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Introduction to Aeronautics

By Pankaj Salunkhe



PARTS OF THE AIRCRAFT

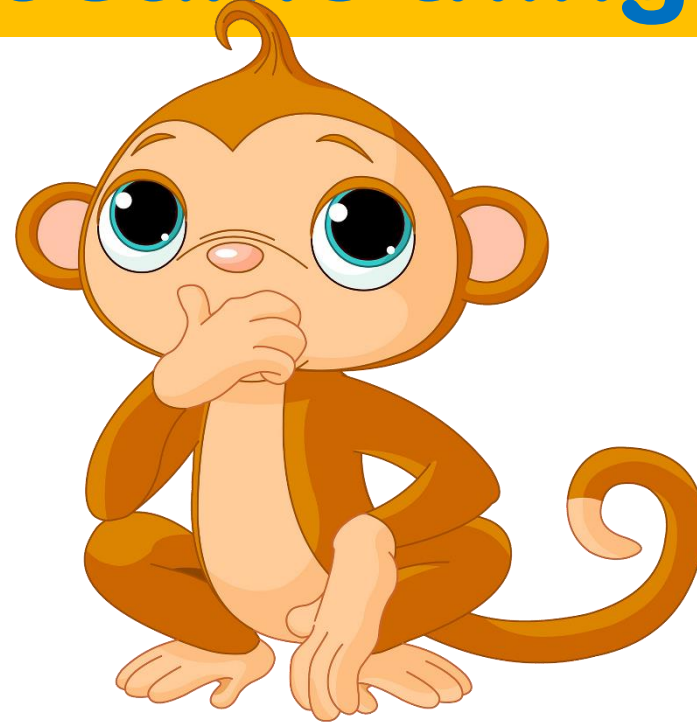
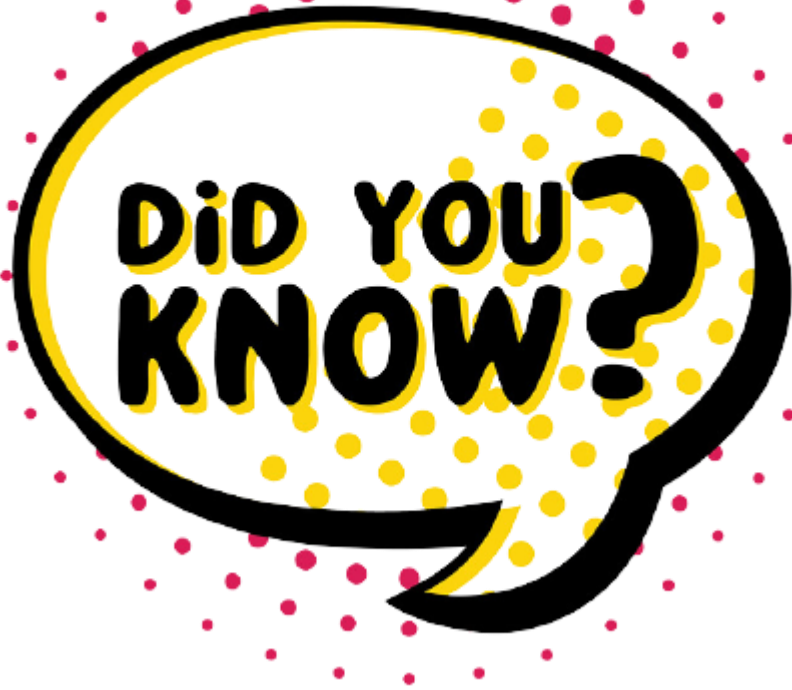


WHAT IS AIRCRAFT ???

- Anything that can fly or float in air
- It can be lighter or Heavier than air
- It can be powered or non powered

