

VI.B. Traffic Patterns

References: FAA-H-8083-3; FAA-H-8083-25; AC 90-42; AC90-66; AIM

Objectives	The student should develop knowledge of the elements related to the proper procedures, rules, and elements of the traffic pattern at both a controlled and uncontrolled field. The student will be able to demonstrate this knowledge as required in the PTS.
Key Elements	<ol style="list-style-type: none">1. Entry Procedures2. Communication3. Orientation
Elements	<ol style="list-style-type: none">1. The Pattern2. Controlled Field3. Uncontrolled Field4. Orientation to the Runway5. Checklists6. Establishing Final Approach7. Maintaining Proper Spacing8. Wind Shear and Wake Turbulence
Schedule	<ol style="list-style-type: none">1. Discuss Objectives2. Review material3. Development4. Conclusion
Equipment	<ol style="list-style-type: none">1. White board and markers2. References
IP's Actions	<ol style="list-style-type: none">1. Discuss lesson objectives2. Present Lecture3. Ask and Answer Questions4. Assign homework
SP's Actions	<ol style="list-style-type: none">1. Participate in discussion2. Take notes3. Ask and respond to questions
Completion Standards	The student understands the rules and elements to a proper traffic pattern and is comfortable arriving and departing from a controlled or uncontrolled field.

Instructors Notes:

Introduction:

Attention

Interesting fact or attention grabbing story

In order to leave or land we're going to have to use the traffic pattern, I guess it's pretty important, huh?

Overview

Review Objectives and Elements/Key ideas

What

Traffic Patterns involve the rules, procedures involved with flying a correct traffic pattern.

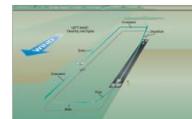
Why

Every flight begins and ends at an airport or other suitable landing area. For that reason, it is essential that the pilot learn the traffic rules, procedures, and pattern layouts that may be in use at various airports.

How:

1. The Pattern

- A. Controlled - The pilot receives a clearance to approach/depart and pertinent pattern information
- B. Uncontrolled - It's up to the pilot to determine traffic direction, and comply with the appropriate rules
- C. If familiar with the basic rectangular pattern, approaches/departures will be easy at most airports
- D. Standard Traffic Pattern
 - i. The Basics
 - a. Pattern Altitude: Usually 1,000' AGL
 - A common altitude is the key factor in minimizing collisions at uncontrolled airports
 - The A/FD will usually specify nonstandard pattern altitudes
 - b. Standard Traffic Patterns: Left Turns
 - All turns are left unless otherwise noted (A/FD, Tower Controller, Airport Markings, etc.)
 - Turns should not be banked more than 30°
 - a Use rudder to maintain coordination; Do Not use rudder to increase the rate of turn, this could result in a cross controlled stall
 - ii. Pattern Legs
 - a. Upwind Leg - The departure leg, flown parallel and in the same direction as runway heading
 - b. Crosswind Leg – The transition from the upwind leg to the downwind leg
 - Perpendicular to the upwind leg (90° turn)
 - Fly the crosswind leg to provide approximately ½ to 1 mile separation from the runway
 - c. Downwind Leg - Parallel to the runway of intended landing
 - The heading flown is opposite the landing runway
 - a EX: Landing runway 10, downwind heading is 280° (no wind)
 - Approximately ½ to 1 mile from the runway
 - Before landing checks, and configuration (flaps, gear) are normally accomplished downwind
 - Descent is normally started on the downwind leg, abeam the point of intended touchdown
 - The downwind leg normally continues to a point 45° off the intended landing point, past the departure end of the runway
 - a The turn to the base leg is started at the end of the downwind leg
 - b This point can be adjust as necessary based on circumstances



