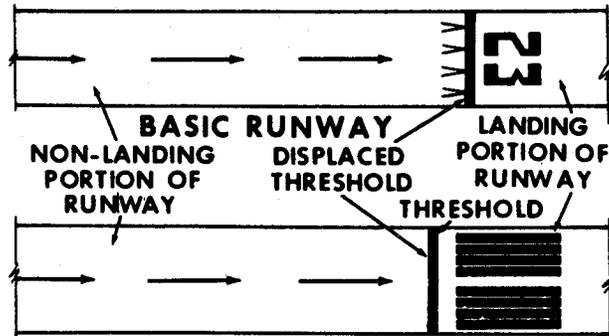


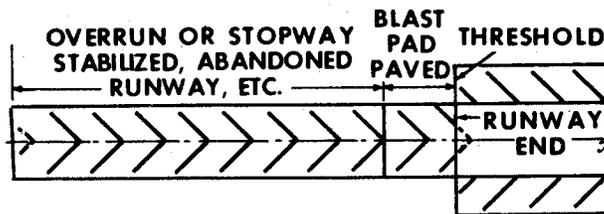
# Airports, Air Traffic Control, and Airspace (chapter's 6 & 7)

## RUNWAY MARKINGS

1. The number at the end of each runway indicates its magnetic alignment divided by 100; e.g., runway 26 indicates 260° magnetic; runway 9 indicates 090° magnetic.
2. A displaced threshold is a threshold (marked as a broad solid line across the runway) that is not at the beginning of the full strength runway pavement. The remainder of the runway, following the displaced threshold, is the landing portion of the runway.
  - a. The paved area before the displaced threshold (marked by arrows) is available for taxiing, the landing rollout, and takeoff of aircraft.



3. Chevrons mark any surface or area extending beyond the usable runway which appears usable but which, due to the nature of its structure, is unusable runway.
  - a. This area is not available for any use, not even taxiing.



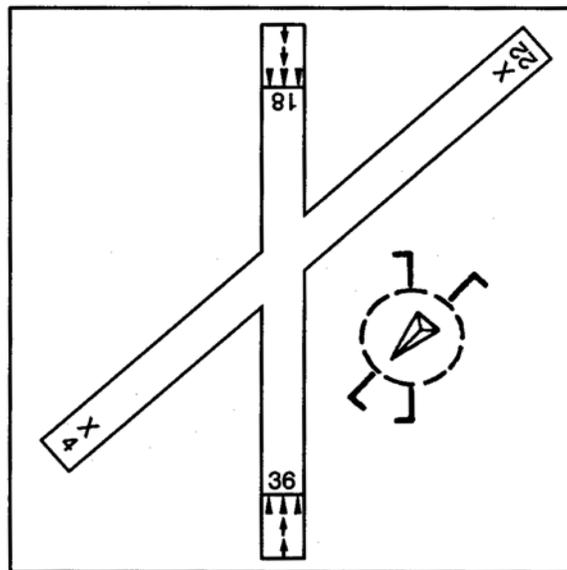
4. Closed runways are marked by an "X" on each runway end that is closed.

## BEACONS AND TAXIWAY LIGHTS

1. Operation of the green and white rotating beacon at an airport located in Class D airspace during the day indicates that the weather is not VFR, i.e.,
  - a. The visibility is less than 3 SM, or b. The ceiling is less than 1,000 ft.
2. A lighted heliport may be identified by a green, yellow, and white rotating beacon.
3. Military airports are indicated by beacons with two white flashes between each green flash.
4. Airport taxiways are lighted with blue edge lights.
5. To operate pilot-controlled lighting (PCL), you should first click the mike seven times, which turns everything on. For high-intensity lights, leave it alone. For medium-intensity lights, key it five times. For low-intensity lights, key it three times.

