



SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution)
Coimbatore - 641 035, Tamil Nadu

DEPARTMENT OF AEROSPACE ENGINEERING

23AST101 - Fundamental of Aerospace Engineering

Topic: *Basic Aircraft Structures*

By

NEHRU.K

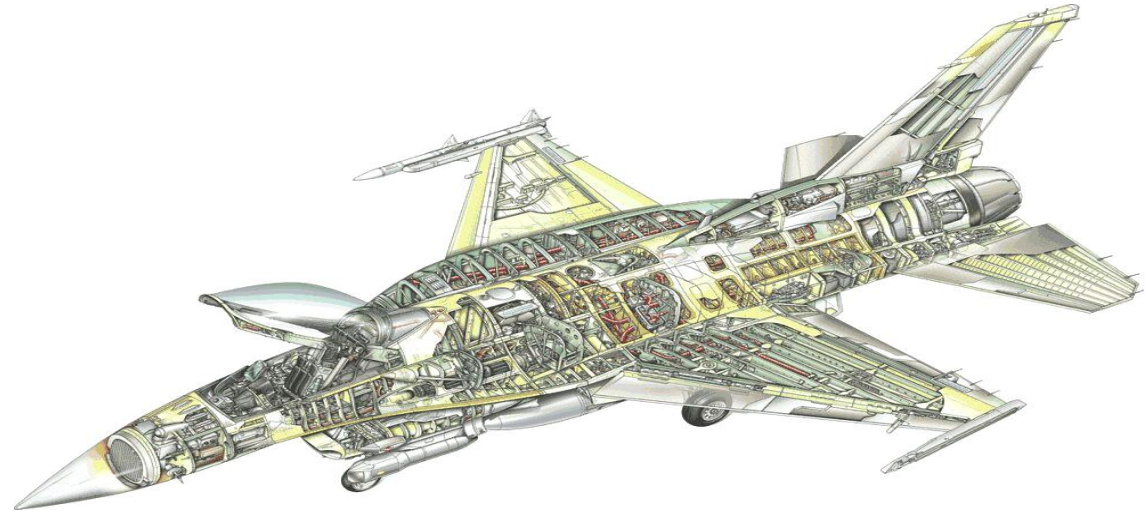
Assistant Professor

Aerospace Engineering



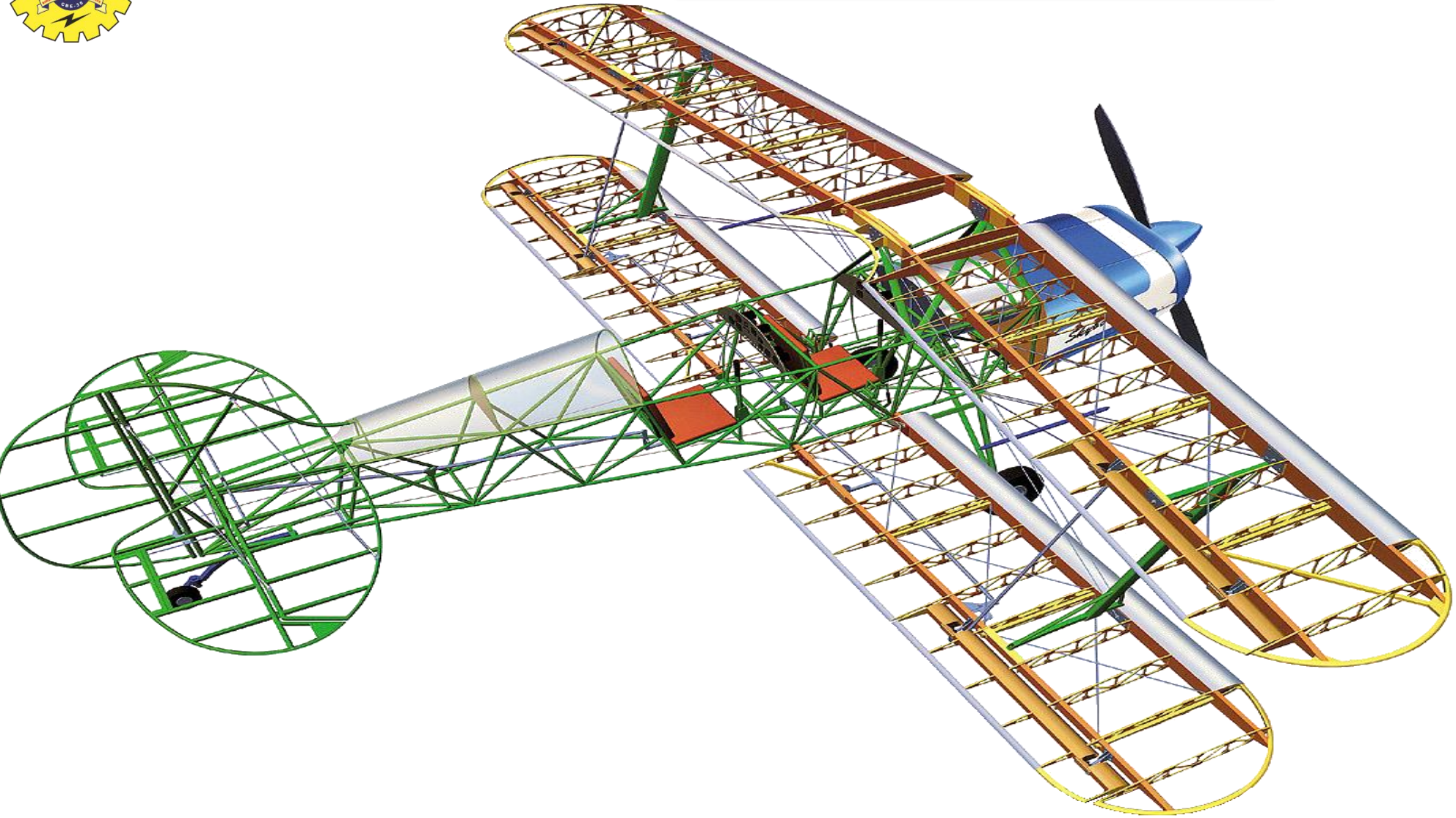
Outline of Presentation

- Aircraft Components
- Material use in Airframe Construction
- Example of Material use in Airframe Construction
- Function of Aircraft Structure
- Fuselage Structure
 - Truss Type
 - Pratt Truss
 - Warren Truss
 - Monocoque
 - Semi-Monocoque
- Basic Structure Member Terms
- Wing Structure
- Empennage Structure
- Power Plant
 - Wing Pod Mount
 - Fuselage Mount
- Landing Gear Structure



