbanking tendencies during high bank turns.
- Load factors caused by high bank turns.
- Maneuvering speed in relationship to high load factors.
- Increases in induced drag requiring an increase in power.
- Cross-check, instrument interpretation, and aircraft control.

Set-up
- Select an entry altitude that allows the recovery to be completed no lower than the Minimum Recovery Altitude.
    - MRA 1,500 feet AGL
- Clear area with two 90° turns.
- Adjust power setting to attain an airspeed appropriate for the aircraft.

NOTE: During operations at density altitudes which lower the aircraft's performance capability, a lower speed may be used.

Execution
- Rolls into a coordinated steep turn with approximately a 45° bank.
- To maintain a steep turn, the primary instruments are:
    - Pitch – Altimeter.
    - Bank – Attitude indicator.
    - Power – Airspeed.
- An increased rate of cross-check and slight adjustments of pitch, power and bank will be necessary to maintain airspeed and altitude.
- If desired, elevator trim may be used to help maintain the desired pitch attitude.

Recovery
- Rollout on the entry heading by releasing control wheel back pressure, reducing power, and maintaining coordination.
- Return to cruise power setting when the airplane is in normal level flight.

4.9 MANEUVER: Recovery from Unusual Flight Attitudes

Objective
To achieve the skill and knowledge to recover from both nose-high and nose-low unusual flight attitudes.

Description
An unusual attitude is any attitude not normally desired for instrument flight.

Teaching Considerations
- Cross-check, instrument interpretation, and aircraft control.
- Fixation, omission, and emphasis errors.
- Over-controlling and failure to trim the aircraft.
- Proper instruments to be used for recovery.
- Reviewing the airplane's load factor and airspeed limitations.
- Proper recovery techniques.

Execution
- Nose-high attitudes are recognized by an increase shown on the altimeter, and vertical speed indicator, and decrease in airspeed.
- Nose-low attitudes are recognized by a decrease shown on the altimeter, and vertical speed indicator, and an increase in airspeed.
- Nose-high
    - Increase power as necessary in proportion to the observed deceleration.
    - Apply forward control wheel pressure to lower the nose and prevent a stall.
    - Apply aileron and rudder pressure to resume coordinated straight flight.
- Nose-low
    - Reduce power to prevent excessive airspeed and loss of altitude.
    - Apply aileron and rudder pressure to resume straight flight.
    - Raise the nose to level flight attitude by applying smooth control wheel back pressure.

Recovery
- Return to cruise power setting when the airplane is in normal level flight.

4.10 MANEUVER: Air Traffic Control Clearances, Procedures, and Compliance

Objective
To achieve the necessary skills and knowledge to copy, correctly interpret, and comply with various types of ATC clearances.

Teaching Considerations
- Elements of an IFR clearance.
- Obtaining and canceling clearances.
- Use of standard phraseology.
- Failure to read back entire clearance.
- Correctly interpreting ATC clearances.

Execution
- Contact the appropriate ATC facility and file the routing information at least 30 minutes before the desired departure time.
- Contact the appropriate ATC facility and request the clearance.
- Read back the clearance to ensure it is copied correctly.
- Correctly interpret and determine that it is possible to comply with the clearance.
- Using current and appropriate navigation publications, comply with the approved and accepted clearance. Upon arrival execute the appropriate approach procedure as requested or assigned.
- Monitor and communicate effectively at uncontrolled airports to obtain advance information and ensure collision avoidance.

4.11 MANEUVER: VOR Navigation

Objective
To achieve the necessary skill and knowledge to intercept and track VOR radials.

Description
The airplane is maneuvered onto a specific radial and maintains that radial by adjusting for wind.

Teaching Considerations
- VOR navaids facility operations and limitations.
- Operational errors as per the Instrument Flying Handbook.
- Partial panel operations.

Execution
- Tune and identify the desired VOR facility.
- Determine the aircraft's position relative to the VOR facility.
- Set the course to be intercepted and determine the intercept angle and heading.
- Turn to the intercept heading.
- Lead the turn to prevent overshooting the selected course.
- When established on the selected course, make the appropriate heading correction(s) to compensate for wind.

4.12 MANEUVER: GPS Navigation

Objective
To achieve the necessary skill and knowledge to intercept and track GPS courses.

Description
GPS navigation includes initialization and maneuvering onto a specific bearing and maintaining that bearing by adjusting for wind.

Teaching Considerations
- GPS operations and limitations.
- Situational awareness.
- Determination of the proper intercept angle and lead points.
- Difference between track and heading as they relate to wind correction.
- GPS course sensitivity.
- Waypoint passage and sequencing.

Execution
- Verify operational status of GPS.
- Select appropriate radio navigation source and ensure proper annunciator display.
- Select desired waypoint(s) and input into GPS unit as appropriate.
- Determine the airplane's position relative to the GPS reference waypoint.
- Determine the desired course, intercept angle, and intercept heading and then turn to the selected intercept heading.
- Lead the turn to prevent overshooting the selected bearing.
- When established on the desired course, make the appropriate heading correction(s) to compensate for wind.

NOTE: Initialization/start-up procedures are outlined in the amplified checklist procedures.

4.13 MANEUVER: DME Arcs

Objective
To achieve the skill and knowledge required to intercept and track DME Arcs.

Description
Using distance information, the airplane is flown at a constant distance from a navigation facility or waypoint.

Teaching Considerations
- Techniques for wind-drift correction.
- Arcing procedures: VOR vs. GPS.
- Determining the proper DME arc interception.
- Situational awareness.

Execution
- Establish appropriate airspeed. (Recommended airspeed is 120 KIAS.)
- Determine what radial/bearing the aircraft is currently on.
- Prior to reaching the DME arc, turn approximately 90° from the current radial/bearing. Lead the turn to prevent overshooting. A .6 Nautical miles lead is satisfactory for ground speeds of approximately 120 knots.
- When established on the DME arc, make appropriate heading correction(s) to compensate for wind-drift.
- Initiate the inbound turn for the intermediate/final approach segment, if applicable.

4.14 MANEUVER: Holding

Objective
To achieve the skill and knowledge required to enter and remain within a published or non-published holding pattern.

Description
Holding is a predetermined maneuver which keeps the aircraft within a specified airspace while awaiting further clearance from ATC.

Teaching Considerations
- Standard and non-standard holding patterns.
- Wind-drift and timing corrections.
- Published vs. non-published holding patterns.
- Various holding pattern entries.
- Situational awareness.

Set-up
- Begin slowing to the holding airspeed when within 3 minutes of the holding fix. (Recommended holding airspeed is 100 KIAS.)
- Determine the type of entry to be made to ensure the aircraft remains within the holding pattern airspace.

Execution
- After crossing the fix, execute the appropriate entry procedure.
- Comply with ATC reporting requirements.
- Use the proper timing criteria where applicable as required by altitude or ATC instructions.
- Use proper wind correction to maintain the desired pattern.
- Depart the fix in accordance with ATC instructions.

4.15 MANEUVER: Non-Precision Approach

Objective
To achieve the skill and knowledge necessary to transition from the enroute phase to the instrument approach and then to the landing with only horizontal guidance.

Description
A standard instrument approach procedure in which only horizontal guidance is provided.

Teaching Considerations
- NDB, VOR, LOC/LOC BC, GPS/RNAV, ASR, LDA, SDF approaches.
- ATC requirements, requests, and clearances.
- Approach charts and procedures.
- Importance of completing checklists.
- Airport/approach lighting.
- Appropriate approach airspeed.
- Situational awareness.
- Missed approach procedures.
- Wind shear and wake turbulence.
- Controlled Flight into Terrain (CFIT).

Set-up
- Select, tune, identify, and confirm the operational status of the navigation equipment to be used.
- Set the proper course(s) with the OBS or for an ASR approach fly the assigned headings/altitudes. Establish the appropriate airplane configuration and airspeed prior to the FAF or in the absence of a FAF, upon commencing a descent to the minimum descent altitude.
- Comply with ATC clearances.

Execution
- Perform appropriate call-outs.
- Complete descent checklist prior to the IAF or intercepting the final approach course, if being radar vectored.
- Complete the Before Landing Checklist prior to the FAF.
- Fly the published approach procedure; in the case of an ASR follow ATC instructions.
- Configure airplane with 10° flaps and 90 KIAS prior to FAF.
- Extend gear at FAF.
- Establish a rate of descent and track that ensures arrival at the MDA prior to reaching the MAP.
- Maintain the MDA.
- Descent from the MDA should be made at the VDP.
    - Minimum descent height (an AGL altitude) divided by 300 gives the VDP.
- Complete the landing under visual conditions if:
    - Runway environment is visible.
    - Visibility requirements are met.
    - The aircraft is in a position to make a normal descent and landing.
- Execute the missed approach procedures at the MAP if visual contact with the runway environment is not established.

NOTES: Per 91.175 (c)(3)(i) - If runway is not in sight by 100 feet above TDZE a missed approach MUST be executed.

4.16 MANEUVER: Precision Approach

Objective
To achieve the skill and knowledge necessary to transition from the enroute phase to the instrument approach, and then to the landing with horizontal and vertical guidance.

Description
A standard instrument approach procedure in which both vertical and horizontal guidance is provided.

Teaching Considerations
- ILS, GPS/LPV, PAR approaches.
- ATC requirements, requests, and clearances.
- Approach charts and procedures.
- Importance of completing checklists.
- Airport/approach lighting.
- Appropriate approach speed and configuration.
- Situational awareness.
- Missed approach procedures.
- Wind shear and wake turbulence.
- Controlled Flight into Terrain (CFIT).