## AIRPORT TRAFFIC PATTERNS

1. The segmented circle system provides traffic pattern information at airports without operating control towers. It consists of the
  - a. Segmented circle --located in a position affording maximum visibility to pilots in the air and on the ground, and providing a centralized point for the other elements of the system
  - b. Landing strip indicators--showing the alignment of landing runways (legs sticking out of the segmented circle)
  - c. Traffic pattern indicators--indicators at right angles to the landing strip indicator showing the direction of turn from base to final
    - 1) In the example below, runways 22 and 36 use left traffic, while runways 4 and 18 use right traffic.
    - 2) The "X" indicates that runways 4 and 22 are closed.
    - 3) The area behind the displaced thresholds of runways 18 and 36 (marked by arrows) can be used for taxiing and takeoff, but not for landing.
  - d. Wind direction indicator--a wind cone, wind sock, or wind tee installed near the runways to indicate wind direction
    - 1) The large end of the wind cone/wind sock points into the wind as does the large end (cross bar) of the wind tree.



- e. Landing direction indicator--a tetrahedron on a swivel installed when conditions at the airport warrant its use. It is used to indicate the direction of takeoffs and landings. It should be located at the center of a segmented circle and may be lighted for night operations.
    - 1) The small end points toward the direction in which a takeoff or landing should be made; i.e., the small end points into the wind.
2. If there is no segmented circle installed at the airport, traffic pattern indicators may be installed on or near the end of the runway.

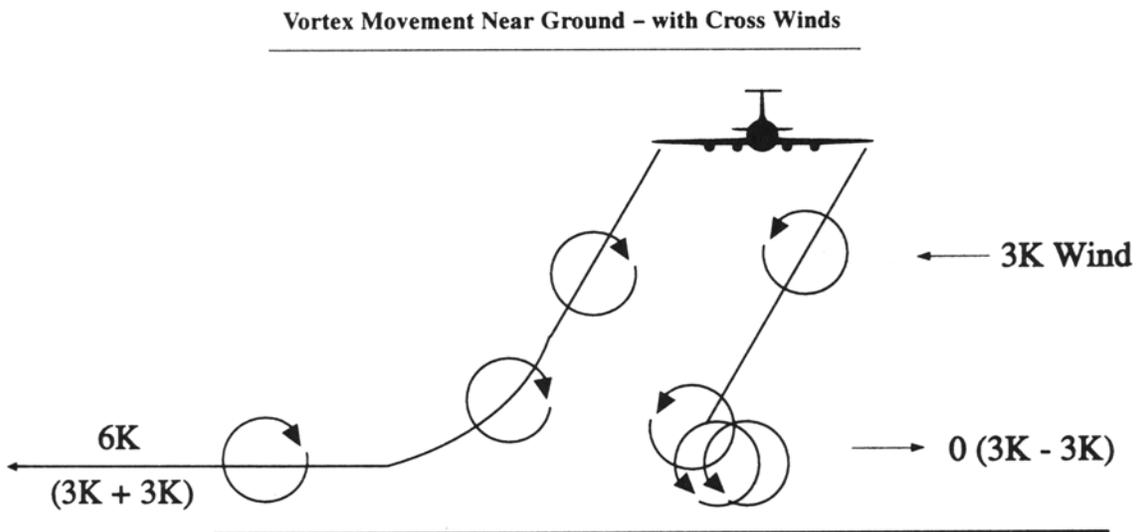
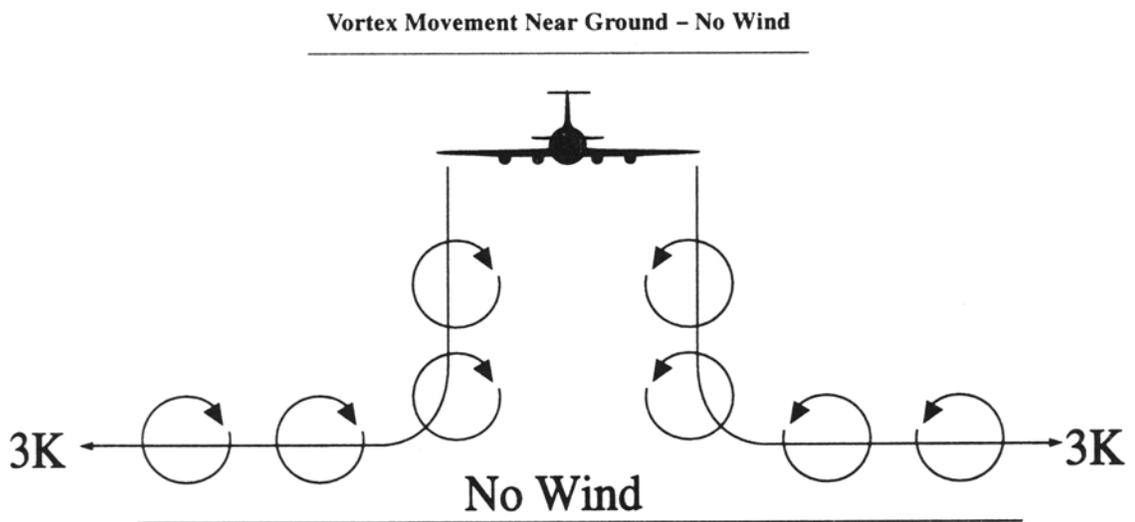
3. Remember, you land
  - a. In the same direction as the tip of the tetrahedron is pointing.
  - b. As if you were flying out of the large (open) end of the wind cone or
  - c. Toward the cross-bar end of a wind "T" (visualize the "T" as an airplane with no nose, with the top of the "T" being the wings).
4. If you are approaching an airport without an operating control tower,
  - a. You must turn to the left when landing unless visual displays advise otherwise.
  - b. You must comply with any FAA traffic pattern for that airport when departing.

