

The Ninety-Nines, Inc.,[®] International Organization of Women Pilots[®]

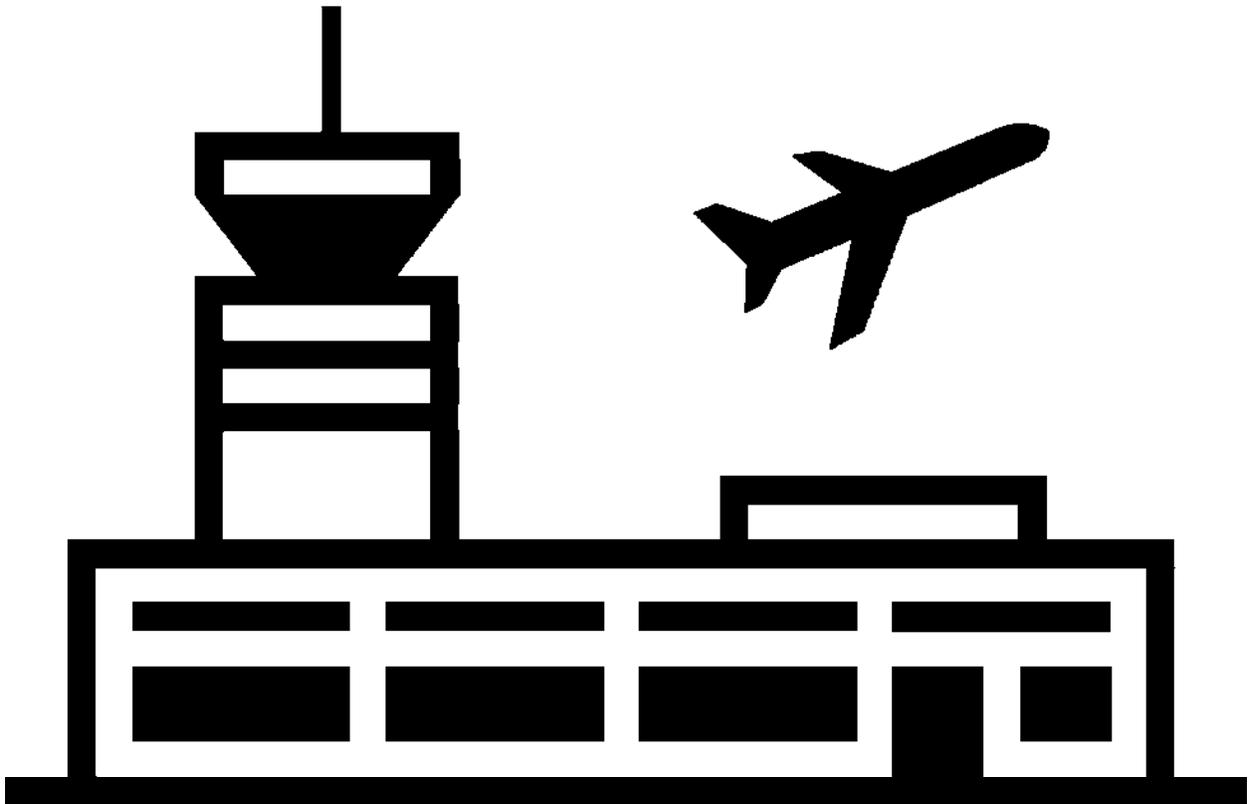
Aviation Adventure Guide

Module 6 - Airports & Airspace



Module 6

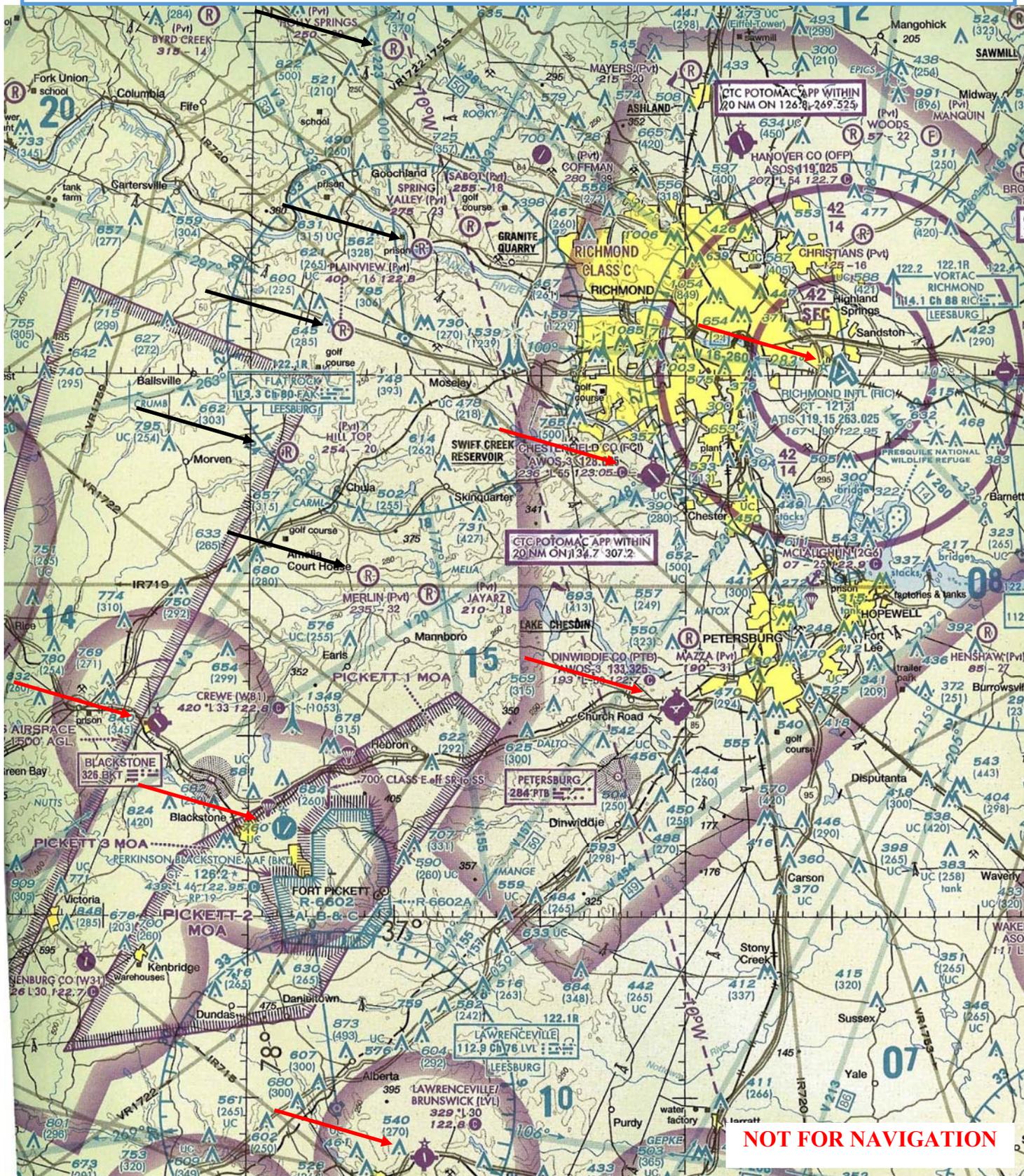
Airports & Airspace



Airspace: Surrounding each airport and all over the United States is designated airspace. There are a number of different classes of airspace, each with its own rules. We are not going to learn all of the rules for all of the airspace you will see, but you do need to be familiar with airspace - what it looks like on the sectional chart and some basic information about each type. The diagram below will help you remember some of the different classes of airspace, the chart symbols and some basic characteristics.

Name of airspace	Chart Symbol	Characteristics	Easy Memory Aid
Class A (Alpha)	NONE	The controlled airspace above 18,000' msl. is the high altitude area where all of the big airliners fly. You must be on a flight plan and you must talk to ATC en route.	A for Altitude
Class B (Bravo)	 Solid blue line	Class B is controlled airspace surrounding very big airports like Atlanta International. These airports have lots of air traffic and air traffic control (ATC, a control tower) with radar service.	B for Big
Class C (Charlie)	 Solid magenta line	This is the airspace around very crowded airports that are smaller than the Class B. There is air traffic control (ATC, a control tower) with radar service.	C for Crowded