Set-up
- Select, tune, identify and confirm the operational status of the navigation equipment to be used.
- Set the proper course(s) with the OBS; in the case of a PAR fly the assigned headings/altitudes.
- Establish the appropriate airplane configuration and airspeed prior to interception of the glideslope.
- Comply with ATC clearances.

Execution
- Perform appropriate call-outs.
- Complete descent checklist prior to the IAF or intercepting the final approach course if being radar vectored.
- Complete Before Landing Checklist prior to the FAF.
- Configure airplane with 25° flaps and 90 KIAS prior to FAF.
- Extend gear at FAF.
- As the glideslope (GS) is intercepted, establish the rate of descent required to maintain the glideslope to the decision altitude (DA).
- Complete the landing under visual conditions if:
    - Runway environment is visible.
    - Visibility requirements are met.
    - The aircraft is in a position to make a normal descent and landing.
- Execute the missed approach procedures at the decision altitude (DA) if visual contact with the runway environment is not established.

NOTES: Per 91.175 (c)(3)(i) - If runway is not in sight by 100 feet above TDZE a missed approach MUST be executed.

4.17 MANEUVER: IFR Approach with One Engine Inoperative

Objective
To achieve the skill and knowledge necessary to transition from the enroute phase to the instrument approach, and then to the landing with one engine inoperative.

Description
An instrument approach is flown with one engine inoperative.

Teaching Considerations
- ATC requirements, requests, and clearances.
- Approach charts and procedures.
- Importance of completing checklists.
- Airport/approach lighting.
- Appropriate approach speed and configuration.
- Situational awareness.
- Missed approach procedures.
- Wind shear and wake turbulence.
- Controlled Flight into Terrain (CFIT).

Set-up
- Select, tune, identify and confirm the operational status of the navigation equipment to be used.
- Set the proper course(s) with the OBS; in the case of a PAR fly the assigned headings/altitudes.
- Establish the appropriate airplane configuration and airspeed prior to interception of the glideslope.
- Comply with ATC clearances.

Execution
- Perform appropriate call-outs.
- Complete descent checklist prior to the IAF or intercepting the final approach course if being radar vectored.
- Complete Before Landing Checklist prior to the FAF.
- Configure airplane with flaps as required and 90 KIAS prior to FAF.
- For a precision approach extend gear at FAF. Non-Precision extend the gear when the landing is assured.
- Complete the landing under visual conditions if:
    - Runway environment is visible.
    - Visibility requirements are met.
    - The aircraft is in a position to make a normal descent and landing.

4.18 MANEUVER: Missed Approach Procedure

Objective
To achieve the skill and knowledge necessary to recognize situations that require execution of a missed approach and accomplish the appropriate missed approach procedure.

Description
A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing.

Teaching Considerations
- Importance of a prompt execution of the missed approach procedure.
- Situational awareness.
- Conditions which require a missed approach:
    - Whenever the requirements for operating below DA or MDA are not met.
    - Whenever an identifiable part of the airport is not visible.
    - When so directed by ATC.
    - Whenever the approach exceeds PTS standards.
- How the missed approach procedure differs at various points in the approach segments
- Compliance with the published or alternate missed approach procedure.
- Regulations concerning takeoff and landing under IFR.
- Controlled Flight into Terrain (CFIT).

NOTE: Execution of a missed approach procedure from an intermediate point between the FAF and MDA/ DA must be flown to remain within the protected approach corridor. Unless otherwise directed by ATC, climb out to remain on the approach centerline until reaching the missed approach point. At that time, the missed approach or climb-out track must be followed.

Execution
- Determine that the missed approach procedure is necessary.
- Apply climb power and establish a climb attitude.
- After a positive rate of climb has been established, retract gear.
- Retract flaps while accelerating to Vy or enroute climb speed.
- Climb at Vy or Enroute Climb speed, while complying with missed approach procedure.
- Advise ATC of the missed approach and your intentions.

4.19 MANEUVER: Landing from a Straight-in Approach

Objective
To achieve the skill and knowledge necessary to transition from the DA, MDA, or VDP to a runway aligned with the final approach course.

Description
Upon achieving visual contact with the runway, the airplane is maneuvered under visual flight conditions from the DA, MDA or VDP to touchdown.

Teaching Considerations
- Approach categories and criteria.
- Transition from approach airspeed and configuration to an appropriate landing airspeed and configuration.
- Regulations concerning takeoff and landing under IFR.
- Controlled Flight into Terrain (CFIT).
- Importance of completing checklists.
- Wind shear and wake turbulence.

Execution
- Perform appropriate call-outs.
- Transition to and maintain a visual flight condition using a stabilized approach until touchdown.
    - A stabilized approach is:
        Check – All checklists are complete
        F – Flight path correct (on centerline)
        L – Landing configuration correct
        A – Airspeed (+5/-0)
        P – Power setting appropriate for aircraft configuration
        S – Sink rate is not abnormal (on glidepath)
- Utilizes visual glideslope indicators, if available.

4.20 MANEUVER: Circling Approach Procedure

Objective
To achieve the skill and knowledge necessary to maneuver the airplane from the MDA or VDP and land on a runway not aligned with the instrument final approach course.

Description
A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable.

Teaching Considerations
- Approach categories and criteria.
- Transition from approach airspeed and configuration to an appropriate landing airspeed and configuration.
- Situational awareness.
- Circling approach protected area and visibility criteria.
- Regulations concerning takeoff and landing under IFR.
- Controlled Flight into Terrain (CFIT).
- Circling pattern considerations:
    - airport design
    - ceiling and visibility
    - wind direction and velocity
    - final approach course alignment
    - distance from the final approach fix to the runway
    - ATC instructions

Set-up
- Determine the circling airspeed considering airplane configuration and weather conditions.
- Determine the runway of intended landing and select the appropriate circling altitude for the approach category, and maneuvering capabilities of the airplane.
- Confirm the direction of traffic, pattern to be flown, and adhere to restrictions and instructions issued by ATC.

Execution
- Transition to and maintain a visual flight condition and circle to the appropriate runway.
- Maintain circling altitude until in a position from which a stabilized approach to a normal landing can be made. If the ceiling allows it, fly at an altitude that approximates the VFR traffic pattern altitude.
    - A stabilized approach is:
        Check – All checklists are complete
        F – Flight path correct (on centerline)
        L – Landing configuration correct
        A – Airspeed (+5/-0)
        P – Power setting appropriate for aircraft configuration
        S – Sink rate is not abnormal (on glidepath)
- Utilizes visual glideslope indicators, if available.

4.21 Considerations for Instrument Flight

Takeoff, cruise, descent, and instrument arrivals
During all phases of flight, the pilot must always be aware of the aircraft's position and attitude with regards to navigation and Controlled Flight into Terrain (CFIT). The pilot must monitor ATC and comply with all clearance limits and requests. During VMC conditions the pilot should always maintain an active visual scan for collision avoidance.

Actual Instrument Conditions (IMC)
In actual instrument conditions, the pilot's primary responsibility is aircraft control and navigation while remaining alert for visual conditions. Upon reaching visual contact with the surface the Pilot should state, "Visual contact." Upon reaching a point at which the runway environment is clearly in sight, the pilot should state, "Approach lights/Runway in sight" (as appropriate). At this time the pilot should divide his/her attention between flight by reference to instruments and flight by visual reference. The pilot may transition to flight by visual reference alone at the point at which a safe approach is assured. During this time, the pilot should remain alert to changing visual conditions. In conditions in which a transition from the instrument approach to landing is not possible, the pilot should announce, "Missed approach" at the DA or MDA (as appropriate). "Missed approach" should be announced by the pilot at any other time a missed approach procedure is executed. (Example: Loss of visual reference while on a circling approach procedure, etc.)

Straight-in Approach: Landing Preparation and Briefing
The pilot should have the appropriate charts, and airport diagrams organized and readily available. Landing computations and the approach briefing should be accomplished during the low workload, low traffic phases of flight after current destination conditions are known. This is done preferably in the last few minutes of cruise but should be accomplished before leaving 2,000 feet AGL.

Circling Approach: Landing Preparation and Briefing
Brief the missed approach point and how, if it becomes necessary, it shall be executed from various positions of the circling approach pattern. The pilot must maintain visual contact with the airport always. If visual contact is lost, immediately execute the missed approach procedure. Brief (preferably before departure) the terrain features of the destination terminal area. If existing or forecast weather dictates a circling approach, and high terrain is a factor, consider using an alternate airport or delaying the flight. Discuss the inherent dangers of executing a circling approach if any of these conditions exist:

- Low visibility
- Night conditions
- Terrain
- Unfamiliar airfield
- Strong winds

Consider an alternate plan of action if necessary. Remember: Safely executed circling approaches are not last-minute maneuvers. Know the destination weather, plan accordingly, and communicate with the crew. During some phases of a circling approach, the runway may not be visible to one of the crew. It is imperative to continuously communicate.

Missed Approach

The main objective for the Pilot is to execute the initial missed approach procedure, clean up the airplane and start to climb on course. In addition, the pilot has the responsibility to tune and identify the appropriate navaids, set in the appropriate course for the missed approach procedure, and contact ATC with her intentions. Remember: Fly the airplane first, navigate second, and communicate with ATC last. The pilot shall brief what shall follow the missed approach procedure if it is initiated. (i.e. vectors for another approach, clearance to the alternate). Formulate a plan and fly it. Multiple approaches in deteriorating conditions is rarely a safe plan of action. Do not wait until the MAP to decide, have a plan and execute it. Before continuing to the alternate airport: The Pilot shall re-confirm weather conditions and ascertain that conditions are still suitable for a successful approach and landing and fuel reserves are adequate.