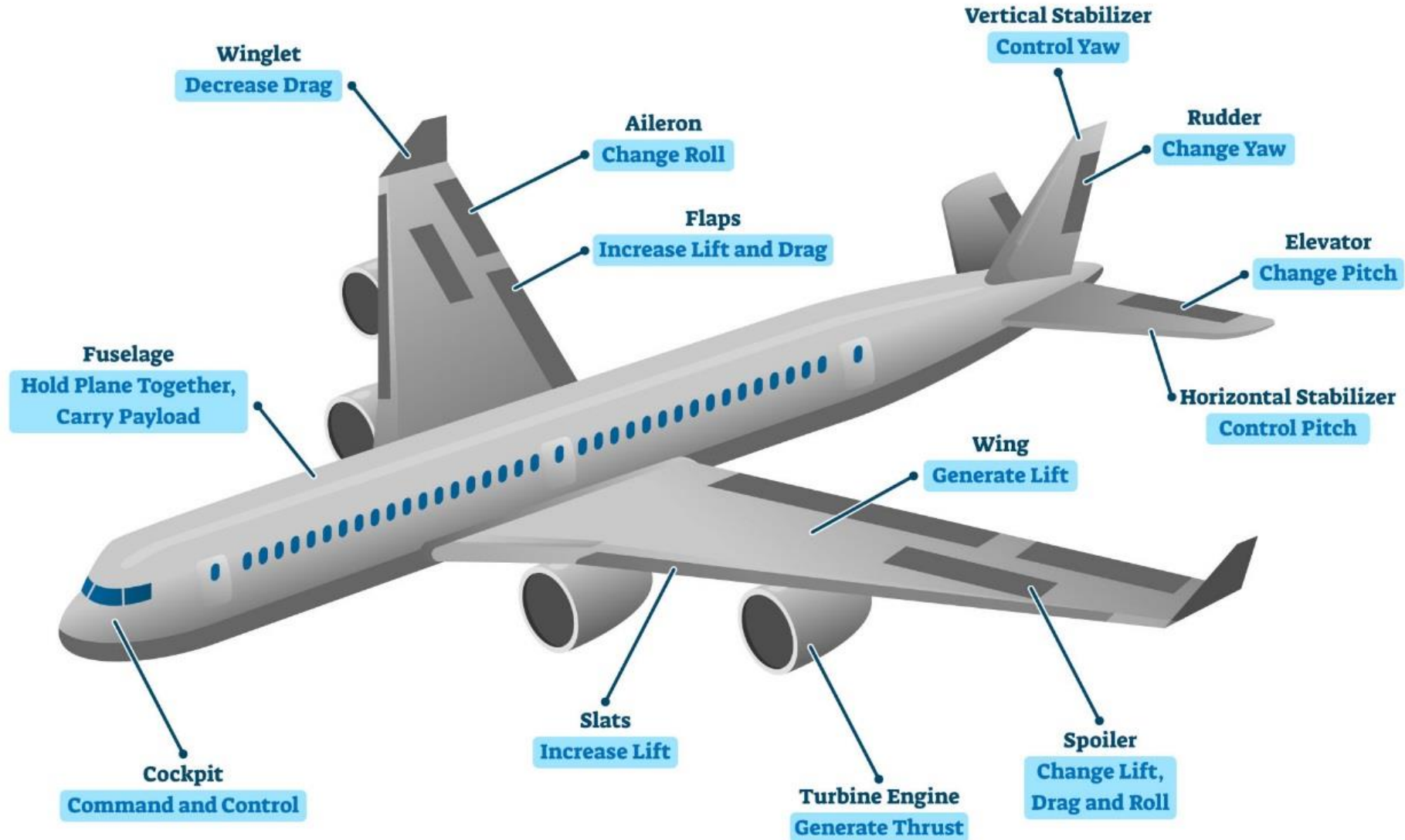


Aircraft & Aeroplane are not same things



- **Aeroplane is one of the type of aircraft. Aircraft can be anything that can fly like kite, drones, balloons, Ornithopter, Helicopter etc.**

AIRPLANE PARTS AND FUNCTION



- **Fuselage:-**

This is the most important part of the aircraft. The main structural body of the aircraft which carries passengers, Fuel, Pilots, Crews Cargo & warheads.

- **Wings:-**

- The part of the aircraft which is used to produce lift. Approx. 90% of lift of aircraft is produced by the wings.

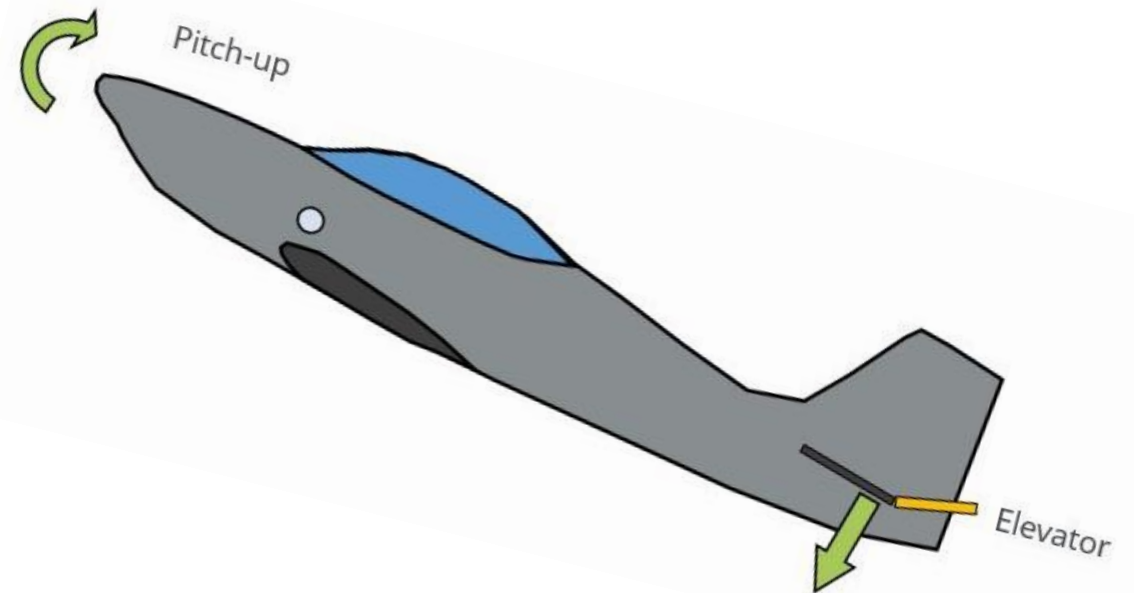
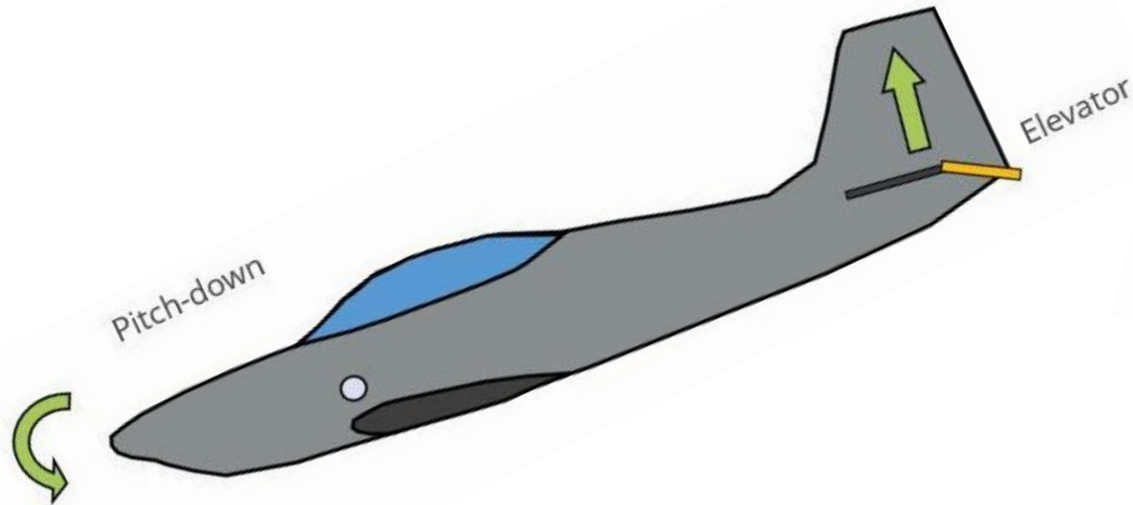
- **Horizontal Stabilizer:-**

- The small wing is attached to tail of the fuselage which provide longitudinal stability.
- It divides into two parts one is fixed part and another moving part
- Fixed part is called Horizontal stabilizer
- Moving part is called Elevator