Class D (Delta)	 Dashed blue line	This airspace has air traffic control (ATC, a control tower) that the pilot must talk to. There is less air traffic than the Class C airspace and ATC may or may not have radar.	D for Dialog
Class E (Echo)	 Dashed magenta  Hazy magenta  Hazy blue line	This airspace is all other controlled airspace not mentioned above. The dashed magenta line means the Class E airspace goes to the ground; hazy magenta means the Class E airspace starts 700' above the ground; hazy blue means the Class E airspace starts at 1200' or more above the ground and abuts Class G airspace.	E for Everything else
Class G (Golf)	NONE	This is uncontrolled airspace. Generally, this airspace is remote and/or close to the ground. Small, slower planes normally fly in this airspace. Pilots are not required to talk to ATC but they are required to see and avoid other airplanes.	G for "Go for it!"
Restricted or Prohibited	 Blue comb-like line	This is airspace which the pilot MUST NOT enter unless she is told to do so by ATC. Generally there is activity that could be hazardous to flight such as live gun firing or a cabled weather balloon.	NONE
MOA	 Magenta comb-like line	Alert area and military operation area. Pilots are permitted to fly in Alert areas and military operation areas but must use extreme caution and be on the lookout for high-speed military traffic and other aircraft traffic.	NONE
ADIZ	 Magenta line with dots	Air Defense Identification Zones surround the U.S. on the oceanic borders. Pilots must talk with ATC to get an aircraft identification code to return to the U.S. after going to another country.	NONE