Holding Procedures

When notified of a "slowdown" or "hold" by ATC, the pilot should determine the nature of the hold (i.e. weather, traffic, airport closure). Understanding the reason for the hold will greatly aid in determining whether the clearance should be accepted. The pilot should monitor the fuel gauges and mentally note fuel used as well as fuel remaining. During extended holding, delayed arrival, or a situation that could jeopardize the safety of the flight arises, the pilot should determine the fuel remaining and make a calculated decision. Based on the fuel calculations, ATC must be notified when fuel reserves are deemed insufficient for the remaining flight. If the fuel remaining is insufficient, and the pilot is unable to receive priority, declare an emergency. Remember: an EFC usually is an indication of an extended hold. The pilot should obtain the latest alternate weather and have charts and approach plates organized and available in case a reroute becomes necessary.

4. Emergency Operations – PA-44

Objective
To develop the pilot's knowledge of the elements related to emergencies, abnormal procedures, system and equipment malfunctions appropriate to the Piper Seminole. The pilot should be able to analyze various situations and take appropriate action for simulated emergencies and malfunctions in which they may encounter.

Description
This chapter outlines and explains in detail the various emergencies, abnormal procedures, system and equipment malfunctions appropriate to the Piper Seminole.

Checklist Usage
- There are two checklists for the aircraft: a laminated Quick Reference checklist and a manufacturer's checklist containing amplified procedures.
- The boxed Emergency Procedures items in Quick Reference checklist and the bold items in the manufacturer's checklist are to be committed to memory. However, once the items have been completed, the checklist should be referenced to ensure proper completion.
- Some procedures in the Quick Reference checklist may continue with amplified procedures in the manufacturer's checklist and shall be referenced as directed, provided time and altitude permit.

Suitable Landing Areas
Certain checklist procedures direct the pilot to divert to another airport. In these cases, the checklist will state 'Nearest Suitable Airport' or 'Land As Soon As Possible'. The pilot must exercise good judgment in these situations considering external factors such as terrain, airspace, weather, personal limitations, etc. The intent of these terms are:

Nearest Suitable Airport – An airport within reasonable distance and adequate facilities to complete repairs. Preferably one with a Piper Service Center that has adequate inventory and expertise.
Land As Soon As Possible – Nearest suitable landing area, preferably an airport, but possibly a road, field or lake of adequate length and without obstructions permitting a normal approach and safe landing.

References
Airplane Flying Handbook
Piper Model PA-44 Pilot's Operating Handbook
Piper Seminole Checklist – Emergency Procedures

5.1 EMERGENCY PROCEDURE: Engine Troubleshoot

Indications/Recognition
A loss of power, annunciator illumination, or any engine abnormality.

Teaching Considerations
- The completion of emergency checklists

Execution
1. **Fuel Quantity – CHECKED**
2. **Engine Instrument – CHECKED**
3. **Fuel Selector – ON**
4. **Carb Heat – ON**
5. **Mixture – RICH**
6. **Throttle – OPEN ½ Travel**
7. **AUX Fuel Pump – ON**
8. **Magneto Switches – CYCLED**
9. **Fuel Selector – CROSSFEED**

If engine fails to develop power

10. Propeller – FEATHER

5.2 EMERGENCY PROCEDURE: Engine Secure

Indications/Recognition
After propeller has been feathered.

Teaching Considerations
- The completion of emergency checklists

Execution
1. **Fuel Selector - OFF**
2. **Cowl Flaps– ADJUSTED**
3. **Carb Heat – OFF**
4. **Mixture – IDLE CUT-OFF**
5. **AUX Fuel Pump – OFF**
6. **Magneto Switches – OFF**
7. **Alternator Switch - OFF**

8. Electrical Load – MAINTAIN BELOW 60 AMPS
9. Radio calls / Transponder – AS APPROPRIATE

5.3 EMERGENCY PROCEDURE: Engine Failure - During Takeoff Before Vmc

Indications/Recognition
A loss of power, annunciator illumination, or any engine abnormality before Vmc constitutes a reason for a rejected takeoff.

Teaching Considerations
- If simulating this emergency, it must be performed within the first 1/3 of the runway.

Execution
10. **Throttle Controls - IDLE**
11. **Brakes - APPLY**
12. Wing Flaps – RETRACT
13. Radio – Advise tower or CTAF

If indication of fire:
14. Mixture Control - IDLE CUTOFF
15. MAGNETOS Switch – OFF
16. MASTER Switch (ALT and BAT) – OFF

5.4 EMERGENCY PROCEDURE: Engine Failure – After Lift-off

Indications/Recognition
A loss of power, annunciator illumination, or any abnormality after rotation constitutes an engine failure immediately after takeoff.

Teaching Considerations
- Stall/spin awareness.
- Selecting a safe landing site.
- The use and completion of appropriate Emergency Checklists.
- No simulated engine failures below Vsse or 500' AGL

Execution
1. **Maintain positive control of aircraft**
2. Pitch for best single-engine performance
3. Perform in-flight engine failure procedures

5.5 EMERGENCY PROCEDURE: Emergency Landing Without Engine Power

Objective
This procedure is appropriate if power is not restored after an engine failure inflight.

Teaching Considerations
- Undershooting and overshooting the selected emergency landing area.
- Plan the approach to arrive at the downwind position abeam the selected landing area at 1,000 feet AGL.
- The use and completion of appropriate Emergency Checklists.

Execution
1. **Emergency Gear Lever – OVERIDE ENGAGE (above 105 KIAS)**
2. **Seats and Seat Belts - SECURE**
3. **Airspeed - 79 KIAS - Flaps UP**
   77 KIAS - Flaps 10° - FULL
4. **Propeller Control – Full Decrease**
5. **Throttle – Closed**
6. Master Switch – OFF
7. Ignition Switches – OFF
8. Flaps – As Desired
9. Fuel Selector Valve – OFF
10. Mixture – Idle Cut Off
11. Touchdown – LOWEST POSSIBLE AIRSPEED

5.6 EMERGENCY PROCEDURE: Precautionary Landing with Engine Power

Objective
This procedure is appropriate when landing off airport, with the engine still producing power.

Teaching Considerations
- Understanding of when a precautionary landing may be necessary.
- Stall and spin awareness.
- Selecting a suitable landing area.
- Establishing a stabilized approach.
- The use and completion of appropriate Emergency Checklists.
- Assessing priorities and division of attention.

Execution
1. **Pilot and Passenger Seat Backs - MOST UPRIGHT POSITION**
2. **Seats and Seat Belts - SECURE**
3. **Airspeed - 79 KIAS**
4. **Selected Field - FLY OVER (noting terrain and obstructions)**
5. **Wing Flaps - FULL (on final approach)**
6. **Airspeed - 77 KIAS**
7. **Master Switch (ALT and BAT) - OFF (when landing assured)**
8. **Doors - UNLATCH PRIOR TO TOUCHDOWN**
9. **Touchdown – LOWEST POSSIBLE AIRSPEED**
12. Mixture Control - IDLE CUTOFF (pull full out)
13. Fuel Selector Valve - OFF
14. Magnetos Switch - OFF
15. Brakes – Apply Brakes Heavily

5.7 EMERGENCY PROCEDURE: Ditching

Objective
This procedure is appropriate if an emergency water landing is necessary.

Teaching Considerations
- Use of personal flotation devices and life rafts.
- Emergency egress procedures in case the aircraft capsizes inverted.
- The necessity of touching down at the established rate of descent and not in a landing flare.

Execution
1. Radio - TRANSMIT MAYDAY on 121.5 MHz, (give location, intentions and SQUAWK 7700)
2. Heavy Objects (in baggage area) - SECURE OR JETTISON (if possible)
3. Pilot and Passenger Seat Backs - MOST UPRIGHT POSITION
4. Seats and Seat Belts - SECURE
5. Wing Flaps - 25° - FULL
6. Landing Gear - UP
7. Power - ESTABLISH 300 FT/MIN DESCENT AT 75 KIAS

NOTE: If no power is available, approach at 80 KIAS with Flaps UP or at 75 KIAS with Flaps 10°.

8. Approach - High Winds, Heavy Seas - INTO THE WIND
   Light Winds, Heavy Swells - PARALLEL TO SWELLS
9. Cabin Doors - UNLATCH
10. Touchdown - LEVEL ATTITUDE AT ESTABLISHED RATE OF DESCENT
11. Face - CUSHION AT TOUCHDOWN (with folded coat)
12. ELT - ACTIVATE
13. Airplane - EVACUATE THROUGH CABIN DOORS OR PILOT EMERGENCY EXIT

NOTE: If necessary, open window and flood cabin to equalize pressure so doors can be opened.

14. Life Vests and Raft - INFLATE WHEN CLEAR OF AIRPLANE

5.8 EMERGENCY PROCEDURE: Engine Fire – During Start on Ground

Indications/Recognition

- Flames and smoke coming from the engine cowl.
- Heat and the smell of smoke in the cockpit.

Teaching Considerations

- Proper priming technique.
- Proper starting technique.
- Determining electrical vs. engine fire.

Execution

IF ENGINE STARTS

1. **Throttle – FULL OPEN**
2. **Mixture – IDLE CUT-OFF**

IF ENGINE FAILS TO START

4. **Cranking - CONTINUE**
5. **Throttle Control - FULL**
6. **Mixtures – IDLE CUT-OFF**
7. Fuel Selectors – OFF
8. AUX Fuel Pumps- OFF
9. Magneto Switches - OFF
10. Alternator Switches – OFF
11. Battery Master - OFF
12. Airplane - EVACUATE
13. Fire - EXTINGUISH (using fire extinguisher, wool blanket, or dirt)

5.9 EMERGENCY PROCEDURE: Engine Fire – In Flight

Indications/Recognition

- Flames and smoke coming from the engine cowl.
- Heat and the smell of smoke in the cockpit.

