SNS COLLEGE OF TECHNOLOGY

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

DEPARTMENT OF AEROSPACE ENGINEERING

23AST101 - Fundamental of Aerospace Engineering

Topic: *Aircraft Structures*

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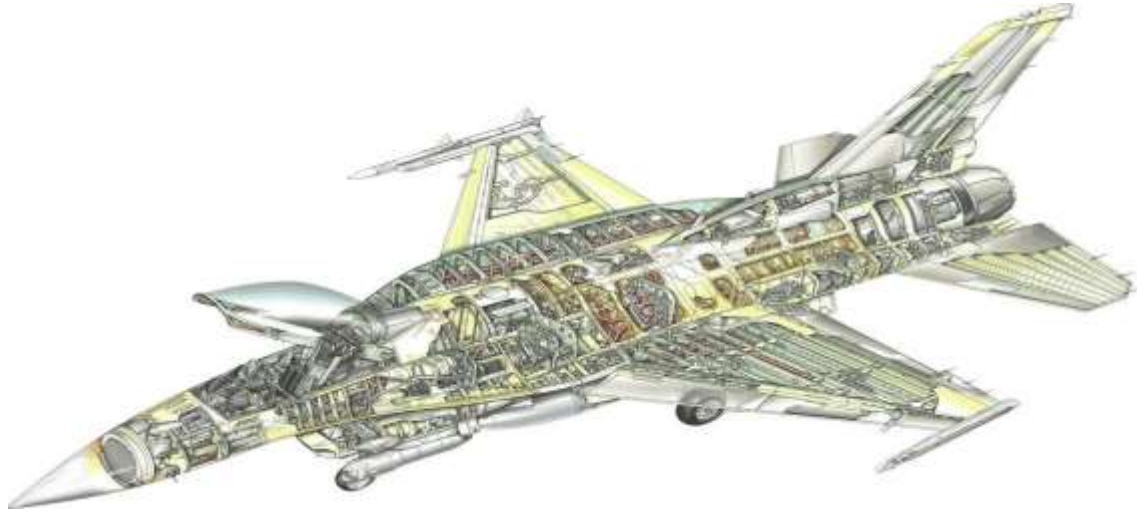
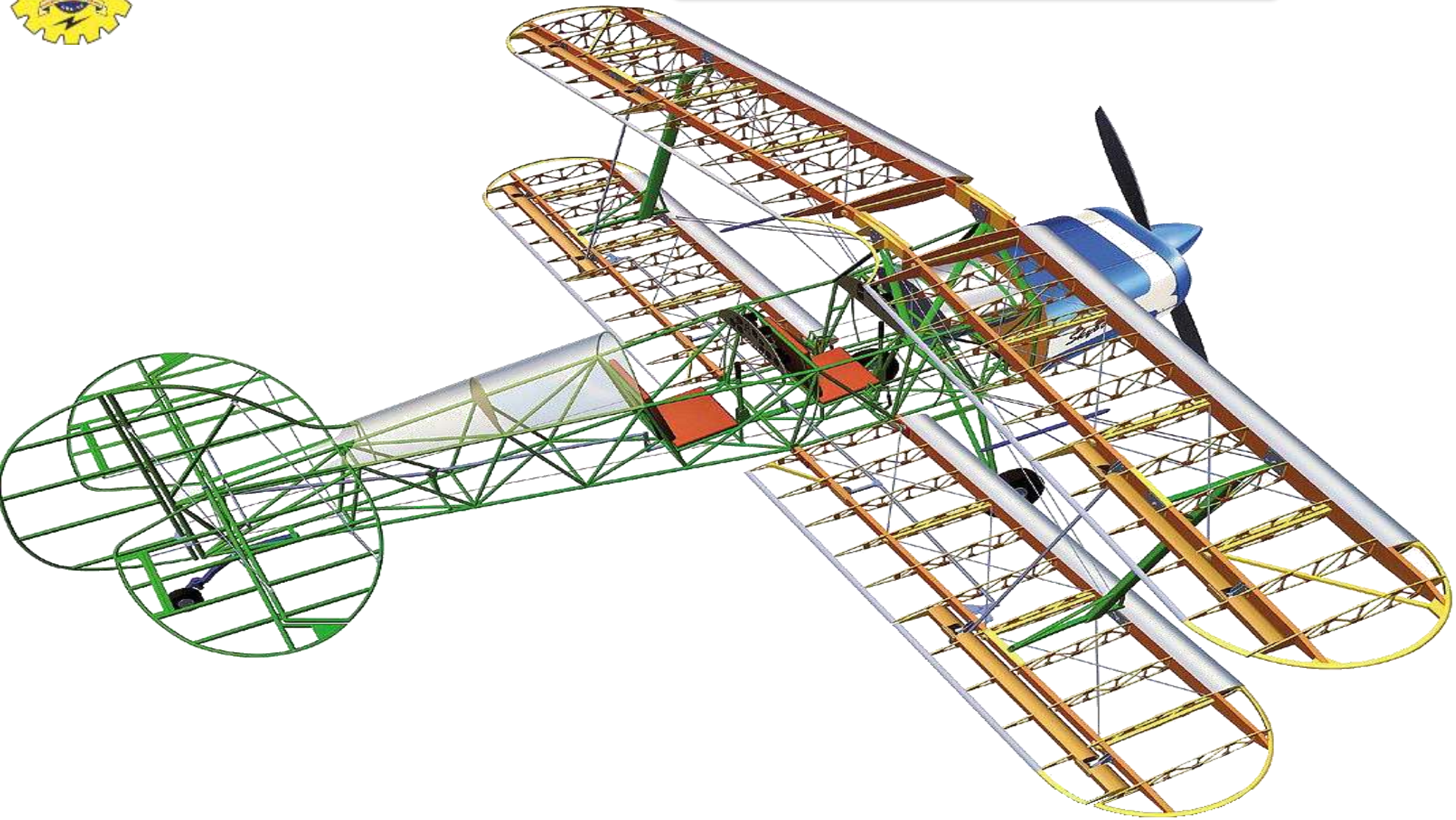
Outline of Presentation