Activity - Sectional Charts: Pilots navigate using sectional charts. Below is a sample sectional chart to be used as an example. Public airports are marked with red arrows. Private airports are marked with black arrows. (Note that the arrows are NOT part of the sectional chart but have been added so you can identify the airports easily. Can you find more airports? If so, mark the public airports with a red arrow and the private airports with a black arrow. HINT: Read about airports on the next page.



Airports: What comes to mind when you think of an airport? Is it that huge terminal building where all of the big jet airliners come to exchange passengers? While that is one kind of airport, there are many others. Look back at the segment of the sectional chart. There are nine blue and magenta circles representing **public** use airports where general aviation airplanes and some commercial jet liners can land. There are also seaplane bases and 18 small **private** airports, and that is just in one very small section of the United States. While most of us know about the big airports, it is the small airports where you will first learn to fly. We want to learn about these smaller airports.

Small airports are vital to many communities, especially the rural communities and other hard to reach places like the mountains or islands where there is insufficient space for a big jet airliner to land. As a pilot, you can land at any public use airport and be very close to the place and people that you really want to visit.

Activity - My Closest Airport: Get a local sectional chart or aviation planning chart and locate your community on the chart. Answer the following questions:

1. What is the closest GENERAL AVIATION AIRPORT to my community?
_____ Approximately how far is it from my house? _____ miles.
2. What is the closest COMMERCIAL airport to my community? _____
_____. How far is it from my house? _____ miles

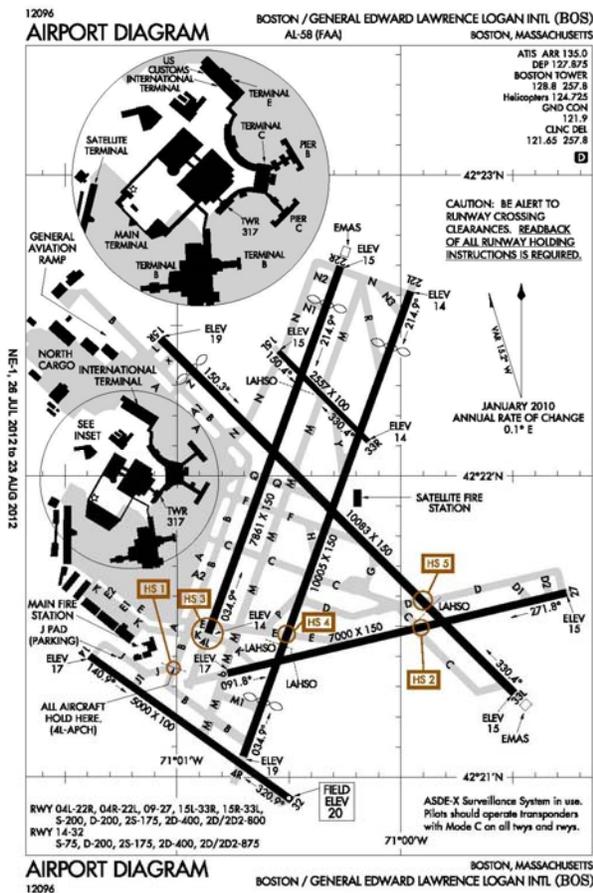
Airport Features: All airports have one thing in common: a **runway**. If an airplane is going to land at an airport, a runway will be there for it to land on. But not all runways are the same. Runways can be long or very short; they can have a hard surface like concrete or asphalt, or a surface of dirt, grass, gravel, snow, or water.

Some, but not all, airports have a **control tower**. The tower is the location for the air traffic controller (ATC) who can look out and see the airplanes on the ground and sometimes see them in the air as they are coming in for a landing. When there is a control tower, the pilots must communicate with ATC to get permission to taxi, take off and land. Communication is usually done by the radio but it can also be by light gun signals if the pilot has no radio.