Teaching Considerations

- Procedures for extinguishing a fire during flight.
- Location of nearest suitable airport/emergency landing location.
- Determining electrical vs. engine fire.

Execution

1. **Fuel Selector Valve – OFF**
2. **Cowl Flap - OPEN**
3. **Mixture – IDLE CUT – OFF**
4. **Propeller - FEATHERED**
5. **Fuel Pump Switch – OFF**
4. **Alternator Switch- OFF**
5. Emergency Descent - INITATE

5.10 EMERGENCY PROCEDURE: Electrical / Cabin Fire

Indications/Recognition

- Flames or smoke from inside the cabin with smell of burning wire insulation.

Teaching Considerations

- Determining electrical vs. engine fire.
- Use of fire extinguisher inflight (Halon).

Execution

1. **MASTER Switches (ALT and BAT) - OFF**
2. **Cabin Vents - OPEN**
3. **Heater and Air vents – OFF / CLOSED**
4. **Fire Extinguisher - ACTIVATE (if available)**

When fire is out

5. Ventilation – Storm Window Open
6. Land – AS SOON AS PRACTICAL

WARNING: AFTER THE FIRE EXTINGUISHER HAS BEEN USED, MAKE SURE THAT THE FIRE IS EXTINGUISHED BEFORE EXTERIOR AIR IS USED TO REMOVE SMOKE FROM THE CABIN.

IF FIRE HAS BEEN EXTINGUISHED AND ELECTRICAL POWER IS NECESSARY FOR CONTINUED FLIGHT TO NEAREST SUITABLE AIRPORT OR LANDING AREA

6. All Electrical Switches – OFF
7. All Circuit Breakers – PULL OUT
8. Battery C/B (60 AMP) – IN
9. One Main Bus C/B (60 AMP) – IN
10. Battery Master – ON
11. One ALT C/B (70 AMP) – IN
12. One ALT FIELD C/B (5 AMP)- IN
13. One Alternator Switch – ON
14. TACH C/B (3 AMP) – IN
15. Gear Indicator C/B (3 AMP) – IN
16. Avionics Bus #1 C/B (40 AMP) – IN
17. Avionics Bus #2 C/B (40 AMP) – IN
18. Radio Master – ON
19. Compass C/B (5 AMP) – IN
20. Audio AMP / MKR C/B (5 AMP) – IN
21. COM 1 C/B (10 AMP) – IN
22. NAV 1 GPS (C/B) – IN

Land as soon as Practical

Use Manual Gear Extension

5.11 EMERGENCY PROCEDURE: Cabin Fire

Indications/Recognition
- Flames and/or smoke coming from inside the cabin.

Teaching Considerations
- Procedures for extinguishing a fire during flight.
- Use of fire extinguisher inflight (Halon).

Execution
1. **MASTER Switch (ALT and BAT) - OFF**
2. **Cabin Vents - OPEN**
3. **Heater and Defroster – OFF**
4. **Fire Extinguisher - ACTIVATE (if available)**

WARNING: AFTER THE FIRE EXTINGUISHER HAS BEEN USED, MAKE SURE THAT THE FIRE IS EXTINGUISHED BEFORE EXTERIOR AIR IS USED TO REMOVE SMOKE FROM THE CABIN.

5. Land the airplane as soon as possible to inspect for damage

5.12 EMERGENCY PROCEDURE: Wing Fire

Indications/Recognition
- Flames and/or smoke coming from the wing.

Teaching Considerations
- Procedures for extinguishing a fire during flight.
- Location of the nearest suitable airport/emergency landing location.

Execution
1. **LAND and TAXI Light Switches - OFF**
2. **NAV Light Switch - OFF**
3. **STROBE Light Switch - OFF**
4. **PITOT HEAT Switch - OFF**

NOTE: Perform a sideslip to keep the flames away from the fuel tank and cabin. Land as soon as possible using flaps only as required for final approach and touchdown

5.13 EMERGENCY PROCEDURE: Inadvertent Icing Encounter During Flight

Indications/Recognition

- Visible ice around windshield, or leading edges

Teaching Considerations

- Importance of recognizing and taking immediate action to exit icing conditions.
- Effects of icing on aircraft aerodynamics and engine performance.

Execution

1. **PITOT HEAT Switch - ON**
2. **Turn back or change altitude (to obtain an outside air temperature that is less conducive to icing)**
3. **CABIN HT Control Knob - ON**
4. **Defroster Control Outlets - OPEN (to obtain maximum windshield defroster airflow)**
5. CABIN AIR Control Knob - ADJUST (to obtain maximum defroster heat and airflow)
6. Watch for signs of induction air filter icing. A loss of engine RPM could be caused by ice blocking the air intake filter. Adjust the throttle as necessary to hold engine RPM. Adjust mixture as necessary for any change in power settings.

IF RPM LOSS OCCURS

Alternate Air - OPEN

7. Plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable off airport landing site.
8. With an ice accumulation of 0.25 inch or more on the wing leading edges, be prepared for significantly higher power requirements, higher approach and stall speeds, and a longer landing roll.
9. Leave wing flaps retracted. With a severe ice build-up on the horizontal tail, the change in wing wake airflow direction caused by wing flap extension could result in a loss of elevator effectiveness.
10. Open left window and, if practical, scrape ice from a portion of the windshield for visibility in the landing approach.
11. Perform a landing approach using a forward slip, if necessary, for improved visibility.
12. Approach at 75 to 85 KIAS depending upon the amount of ice accumulation.
13. Perform landing in level attitude.

Missed approaches should be avoided whenever possible because of severely reduced climb capability

5.14 EMERGENCY PROCEDURE: Static Source Blockage

Indications/Recognition

- Erroneous instrument readings may or may not be accompanied by equipment failure indications on display.

Teaching Considerations

- Effects of static system blockage on instruments and autopilot.

Execution

1. ALT STATIC AIR Valve - ON (rotate)
2. Cabin Vents - CLOSED
3. CABIN HT and CABIN AIR Control Knobs - ON (pull full out)
4. Pitot Heat - ON

5.15 EMERGENCY PROCEDURE: Excessive Fuel Vapor

Indications/Recognition

- Flow indications of 1 GPH or more, or power surges occur.

Teaching Considerations

- Systems description and possible causes.

Execution

1. FUEL PUMP Switch - ON
2. Mixture Control - ADJUST (as necessary for smooth engine operation)
3. Fuel Selector Valve - SELECT OPPOSITE TANK (if vapor symptoms continue)
4. FUEL PUMP Switch - OFF (after fuel flow has stabilized

5.16 EMERGENCY PROCEDURE: Landing with a Flat Main Tire

Indications/Recognition
- Main tire appears deflated or shredded.

Teaching Considerations
- Importance of maintaining directional control.

Execution
1. Approach - NORMAL
2. Wing Flaps - FULL
3. Touchdown - GOOD MAIN TIRE FIRST (hold airplane off flat tire as long as possible with aileron control)
4. Directional Control - MAINTAIN (using brake on good wheel as required)

5.17 EMERGENCY PROCEDURE: Landing with a Flat Nose Tire

Indications/Recognition
- Nose tire appears deflated or shredded.

Teaching Considerations
- Importance of protecting propeller from ground contact.

Execution
1. Approach - NORMAL
2. Wing Flaps - AS REQUIRED
3. Touchdown - ON MAINS (hold nosewheel off the ground as long as possible)
4. When nosewheel touches down, maintain full up elevator as airplane slows to stop.

5.18 EMERGENCY PROCEDURE: Emergency Landing Gear Extension

Indications/Recognition

- Gear unsafe light.
- Gear down lights (3 green) not illuminating.

Teaching Considerations

- Importance of gear unsafe recognition.

Execution

1. Master Switch – ON
2. Circuit Breakers – IN
3. Panel Lights – OFF (if daytime)
4. Gear Indicators – CHECK BULBS
5. If gear does not check down, and safe
6. Airspeed – BELOW 100 KIAS
7. HYD PUMP PWR (25 AMP) C/B – PULL
8. Landing Gear Selector – DOWN
9. Emergency Gear Extension Knob – PULL
10. If gear still does not lock down: Yaw plane side to side with rudder. IF nose gear does not lock down, slow airplane to slowest airspeed.
11. Verify – THREE GREEN
12. Emergency Extension Knob – KEEP EXTENDED.

5.19 EMERGENCY PROCEDURE: Propeller Overspeed

Indications/Recognition

- Propeller RPM higher than 2700 RPM.
- Propeller blades rotate to full low pitch

Teaching Considerations

- Importance of a proper instrument scan, including engine gauges.
- Possible outcomes of prop Over speeding.

Execution

1. Throttle – RETARD
2. Oil Pressure – Check
3. Propeller Control – Full Decrease RPM
4. Propeller Control – Set RPM (if control is available)
5. Airspeed and throttle – Adjust to maintain 2700 RPM

5.20 EMERGENCY PROCEDURE: Illumination of ALT of LO BUS Annunciator

Indications/Recognition

- Low Volts Annunciator or ALT annunciator comes on

Teaching Considerations

- Importance of a proper instrument scan, including engine gauges.

Execution

Verify Single / Dual Failure

If single Alternator Failure:

1. Electrical Load – MINIMIZE
2. Affected Alternator Switch – OFF
3. Affected Alternator Circuit Breakers – RESET

If proper operation not restored

4. Failed Alternator Switch – OFF
5. Electrical Load – MAINTAIN BELOW 60 AMPS

If Dual Alternator Failure:

6. Electrical Load – MINIMIZE
7. Alternator Switches – OFF
8. Alternator Circuit Breakers – RESET
9. Alternator Switches – ON (ONE AT A TIME)

If one alternator resets

10. Failed Alternator Switch – OFF
11. Electrical Load – MAINTAIN BELOW 60 AMPS

If neither alternator resets

12. Both Alternator Switches – OFF

Land as soon as practical
Anticipate complete electrical failure
Use manual gear extension

5.21 EMERGENCY PROCEDURE: Low Voltage

Indications/Recognition

- Low Volts Annunciator comes on or does not go out at higher RPM.