- **Elevator**

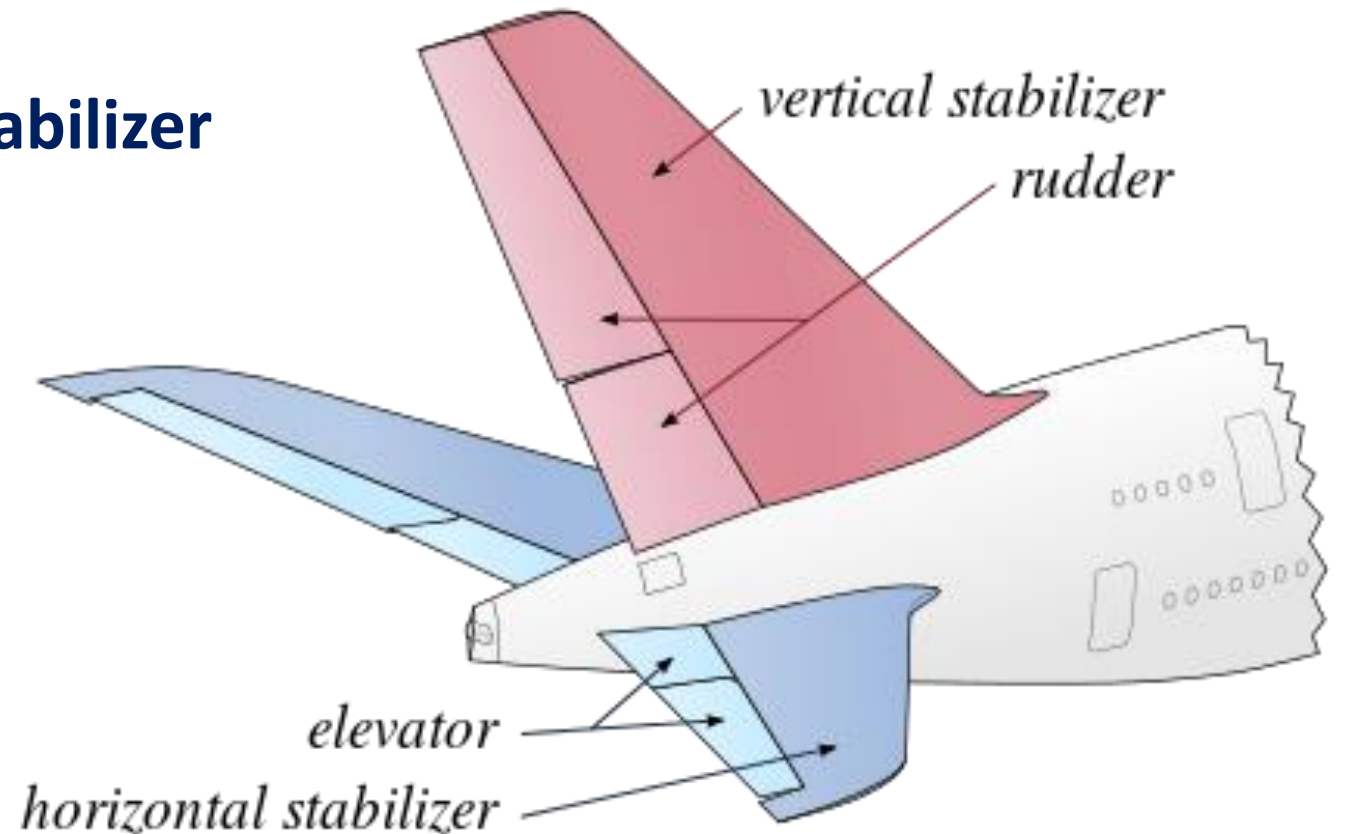
- This is the one of the main of Primary Control Surface.

- It is moving hinged part of the Horizontal control surface which is used to create Pitching moment (Pitch up Pitch down Nose up Nose down). When elevator deflected downward then aircraft is nose down position and When elevator deflected upward then aircraft is nose up position



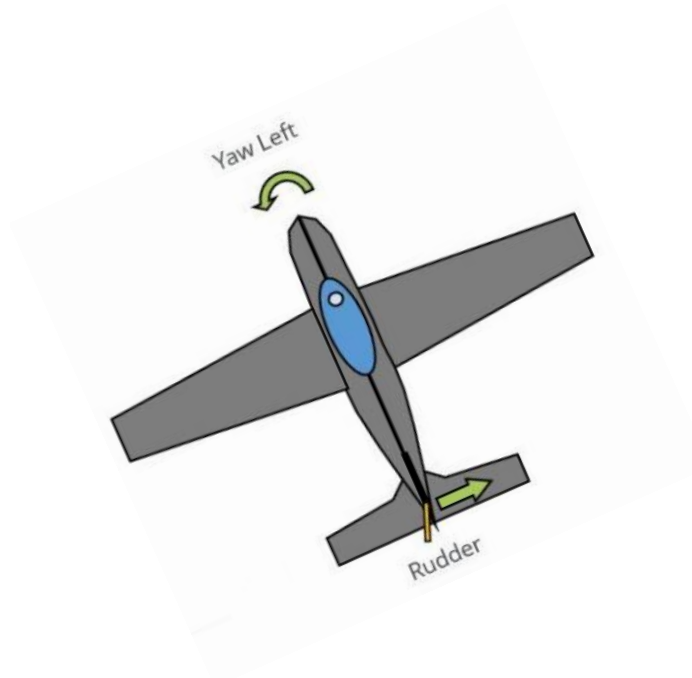
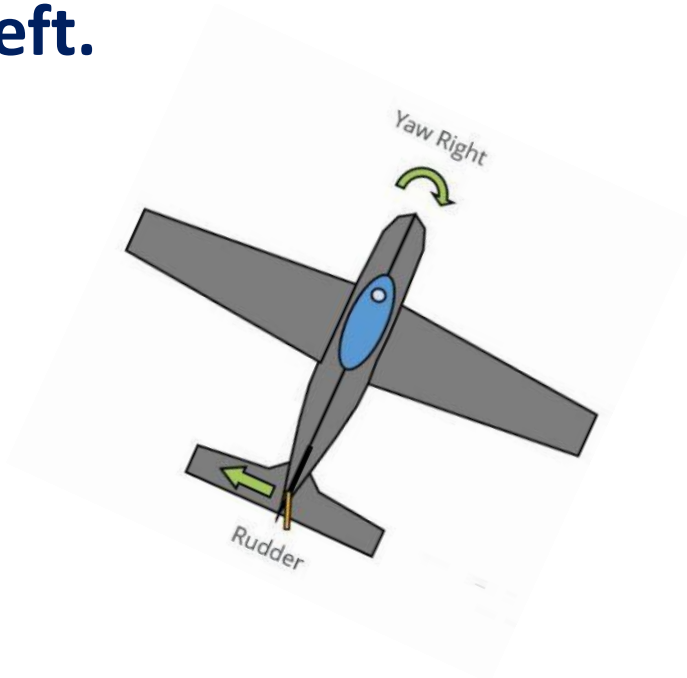
- **Vertical Stabilizer:-**

- The small vertical wing attached to the tail of the fuselage. It provides the directional stability.
- It has divided into two parts one is fixed part and another is moving part
- Fixed part is called Vertical stabilizer
- Moving part is called Rudder.