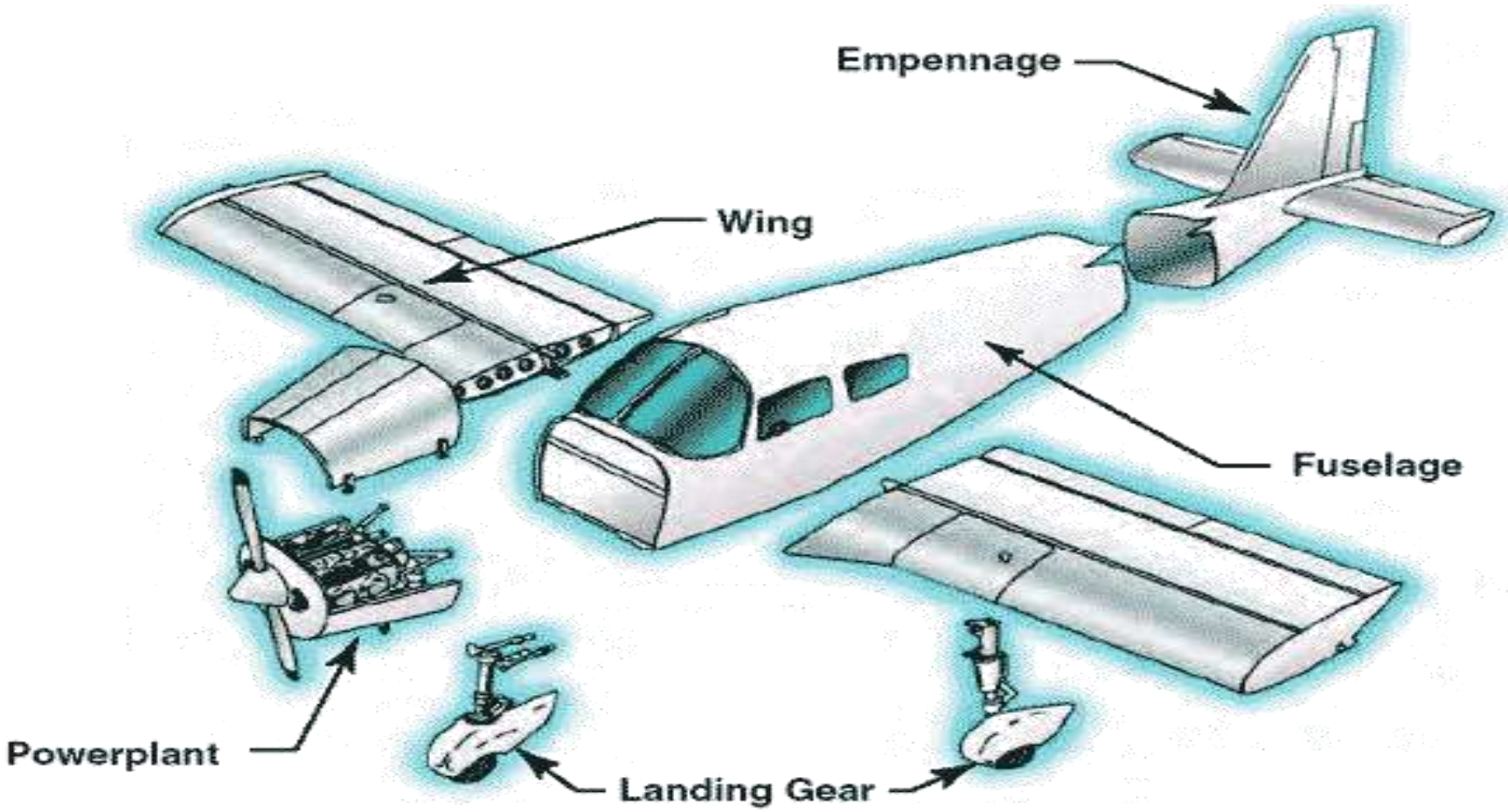
- Aircraft Components
- Material use in Airframe Construction
- Example of Material use in Airframe Construction
- Function of Aircraft Structure
- Fuselage Structure
  - Truss Type
    - Pratt Truss
    - Warren Truss
  - Monocoque
  - Semi-Monocoque
- Basic Structure Member Terms
- Wing Structure
-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