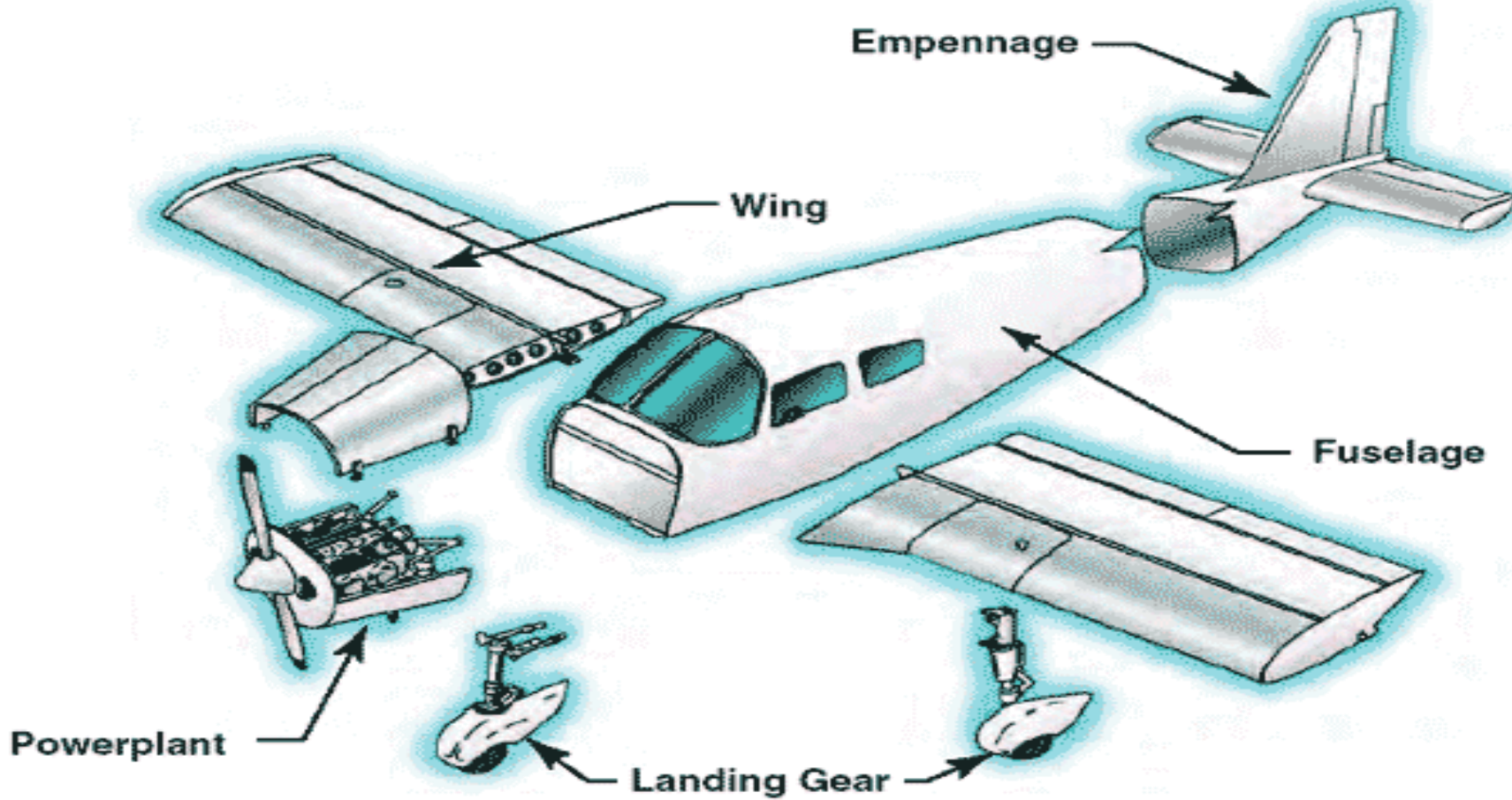


Skeleton view of airplane





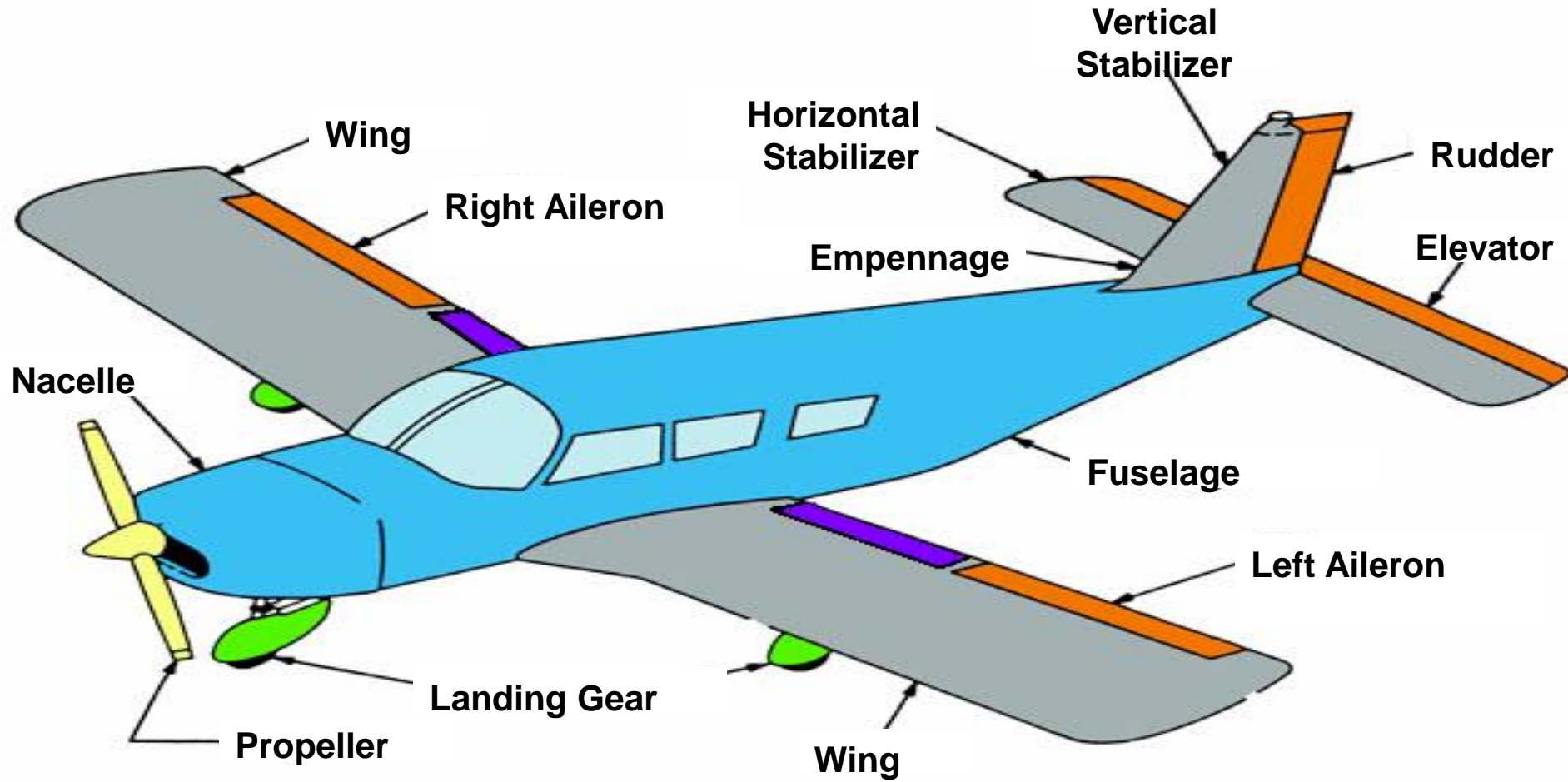
Aircraft Components



- A. Fuselage
- B. Wings
- C. Empennage or Tail
- D. Power Plant
- E. Landing Gear or Undercarriage