- **Rudder:-**

- This is the one of the main of Primary Control Surface.
- It is moving hinged part of the Vertical control surface which is used to create yawing moment.
- When Rudder deflected right then aircraft takes turn(yaw) toward right and When Rudder deflected left then aircraft takes turn(yaw) toward left.





Today's Amazing Fact!!



AN-225 IS BIGGEST HUMAN MADE RUSSIAN AIRCRAFT TILL DATE. IT CAN CARRY 2.5 LAKH KG THAT IS EQUIVALENT TO 4000 PASSENGERS

- **Empennage:-**

- **The rear portion of the aircraft structure which includes Horizontal stabilizer, Vertical stabilizer, Rudder & Elevator.**





Left Side of the wing is called port side wing
&
Right side of the wing is starboard side wing

The left side is called 'port' because ships with steer boards or star boards would dock at ports on the opposite side of the steer board or star.



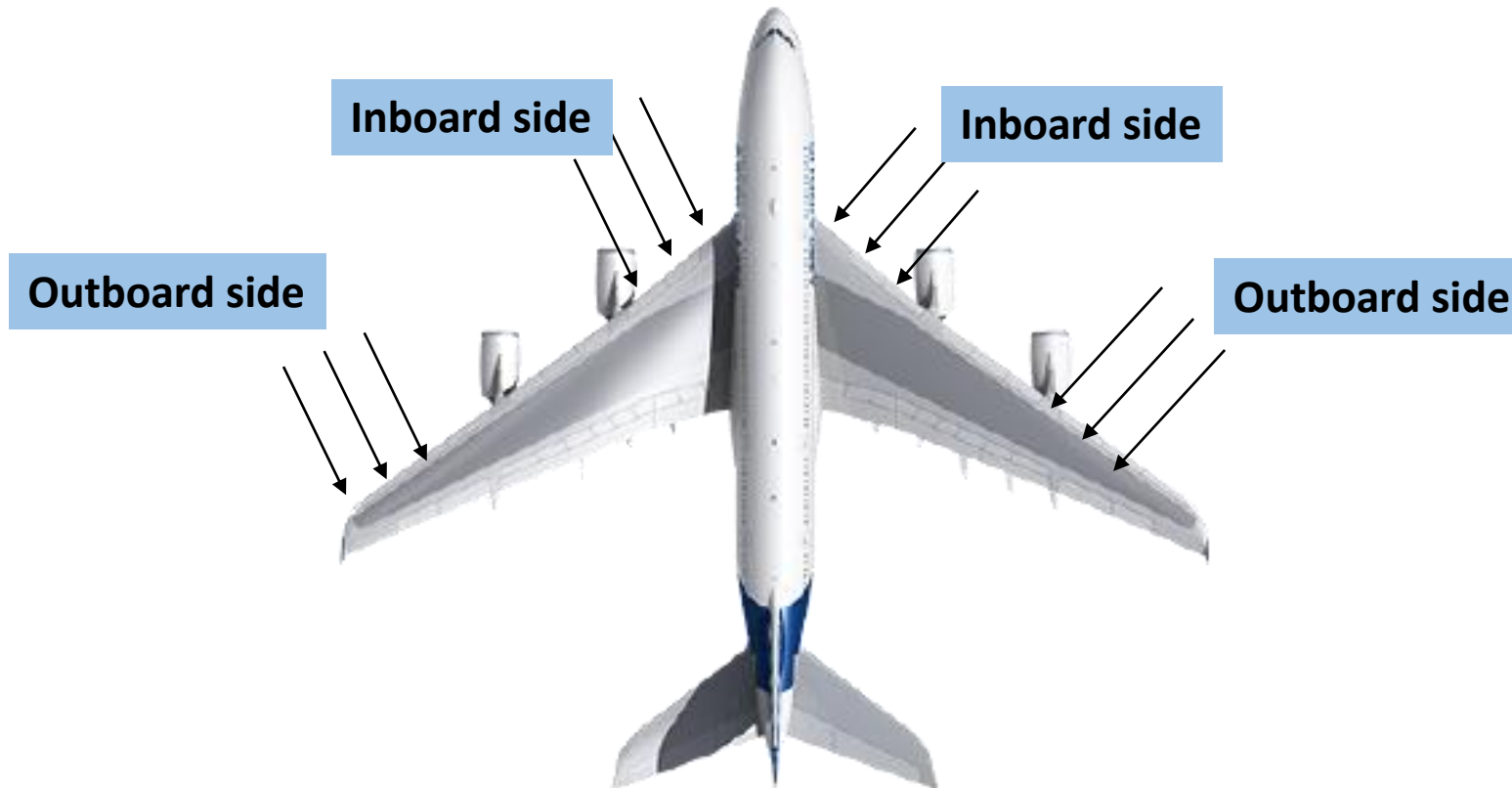
In the old times, Most of the sailors were right handed so steering oar is placed at right of the stern. Sailors began calling the right side the steering side, which soon became "starboard" by combining two Old English words: stéor (meaning "steer") and bord (meaning "the side of a boat").