Skeleton view of airplane

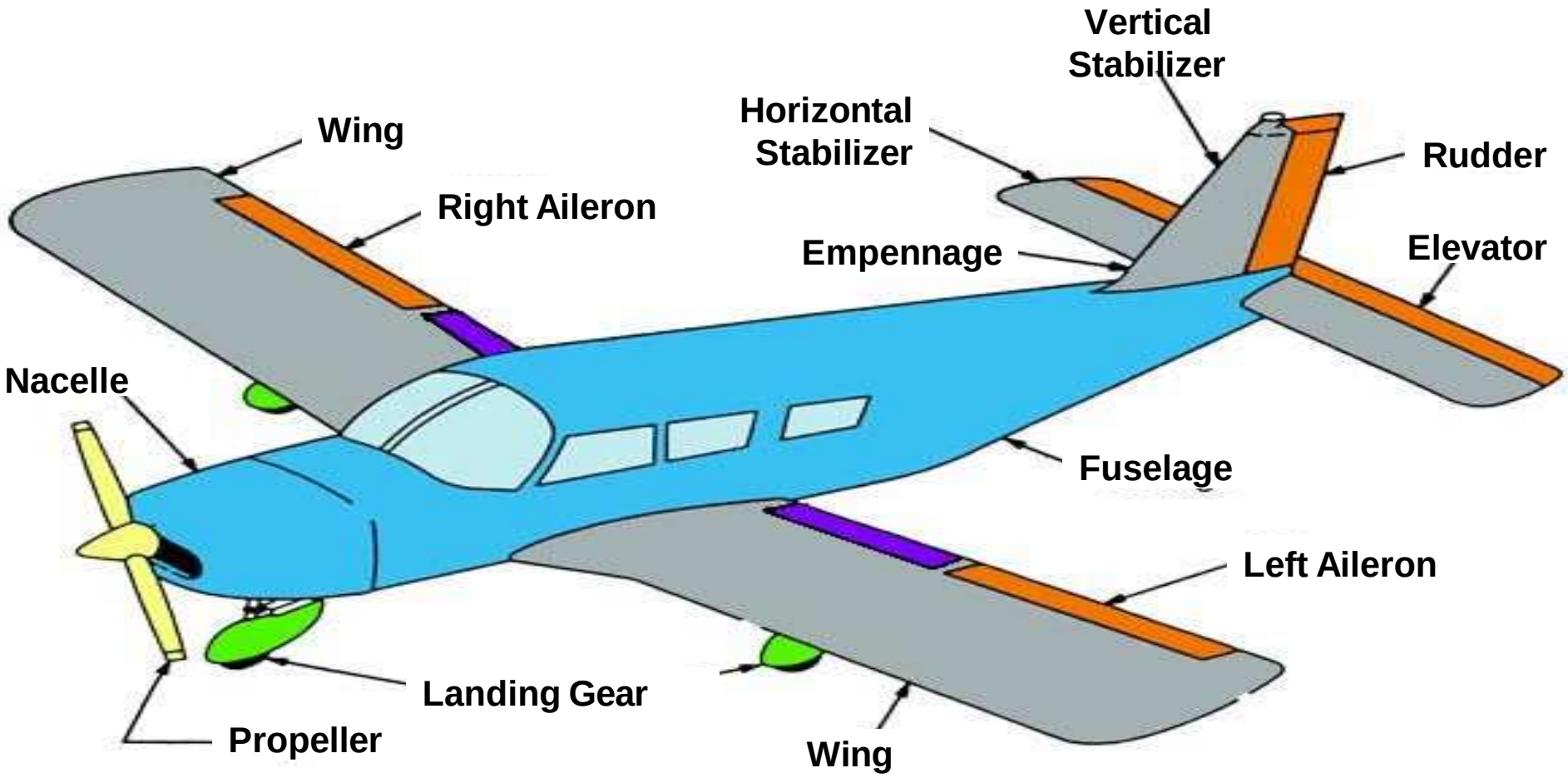


Aircraft Components

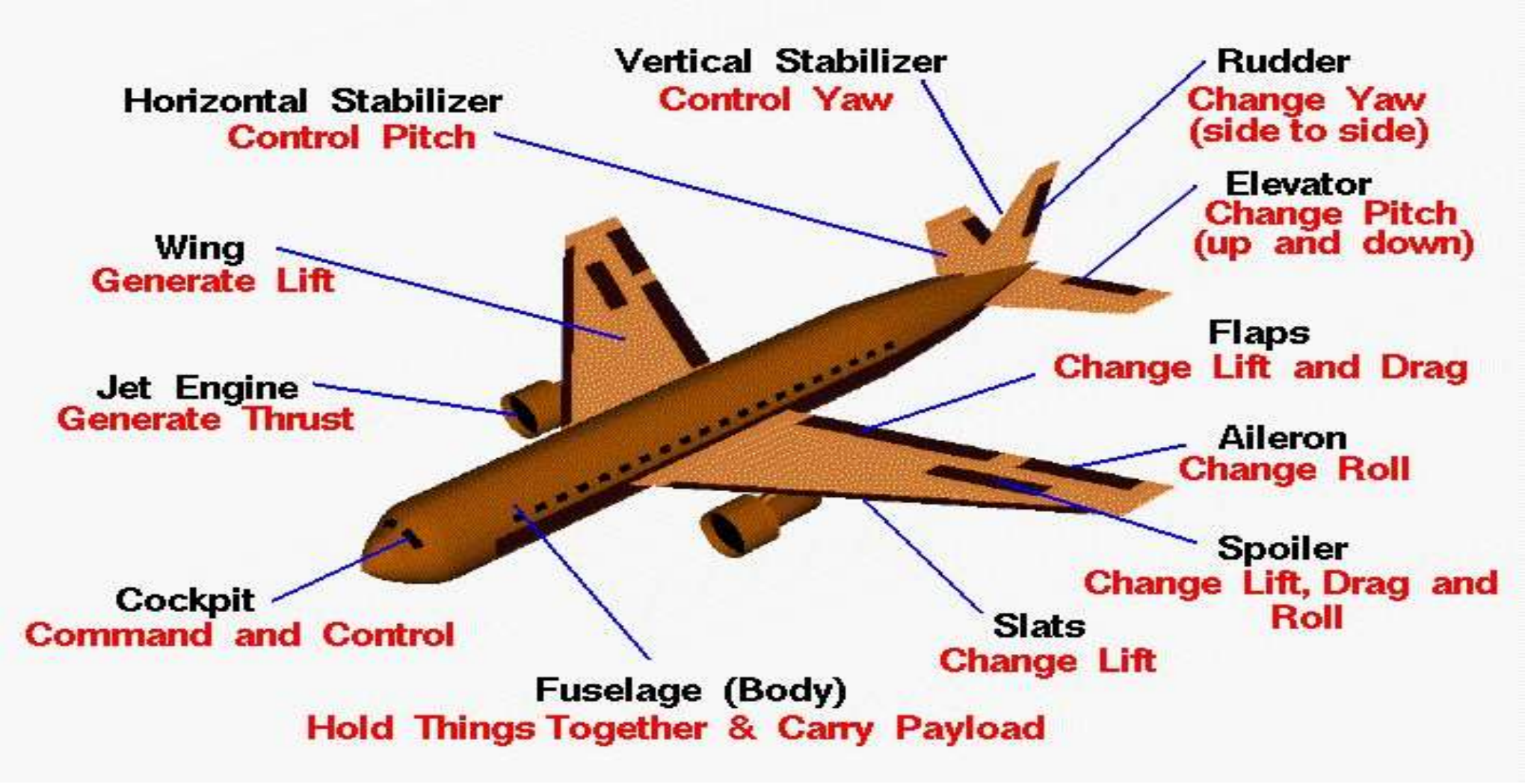


A. Fuselage
B. Wings
