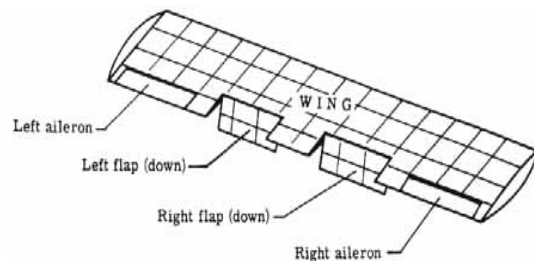
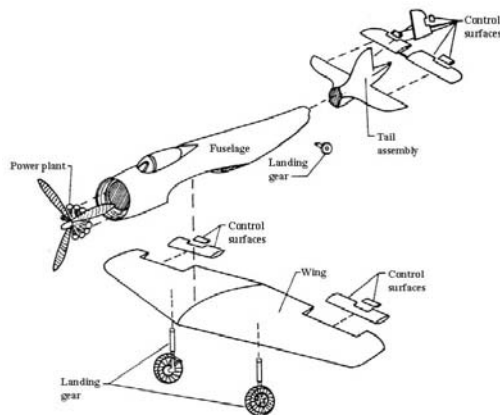


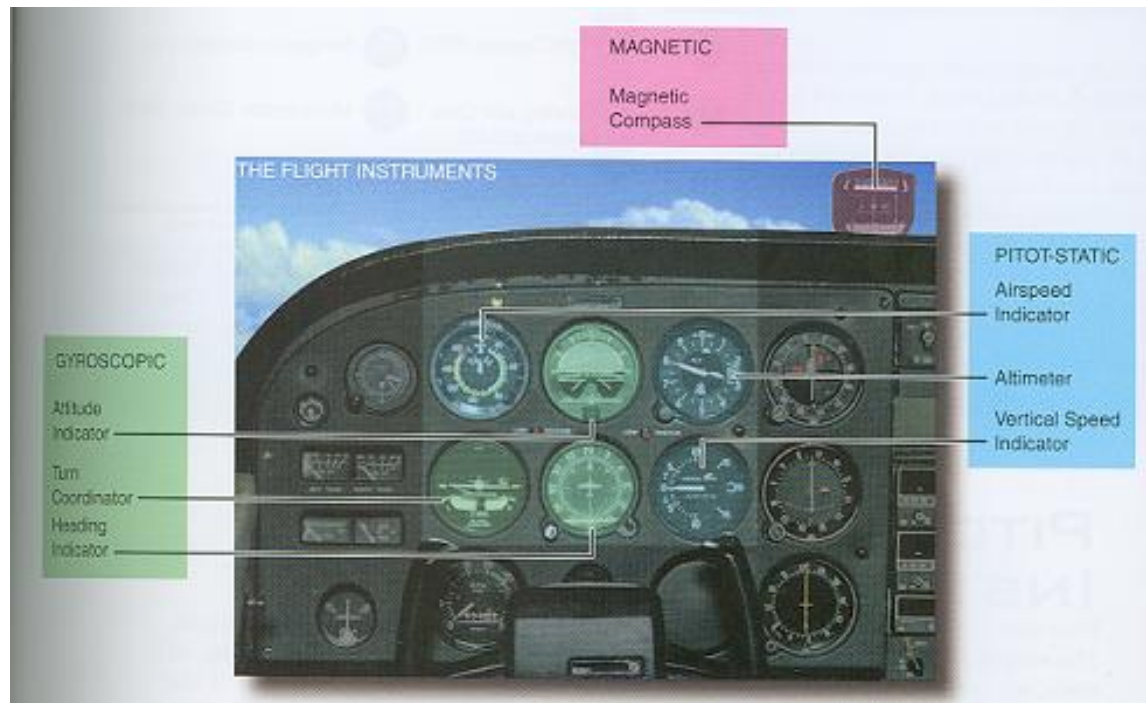
Airplane Basics

Airplane Components

1. **Fuselage** – the main body of the airplane housing the cabin, flight controls, and seats for occupants
2. **Wing** – attached to the fuselage and provides lift for the airplane
 - a. *aileron* – extends from about the midpoint of each wing outward toward the tip. This creates an aerodynamic force which turns the plane
 - b. *Flaps* – extends outwards from the fuselage towards the midpoint of the wing. Flaps increase the lifting force of the wing for takeoffs and landings and can increase or decrease the stall speed of an airplane; depending whether they are retracted or extended.
3. **Empennage** - the tail assembly of the plane. Usually consists of a vertical and horizontal stabilizer. These two surfaces act like the feathers on an arrow to steady the airplane and help maintain a straight flight path.
 - a. *Vertical stabilizer* controls the rudder of the airplane. The rudder determines yaw or the movement of the nose left or right of the plane
 - b. *Horizontal stabilizer* holds the elevator of the plane which is used to pitch the nose of an airplane up or down
4. **Landing Gear** – absorbs landing loads and supports the airplane on the ground
5. **Powerplant** – both the engine and propeller of the plane