- **Inboard Side Wing :-**

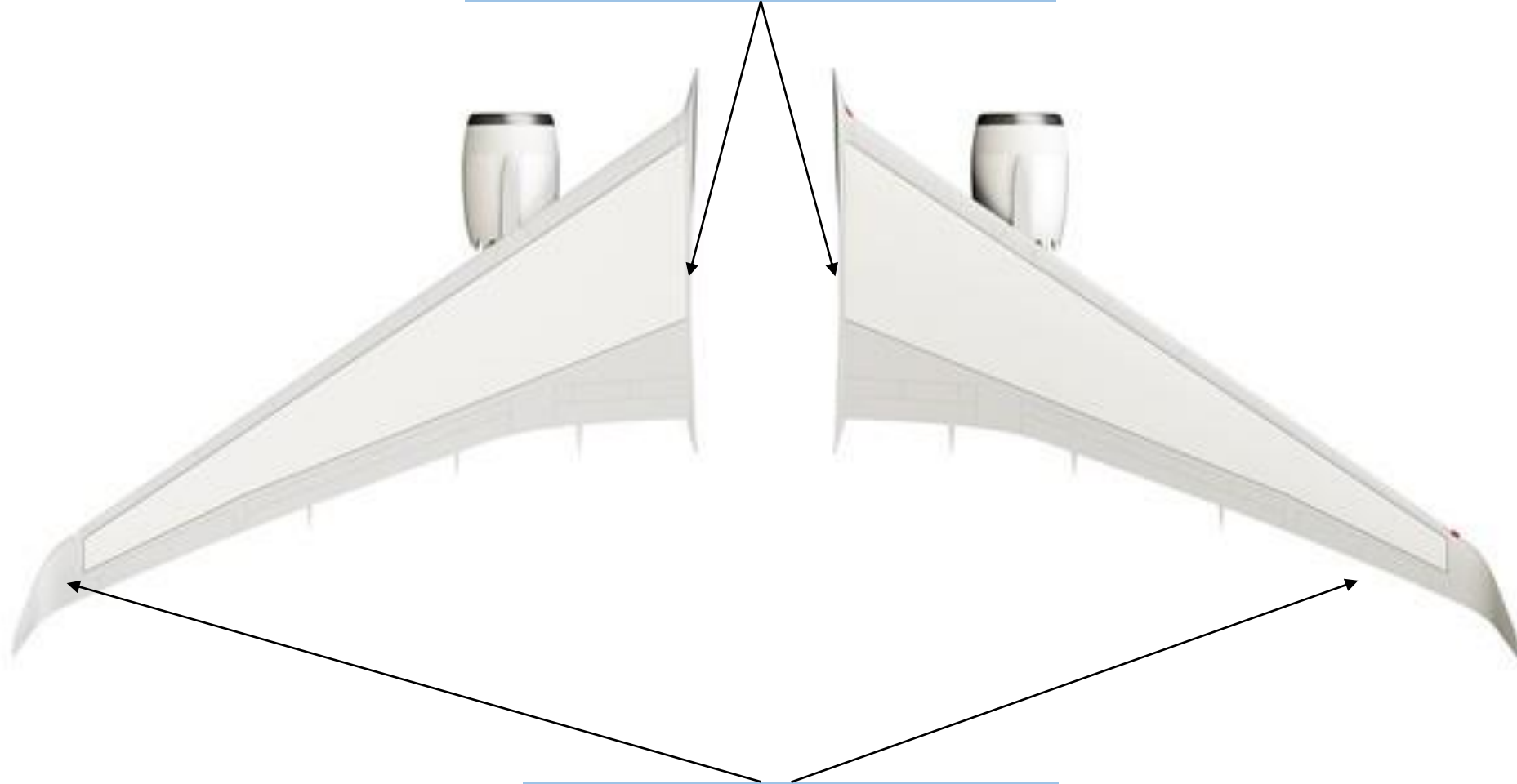
The wing portion which is closed to the fuselage

- **Outboard Side Wing :-**

The wing portion which is closed to the wing tips.



Root of the Wing



Tip of the Wing

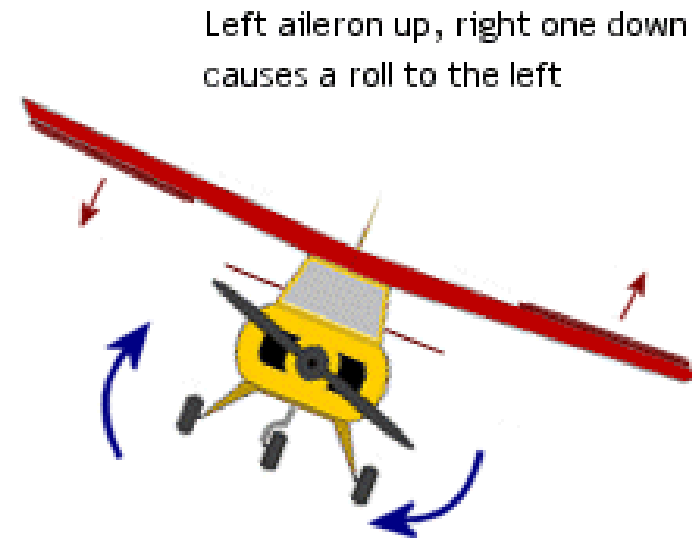
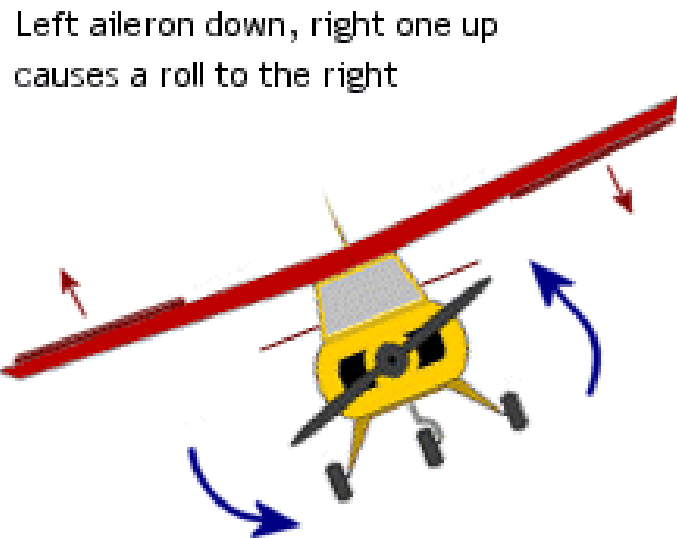
Trailing Edge side of the wing