Teaching Considerations

- Importance of a proper instrument scan, including engine gauges.
- Possible outcomes of uncorrected low voltage situations.

Execution

1. MASTER Switch (ALT Only) - OFF
2. ALT FIELD Circuit Breaker - CHECK IN
3. MASTER Switch (ALT and BAT) - ON
4. LOW VOLTS Annunciator - CHECK OFF

IF LOW VOLTS ANNUNCIATOR REMAINS ON

5. MASTER Switch (ALT Only) - OFF
6. Electrical Load - REDUCE IMMEDIATELY as follows:
   a. PITOT HEAT Switch - OFF
   b. BEACON Light Switch - OFF
   c. LAND Light Switch - OFF (use as required for landing)
   d. TAXI Light Switch - OFF
   e. NAV Light Switch - OFF
   f. STROBE Light Switch - OFF

Transponder MFD

5.22 EMERGENCY PROCEDURE: Spin Recovery

Indications/Recognition

- Uncoordinated Stall

Teaching Considerations

- Dangers of a spin.
- Intentional spins are prohibited.

Execution

1. Rudder – FULL OPPOSITE DIRECTION OF ROTATION
2. Control Wheel – FULL FORWARD
3. Ailerons – NEUTRAL
4. Throttle – IDLE

When rotation stops. Neutralize rudder and ease back on control wheel, regain level flight.

5.23 EMERGENCY PROCEDURE: Open Door in Flight

Indications/Recognition

- Door not latched.
- Door partially open.
- Airspeed slightly lower.

Teaching Considerations

- Importance of flying the airplane
- Keeping calm

Execution

1. Airspeed – 82 KIAS
2. Air Vents – CLOSED
3. Strom Window – OPEN
4. Arm Rest – PULL DOOR CLOSED
5. Lower Latch – LOCK
6. Upper Latch – LOCK

5.24 EMERGENCY PROCEDURE: Autopilot Failure

Indications/Recognition

- Uncommanded or unresponsive to control inputs.

Teaching Considerations

- Proper systems knowledge to troubleshoot extent of problem.
- Various ways of disconnecting autopilot/trim system.

Execution

1. **Control Wheel - GRASP FIRMLY (regain control of airplane)**
2. **Interrupt Switch – PUSH**
3. **Autopilot Master Switch – OFF**
4. **Control Wheel – OVERRIDE MANUALLY**

WARNING: FOLLOWING AN AUTOPILOT SYSTEM MALFUNCTION, DO NOT ENGAGE THE AUTOPILOT UNTIL THE CAUSE OF THE MALFUNCTION HAS BEEN CORRECTED.

5.25 EMERGENCY PROCEDURE: Loss of Fuel Pressure

Indications/Recognition
- Fuel Flow Indication Reading Low.
- Power Loss.
- Engine Roughness.
- Fuel Quantity Low.

Teaching Considerations
- Instrument Scan.
- Switching Fuel Tanks.

Execution
1. Fuel Selector Valve – TANK WITH FUEL
2. Electric Fuel Pump – ON
3. Land as soon as possible.

5.26 EMERGENCY PROCEDURE: Vacuum System Failure

Indications/Recognition
- LOW VACUUM annunciator comes on.

Teaching Considerations
- Proper systems knowledge to troubleshoot extent of problem.

Execution
1. Vacuum Indicator (VAC) – 4.8" HG and 5.1" HG

CAUTION: IF VACUUM POINTER IS OUT OF LIMITS DURING FLIGHT OR THE GYRO FLAG IS SHOWN ON THE ATTITUDE INDICATOR, THE ATTITUDE INDICATOR MUST NOT BE USED FOR ATTITUDE INFORMATION.

5.27 EMERGENCY PROCEDURE: Illumination of HTR OVER TEMP Annunciator

Indications/Recognition
- HTR OVER TEMP annunciator comes on.

Teaching Considerations
- Proper systems knowledge to troubleshoot extent of problem.

Execution
1. Air Intake Lever – OPEN
2. Cabin Heat Switch - FAN

5.28 EMERGENCY PROCEDURE: Emergency Descent

Indications/Recognition

- This procedure may be directed by another checklist or initiated by the pilot to rapidly lose altitude in an emergency situation.

Teaching Considerations

- Aircraft limitations.
- Appropriate recovery altitude for simulated emergency descents.

Execution

1. **Throttle – IDLE**
2. **Propellers – Full Forward**
3. **Landing Gear – DOWN**
4. **Airspeed – 140 KIAS (130 KIAS for practice)**
5. **Bank – 30° to 45° (A steep bank greatly decreases the vertical component of lift, allowing the pilot to quickly establish a steep descent angle while maintaining positive load factors (G-forces) on the airplane.)**

NOTE: In the event of an engine fire the mixture should be idle/cut-off and the fuel pump turned off.

5.29 ABNORMAL PROCEDURE: Illumination of Oil Annunciator

Indications/Recognition

- Low reading of oil pressure.
- Oil pressure annunciator may be illuminated.
- High oil temperature reading.

Teaching Considerations

- Reasons for partial or complete loss of oil pressure.
- Troubleshooting actual failure versus faulty gauge.
- Selecting the closest suitable airport or landing site.

Execution

1. Oil Pressure Gauge – CHECK, CONFIRM AFFECTED ENGINE
2. Oil Temperature – CHECK

If pressure is low and temp high

3. Affected Engine – SECURE

5.30 ABNORMAL PROCEDURE: Engine Overheat

Indications/Recognition

- High temperature reading of the oil temperature.
- High temperature reading of the Cylinder head temperature.
- Low reading on the oil pressure.

Teaching Considerations

- Cooling techniques.
- Troubleshooting actual failure versus faulty gauge.
- Selecting the closest suitable airport or landing site.
- Reasons for partial or complete loss of oil pressure.

Execution

1. Cowl Flap - OPEN
2. Mixture – RICH
3. Airspeed - INCREASE
4. Throttle – REDUCE
5. Oil Pressure Gauge – CHECK
6. Oil Temperature – CHECK

If pressure is low and temp high

7. Affected Engine - SECURE

5.31 ABNORMAL PROCEDURE: Engine Roughness

Indications/Recognition

- A loss in engine RPM.

Teaching Considerations

- Selecting the closest suitable airport or landing site.
- The effect of atmospheric conditions on engine performance.

Execution

1. Engine Instruments – CHECK
2. Mixture – Adjust for Maximum Smoothness

If roughness continues

3. Carb Heat – ON

If roughness still continues after a few minutes

4. Carb Heat - OFF
5. AUX Fuel Pump - ON
6. MAGNETOS Switch – L then R then Both (If operation is satisfactory on either magneto, proceed on that magneto at reduced power with mixture full rich to the nearest airport.)
7. If roughness persists – Prepare to complete Engine Failure – Inflight checklist

5.32 ABNORMAL PROCEDURE: Open Door

Indications/Recognition

- In-flight, a noise or breeze coming from the sides of the cockpit and visually determining the door latch is not engaged. This usually happens shortly after takeoff.

Teaching Considerations

- Normally, open doors occur right after takeoff.
- If the door cannot be latched, find the nearest airport and land, latch the door and continue the flight.
- Fly the aircraft first.
    - A partially open door does not affect normal flight characteristics.
    - A normal landing can be made with the door open.
- Latch cabin doors is an item on both the Before Start and the Before Takeoff Checklists.
- Maintain situational awareness while attempting to latch the door.

Execution

1. Airspeed – REDUCE
2. Cabin Vents – CLOSE
3. Side Latch (If Open) – Pull on armrest and move latch handle to latched position.

5.33 ABNORMAL PROCEDURE: Loss of Communications

Indications/Recognition

- Failure to communicate through the radio with outside sources.

Teaching Considerations

- Lost communications during VFR/IFR conditions.
- Alternate courses of action.
- Attempting to use different frequencies.
- Faulty push-to-talk switch: Trying the button on the other control wheel.
- Setting audio panel to speaker.
- Use of the hand-held mic.

Execution

1. Radios – Switch
2. Circuit Breakers – Check (If a breaker has popped, do not reset)
3. Volume – Check
4. Transponder – Squawk 7600
5. Proceed as required for VFR or IFR conditions.
6. Additional troubleshooting:
   a. Attempt to use different frequencies.
   b. Faulty push-to-talk switch; try the button on the other control wheel.
   c. Set audio panel to speaker.
   d. Use the hand-held mic.
   e. Use your cell phone, if available.

5.34 ABNORMAL PROCEDURE: Propeller Unfeathering/ Engine Restart

Execution

1. Fuel Selector – ON
2. Mixture – RICH
3. Throttle – OPEN ¼ Travel
4. AUX Fuel Pump – ON
5. Magneto Switches – ON
6. Airspeed – 100 KIAS minimum
7. Propeller – FULL FORWARD

If propeller does not windmill

8. Starter – ENGAGE

If Propeller Windmills

9. Prop – 2000RPM
10. Throttle – 15 Inches
11. AUX fuel Pump – AS REQUIRED
12. Mixture – LEAN
13. Alternator – ON

5.35 Emergency Equipment and Survival Gear

Objective
To develop the pilot's knowledge of the elements related to emergency equipment and survival gear appropriate to the aircraft and environment encountered during the flight.

Description
This section outlines the available emergency equipment and survival gear located in the Piper Arrow.