C. Empenage or Tail
D. Power Plant
E. Landing Gear or Undercarriage

Aircraft Components

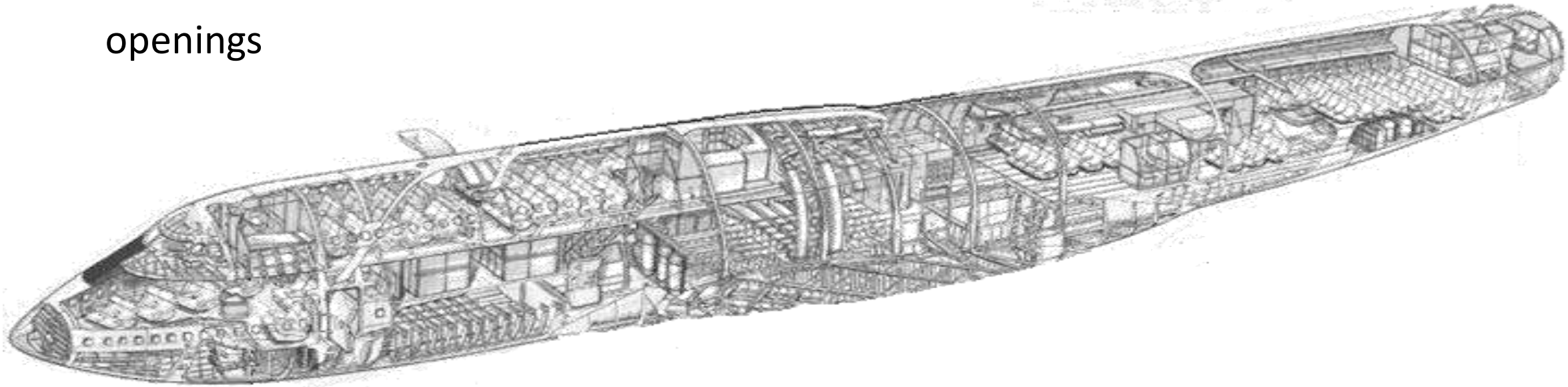