Leading Edge side of the wing



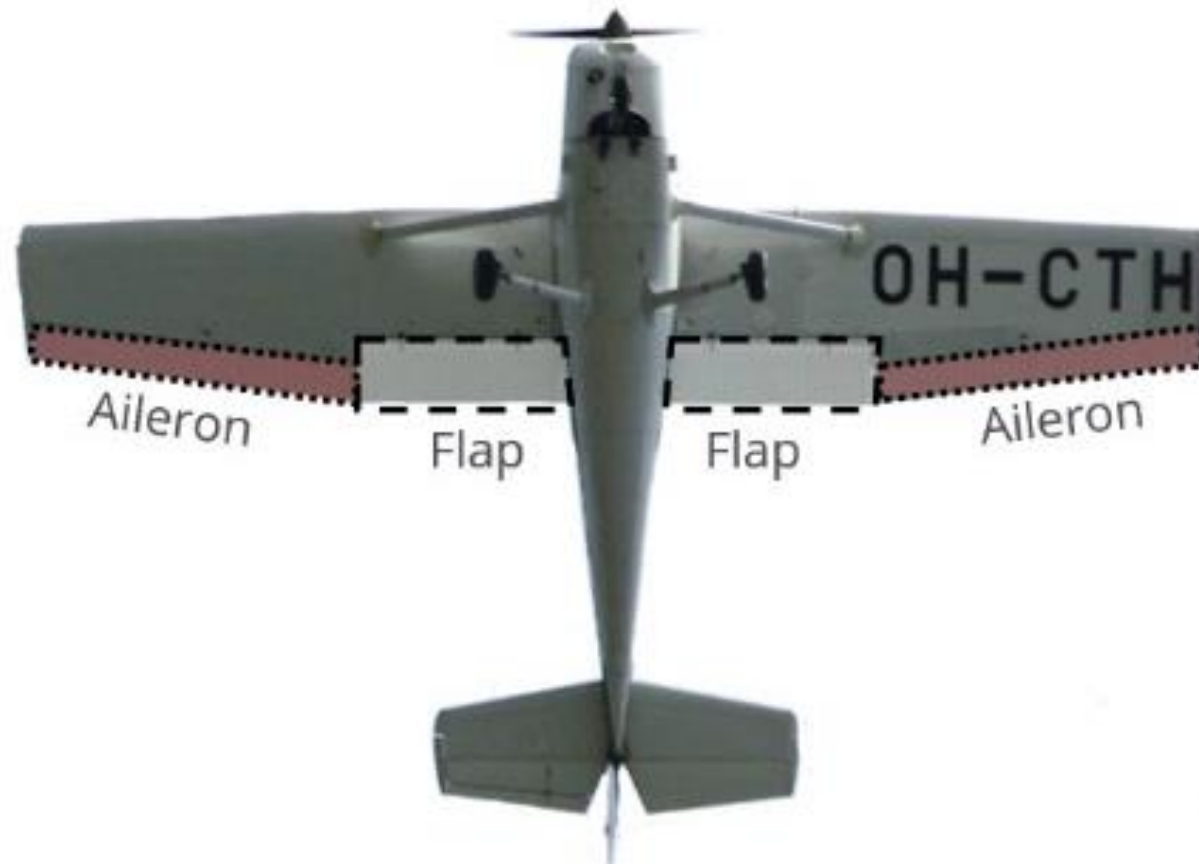
- **Ailerons:-**

- This is the one of the main of Primary Control Surface.
- The hinged control surface located at outboard trailing edge of the wing which controls the rolling moment (lateral moment) of the aircraft.
- Unlike other control surfaces, Ailerons are operated differentially that mean if one aileron move upward then another aileron must do down.



- **Flaps:-**

- It is high lift device. High lift device means which device increase the lift of the wing at low speed.
- The high lift device located at inboard trailing edge of the wing which increase the lift at the time of takeoff and landing.



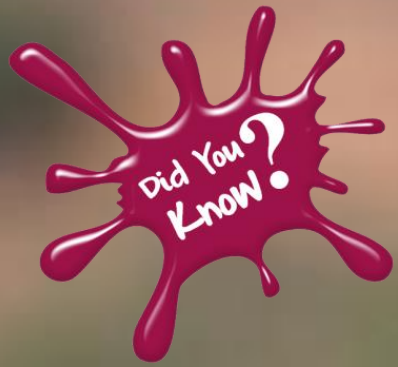
Flaps





- **Winglets:-**

- The small vertical plates are attached to the tip of the wing to reduce induced drag. Curved winglets also called sharklets.



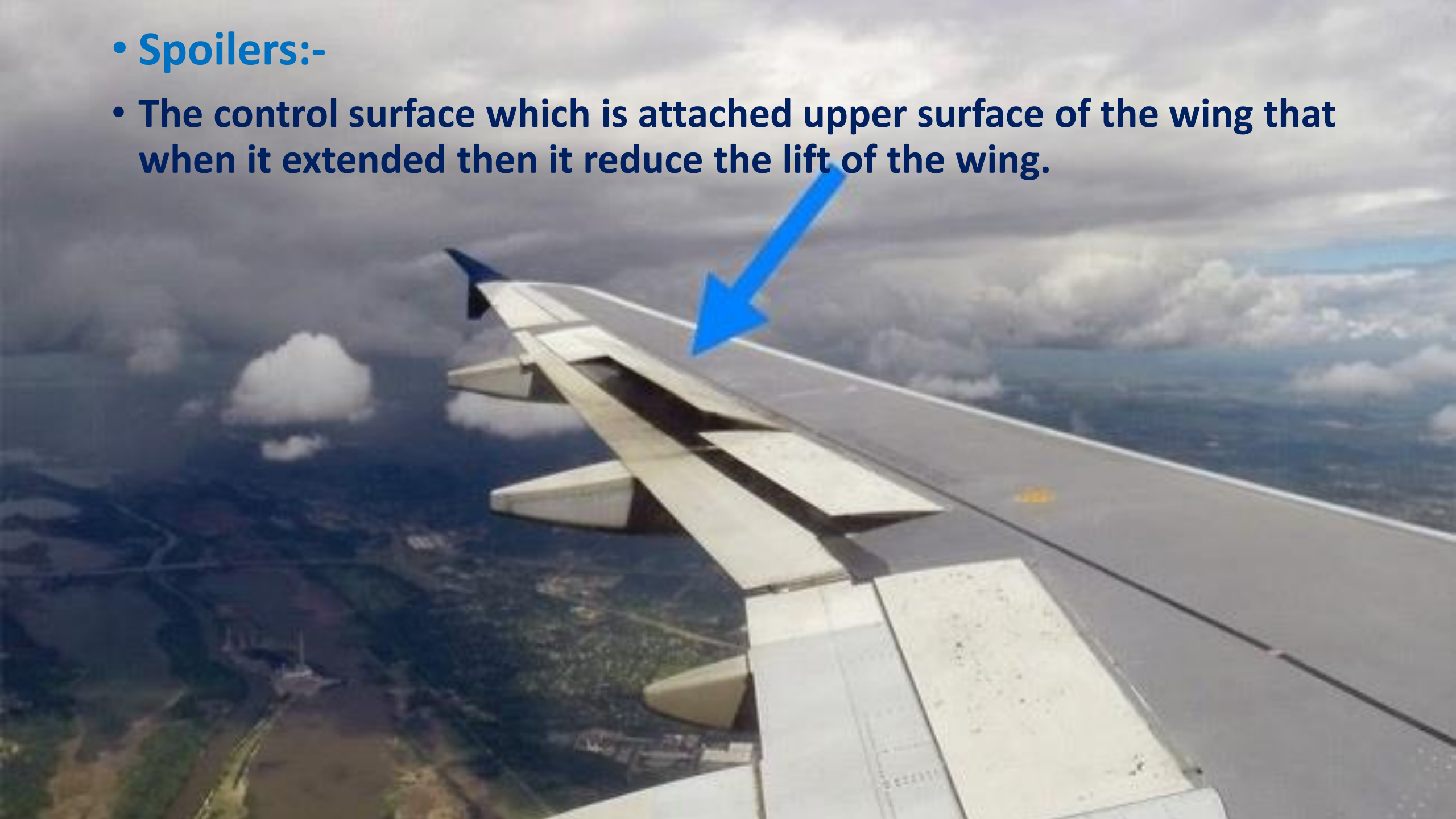
Today's Amazing Fact!!