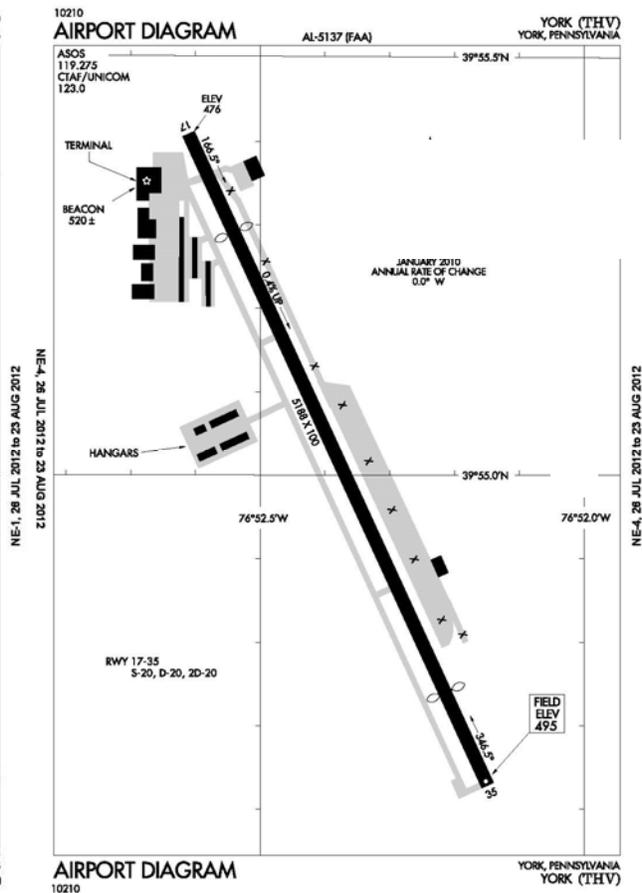
Airport Features Continued: Another thing that you find at an airport is a **wind sock:** a pole with a fabric sleeve that shows the direction the wind is blowing. At public airports there is a **rotating beacon** that comes on at night. The beacon flashes alternating green and white lights to indicate a public use airport. Beacons at military airports flash white, white, green. A white and yellow alternating light marks a lighted water airport.

Today, it is common to have an **automatic weather reporting station** at the airport. You will see these marked on the charts as AWOS (Automated Weather Observation System) or ASOS (Automated surface Observation System). Other common features are: a **terminal building** that can be a large multi-level building or as small as a single room; a **parking ramp** or **apron**; **hangars** where the airplanes park; businesses such as airplane mechanic, and a self **fueling station** where the pilots can pump fuel for their planes. Finally, airports most often have **taxiways**. There may be only one taxiway or multiple taxiways to serve multiple runways.

Take a look below and you will see two very different airport diagrams: one for a large airport and one for a small, general aviation airport.



Boston Logan International Airport

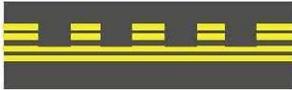
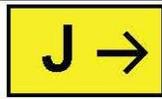


York Airport

Airport Signs: Imagine flying your airplane or a commercial jet liner to a new and different airport every day. It's just like arriving in an unfamiliar city by car. You are arriving at an unfamiliar airport and you will want to rely on the airport signs to direct you to a runway, taxiway and the parking area. Because people from all over the world use airports, a common code is used in airport signs. Thus people from different parts of the country and different parts of the world will readily recognize the signs. The **Federal Aviation Administration (FAA)**, the federal agency in charge of regulating airplanes, pilots and airports, has developed a chart to help pilots acquaint themselves with the airport signs and their meanings. Think back to learning to read a key or legend. This is very similar.

Signs can be either free standing or painted on the pavement. Note the colors of the signs on the chart. Generally, red background with white letters are mandatory instruction signs. Black background with yellow letters are location signs, which means "you are here". Runways are marked with numbers that correspond to the compass direction of that runway; taxiways are marked with letters. Yellow background with black letters are information/direction signs. Black background with a white number shows the distance remaining on the runway, telling pilots how much runway is left before the end.

Activity - Airport Signs: On the following page is the FAA chart about airport signs and their meanings. Use the chart to assist you in matching each sign below with its meaning. Place the letter of the sign in the box provided next to the meaning of the sign.

- | | | |
|--|---|---|
| 1. Mandatory instruction sign _____ | A |  |
| 2. Runway location sign _____ | B |  |
| 3. Informational sign _____ | C |  |
| 4. Holding position sign _____ | D |  |
| 5. Taxiway location sign _____ | E |  |
| 6. Directional sign to a taxiway _____ | F |  |

