



# AVIATION MERIT BADGE

Troop 81

Darby Thompson

24 Nov 14



# Administrative Paperwork

- Merit Badge Worksheet

Knowledge requirements    Nov. 24th

Participation requirement    Dec. 6<sup>th</sup>

**\*\*Must turn the Merit Badge Worksheet in to receive Merit Badge Create & compete airport tour and flight.**

Scouts that did not attend Yorktown will also need to build a glider on the 6<sup>th</sup>.



Alaska, July  
2007 - Piper Cub



# Define “Aircraft”

- “a weight-carrying structure for navigation of the air that is supported either by its own buoyancy or by the dynamic action of the air against its surfaces.” – **Websters**
- “a device that is used or intended to be used for flight in the air.” - **FAA**





# Types of Aircraft

- Lighter-than-air
- Glider
- Airplane
- Rotorcraft
- Powered-lift



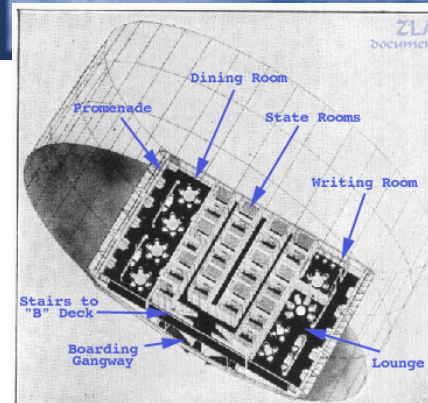
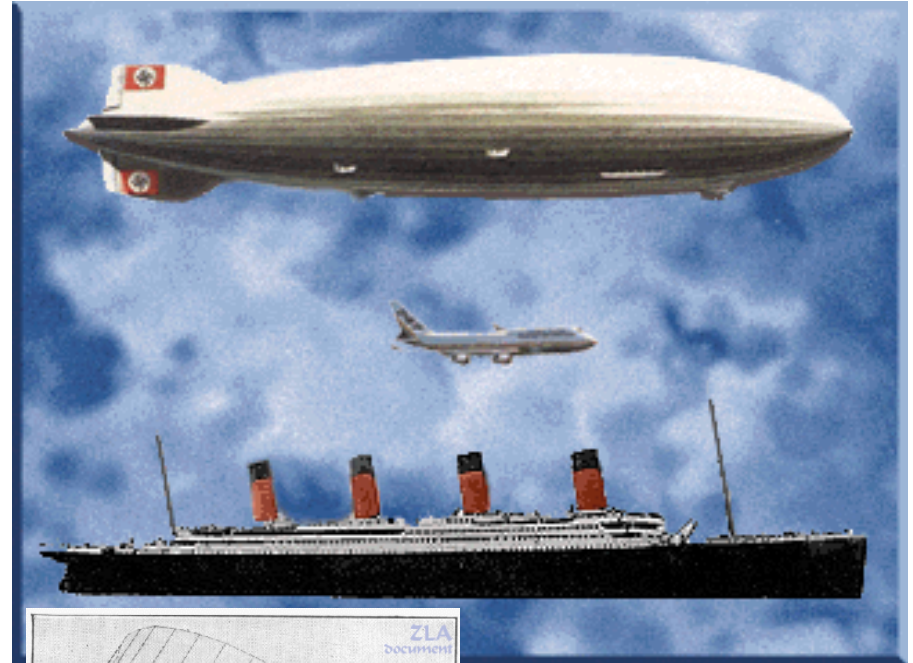


# Lighter-than-Air

## “Balloons and Airships”



The National Eagle Scout Association and Order of the Arrow hot air balloons at the 2001 National Boy Scout Jamboree



Graf Zeppelin compared to a Boeing 747 and the HMS Titanic

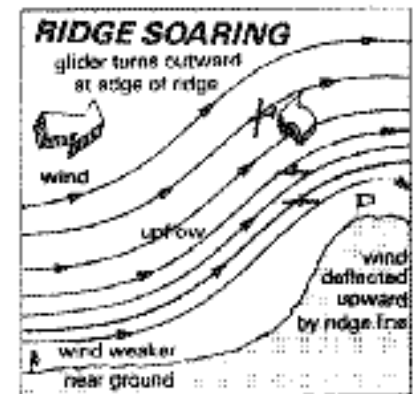
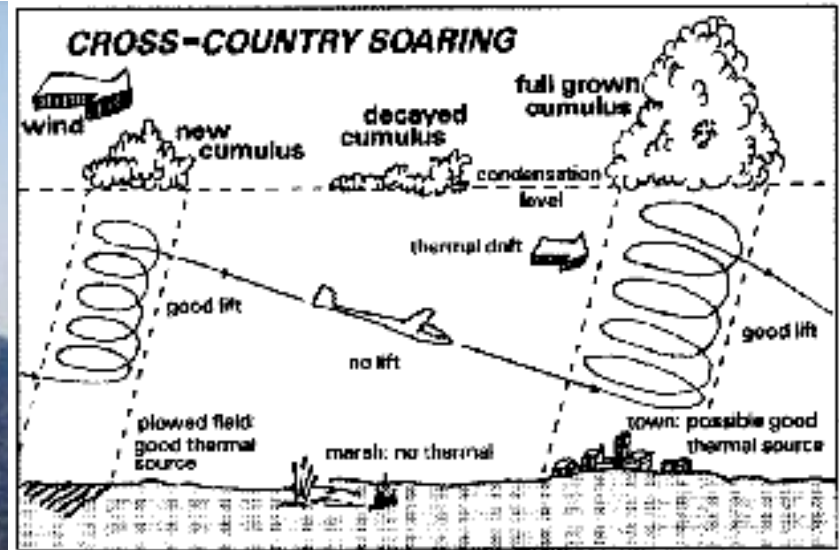