Birds also have the winglets/ Sharklets

- **Spoilers:-**

- **The control surface which is attached upper surface of the wing that when it extended then it reduce the lift of the wing.**



- **Speed Brakes:-**

- **It is the drag inducing device that can be mounted on wings, Fuselage in pairs and opens symmetrically.**
- **The main purpose of the speed brake is to increase drag and reduce the speed of the aircraft.**



- **Speed Brakes / Air Brakes:-**
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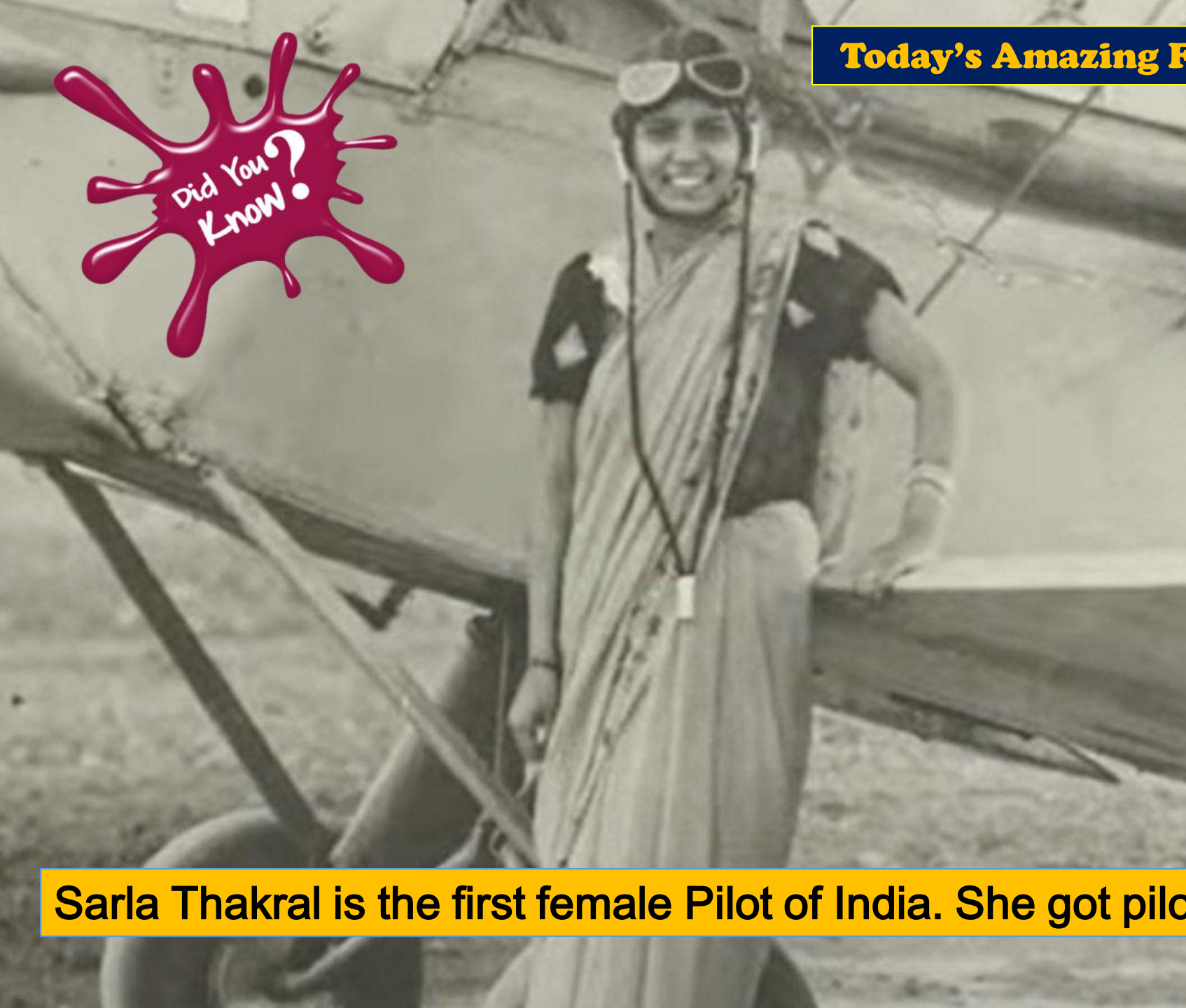
Symmetric Opening speed brakes /air brakes

- **Cockpit:-**

- The accommodation provided for the pilot, From where pilot control aircraft either mechanically or electronically.



Today's Amazing Fact!!



Sarla Thakral is the first female Pilot of India. She got pilot license in 1936 at age of 21.