### **VISUAL APPROACH SLOPE INDICATORS (VASI)**

1. Visual approach slope indicators (VASI) are a system of lights to provide visual descent information during an approach to landing.
2. The standard VASI consists of a two-barred tier of lights. You are
  - a. Below the glide path if both light bars are red, i.e., 'red means dead.'
  - b. On the glide path if the far (on top visually) lights are red and the near (on bottom visually) lights are white.
  - c. Above the glide path if both light bars are white.
3. Remember, red over white (i.e., R before W alphabetically) is the desired sequence.
  - a. White over red is impossible.
4. A tri-color VASI is a single light unit projecting three colors.
  - a. The below glide path indicator is red.
  - b. The above glide path indicator is amber.
  - c. The on glide path indicator is green.
5. VAS I only projects a glide path. It has no bearing on runway alignment.
6. On a precision approach path indicator (PAPI)
  - a. Low is four red lights (less than 2.5°).
  - b. Slightly low is one white and three reds (2.8°).
  - c. On glide path is two whites and two reds (3.0°)
  - d. Slightly high is three whites and one red (3.2°).
  - e. High is four whites (more than 3.5°).
7. On a pulsating approach slope indicator (a VASI with flashing/pulsating signals)
  - a. Low is a pulsating red.
  - b. On glide path is a steady white or alternating red/white (depending on model). c. High is a pulsating white.
8. Each pilot of an airplane approaching to land on a runway served by a visual approach slope indicator shall maintain an altitude at or above the glide slope until a lower altitude is necessary for landing (FAR 91.129).

## WAKE TURBULENCE

1. Wingtip vortices (wake turbulence) are only created when airplanes develop lift.
2. The greatest vortex strength occurs when the generating aircraft is heavy, clean, and slow.
3. Wingtip vortex turbulence tends to sink into the flight path of airplanes operating below the airplane generating the turbulence.
  - a. Thus, you should fly above the flight path of a large jet rather than below.
  - b. You should also fly upwind rather than downwind of the flight path, since the vortices will drift with the wind.
4. The most dangerous wind, when taking off or landing behind a heavy aircraft, is the light quartering tailwind. It will push the vortices into your touchdown zone, even if you are executing proper procedures.



## **COLLISION AVOIDANCE**

1. Navigation lights on the aircraft consist of a red light on the left wing, a green light on the right wing, and a white light on the tail. In night flight.
  - a. When an airplane is crossing in front of you from your right to left, you will observe a red light.
  - b. When an airplane is crossing in front of you from your left to right, you will observe a green light.
  - c. When an airplane is flying away from you, you will observe a steady white light.
  - d. When an airplane is approaching you head-on, you will observe a red and green light but no white light.
  - e. Note that the navigation lights on the wings cannot be seen from the rear.
2. A flashing red light on an aircraft is a rotating beacon and may be seen from any angle.
3. In daylight, the most effective way to scan for other aircraft is to use a series of short, regularly-spaced eye movements that bring successive areas of the sky into your central visual field.
  - a. Each movement should not exceed 10°, and each area should be observed for at least one second to enable detection.
  - b. Only a very small center area of the eye has the ability to send clear, sharply focused messages to the brain.
4. At night, collision avoidance scanning must use the off-center portions of the eyes. These portions are most effective at seeing objects at night.
  - a. Accordingly, peripheral vision should be used, scanning small sectors and using off- center viewing.
5. Any aircraft that appears to have no relative motion with respect to your aircraft and stays in one scan quadrant is likely to be on a collision course.
  - a. If it increases in size, you should take immediate evasive action.
6. Prior to each maneuver, a pilot should visually scan the entire area for collision avoidance.
  - a. When climbing or descending VFR on an airway, you should execute gentle banks left and right to facilitate scanning for other aircraft.
7. All pilots are responsible for collision avoidance when operating in an alert area.