# Glider

## “Sailplanes”



Sailplane over Tennessee







# Airplanes

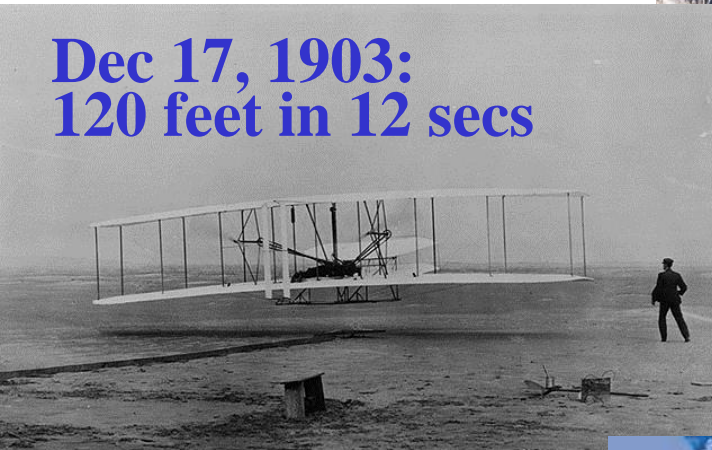
**Predator, USAF**



**SR-71, USAF**



**Dec 17, 1903:  
120 feet in 12 secs**



**Caravan Amphibian,  
Cessna**



**Sky Hawk, Cessna**



**B-2, USAF**







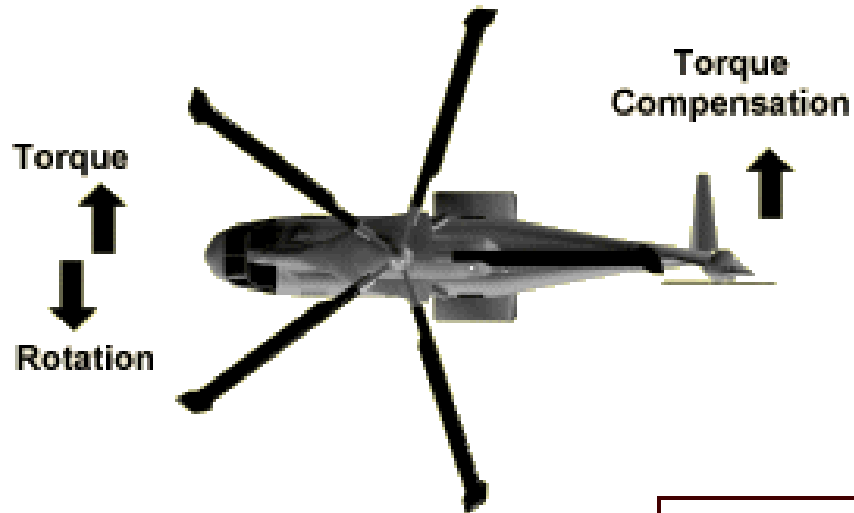