AIRPORT SIGN AND MARKING – QUICK REFERENCE GUIDE

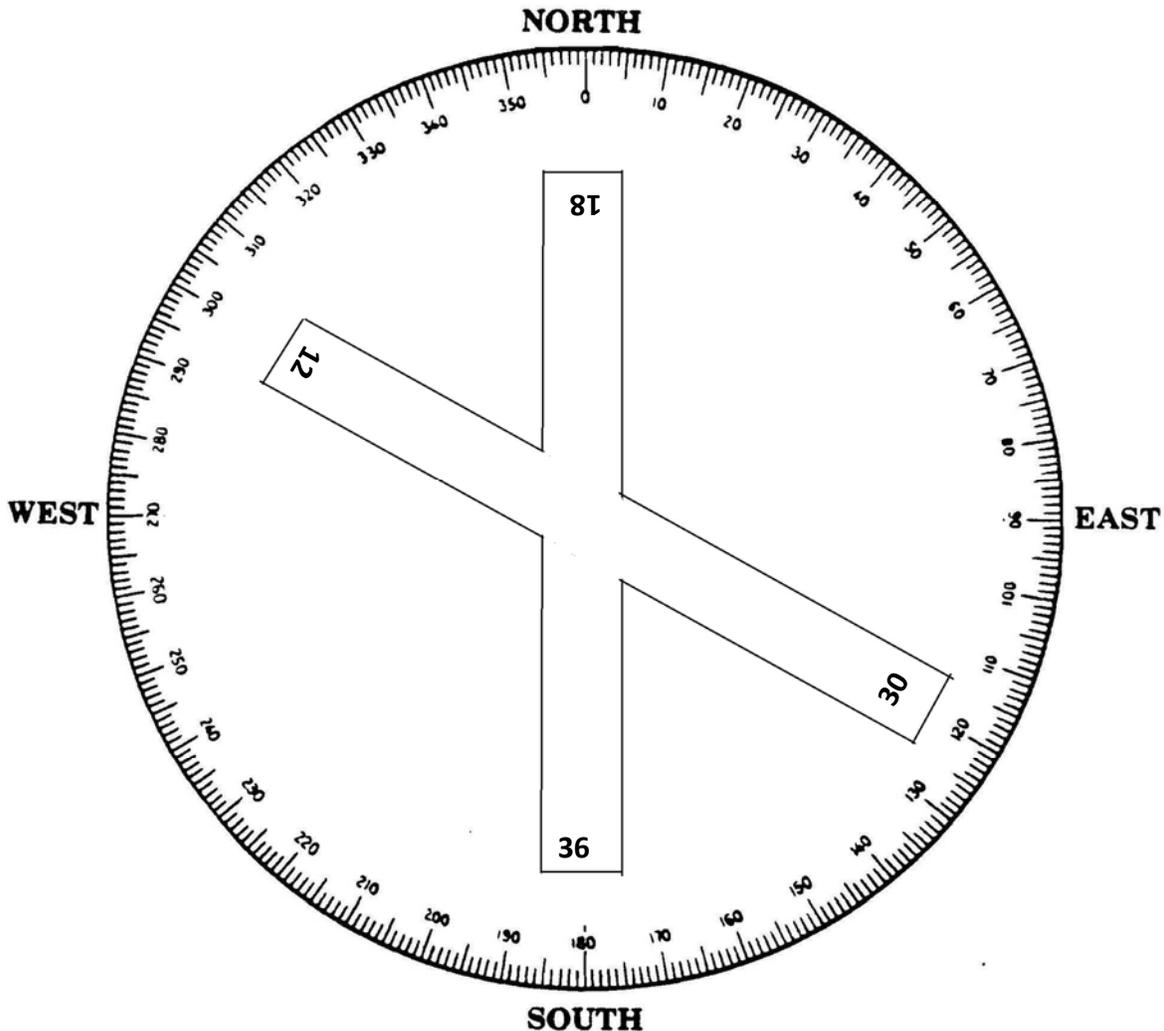
EXAMPLE	TYPE OF SIGN	PURPOSE	LOCATION/CONVENTION
	Mandatory: Hold position for taxiway/runway intersection.	Denotes entrance to runway from a taxiway.	Located <u>L side</u> of taxiway within 10 feet of hold position markings.
	Mandatory: Holding position for runway/runway intersection.	Denotes intersecting runway.	Located <u>L side</u> of rwy prior to intersection, & <u>R side</u> if rwy more than 150' wide, used as taxiway, or has "land & hold short" ops.
	Mandatory: Holding position for runway approach area.	Denotes area to be protected for aircraft approaching or departing a runway.	Located on taxiways crossing thru runway approach areas where an aircraft would enter an RSA or apch/ departure airspace.
	Mandatory: Holding position for ILS critical area/precision obstacle free zone.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Mandatory: No entry.	Denotes aircraft entry is prohibited.	Located on paved areas that <u>aircraft</u> should not enter.
	Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located along taxiway by itself, as part of an array of taxiway direction signs, or combined with a runway/taxiway hold sign.
	Runway Location.	Identifies the runway on which the aircraft is located.	Normally located where the <u>proximity of two rwys</u> to one another could cause confusion.
	Runway Safety Area / OFZ and Runway Approach Area Boundary.	Identifies exit boundary for an RSA / OFZ or rwy approach.	Located on taxiways on <u>back side</u> of certain runway/taxiway holding position signs or runway approach area signs.
	ILS Critical Area/POFZ Boundary.	Identifies ILS critical area exit boundary.	Located on taxiways on <u>back side</u> of ILS critical area signs.
	Direction: Taxiway.	Defines designation/direction of intersecting taxiway(s).	Located on <u>L side, prior to intersection</u> , with an array L to R in clockwise manner.
	Runway Exit.	Defines designation/direction of exit taxiways from the rwy.	Located on same side of runway as exit, prior to exit.
	Outbound Destination.	Defines directions to take-off runway(s).	Located on taxi routes to runway(s). <u>Never</u> collocated or combined with other signs.