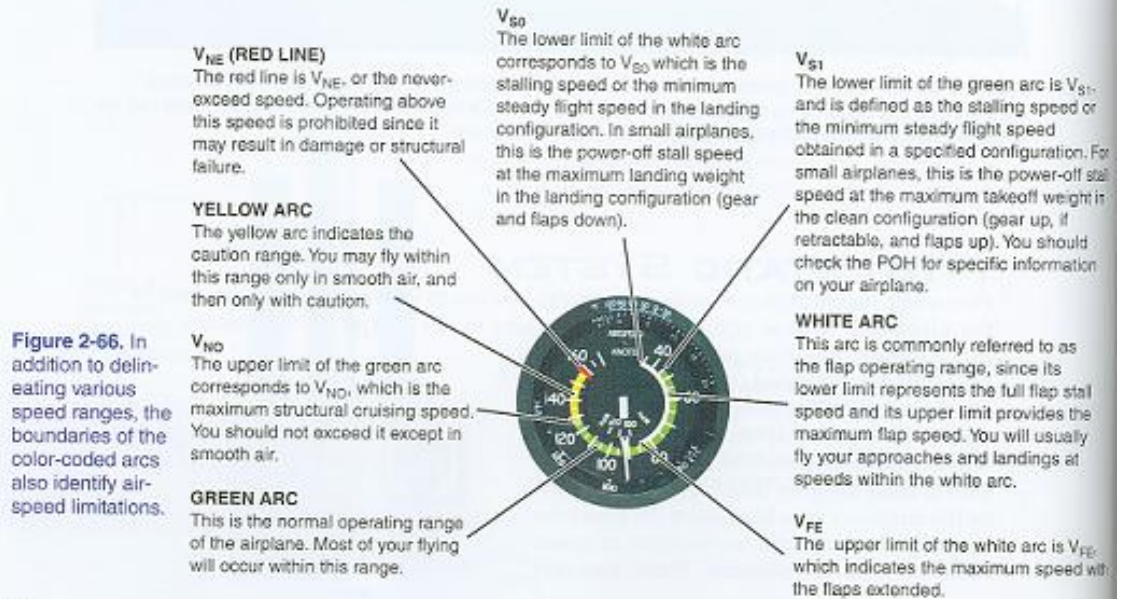
Basic Flight Instruments



How to read an Airspeed Indicator

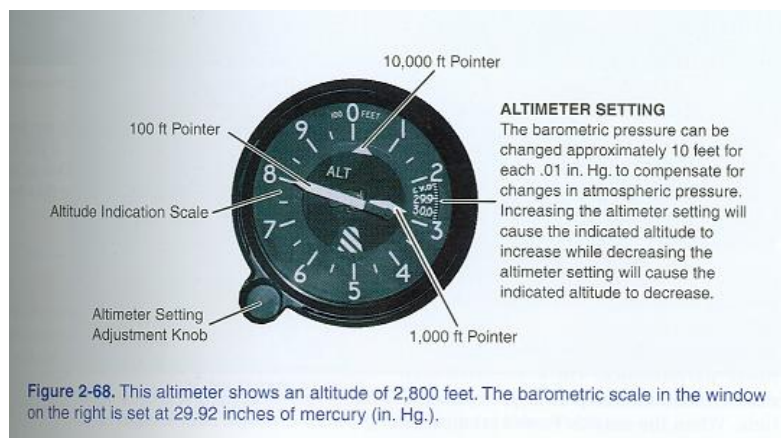
AIRSPEED INDICATOR

The airspeed indicator is the only instrument to operate using both pitot and static pressure. The speed of your airplane through the air is determined by comparing ram air pressure with static air pressure — the greater the differential, the greater the speed. The airspeed indicator is divided into color-coded arcs that define speed ranges for different phases of flight. The upper and lower limits of the colored arcs correspond to some airspeed limitations, called **V-speeds**. [Figure 2-66]