# Rotorcraft

## “Helicopters and Gyroplanes”





# How Helicopters Fly ??





# Powered-Lift

## “V-22”





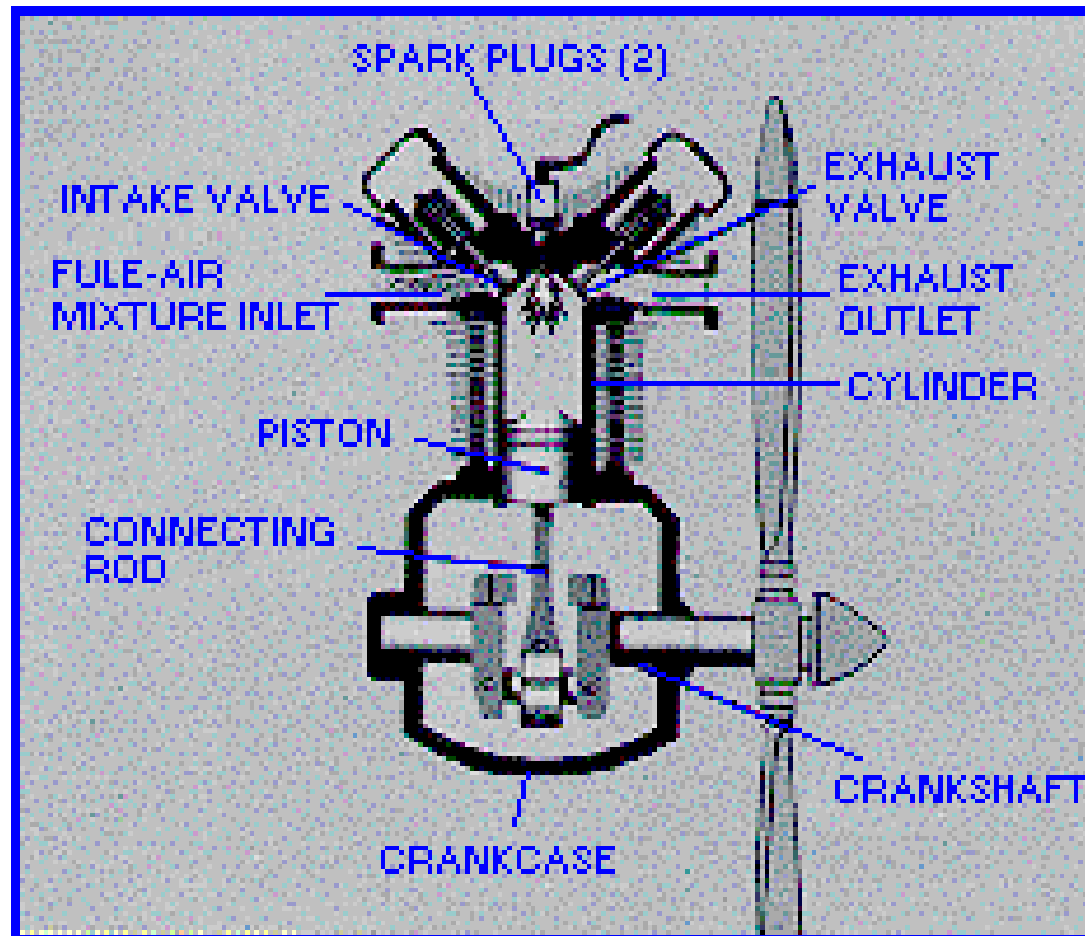


# Engines

- Piston
- Turboprop
- Jet Engines

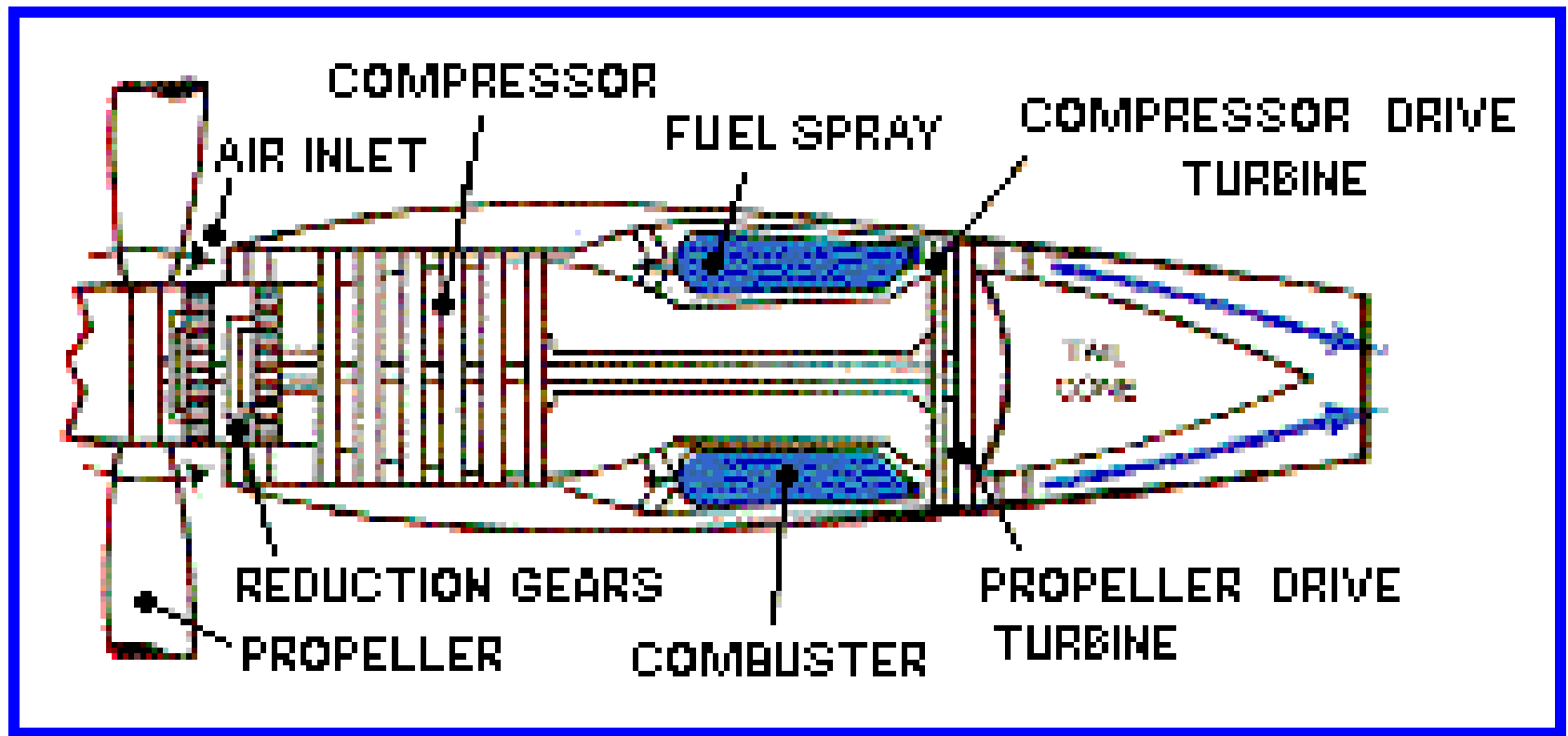


# Piston Engine





# Turboprop Engine







# Jet Engine

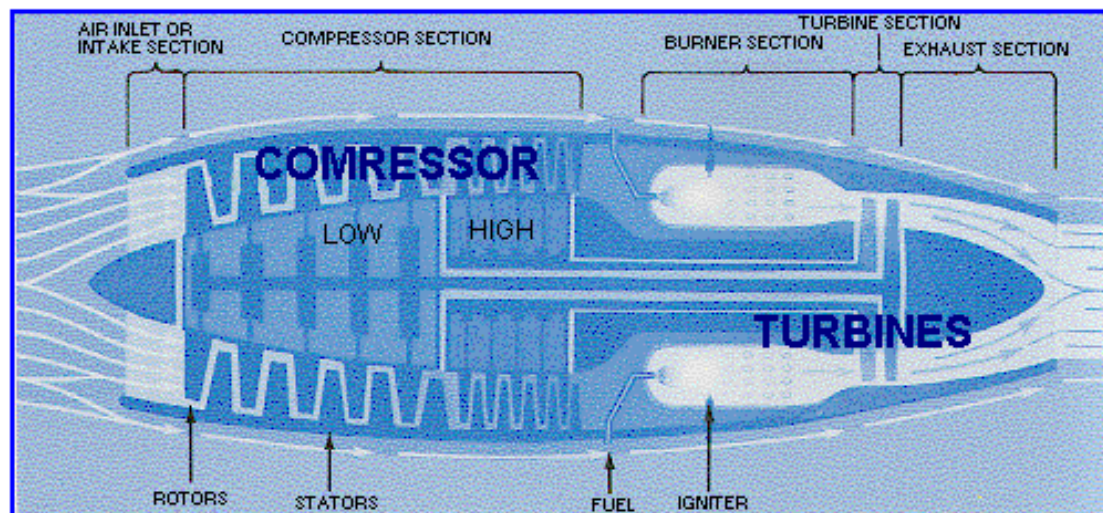


Figure 6-7 Simplified view of a turbojet engine.