	Inbound Destination.	Defines directions to airport destinations for arriving aircraft.	Located on taxi routes to airport destinations. <u>Never</u> collocated or combined with other types of signs.
	Information.	Provides procedural or other specialized information.	Located along taxi routes or aircraft parking/staging areas. May not be lighted.
	Taxiway Ending Marker.	Indicates taxiway does not continue beyond intersection.	Installed at taxiway end or far side of intersection, if visual cues are inadequate.
	Distance Remaining.	Distance remaining info for take-off/landing.	Located along the sides of runways at 1000' increments.
EXAMPLE	TYPE OF MARKING	PURPOSE	LOCATION/CONVENTION
	Holding Position.	Denotes entrance to runway from a taxiway.	Located across centerline within 10 feet of hold sign on taxiways and on certain runways.
	ILS Critical Area/POFZ Boundary.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Taxiway/Taxiway Holding Position.	Denotes location on taxiway or apron where aircraft hold short of another taxiway.	Used at ATCT airports where needed to hold traffic at a twy/twy intersection. Installed provides wing clearance.
	Non-Movement Area Boundary.	Delineates movement area under control of ATCT, from non-movement area.	Located on boundary between movement and non-movement area. Located to ensure wing clearance for taxiing aircraft.
	Taxiway Edge.	Defines edge of usable, full strength taxiway.	Located along twy edge where contiguous shoulder or other paved surface NOT intended for use by aircraft.
	Dashed Taxiway Edge.	Defines taxiway edge where adjoining pavement is usable.	Located along twy edge where contiguous paved surface or apron is intended for use by aircraft.
	Surface Painted Holding Position.	Denotes entrance to runway from a taxiway.	Supplements elevated holding position signs. Required where hold line exceeds 200'. Also useful at complex intersections.
	Enhanced Taxiway Centerline.	Provides visual cue to help identify location of hold position.	Taxiway centerlines are enhanced 150' prior to a runway holding position marking.
	Surface Painted Taxiway Direction.	Defines designation/direction of intersecting taxiway(s).	Located L side for turns to left. R side for turns to right. Installed prior to intersection.
	Surface Painted Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located R side. Can be installed on L side if combined with surface painted hold sign.