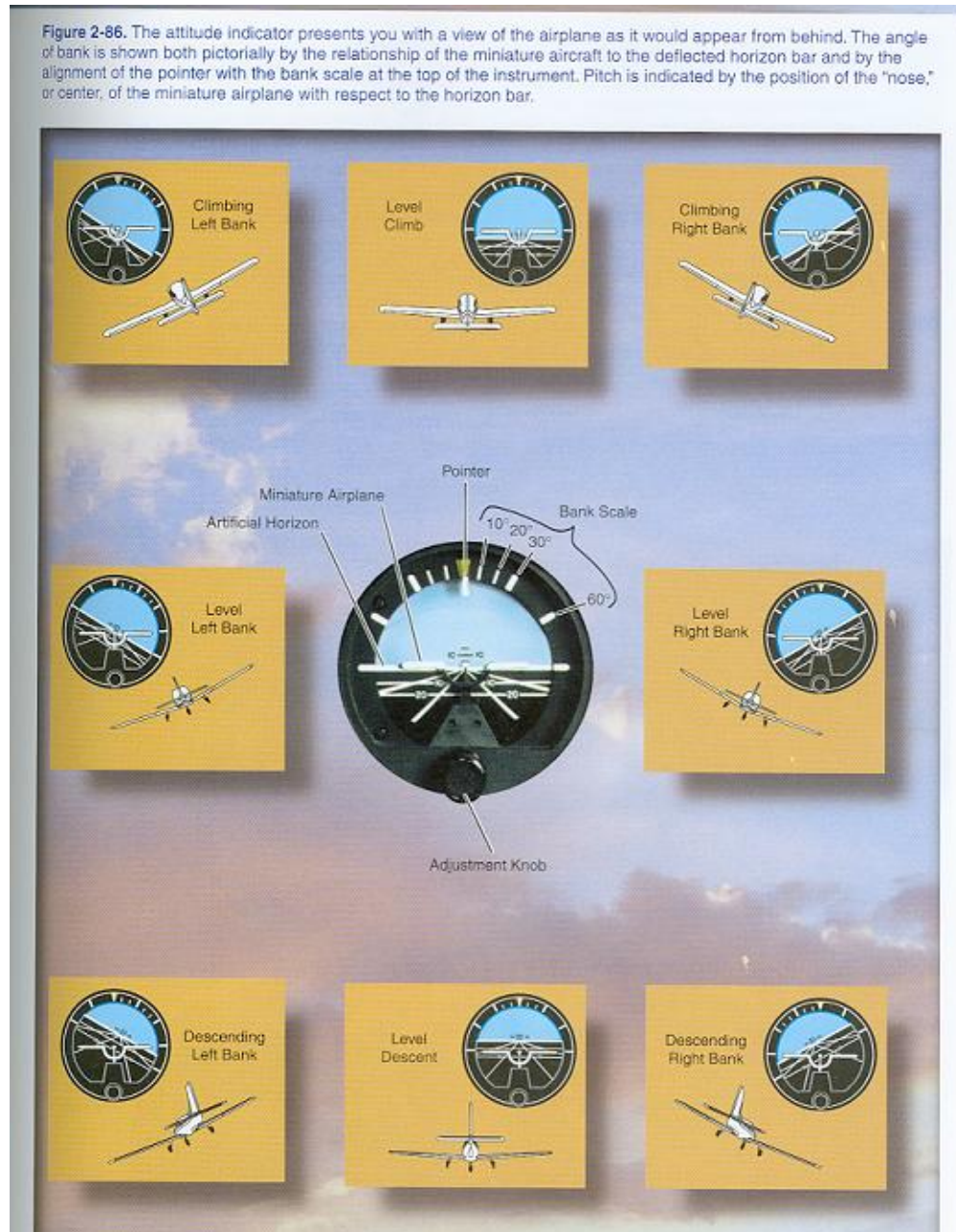
2-52

Altimeter – Provides the altitude of the airplane based on the height above the ground level (AGL) or true altitude can be determined based on the height of the plane above mean sea level (MSL).



Attitude Indicator

Figure 2-86. The attitude indicator presents you with a view of the airplane as it would appear from behind. The angle of bank is shown both pictorially by the relationship of the miniature aircraft to the deflected horizon bar and by the alignment of the pointer with the bank scale at the top of the instrument. Pitch is indicated by the position of the "nose," or center, of the miniature airplane with respect to the horizon bar.