**Turbojet Engine**

**Turbofan Engine**

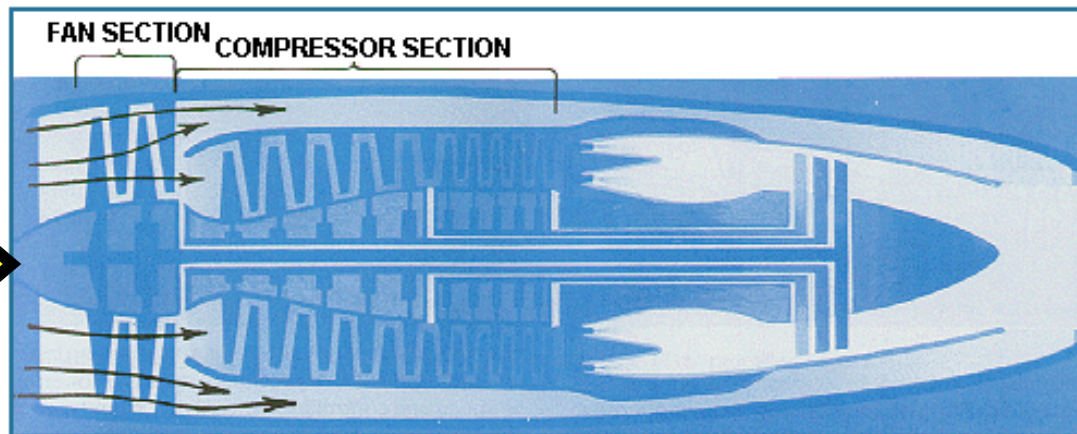
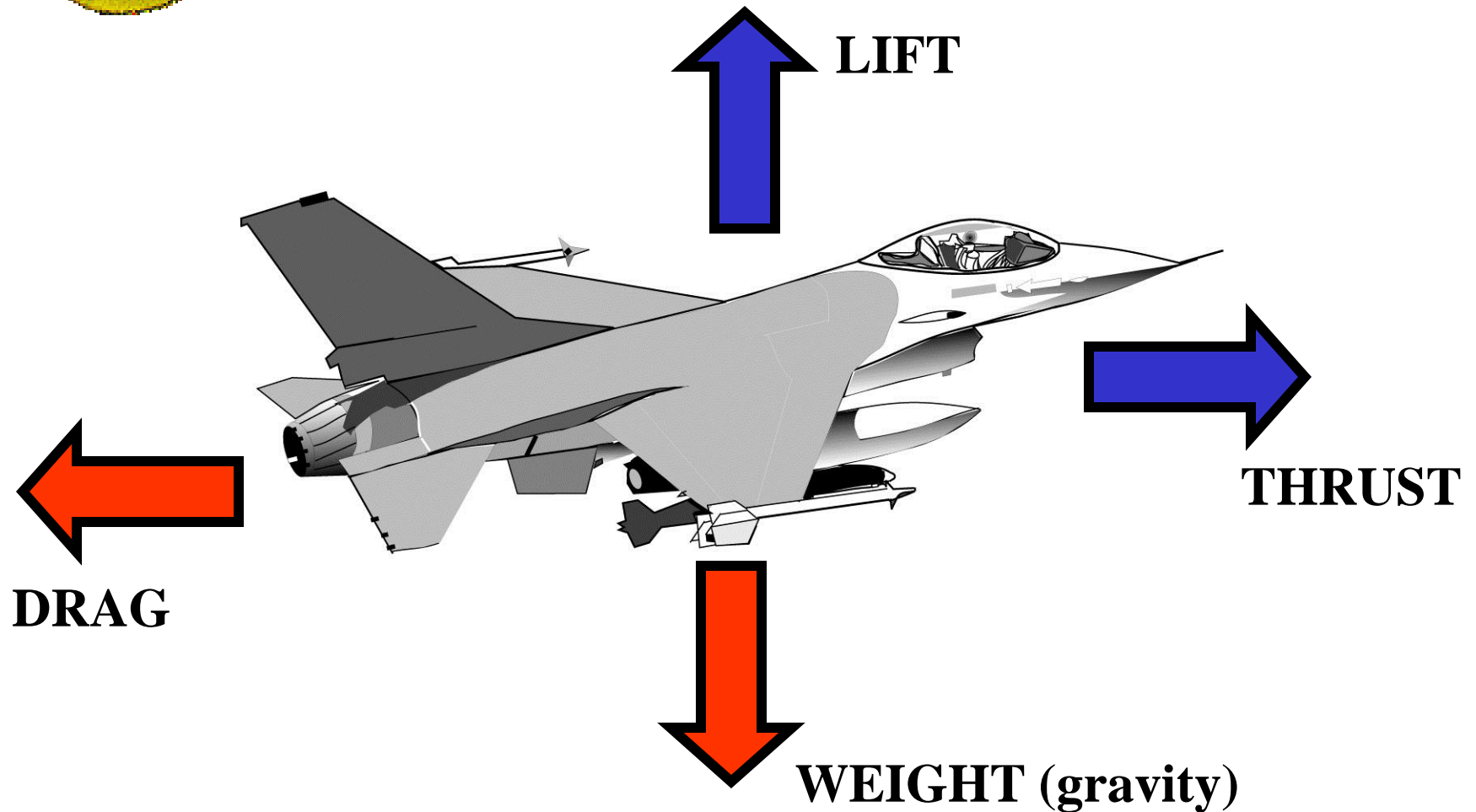


Figure 6-8 Turbofan engine.