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1. Winds, other traffic, emergency situation, etc. can require adjustments
- iii. Base Leg - Perpendicular to the runway and the transition between downwind and final
 - a. The ground track of the airplane should be perpendicular to the extended centerline
 - Heading is 90° off the runway direction (with no wind)
 - b. Continue the descent adjusting pitch and power as necessary to maintain airspeed, glideslope, and aim point
 - c. Begin the turn to final in order to end up established on the extended centerline of the runway
- iv. Final - The final descent of the approach, aligned with the landing runway
 - a. Adjust the turn from base in order to center the aircraft on the runway
 - b. Crab into the wind in order to maintain ground track
 - c. Adjust pitch and power as necessary to maintain airspeed, glideslope, and aim point
- E. Departing the Pattern
 - i. Climb out on the upwind leg
 - ii. If remaining in the pattern, turn to the crosswind leg past the departure end of the runway and within 300' of pattern altitude
 - iii. If departing, continue straight out or exit with a 45° turn to the left (or right, for a right pattern)
- F. Maintaining the Desired Ground Track (on any leg in the pattern)
 - i. The goal is to fly a rectangular pattern regardless of the wind direction or speed
 - a. The airplane will have to be crabbed into the wind in order to maintain a straight ground track
 - b. Maintain awareness of the wind direction in relation to the aircraft, adjust heading as necessary to maintain ground track
 - ii. Visual references are very helpful in maintaining ground track
 - a. Upwind: Glance behind briefly to ensure you are maintain the runway centerline
 - b. Crosswind: Use the runway as a reference; note and correct for any drift to or from the runway
 - c. Downwind: Place the runway at a point on the leading edge of the wing and adjust as needed
 - EX: Place the runway on the edge of a stall strip or outside the fuel cap (whatever reference works for your comfort, the aircraft and the local pattern procedures)
 - d. Final: Maintain the centerline, crab as necessary to correct for the wind
 - e. Familiar Airports may have well known references for the pattern
 - These are helpful for learning the pattern, but these references will not exist at other airports; be sure to teach references that can be carried from airport to airport
 - iii. **CE** - Poor altitude or airspeed control
 - a. Know the airspeed required at certain points in the pattern (max speed is 200 kts in Class D)
 - Adjust as necessary, excessively fast or slow speeds can cause a hazard to other traffic
 - b. Constantly check the instruments to ensure airspeed and altitude are as desired; make fine, controlled adjustments when necessary
 - c. At slow speeds, close to the ground airspeed control is very important
 - A stall within 1,000' AGL could be unrecoverable
 - iv. **CE** - Improper correction for wind drift
 - a. Keep the pattern a rectangle, crab into the wind as necessary
 - b. Use the heading bug or make a mental note of the wind direction from the ATIS/ASOS and adjust heading as necessary to correct for the wind
 - c. Use visual references
2. **Controlled Field**
 - A. The pilot receives, by radio, a clearance to approach/depart as well as pertinent information about the pattern
 - B. ATC will specify pattern entry and departure procedures (Where/how to enter and depart)
 - C. During the pattern the controller may make adjustments (speed, legs lengths, turns for spacing, etc.)

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- D. **CE** - Failure to comply with traffic pattern instructions, procedures, and rules
 - i. Know the rules and ensure you understand radio communications and instructions
 - a. If you're unsure ask!
 - ii. Learn to divide attention in the pattern between flying, collision avoidance, checklists, and communications

3. Uncontrolled Field

A. Communication

- i. There are 2 ways to communicate intentions and obtain airport/traffic info at an uncontrolled field
 - a. Communicating with an FSS providing advisories
 - The FSS provides wind info, runway in use, altimeter setting, known traffic, NOTAMs, etc.
 - a They are not a controller, the FSS just provides information for your use
 - Inbound aircraft should initiate contact approximately 10 miles out with altitude, aircraft type, and location
 - Departing aircraft should transmit their tail number, type of flight, destination, services desired, and anything else applicable
 - b. Self-announced broadcast on the CTAF (frequency is found in the A/FD and on sectionals)
 - Announce your position and intentions on the CTAF frequency
 - Monitor other aircraft calls on CTAF and coordinate actions as necessary to avoid hazards

B. Arriving

- i. Observe other aircraft already in the pattern and conform to the traffic pattern in use
 - a. If other aircraft are not in the pattern, use traffic indicators and wind direction to determine the runway in use
 - Look for L shaped indicators displayed with a segmented circle (the short part of the L shows the turn direction)
 - Check these indicators well above pattern altitude (500' – 1,000' above pattern altitude)
 - Pattern direction can also be determined in the A/FD and on sectional charts
- ii. Once pattern direction is determined, proceed to a point well clear of the pattern before descending
- iii. Enter the pattern in level flight, at pattern altitude, at a 45° angle to the downwind leg, abeam the runway midpoint
 - a. Entry while descending creates collision hazards and should be avoided
 - Since you cannot see below the cowling, you could unknowingly descend onto another aircraft in the pattern; always enter at pattern altitude and clear aggressively

C. Departing

- i. Monitor the radio for other traffic in the local area
- ii. Announce your intentions
- iii. Clear aggressively prior to takeoff and on departure
 - a. Radio communication is not required at an uncontrolled field

D. **CE** - Failure to comply with traffic pattern instructions, procedures, and rules

- i. Know the rules and ensure you understand radio communications
- ii. Learn to divide attention in the pattern between flying, collision avoidance, checklists, and communication
- iii. Clear aggressively, especially at uncontrolled airfields
- iv. Follow the procedures established and in use at uncontrolled fields