Parts of an aircraft and their functions



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

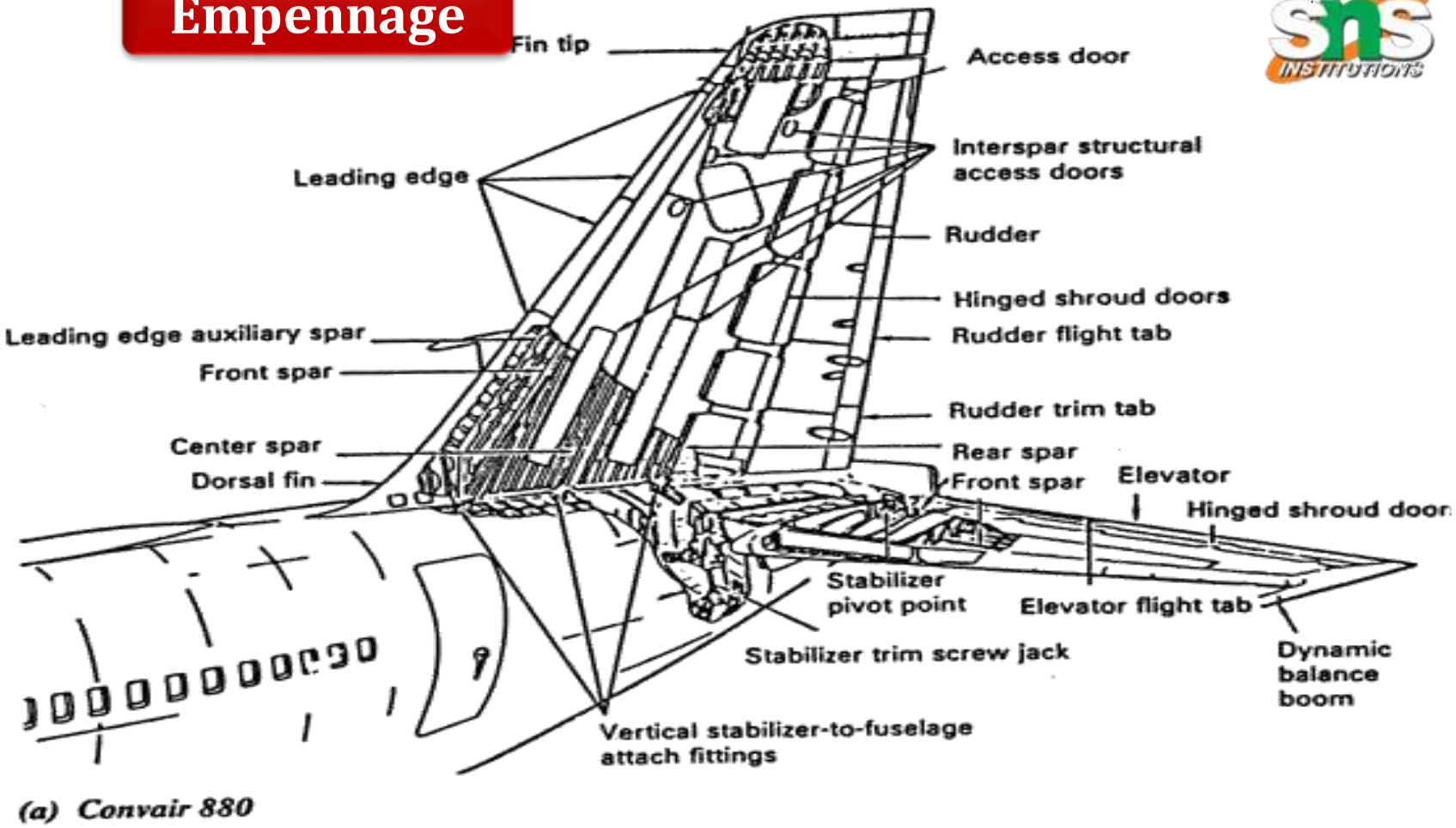
- Airfoils attached to each side of the fuselage
- Main lifting surfaces
- Various design size and shape
- May be attached at the top, middle, or lower portion of the fuselage