Ref. AC 150/5340-1J Standards for Airport Markings, and AC 150/5340-18D Standards for Airport Signs Systems



Federal Aviation Administration

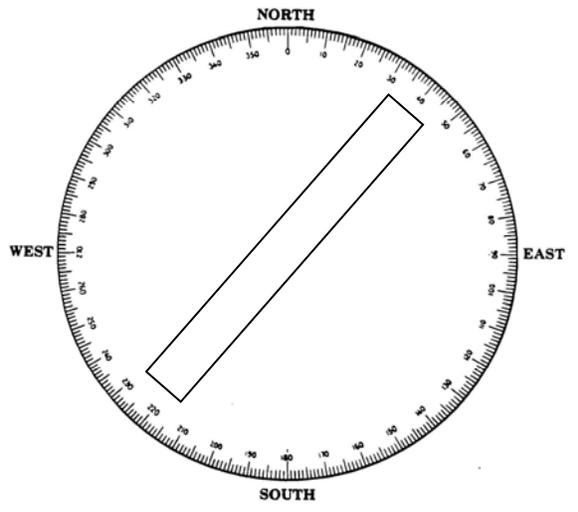
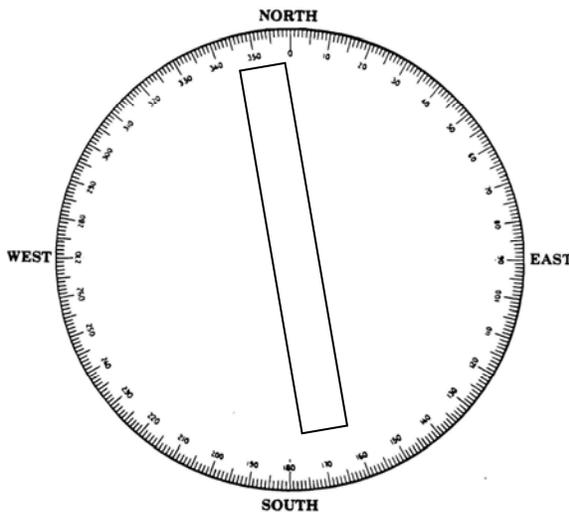
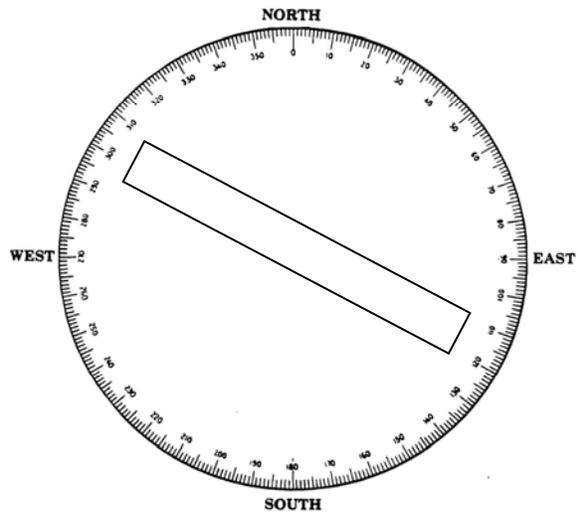
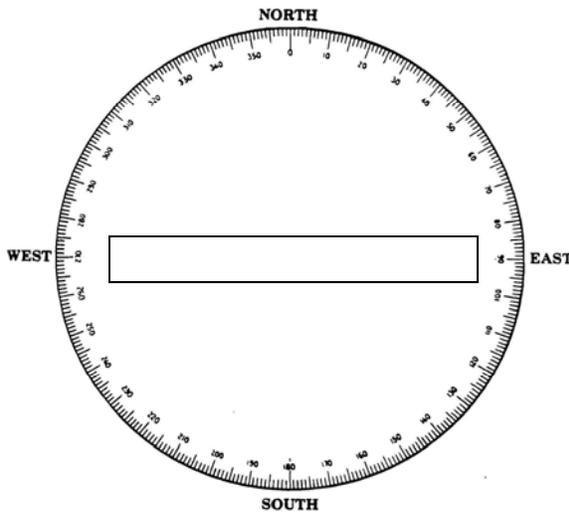
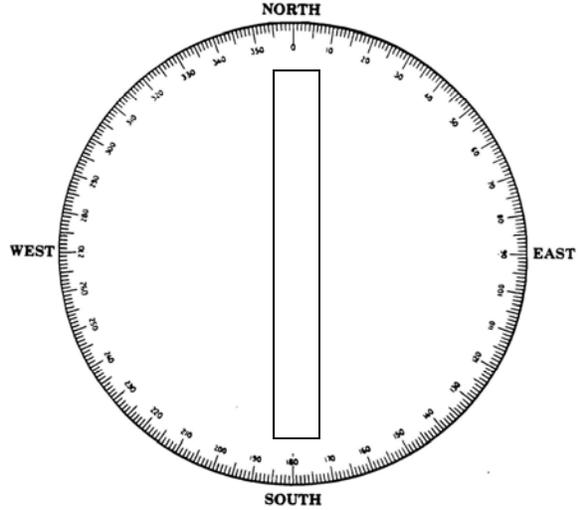
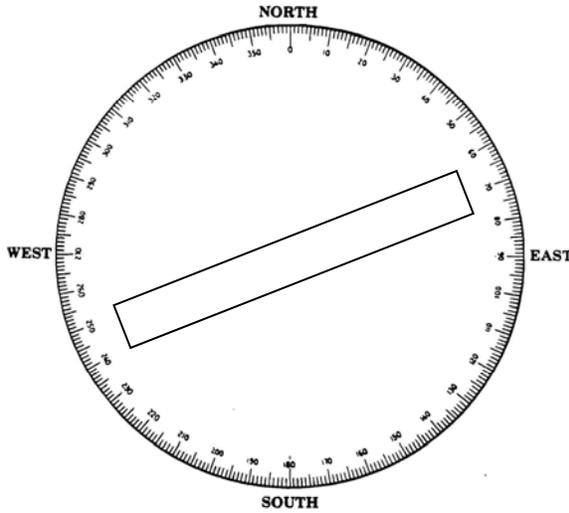
Runways: All runways have a name and that name is typically a number. The number, expressed in two digits, corresponds to the magnetic compass direction that the runway is facing. For example: if a runway is facing SE at 120° , the name of the runway would be 12. When a runway faces N, or 360° then runway name is 36. Note these examples on the diagram below.