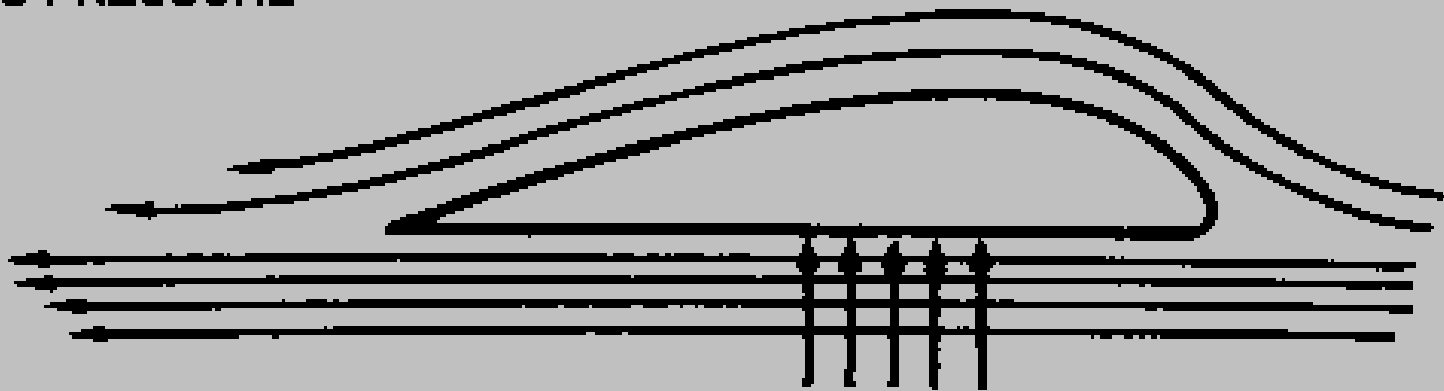
# Forces Acting on Aircraft





# How an Airfoil Works ?

FASTER MOVING AIR ...  
... LESS PRESSURE



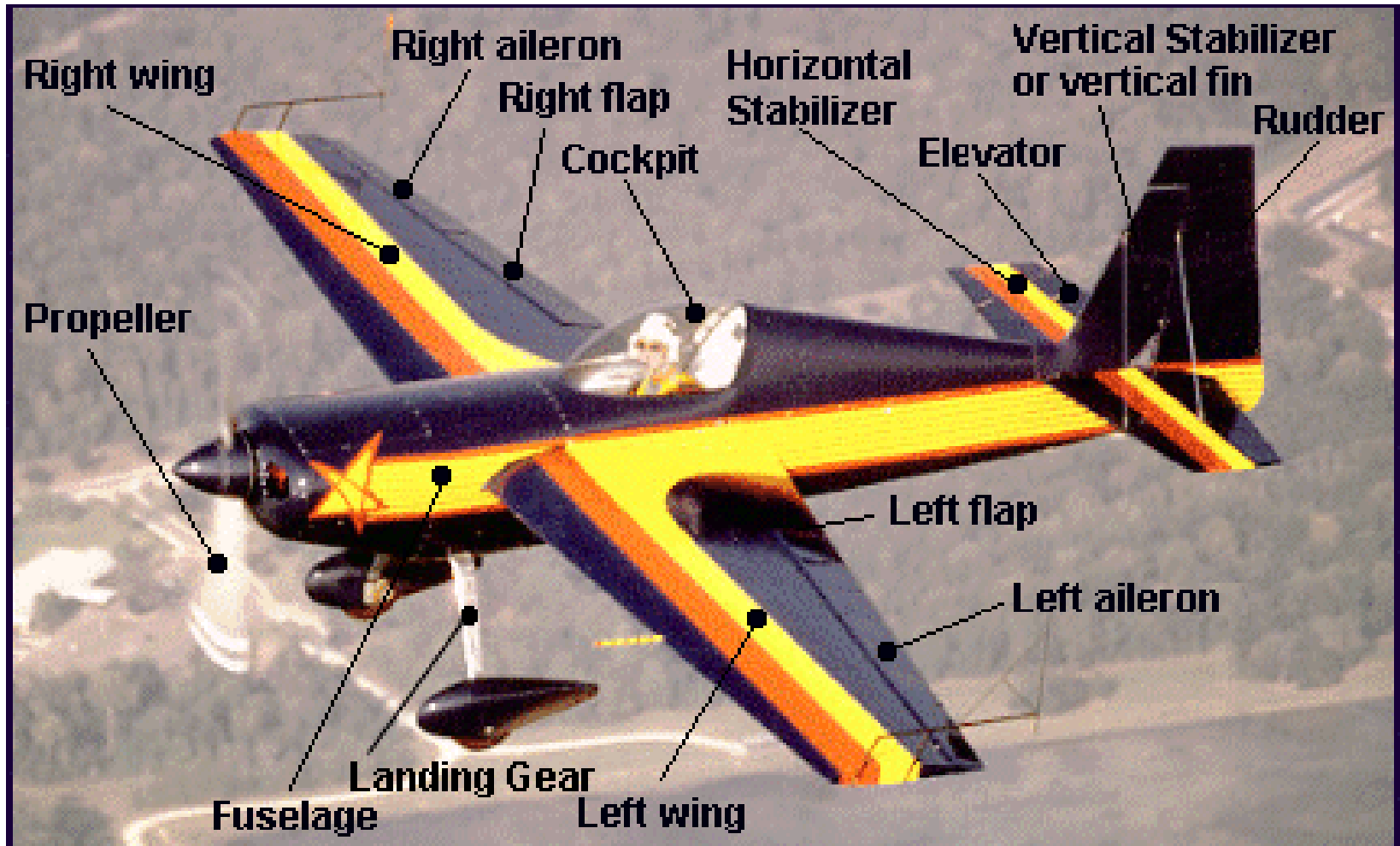
SLOWER MOVING AIR ..... MORE PRESSURE

**Bernoulli's Principle**





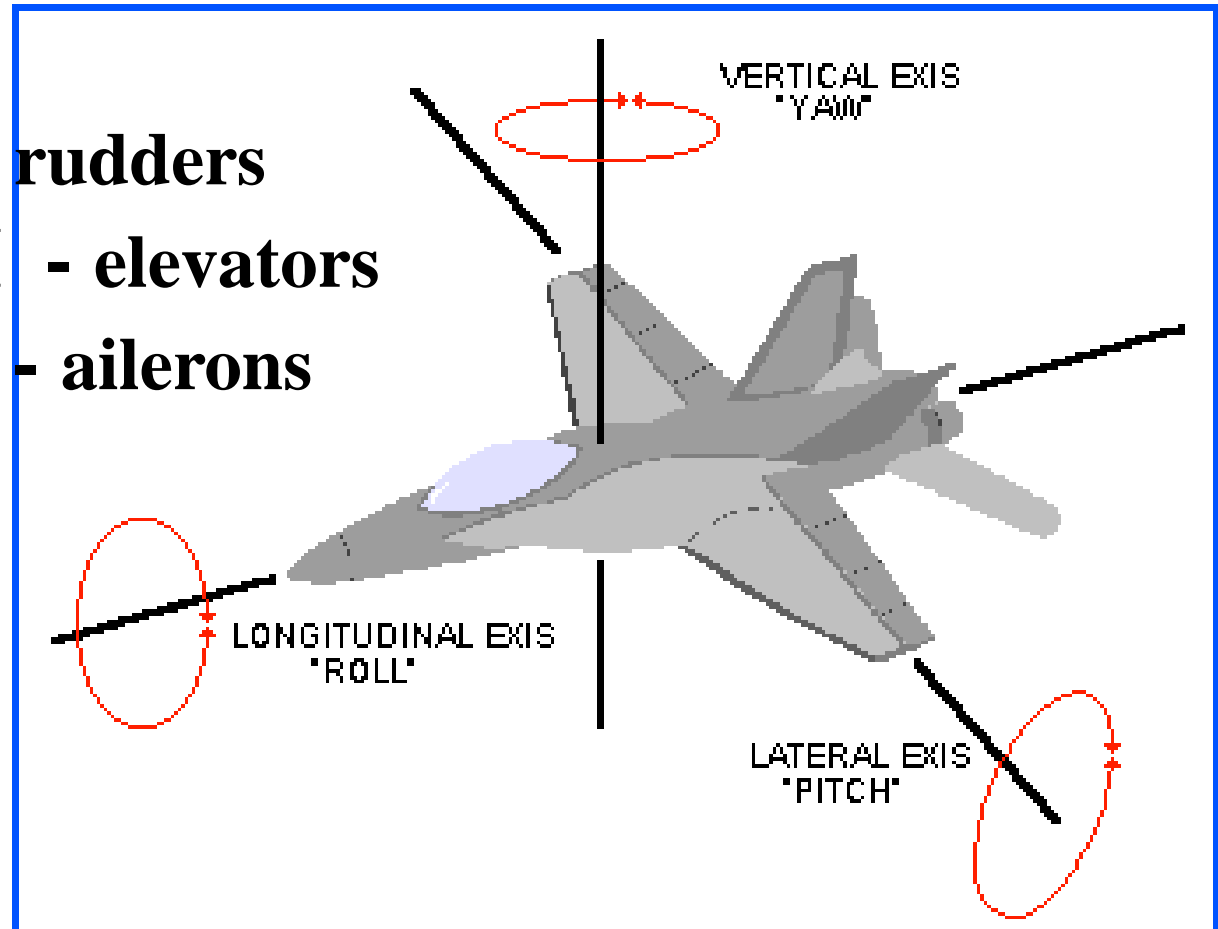
# Control Surfaces Work ?