## **ATIS AND GROUND CONTROL**

1. Automatic Terminal Information Service (ATIS) is a continuous broadcast of recorded noncontrol information in selected high activity terminal areas (i.e., busy airports).
  - a. The information is essential but routine.
2. The information included is the latest weather sequence, active runways, and other pertinent remarks.
  - a. Ceilings are usually not broadcast if they are above 5,000 ft., and visibility is usually not mentioned if it is more than 5 SM.
3. After landing, you should contact ground control only when so instructed by the tower. 4. A clearance to taxi to the active runway is a clearance to taxi via taxiways and across intersecting runways, but not onto the active runway.
  - a. When cleared to a runway, you are cleared to that runway's runup area, but not onto the active runway itself.
  - b. "Taxi into position and hold" is the instruction to taxi onto the active runway and prepare for takeoff, but not to take off.

## **CLASS D AIRSPACE AND AIRPORT ADVISORY AREA**

1. Class D airspace is an area of controlled airspace surrounding an airport with an operating control tower, not associated with Class B or Class C airspace areas.
  - a. Airspace at an airport with a part-time control tower is classified as Class D airspace only when the control tower is operating.
2. Class D airspace is depicted by a blue segmented (dashed) circle on a sectional chart.
3. When departing a non-tower satellite airport within Class D airspace, you must establish and maintain two-way radio communication with the primary airport's control tower.
  - a. The primary airport is the airport for which the Class D airspace is designated.
  - b. A satellite airport is any other airport within the Class D airspace area.
4. Class D airspace is normally the airspace up to 2,500 ft. above the surface of the airport.
  - a. The actual lateral dimensions of Class D airspace are based on the instrument procedures for which the controlled airspace is established.
5. Two-way radio communication with the control tower is required for landings and takeoffs at all tower-controlled airports, regardless of weather conditions.
6. Airport Advisory Areas exist at noncontrolled airports that have a Flight Service Station (FSS) physically located on that airport.
  - a. The FSS provides advisory (not control) information on traffic, weather, etc., to requesting aircraft.

## **CLASS C AIRSPACE**

1. Class C airspace consists of a surface area (formerly called the inner circle) and a shelf area (formerly called the outer circle).
  - a. The surface area has a 5-NM radius from the primary airport.
    - 1) Extending from the surface to 4,000 ft. above the airport elevation.
  - b. The shelf area is an area from 5 to 10 NM from the primary airport.
    - 1) Extending from 1,200 ft. to 4,000 ft. above the airport elevation.
2. Surrounding the Class C airspace is the outer area. The outer area is not classified as Class C airspace.
  - a. A TC provides the same radar services as provided in Class C airspace.
  - b. The normal radius of the outer area of Class C airspace is 20 NM from the primary airport.
3. The minimum equipment needed to operate in Class C airspace
  - a. 4096 code transponder,
  - b. Mode C (altitude encoding) capability, and
  - c. Two-way radio communication capability.
4. You must establish and maintain two-way radio communication with ATC prior to entering Class C airspace.
  - a. A clearance is not required because a clearance relates to IFR operations.
5. When departing from a satellite airport without an operating control tower, you must contact ATC as soon as practicable after takeoff.