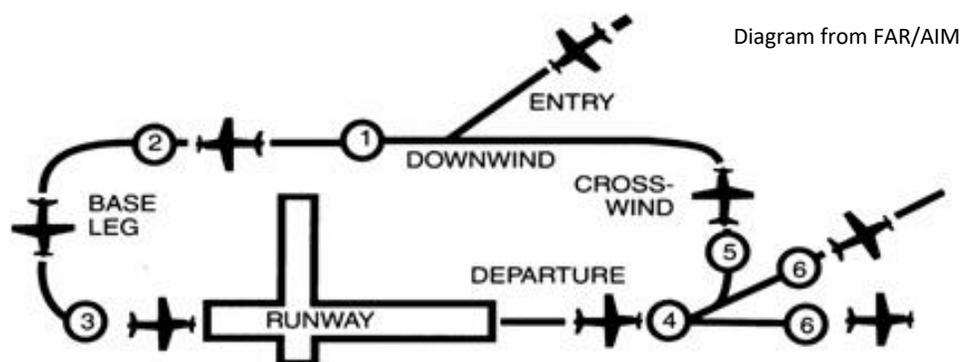
Runway orientation is very important to pilots. Always remember that the runway name will correspond to the heading on your compass in the direction that the nose of the airplane is pointed. Also remember that a compass has 360° , so a **reciprocal heading** (heading in the opposite direction) will be $+$ or $- 180^\circ$.

Refer back to the airport diagrams of Boston Logan and York. Can you see the names of the runways on the diagram? Note the actual magnetic heading of the runways and note that they are rounded to the nearest 10° to make naming easier.

Activity - Runways: Name all of the runways below by putting the number at each end of the runway. Remember that each runway has 2 ends and if you add or subtract 18, you will have the name of the runway at the other end!



Flying a Traffic Pattern: Unlike when you are driving a car, there are no roads to guide an airplane to the airport. An airplane can approach the airport from any direction and any altitude. If you can picture many airplanes converging on the same runway at the same time in a disorderly manner, you can see where there could be the possibility for an accident. It is for this reason that the FAA has developed a standard traffic pattern when approaching an airport to land. Look at the diagram below to see the components of a traffic pattern.



1. **Downwind leg.** A flight path parallel to the landing runway in the opposite direction of landing.
2. **Base leg.** A flight path perpendicular to the landing runway off its approach end and extending from the downwind leg to the intersection of the extended runway centerline.
3. **Final approach.** A flight path in the direction of landing along the extended runway centerline from the base leg to the runway.
4. **Upwind leg.** A flight path parallel to the landing runway in the direction of landing.
5. **Crosswind leg.** A flight path perpendicular to the landing runway off its takeoff end.
6. **Departure leg.** The flight path which begins after takeoff and continues straight ahead along the extended runway centerline. The departure climb continues until reaching a point at least 1/2 mile beyond the departure end of the runway and within 300 feet of the traffic pattern altitude.

Activity - Flying a Traffic Pattern: With a group of 5-6 study partners, pretend to be airplanes approaching an airport to land. Have one of the study partners act as ATC, calling out your tail number and giving directions on where to enter the pattern to land. Pilots: don't forget: you have to talk to ATC.

Activity - Airport Double Puzzle: Please write the word for each definition. Then, write the letters from the circled spaces in the lines below. Finally, unscramble the circled letters to form a phrase.

1. The roadway for airplanes leading to a runway _____
2. Person who directs airplanes at an airport _____
3. Night light at airport that helps pilots recognize airport location _____
4. A flight path starting after take off and taking the airplane away from the airport
_____ _____
5. Surface on which an airplane lands _____
6. A flight path at a right angle to the landing runway off the departure end
_____ _____
7. A building where airplanes can park inside _____ _____
8. The flight path in the direction of the landing runway
_____ _____
9. Building at an airport where passengers wait to board an airplane
_____ _____
10. Outside area where airplanes park _____ _____
11. A flight path at a right angle to the landing runway _____ _____
12. Leg in the pattern opposite to the direction of landing
_____ _____

WORD BANK:

APRON BASE LEG BEACON CONTROLLER CROSSWIND DEPARTURE
DOWNWIND FINAL APPROACH HANGAR PATTERN RUNWAY TAXIWAY
TERMINAL



Circled letters:

Arrange the letters above to form a two-word phrase.

Hint: This is something you are likely to see at a big airport.