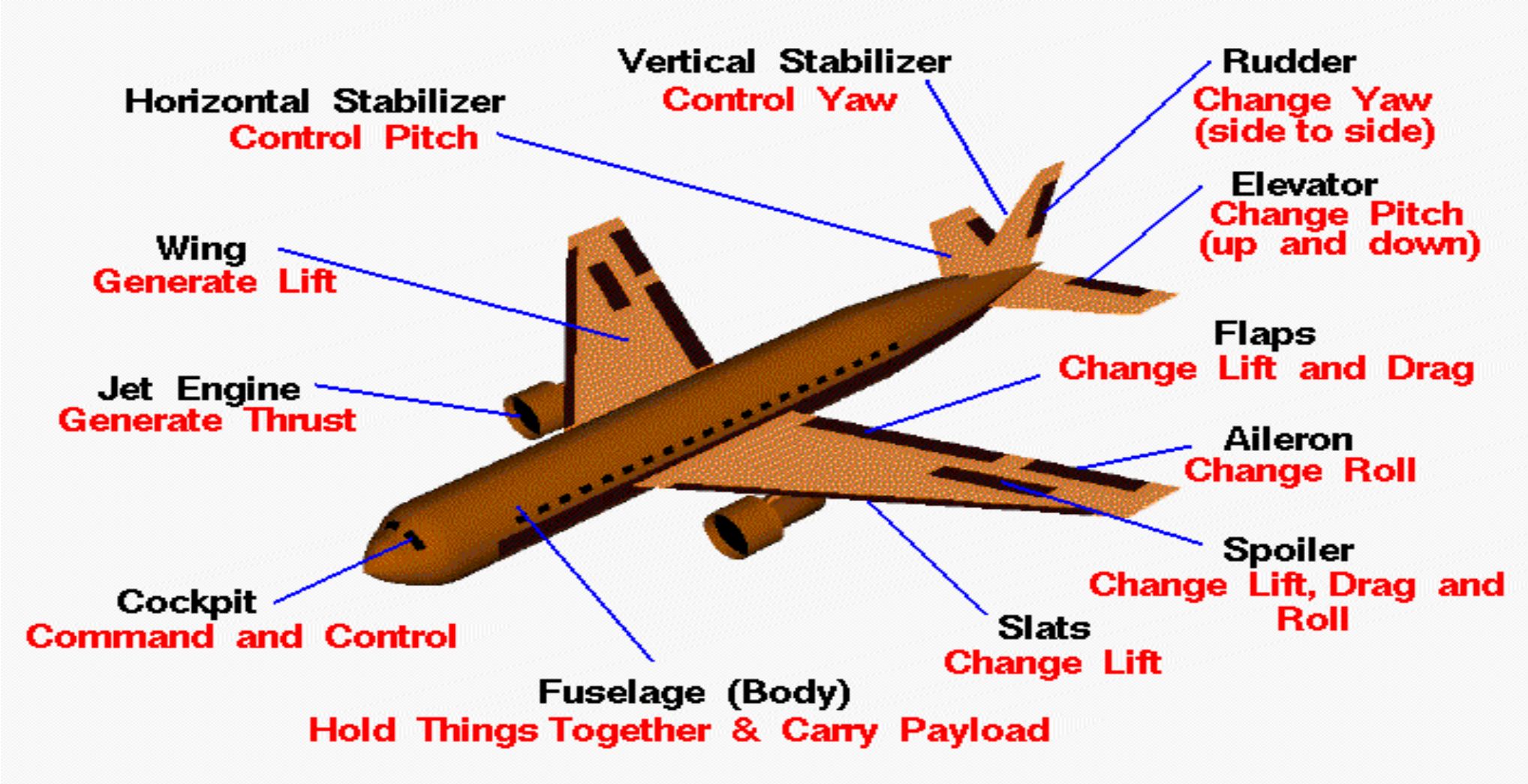


Aircraft Components





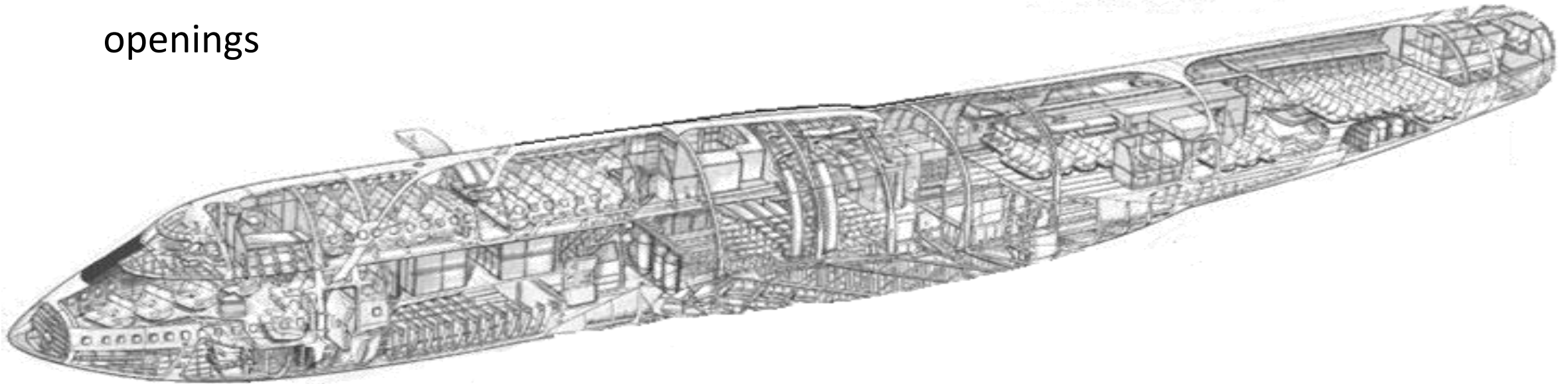
Parts of an aircraft and their functions