# Directional Control

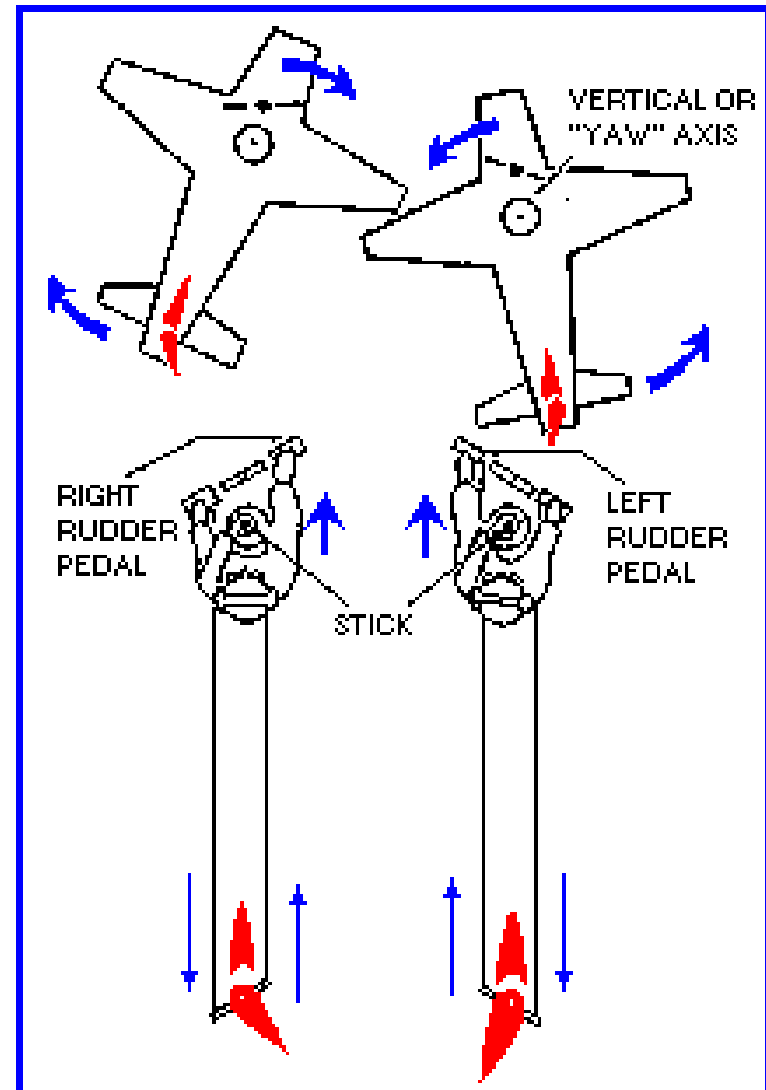
**YAW** - rudders  
**PITCH** - elevators  
**ROLL** - ailerons





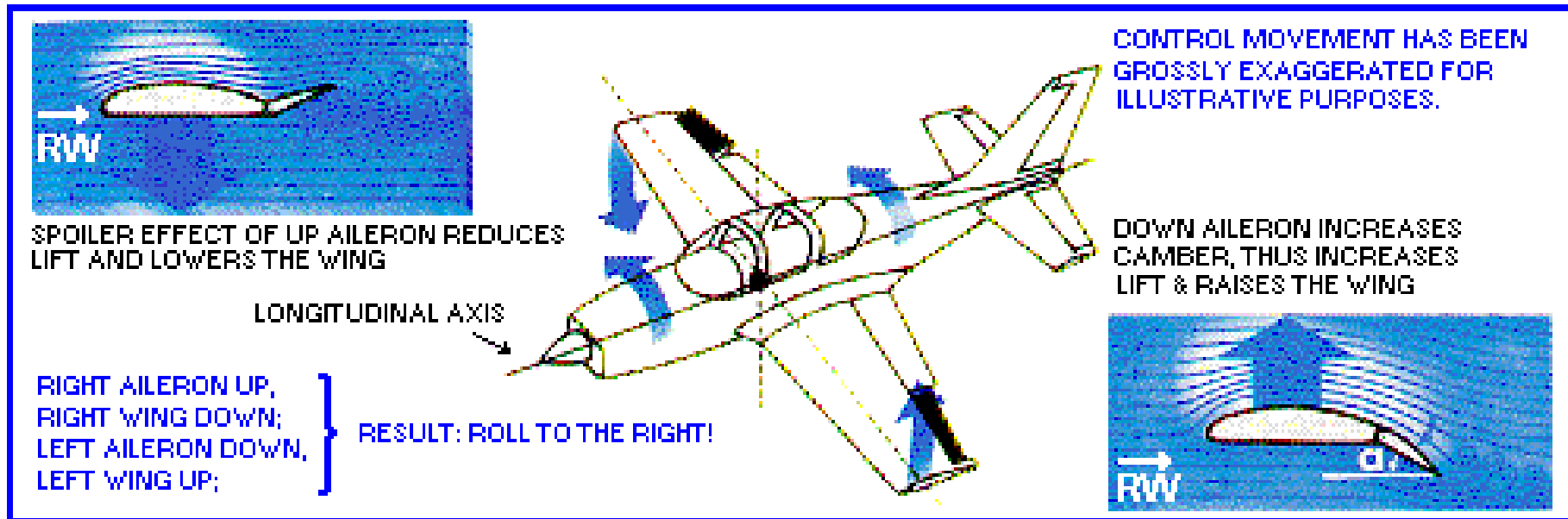
# YAW

**Rudder** – The foot pedals are connected by means of wires or hydraulics to the rudder of the tail section. The rudder is the vertical part of the tail that can move from side to side.