## **TERMINAL RADAR PROGRAMS**

1. Terminal radar programs for VFR aircraft are classified as basic, TRSA, Class C, and Class B service.
  - a. Basic radar service provides traffic advisories and limited vectoring on a workload-permitting basis.
  - b. TRSA service (formerly Stage III service) provides sequencing and separation for all participating VFR aircraft operating within a Terminal Radar Service Area (TRSA).
2. Terminal radar program participation is voluntary for VFR traffic.
  - a. Contact approach control when inbound.
  - b. When departing, you should request radar traffic information (formerly Stage II terminal radar advisory service) from ground control on initial contact, along with your direction of flight.

## **TRANSPONDER CODES**

1. Code 1200 is the standard VFR transponder code.
2. The ident feature should not be engaged unless instructed by ATC.
3. Certain special codes should never be engaged (except in an emergency), as they may cause problems at ATC centers:
  - a. 7500 is the hijacking code.
  - b. 7600 is the lost radio communication code.
  - c. 7700 is the general emergency code.
  - d. 7777 is the military interceptor code.

## **RADIO PHRASEOLOGY**

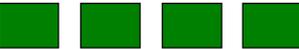
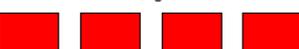
1. When contacting a flight service station the proper call sign is the name of the FSS followed by "radio" (e.g., McAlester Radio).
2. When contacting an En Route Flight Advisory Service (EFAS) the proper call sign is the name of the Air Route Traffic Control Center facility serving your area followed by "flight watch" (e.g., "Seattle Flight Watch").
3. Civilian aircraft should start their aircraft call sign with the make or model aircraft (e.g., Cessna 44WH or Baron 2DF).
  - a. When a make or model is used the initial letter is dropped from the call sign.
4. Pilots should state each digit of the call sign individually (e.g., 6449U = six, four, four, niner, uniform).
5. When calling out altitudes up to but not including 18,000 ft., state the separate digits of the thousands, plus the hundreds, if appropriate (e.g., 4,500 ft. = four thousand five hundred).
  - a. Unless otherwise noted the altitudes are MSL

## **ATC TRAFFIC ADVISORIES**

1. Radar traffic information services provide pilots with traffic advisories of nearby aircraft. 2. Traffic advisories provide information based on the position of other aircraft from your airplane in terms of clock direction in a no-wind condition (i.e., it is based on your ground track, not heading).
  - a. 12 o'clock is straight ahead.
  - b. 3 o'clock is directly off your right wing.
  - c. 6 o'clock is directly behind you.
  - d. 9 o'clock is directly off your left wing,
  - e. Other positions are described accordingly, e.g., 2 o'clock, 10 o'clock.
3. Traffic advisories usually also include
  - a. Distance away in miles
  - b. Direction of flight of other aircraft
  - c. Altitude of other aircraft

## ATC LIGHT SIGNALS

1. In the absence of radio communications, the tower can communicate with you by light signals.
2. Light signal meanings depend on whether you are on the ground or in the air.
3. Acknowledge light signals in the air by rocking wings in daylight and blinking lights at night.
4. If your radio fails and you wish to land at a tower-controlled airport, remain outside or above the airport's traffic pattern until the direction and flow of traffic has been determined, then join the traffic pattern and maintain visual contact with the tower to receive light signals.

IN FLIGHT	SIGNAL	ON THE GROUND
Cleared to Land	Steady Green 	Cleared for Take-off
Return for Landing (to be followed by steady Green)	Flashing Green 	Cleared to Taxi
Give Way to Other Aircraft and Continue Circling	Steady Red 	Stop
Airport Unsafe ..... Do Not Land	Flashing Red 	Taxi Clear of Active Runway
None	Flashing White 	Return to Starting Point on Airport
General Warning .... Exercise Extreme Caution	Red and Green 	General Warning .... Exercise Extreme Caution

## ELTs AND VHF/DF

1. EL Ts transmit simultaneously on 121.5 and 243.0 MHz.
  - a. You can monitor either frequency during flight and before shut down (after landing) to ensure your EL T has not been activated.
2. The VHF/Direction Finder facility is a ground operation that displays the magnetic direction of the airplane from the station each time the airplane transmits a signal to it.
3. In order to take advantage of VHF/DF radio reception for assistance in locating a position, an airplane must have both a VHF transmitter and a receiver. The transmitter and receiver are necessary to converse with a ground station having VHF/DF facilities.
  - a. The transmitter is also needed to send the signal that the Direction Finder identifies in terms of magnetic heading from the facility.