Fuselage

- Main body of airplane
- Pilot & cargo compartments
- Generally constructed in two or more sections
- Carries accessories and other equipments
- Includes numerous access doors, inspection plates, landing wheel wells, and other openings





WING

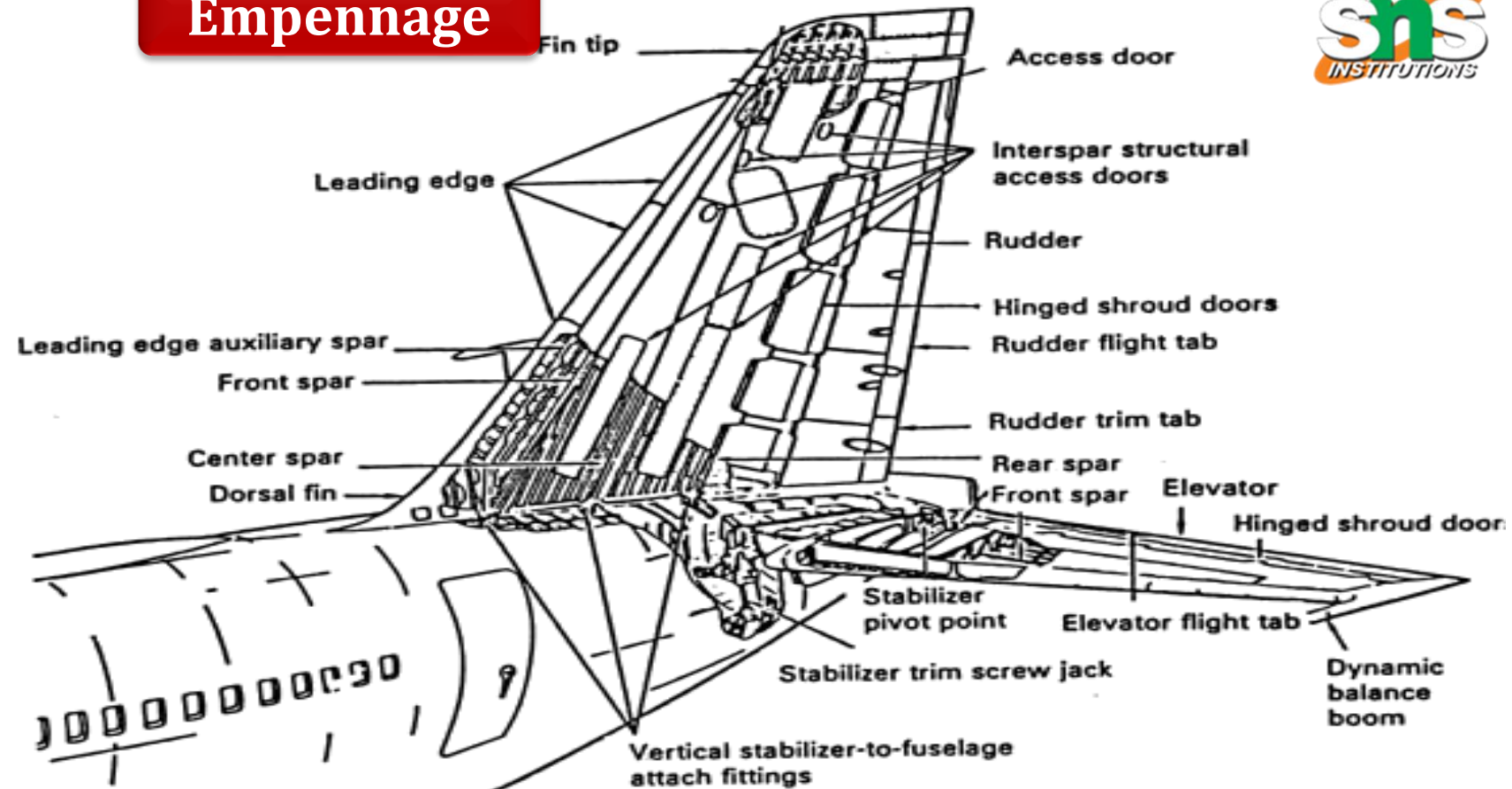
- Airfoils attached to each side of the fuselage
- Main lifting surfaces
- Various design size and shape
- May be attached at the top, middle, or lower portion of the fuselage
 - High-wing, mid-wing, and low-wing
- The number of wings can also vary
 - Monoplanes, biplanes