  - High-wing, mid-wing, and low-wing
- The number of wings can also vary

  - Monoplanes, biplanes

Empennage

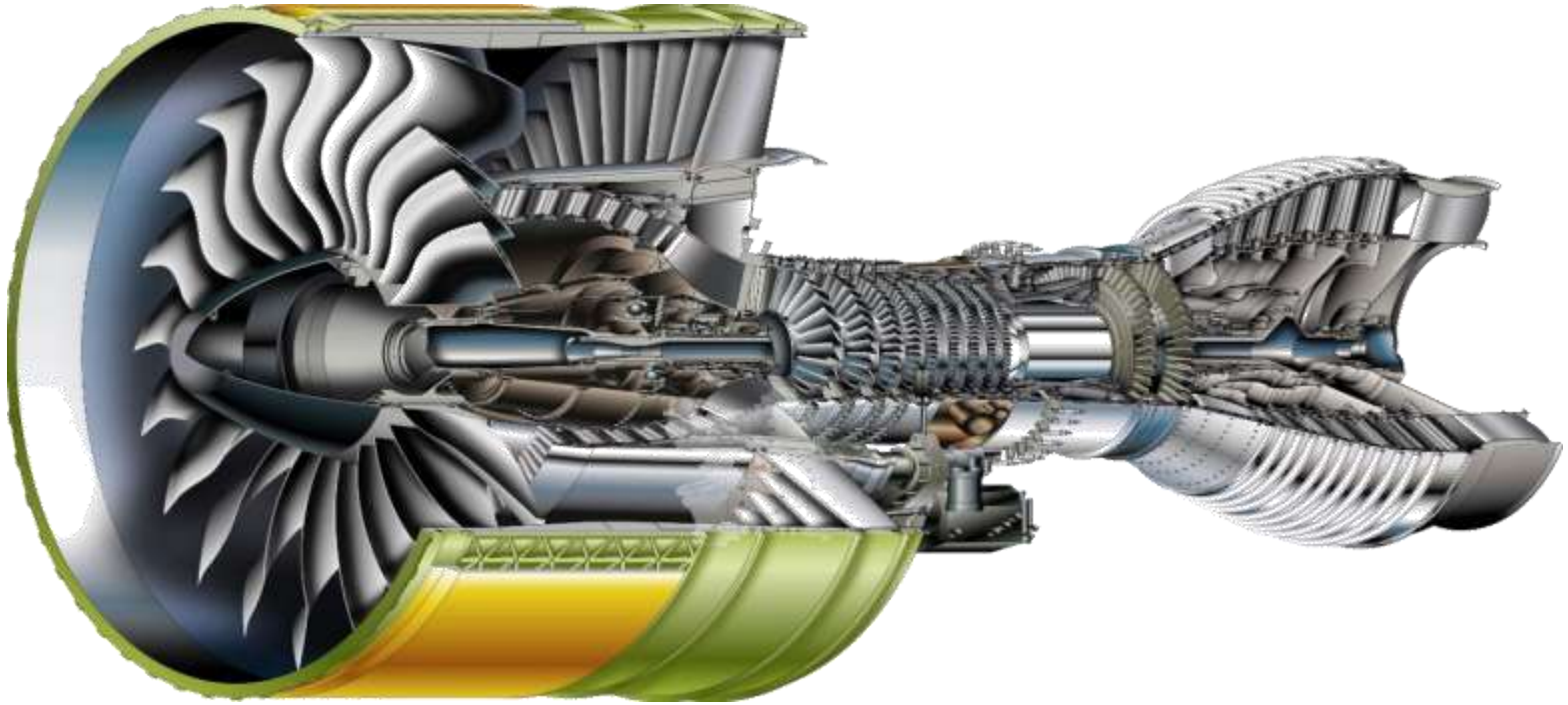
- Know as tail section
- Consist of
  - Vertical Stabilizer
  - Rudder
  - Horizontal Stabilizer
  - Elevators