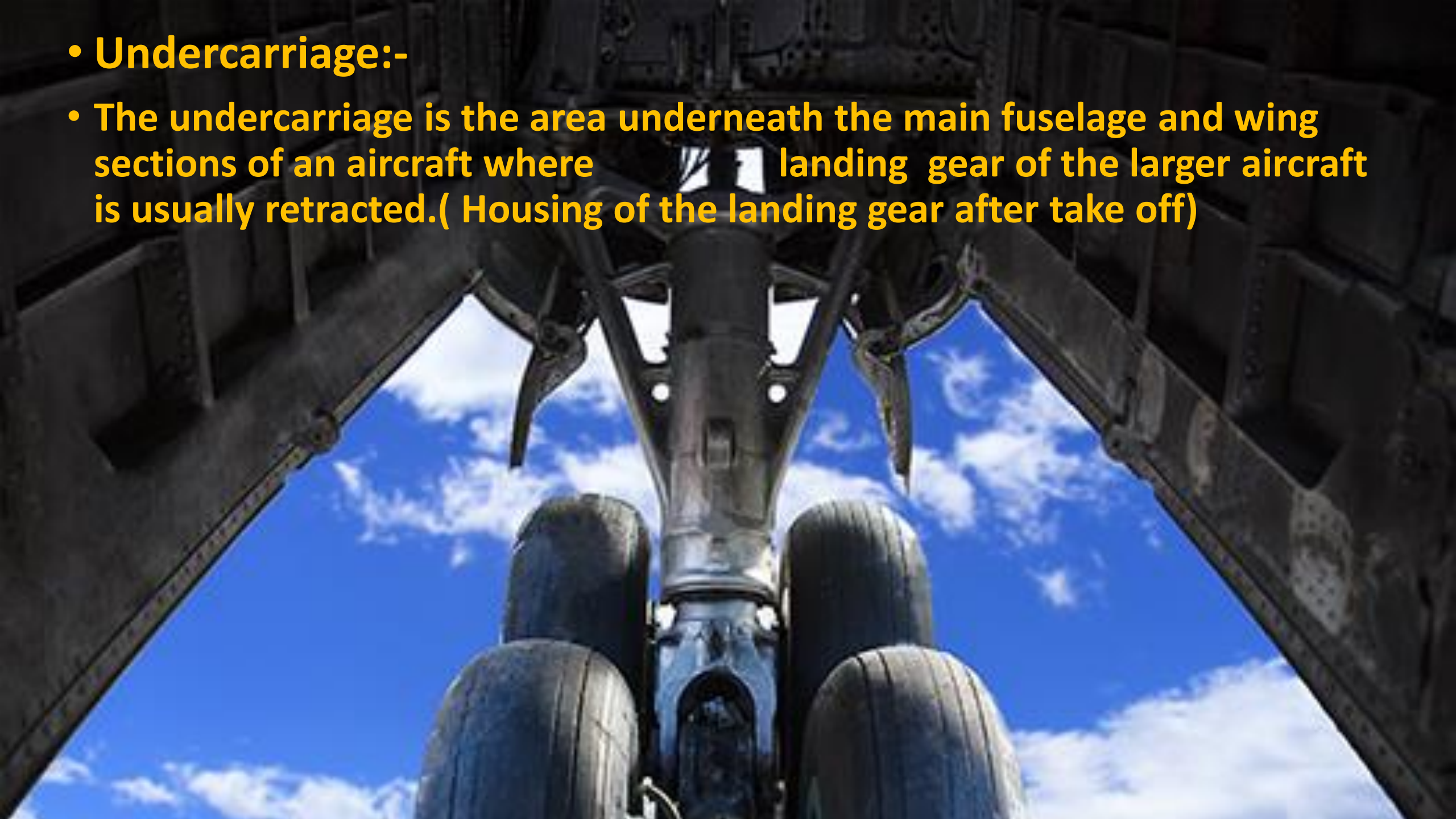
- **Propeller:-**

- It is radially mounted blades on the hub that converts mechanical energy to thrust.
- Propellers are actually used to push air backward to move aircraft forward.



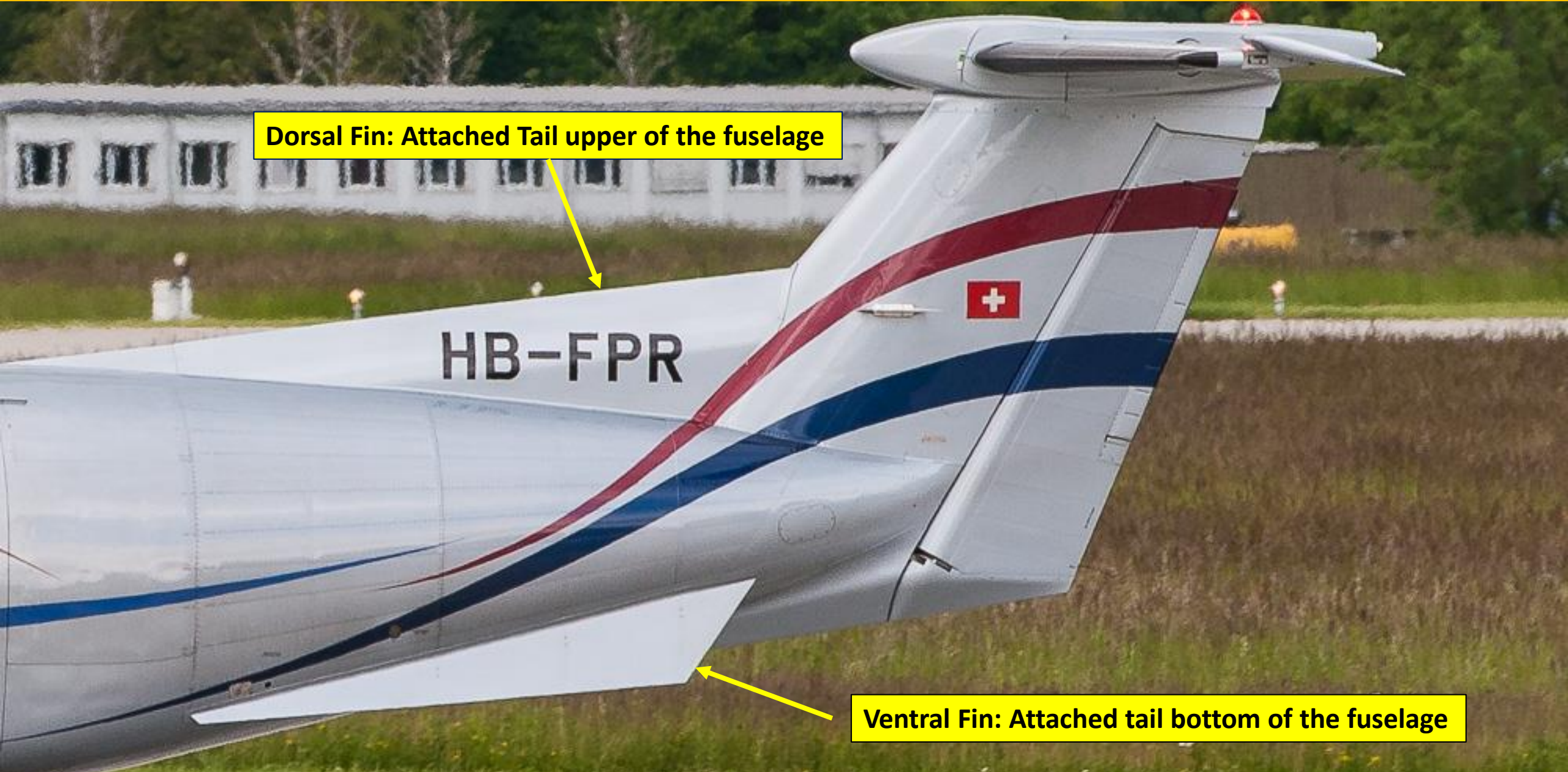
- **Undercarriage:-**

- The undercarriage is the area underneath the main fuselage and wing sections of an aircraft where landing gear of the larger aircraft is usually retracted.(Housing of the landing gear after take off)



Ventral fin & Dorsal Fin

The small fins are attached at tail of the fuselage to increase the directional stability



Dorsal Fin: Attached Tail upper of the fuselage

Ventral Fin: Attached tail bottom of the fuselage

Landing Gear

- The part of the aircraft is used for landing, Take off, Towing & Taxing.





Any Questions



Today's Amazing Fact!!



On Friday, 13th April 2029 an asteroid more than 1000 feet wide will pass by earth closer than moon and easily observed by naked eyes

धन्यवाद

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