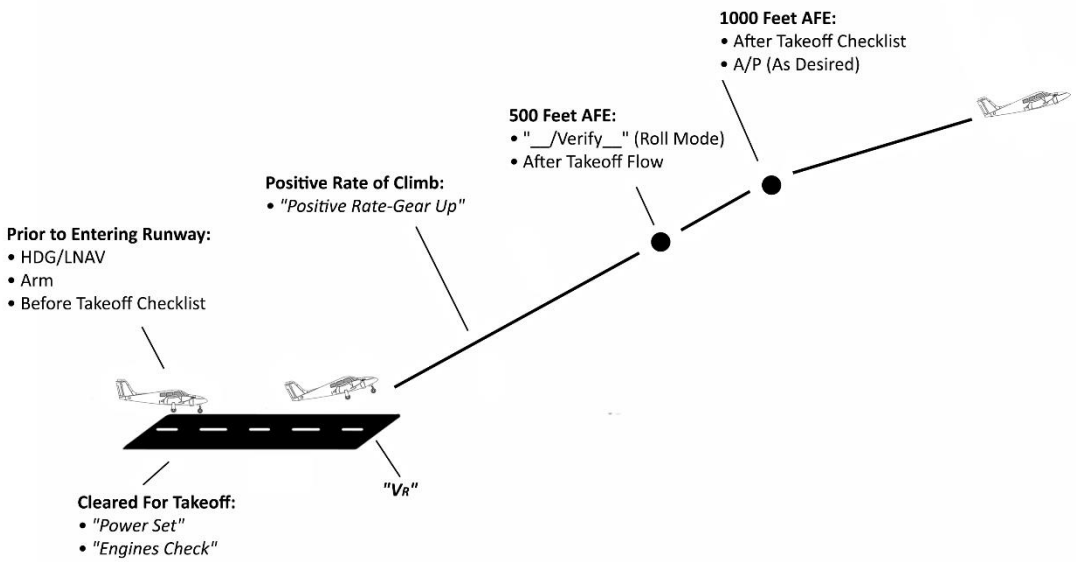
Teaching Considerations
- Additional personal gear. (i.e., cell phone, credit card)
- Required winter clothing.
- Survival Kit
- Emergency Locator Transmitter (ELT)