Q & A

1. What is the relationship of lift, drag, thrust, and weight when the airplane is in straight and level flight?
 - a. Lift equals weight and thrust equals drag
 - b. Lift, drag, and weight equal thrust
 - c. Lift and weight equal thrust and drag
2. The term "angle of attack" is defined as the angle

- a. Between the wing chord line and the relative wind
 - b. Between the airplane's climb angle and the horizon
 - c. Formed by the longitudinal axis of the airplane and the chord line of the wing
3. Ground effect is most likely to result in which problem?
- a. Settling to the surface abruptly during landing
 - b. Becoming airborne before reaching recommended takeoff speed
 - c. Inability to get airborne even though airspeed is sufficient for normal takeoff needs
4. What is absolute altitude?
- a. The altitude read directly from the altimeter
 - b. The vertical distance of the aircraft above the surface
 - c. The altitude indicated when the barometric pressure scale is set to 29.92 in. Hg
5. The uncontrolled firing of the fuel/air charge in advance of normal spark ignition is known as:
- a. Combustion
 - b. Pre-ignition
 - c. Detonation
6. An Air Traffic Control (ATC) radar facility issues the following advisory to a pilot flying north in a calm wind: "Traffic 9 o'clock, 2 miles Southbound." Where should the pilot look for this traffic?
- a. South
 - b. North
 - c. West
7. What force makes an airplane turn?
- a. Centrifugal Force
 - b. The vertical component of lift
 - c. The horizontal component of lift

Answers:

1. A – When the airplane is in straight and level flight (assuming no change in airspeed), it is not accelerating, and therefore lift equals weight and thrust equals drag.
2. A – The angle of attack is the angle between the wing chord line and the direction of the relative wind. The wing chord line is a straight line from the

leading edge to the trailing of the wing. The relative wind is the direction of airflow relative to the wing when the wing is moving through the air.

3. B – Due to the reduction of induced drag in ground effect, the airplane may seem capable of becoming airborne well below the recommended takeoff speed. The tips of the airplanes wings generate a swirling motion that rotates inward toward the fuselage of the plane. This vortex can create a cushion of air beneath the wings creating a momentary additional amount of lift that can allow the plane to take off too early increasing the chances of a stall.
4. B – Absolute altitude is the altitude of the airplane above the surface (AGL)
5. B – Pre-ignition is the ignition of the fuel prior to normal ignition. This phenomenon usually occurs in only one or two of the four cylinders and is usually due to excessively hot exhaust valves, carbon particles, or spark plugs and electrodes that are heated to an incandescent.
6. C – Traffic at the 9 o'clock is off the left wingtip. The nose of the airplane is 12 o'clock, the tail is 6 o'clock, and the right wingtip is 3 o'clock.
7. C – When the wings of an airplane are not level, the lift is not entirely vertical and tends to pull the airplane toward the direction of the lower wing. An airplane is turned when the pilot coordinates rudder, aileron, and elevator to bank in order to attain a horizontal component of lift.

How to apply for flight/navigator school:

1. You must be a contracted cadet assigned to an AFROTC detachment
 - a. Taken and passed the AFOQT and meet the scores for pilot/nav
 - b. Take and pass the Physical Fitness Test
 - c. Complete an Air Force Commissioning physical
 - d. Meet all standards of conduct and guidelines laid out by the detachment

2. Once you are contracted, express your interest in being a pilot or navigator to the cadre members. Normally the process for applying for a flight or navigator slot is accomplished during the fall semester of your junior year.
 - a. Complete an Air Force Class I Physical for pilot or a Class I/A Physical for navigator
 - b. Complete the Air Force Battery Aptitude Test (BAT) – this is a one-time test that checks your short-term memory and hand/eye coordination.
 - c. Have all required paperwork completed and returned to the cadre for forwarding
 - d. Letter of recommendation from the detachment commander

Helpful Hints:

1) Be sure that you strong competitive grades. You are only required to have a 2.0 to be in AFROTC and a 2.5 to be contracted for scholarship. However, this is **NOT** a very competitive GPA. Always strive for your best in all of your classes and never settle for second best.

2) Taking some flight training on your own is very expensive but may be very helpful if applying for the flight program. The Air Force does take into consideration any previous flight training and therefore can be helpful with a flight application package.

3) Joining the Civil Air Patrol (CAP) may also be a great way to get some flight experience and may be helpful with a packet. The hours flown while in CAP do NOT count for any flight training hours but it does help to have it on the packet. If interested in CAP, you may speak with any cadre member on how to join. It does require a \$15 fee per year to join.