(a) Convair 880

Power Plant

- A unit or machine that converts chemical energy contains 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.



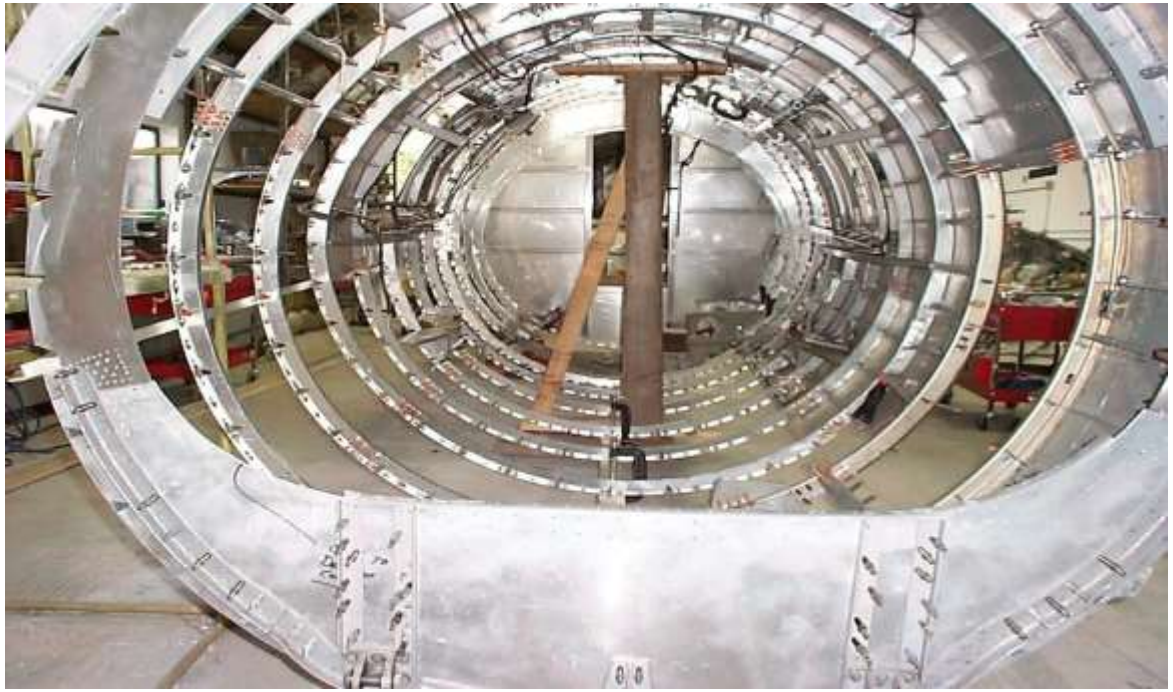
Landing Gear

- 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


Thank You