5 Profiles and Required Call-outs

5.1 Normal Takeoff

Flight Profile | Normal Takeoff

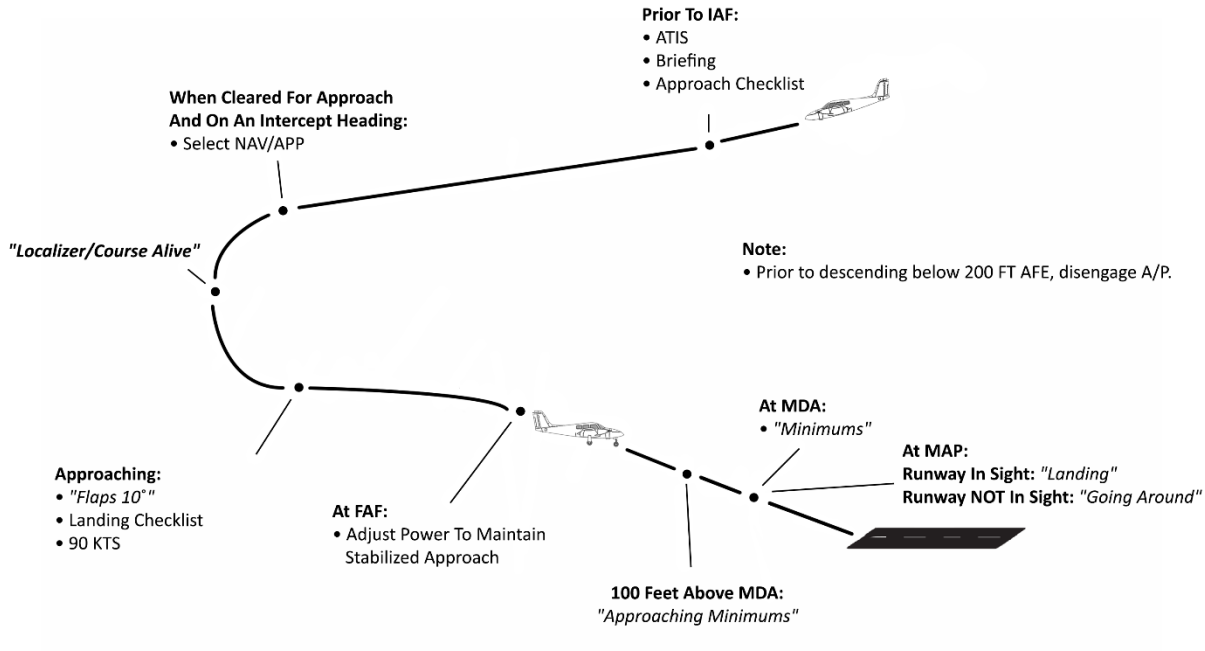
Piper Seminole PA44



5.2 Normal Non-Precision

Flight Profile | Non Precision Approach

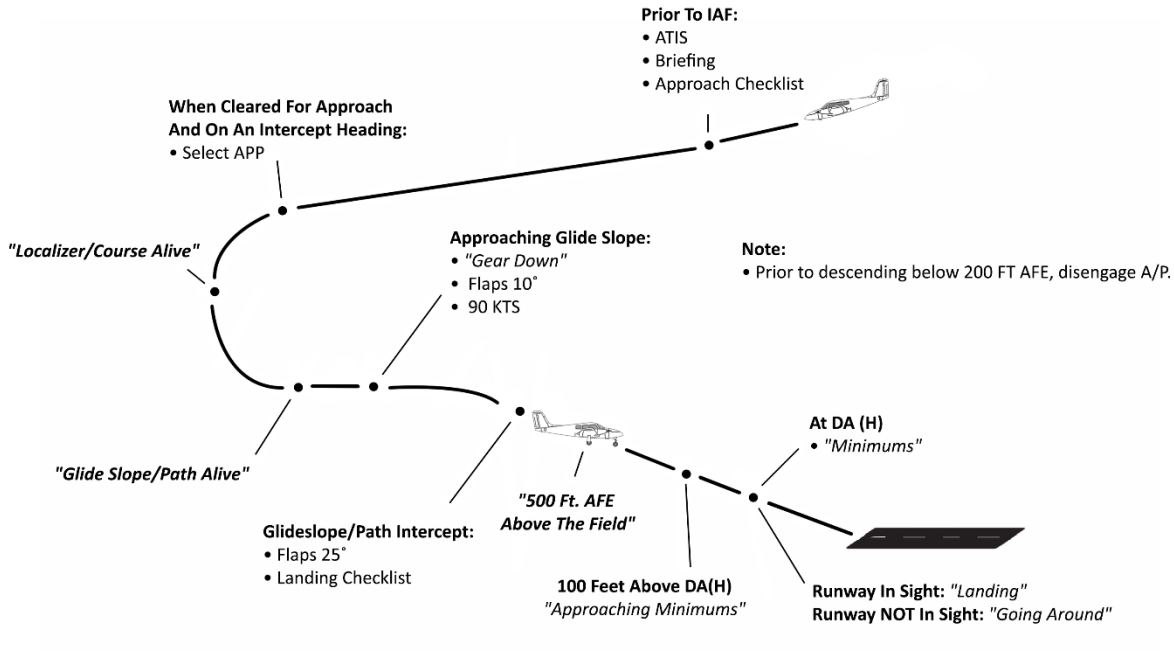
Piper Seminole PA44



5.3 Normal ILS-LPV Approach

Flight Profile | Normal ILS/LPV Approach

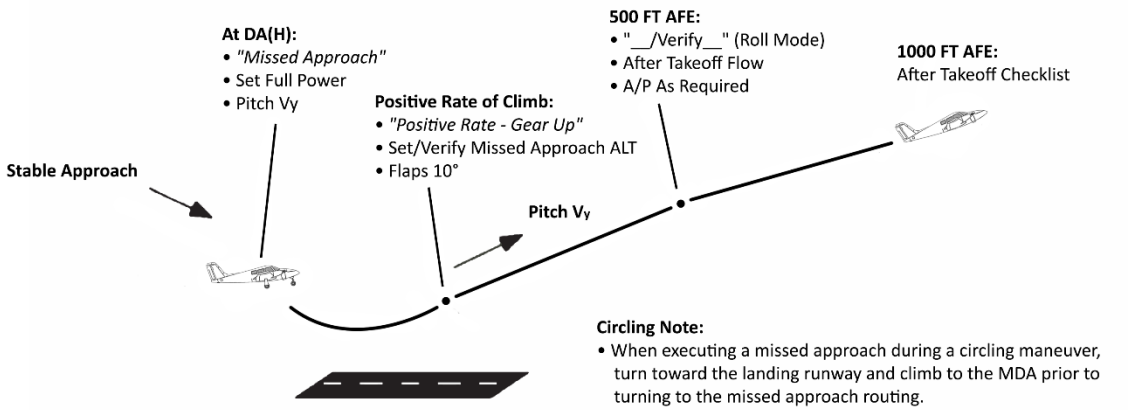
Piper Seminole PA44



5.4 Missed Approach

Flight Profile | Missed Approach

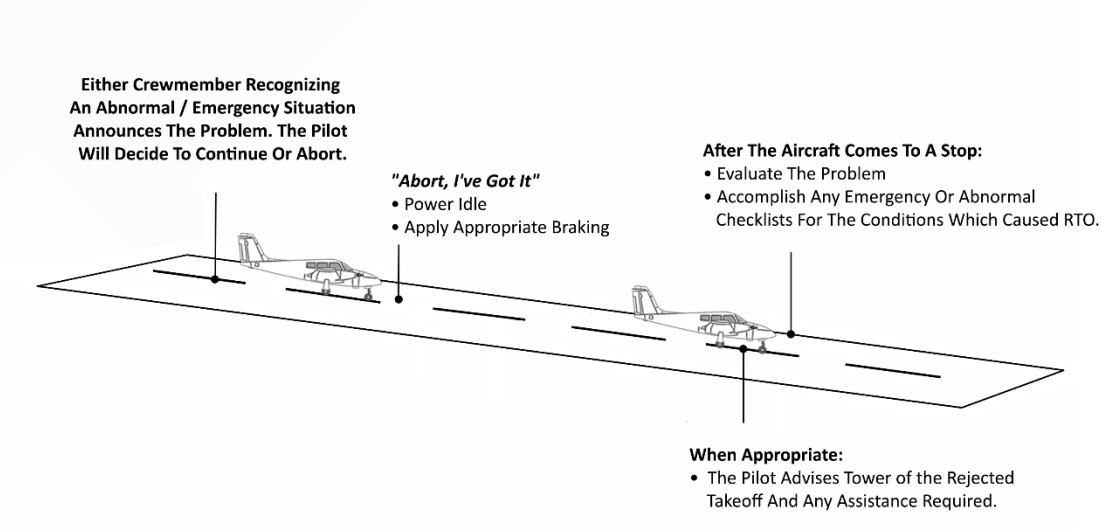
Piper Seminole PA44



5.5 Rejected Takeoff

Flight Profile | Rejected Takeoff

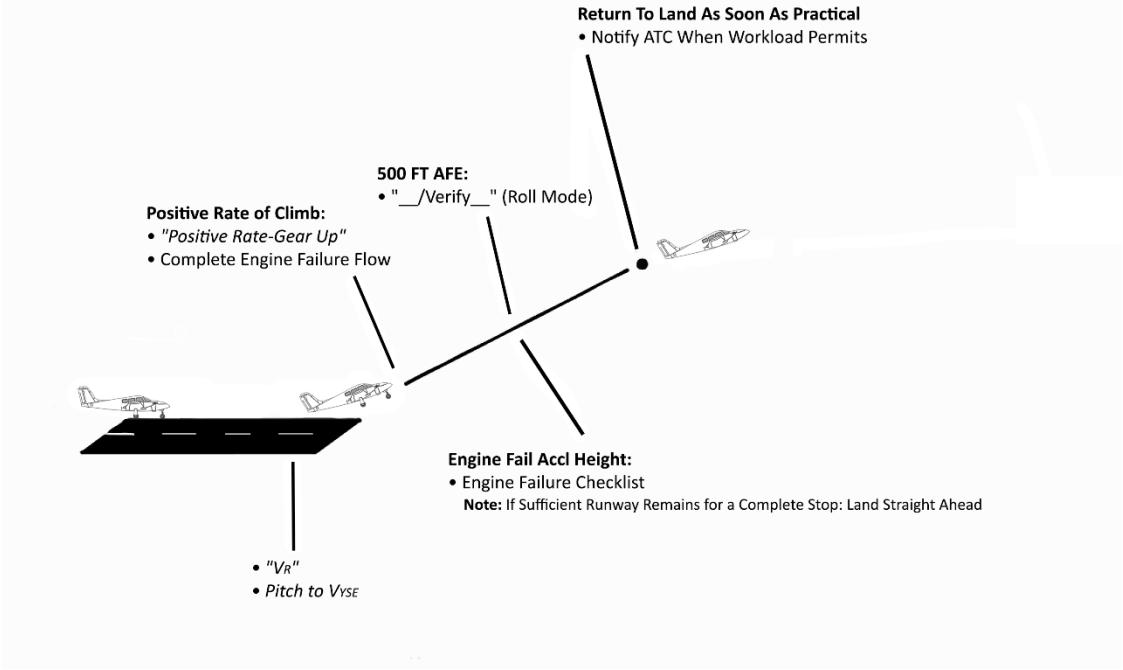
Piper Seminole PA44



5.6 Engine Fire, Failure, Severe Damage on Takeoff

Flight Profile | Engine Fire, Failure, Severe Damage on Takeoff

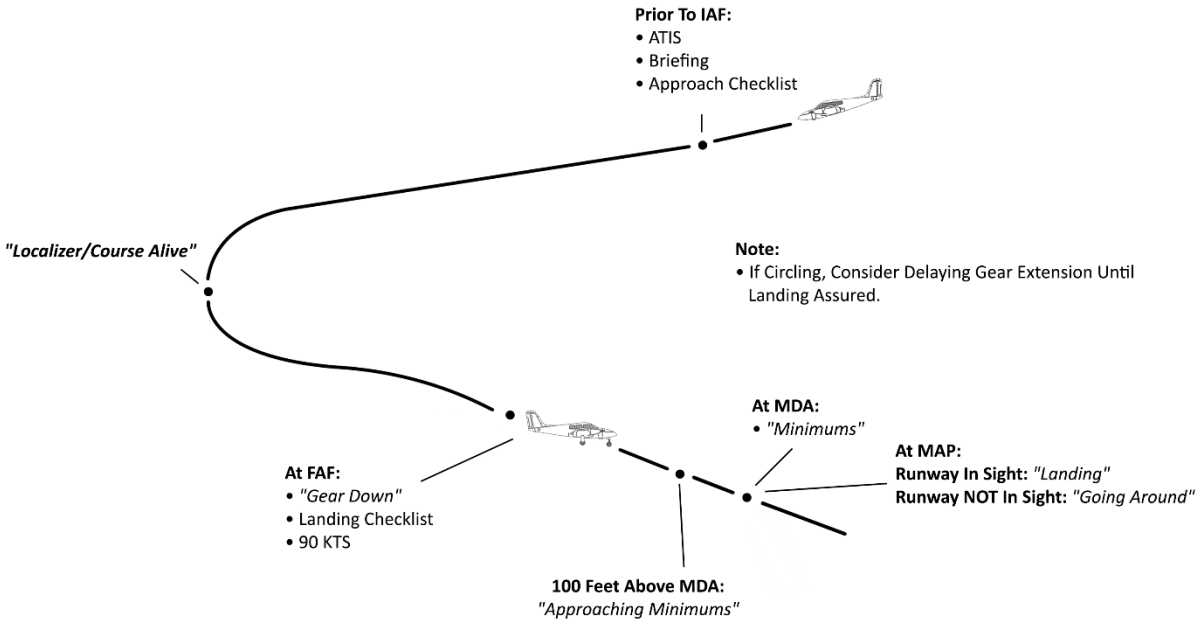
Piper Seminole PA44



5.7 Single Engine Non-Precision

Flight Profile | Non Precision Approach

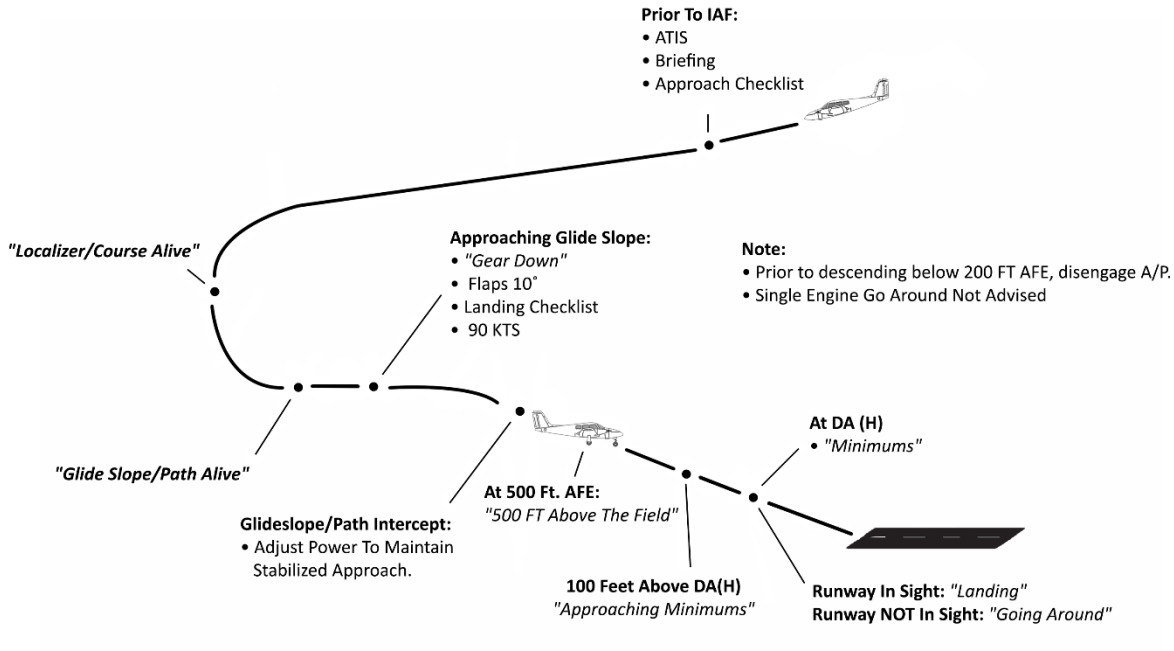
Piper Seminole PA44



5.8 Single Engine Precision/LPV

Flight Profile | Single Engine Precision Approach

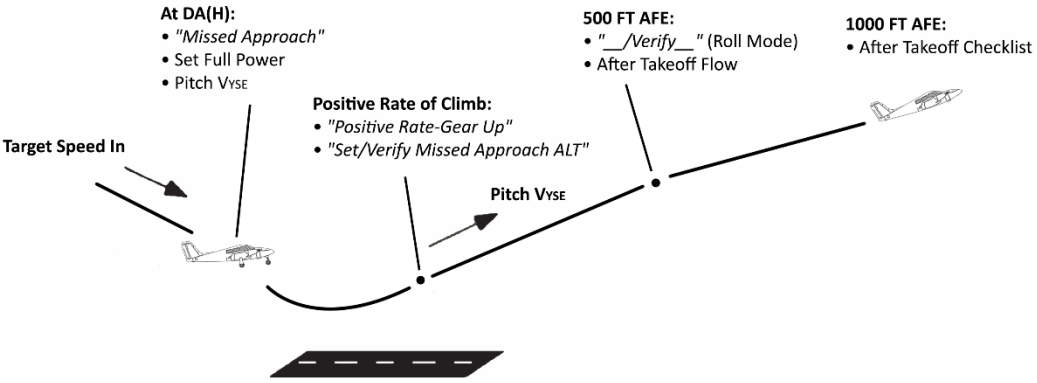
Piper Seminole PA44



5.9 Single Engine Missed Approach

Flight Profile | Single Engine Missed Approach

Piper Seminole PA44



*Note: Single engine missed approach not advisable.