# ROLL

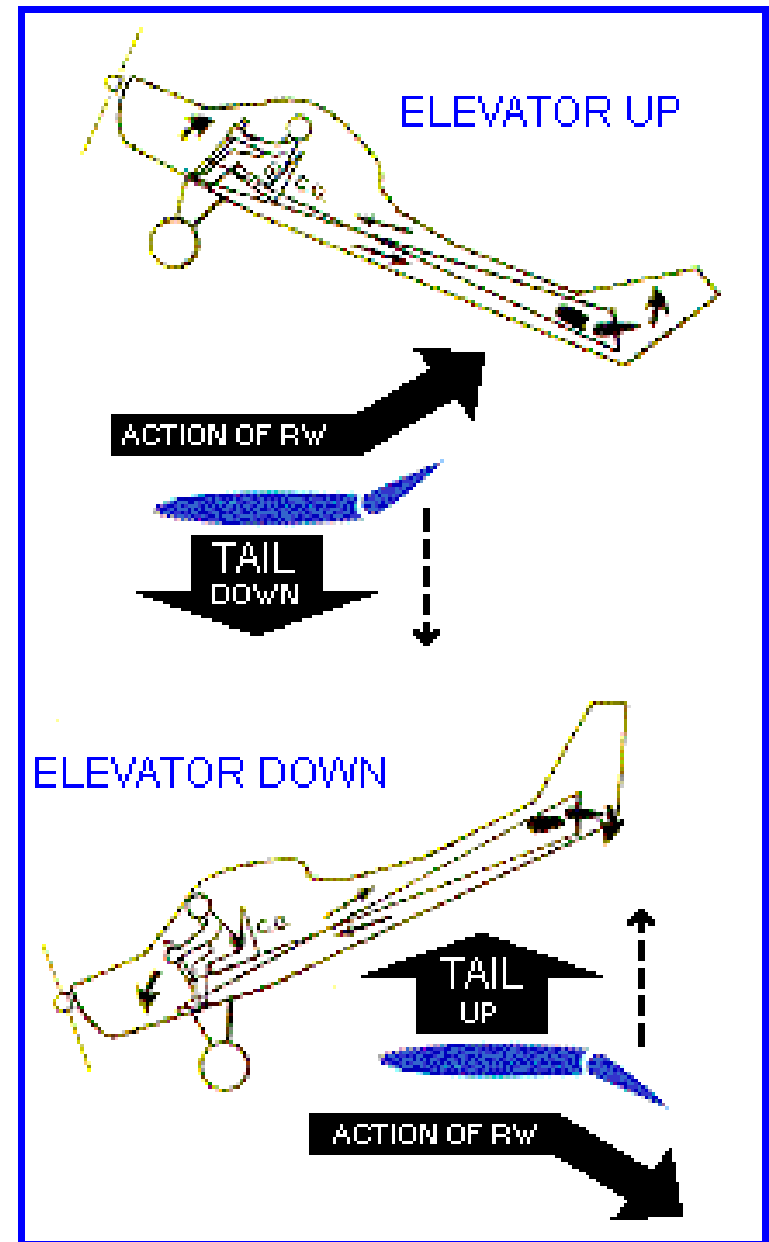


**Ailerons – The stick is connected by means of wires or hydraulics to the wings' ailerons. By turning the stick, the pilot can change the positions of the ailerons.**



# PITCH

**Elevators – The stick (joy stick) is connected by means of wires or hydraulics to the tail section's elevators. By moving the stick, the pilot can change the position of the elevators.**







# Takeoff & Climb

1. NOSEWHEEL OFF



2. LIFT-OFF (MAIN GEAR OFF)



3. GAIN AIRSPEED



4. CLIMB





# Landing

1. APPROACH



2. "ROUNDOUT" (LEVEL OFF AT START OF FLARE)



3. FLARE (INCREASE ANGLE OF ATTACK)



4. TOUCHDOWN (ON MAIN GEAR)





# Certificates/Ratings

- **Recreational pilot certificate**
  - a person is qualified to act as pilot-in-command of a single-engine aircraft carrying 1 passenger
- **Private pilot certificate**
  - you can act as pilot-in-command of an aircraft carrying passengers and baggage
- **Instrument rating**
  - a pilot can fly the aircraft by solely using the flight instruments within the aircraft