Empennage

- Know as tail section
- Consist of
 - Vertical Stabilizer
 - Rudder
 - Horizontal Stabilizer
 - Elevators

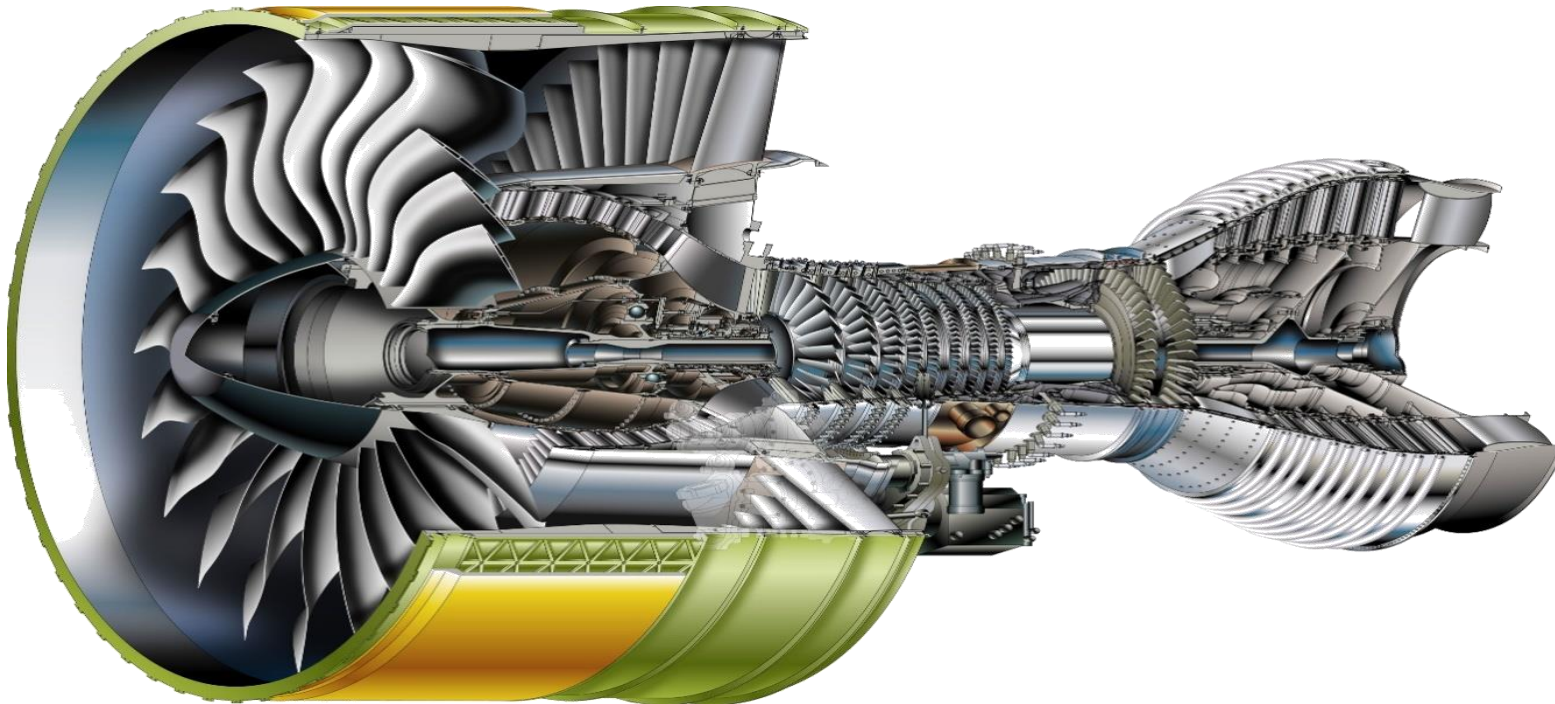


(a) Convair 880



Power Plant

- A unit or machine that converts chemical energy contained in the fuel to thrust force.
- Thrust force is essential for moving the airplane forward and producing lift force.
- With the piston engine, the propeller is used to convert torque at engine shaft to be thrust.
- With the jet engine, the jet engine output is the thrust force.