5.10 Required Call-Outs

Action	Callout
Prior to engaging starter	"Clear Prop"
After advancing power confirm • MAP and TACH indications • Engine instrument indications • Airspeed indications	"Power Set" "Engines Checked" "Airspeed Alive"
At rotation Speed	"Vr"
Positive Rate-of-Climb	"Positive Rate"
Gear Retraction	"Gear Up"
Aborted Takeoff	"Abort, Abort, Abort"
1000 or 500 feet Above/Below Assigned Altitude	"1000 (or 500) feet to Level Off"
100 feet Above/Below Assigned Altitude	"Approaching Altitude"
Extending Landing Gear and Beginning Landing Flow	"Gear Down, Landing Flow"
Confirming Landing Gear Down Immediately After Extension	"Gear Down, Three Green, No Red, One in the Mirror"
Before Landing, on Short Final	"Verify Three Green"
(*Listen for Instructor Response)*	*("Three Green Verified")*

6 Glossary of Abbreviations and Terms

Abeam: An aircraft is "abeam" a fix, point, or object when that fix, point, or object is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point.
A/FD - Airport/Facilities Directory: An FAA Publication containing information on all airports, communications, and NAVAIDs.
AGL - Above Ground Level: Actual height above the ground.
Aiming Point: During the landing procedure it is the point on the ground at which, if the airplane maintains a constant glidepath and was not flared for landing, it would strike the ground.
Angle of Attack: The acute angle between the chord line of the airfoil and the direction of the relative wind.
CRM - Crew Resource Management: The effective use of all available resources: human resources, hardware, and information. Human resources include all groups routinely working with the cockpit crew or pilot who are involved with decisions that are required to operate a flight safely. These groups include, but are not limited to:

- dispatchers
- cabin crewmembers
- maintenance personnel
- air traffic controllers (ATC)
- weather services

CRM is not a single *task*, but a set of competencies that must be evident in all tasks. The principles of CRM should be applied to all operations regardless of whether tasks are done as a single pilot or as part of a crew.
Dead Reckoning: Navigation solely by means of computations based on the time, airspeed, distance, and direction.
Discrepancy: The term for an inoperative or defective piece of equipment.
DME - Distance Measuring Equipment
ELT - Emergency Locator Transmitter: A small, self-contained radio transmitter that automatically, upon the impact of a crash, transmits an emergency signal on 121.5, 243.0, or 406.0 MHz.
EPU - External Power Unit: An external battery used to crank the engine without having to gain access to the aircraft's battery.
FAF - Final Approach Fix: The fix from which an IFR final approach to an airport is executed, and which identifies the beginning of the final approach segment. An FAF is designated on government charts by the Maltese cross symbol for non-precision approaches, and the lightning bolt symbol for precision approaches.
Flight Controls:

- Ailerons
- Elevator/Stabilator
- Rudders
- Trim
- Flaps

Fuel Pump: An engine driven or electrically powered pump used to supply positive fuel pressure. The electric fuel pump should be turned on before switching tanks and should be left on for a short period thereafter.

Go-Around Point: The point at which if the aircraft has not touched down under control, a go-around should be executed. NOTE: A go-around can be executed at any point during the landing phase as deemed necessary by the PIC.
GPS - Global Positioning System: A satellite-based radio positioning, navigation, and time-transfer system.
IAF - Initial Approach Fix: The fix depicted on Instrument Approach Procedure charts where the Instrument Approach Procedure begins unless otherwise authorized by Air Traffic Control.

Instruments:

- Flight Instruments:
  - Airspeed Indicator
  - Attitude Indicator (gyro)
  - Altimeter
  - VSI - Vertical Speed Indicator
  - Heading Indicator (directional gyro)
  - Turn Coordinator and Inclinometer (ball)
  - Magnetic Compass
- Radio Navigation Instruments:
  - VOR/LOC - VHF Omni-Directional Range/Localizer
  - ADF - Automatic Direction Finder
  - NDB - Non-Directional Radio Beacon
  - GPS - Global Positioning System
- Engine Instruments:
  - Tachometer
  - Fuel Quantity
  - Engine Gauge, Oil Temp, Oil and Fuel Pressure

IFR - Instrument Flight Rules: Rules and regulations established by the Federal Aviation Administration to govern flight under conditions in which flight by outside visual reference is not safe. IFR flight depends on reference to instruments in the cockpit, and navigation by reference to electronic signals.
KIAS - Knots Indicated Airspeed
Land as soon as possible: Land at the nearest available landing site. If no airport is within gliding distance, an off-airport landing should be made.
Land as Soon as Practical: Divert to the nearest suitable airport.
MAP - Missed Approach Point: A point prescribed in each instrument approach at which a missed approach procedure shall be executed if the required visual reference has not been established.
MCA - Minimum Controllable Airspeed: An airspeed at which any further increase in angle of attack, increase in load factor, or reduction of power, would result in an immediate stall.
MDA - Minimum Descent Altitude: The lowest altitude (in feet MSL) to which descent is authorized on final approach, or during circle-to-land maneuvering in execution of a non-precision approach.
MEL - Minimum Equipment List: An inventory of instruments and equipment that may legally be inoperative, with specific conditions under which an aircraft may be flown with such items inoperative.
MFD - Multifunction Display
MSL - Mean Sea Level
MRA - Minimum Recovery Altitude: The lowest altitude expressed in feet (MSL or AGL) to which descent is authorized.
OAT - Outside Air Temperature
PFD - Primary Flight Display
PIC - Pilot in Command: The pilot who has final authority and responsibility for the operation and safety of the flight. They have authority over all decisions, are authorized to take control when they feel it is necessary for safety or instruction and are responsible for determining safe flight.
Pilotage: Navigation by reference to landmarks or checkpoints.
POH - Pilot's Operating Handbook
PIM - Pilot Information Manual

PTS - Practical Test Standards
Pylons: An identifiable point on the ground marking a prescribed turning point used in some ground reference maneuvers.
Rotation: The act of applying control wheel back pressure to raise the nose-wheel off the ground.
Sink Rate: The rate at which the aircraft is descending.
Slips: An intentional maneuver to decrease airspeed or increase the rate of descent, and to compensate for a crosswind on landing.
Forward Slip: This slip moves sideways, the nose points into the wind, and is used to quickly decrease altitude without increasing airspeed.
Side Slip: This slip moves forward, the nose is aligned with the ground track, and is used to apply a crosswind correction during landing.
Slow Flight: Flight at any airspeed that is less than cruise. The PTS requires demonstration at MCA to feel the effects of airspeeds and configurations found in takeoffs, climbs, descents, etc., at which any increase in angle of attack, load factor, or a reduction in power would result in an immediate stall.
SRM - Single Pilot Resource Management: Single-Pilot Resource Management refers to the effective use of ALL available resources: human resources, hardware, and information. It is similar to Crew Resource Management (CRM) procedures that are being emphasized in multi-crewmember operations except that only one crewmember (the pilot) is involved.
TPA - Traffic Pattern Altitude: The altitude to be flown on the downwind leg of an airport traffic pattern. The AIM recommends adding 1,000 feet AGL to the field elevation, but generally ranges from 600-1,500 feet AGL.
Touchdown Point: The desired point on the runway where the aircraft should touch the ground. This should be a minimum of 200 feet past the threshold and within the first 1/3 of the runway.
VFR - Visual Flight Rules: Flight rules adopted by the FAA governing aircraft using visual references, VFR operations specify the amount of ceiling and the visibility the pilot must have to operate according to the rules. When the weather conditions are such that the pilot cannot operate according to VFR, he or she must use instrument flight rules (IFR).
V-Speeds

- VSO - Stalling Speed in landing configuration.
- VS - Stalling Speed at a specified configuration.
- VX - Best Angle-of-Climb Speed. The airspeed that delivers the greatest gain of altitude in the shortest distance.
- VGLIDE - Best Glide Speed.
- VY - Best Rate-of-Climb Speed. The airspeed that delivers the greatest gain in altitude in the shortest possible time.
- VA - Maneuvering Speed. The maximum speed at which full available aerodynamic control will not overstress the airplane.
- VFE - Maximum Flap Extended Speed.
- VNO - Maximum structural cruising speed.
- VNE - Never Exceed Speed.

Wake Turbulence: Wingtip vortices that are created when an airplane generates lift. When an airplane generates lift, air spills over the wingtips from the high-pressure areas below the wings to the low-pressure areas above them. This flow causes rapidly rotating whirlpools of air called wingtip vortices or wake turbulence.
Wind Shear: A sudden drastic shift in wind speed, direction, or both that may occur in the horizontal or vertical plane.