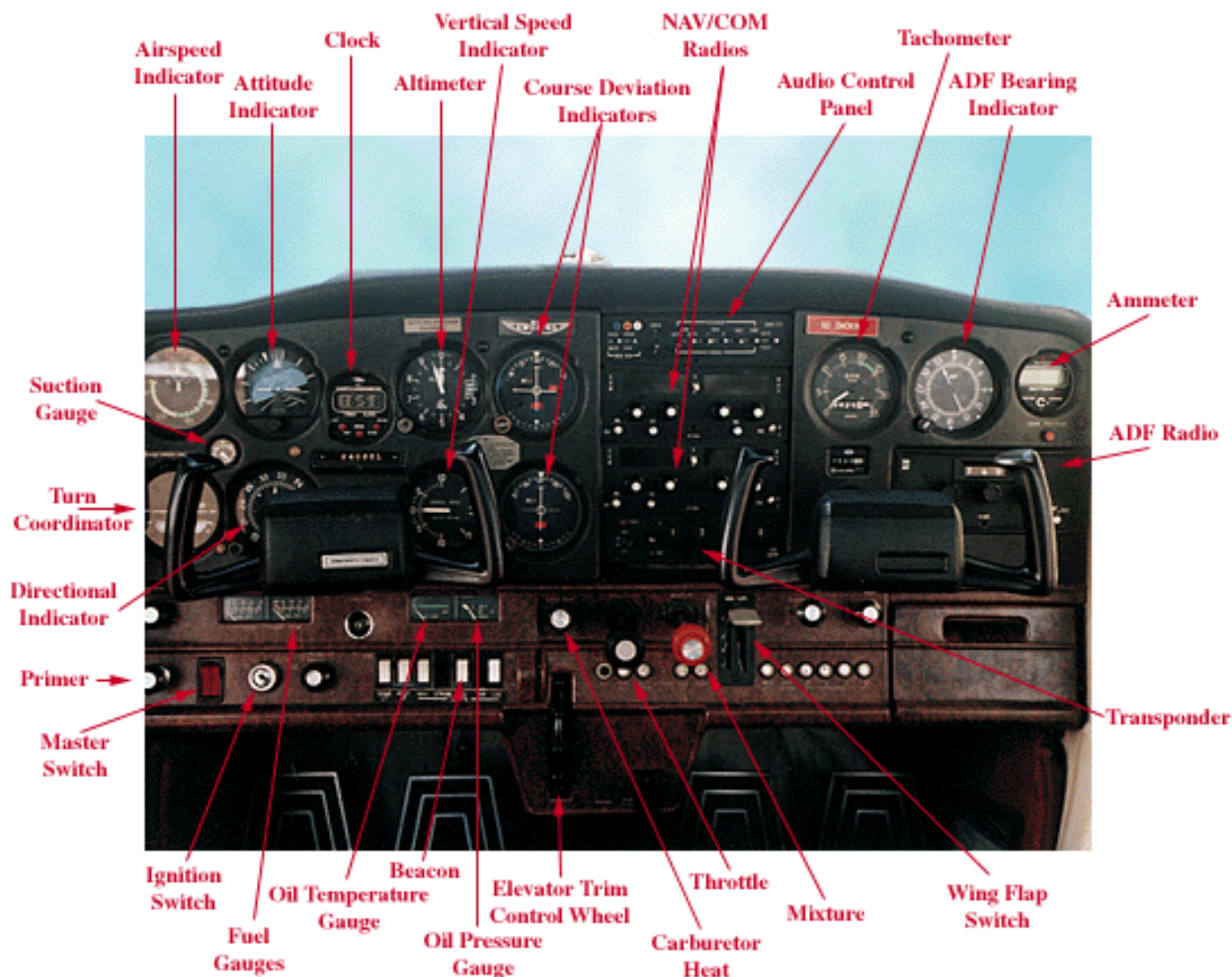


# Job Opportunities

- Careers with the Airlines
- Landing Facilities
- Engineering Research & Development
- General Aviation
- Government Aviation
- Aerospace Industries
- Military Aerospace (**USAF, USN, USMC, USA, NOAA**)
- National Aeronautics & Space Administration (**NASA**)



# Instruments



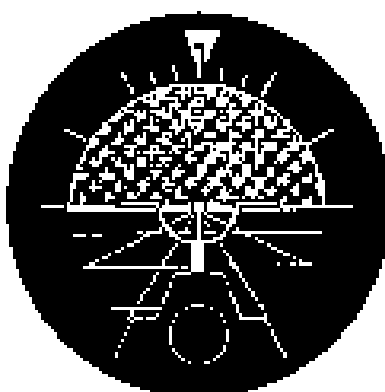




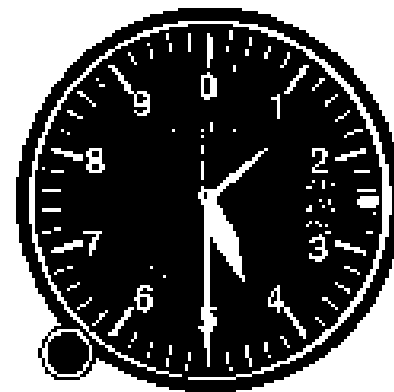
# Instruments



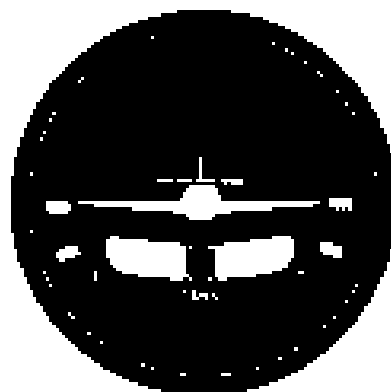
1. AIRSPEED INDICATOR



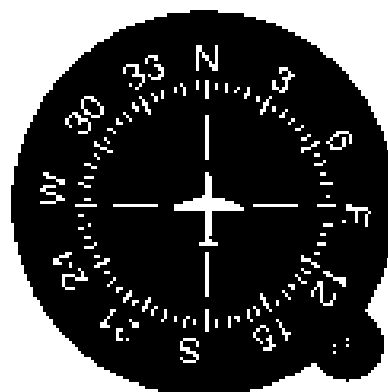
2. ATTITUDE INDICATOR



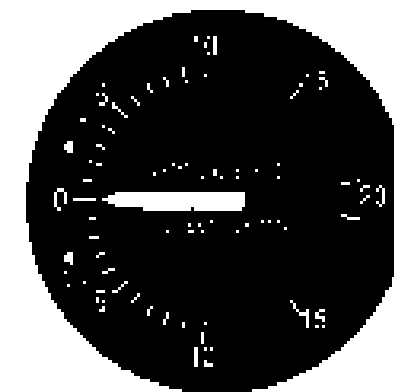
3. ALTIMETER



4. TURN COORDINATOR



5. HEADING INDICATOR



6. VERTICAL SPEED INDICATOR



# December 6<sup>th</sup> preflight check list

- Check Troop 81 web site for flight conditions - If IFR flight will be rescheduled
- Be at church at 8:15 – arrive airport at 8:45
- 3 scouts per flight
- Bring sack lunch
- Bring permission an waiver paper work
- Bring pencil & Merit Badge workbook.
- Return to church at 1pm.



# Credits

- **Bill Britt**  
**SM Troop 509**
- **Hurlburt Field, FL**
- <http://meritbadge.com/files/mb-pdfs/Aviation.pdf>
- **John Burt**