Landing Gear

- Located underneath of the fuselage with shock strut
- Fixed / Retractable
- Provides means of landing taxiing
- Tri- cycle –Conventional type
- Floating gear for seaplane /ski- equipped for ice surface landing etc..

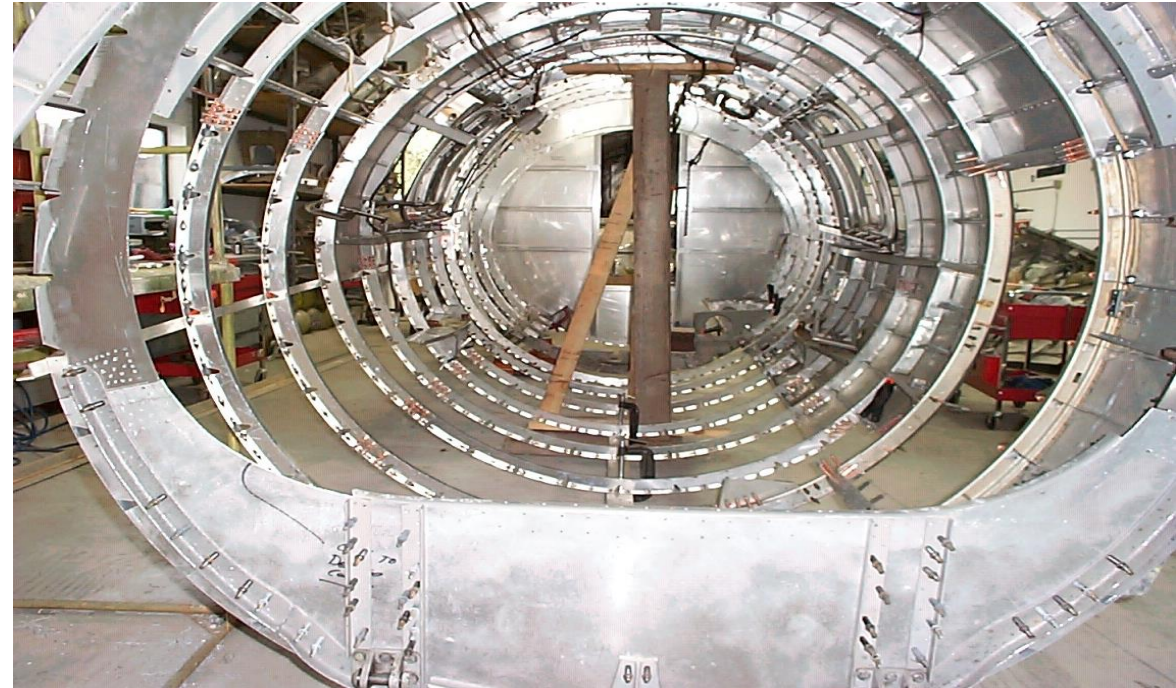




Material use in Airframe Construction

Airframe Materials Properties

- High Strength to Weight ratio
- Light weight
- Corrosion Resistant
- Should be non flammable
- High quality





Example of Material use in Airframe Construction

- WOOD (Spruce)
- STEEL & ITS ALLOYS (Strong)
- ALUMINIUM & ITS ALLOY (Commonly use)
- TITANIUM ALLOYS (Heat Barriers)
- MAGNESIUM ALLOYS (3 times lighter than AL)
- PLASTICS & COMPOSITE MATERIAL

A blue biplane is flying in the upper right, and a brown biplane is flying in the lower left. The background is a light blue sky with several white, fluffy clouds. The text 'Thank You' is written in a dark blue, cursive font in the center of the image.

Thank You