4. Orientation to the Runway

A. Know which runway is in use and remain oriented with the runway

- i. Plan to enter properly visualizing your position in relation to the runway on the heading indicator
- ii. Confirm the runway number with the heading indicator during all pattern legs

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- a. Downwind – reciprocal of the landing runway; Base - 90° off (in the direction of the pattern);
Final – Same as the runway number

5. Checklists

- A. Prior to entering/upon entering the pattern complete the Before-Landing Checklist
- B. Run through the checklist again on final to ensure everything is complete

6. Establishing Final Approach

- A. The base leg will be adjusted depending on wind conditions
 - i. The stronger the wind, the closer the base leg because the decreased groundspeed will shorten the approach
- B. The turn to final should be no closer than ¼ mile at an altitude appropriate for the glide slope selected
 - i. A 3° glide slope is normal; a 3° glide slope means we descend 300' every mile

7. Maintaining Proper Spacing

- A. In the pattern, you must observe other traffic and maintain separation (know where other aircraft are)
 - i. On downwind with another aircraft on final, delay the base turn until abeam/past the other aircraft
 - a. This should provide comfortable spacing at similar airspeeds
 - ii. Adjust upwind as necessary to accommodate aircraft on downwind
- B. At a controlled field, the controller may request/advise certain maneuvers to provide spacing
- C. YOU are responsible for seeing and avoiding whether at a controlled or uncontrolled field
- D. **CE** - Inadequate spacing from other traffic
 - i. Don't fly faster than an airplane in-front of you or turn too early following another plane
 - a. Wait until you are abeam the other aircraft before making your turn

8. Wind Shear and Wake Turbulence

- A. Wind Shear (WS)
 - i. Best method in dealing with wind shear is to avoid it (Don't fly in or near thunderstorms)
 - ii. If there is a possibility of WS, during the approach, use more power, a higher airspeed (as described in the POH), stay as high as feasible until necessary to land, and go-around at the first sign of an unexpected airspeed or pitch change
- B. Wake Turbulence
 - i. Landing: Land prior to a departing jet's takeoff point, and stay above and land beyond an arriving jet's touchdown point
 - ii. Takeoff: Takeoff prior to and stay above a departing jet's takeoff point, and takeoff after an arriving jet's touchdown point

Common Errors:

- Failure to comply with traffic pattern instructions, procedures, and rules
- Improper correction for wind drift
- Inadequate spacing from other traffic
- Poor altitude or airspeed control

Conclusion:

Brief review of the main points

Every flight begins and ends at an airport or other suitable landing area, making patterns very important.

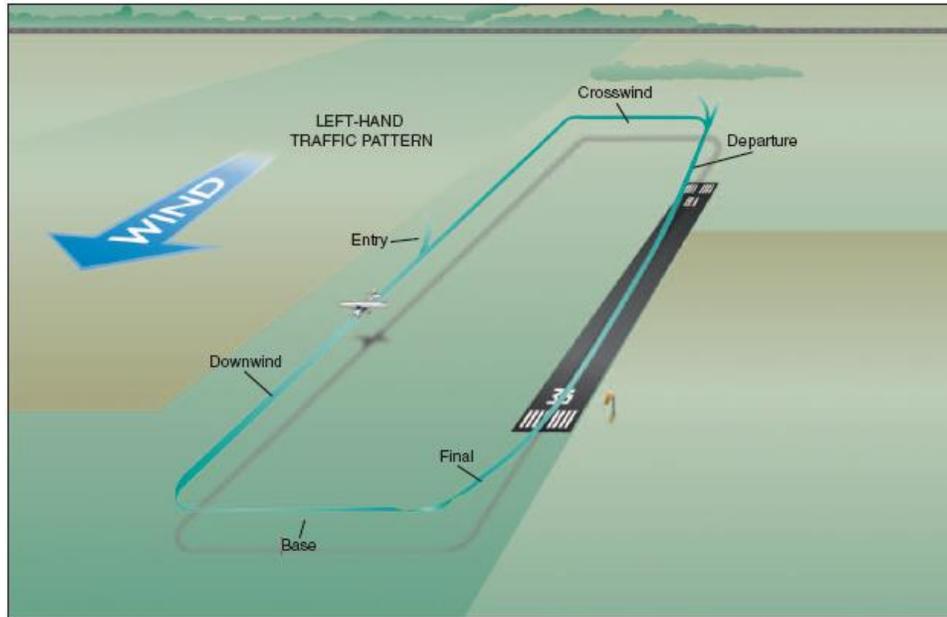
PTS Requirements:

To determine that the applicant:

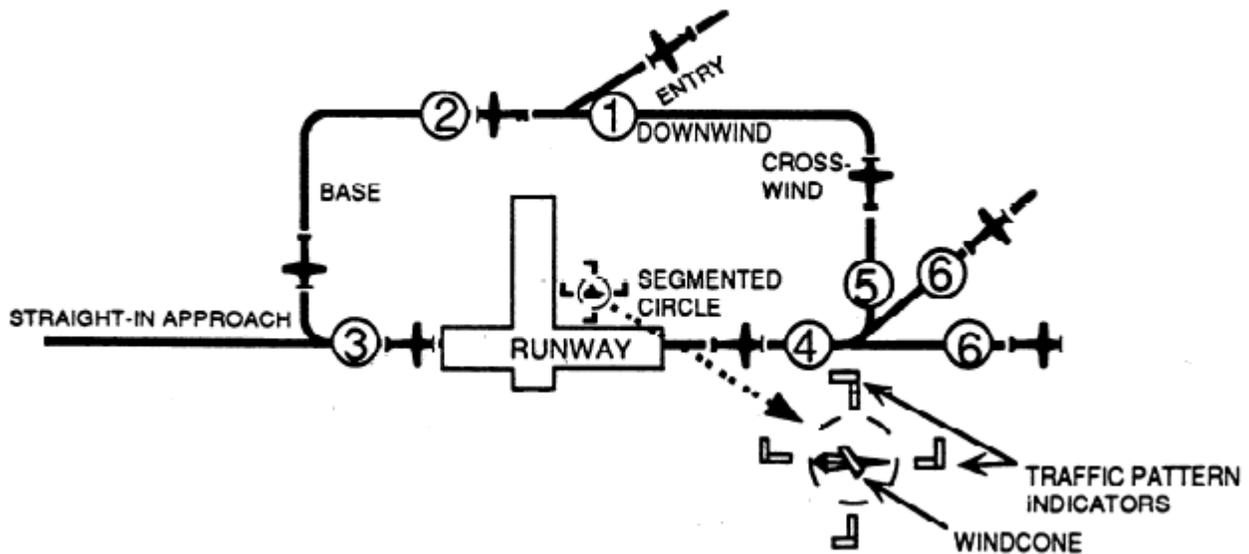
1. Exhibits instructional knowledge of the elements of traffic patterns by describing:
 - a. Operations at airports and seaplane bases with and without operating control towers.
 - b. Adherence to traffic pattern procedures, instructions, and rules.

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- c. How to maintain proper spacing from other traffic.
 - d. How to maintain the desired ground track.
 - e. Wind shear and wake turbulence avoidance procedures.
 - f. Orientation with the runway or landing area in use.
 - g. How to establish a final approach at an appropriate distance from the runway or landing area.
 - h. Use of checklist.
2. Exhibits instructional knowledge of common errors related to traffic patterns by describing:
 - a. Failure to comply with traffic pattern instructions, procedures, and rules.
 - b. Improper correction for wind drift.
 - c. Inadequate spacing from other traffic.
 - d. Poor altitude or airspeed control.
 3. Demonstrates and simultaneously explains traffic patterns from an instructional standpoint.
 4. Analyzes and corrects simulated common errors related to traffic patterns.



AIRPORT OPERATIONS



KEY

- ① Enter pattern in level flight, abeam the midpoint of the runway, at pattern altitude. (1000' AGL is recommended pattern altitude unless established otherwise).
- ② Maintain pattern altitude until abeam approach end of the landing runway, or downwind leg.
- ③ Complete turn to final at least 1/4 mile from the runway.
- ④ Continue straight ahead until beyond departure end of runway.
- ⑤ If remaining in the traffic pattern, commence turn to crosswind leg beyond the departure end of the runway, within 300 feet of pattern altitude.
- ⑥ If departing the traffic pattern, continue straight out, or exit with a 45° left turn beyond the departure end of the runway, after reaching pattern altitude.

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FACILITY AT AIRPORT	FREQUENCY USE	COMMUNICATION/BROADCAST PROCEDURES		
		OUTBOUND	INBOUND	PRACTICE INSTRUMENT APPROACH
UNICOM (No Tower or FSS)	Communicate with UNICOM station on published CTAF frequency (122.7, 122.8, 122.725, 122.975, or 123.0). If unable to contact UNICOM station, use self-announce procedures on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	
No Tower, FSS, or UNICOM	Self-announce on MULTICOM frequency 122.9	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	Departing final approach fix (name) or on final approach segment inbound.
No Tower in operation, FSS open	Communicate with FSS on CTAF frequency.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	Approach completed/terminated.
FSS closed (No Tower)	Self-announce on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	
Tower or FSS not in operation	Self-announce on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out. Entering downwind, base, and final. Leaving the runway.	