Performance
DRONE PILOT TRAINING

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Fundamentals

Aerodynamics

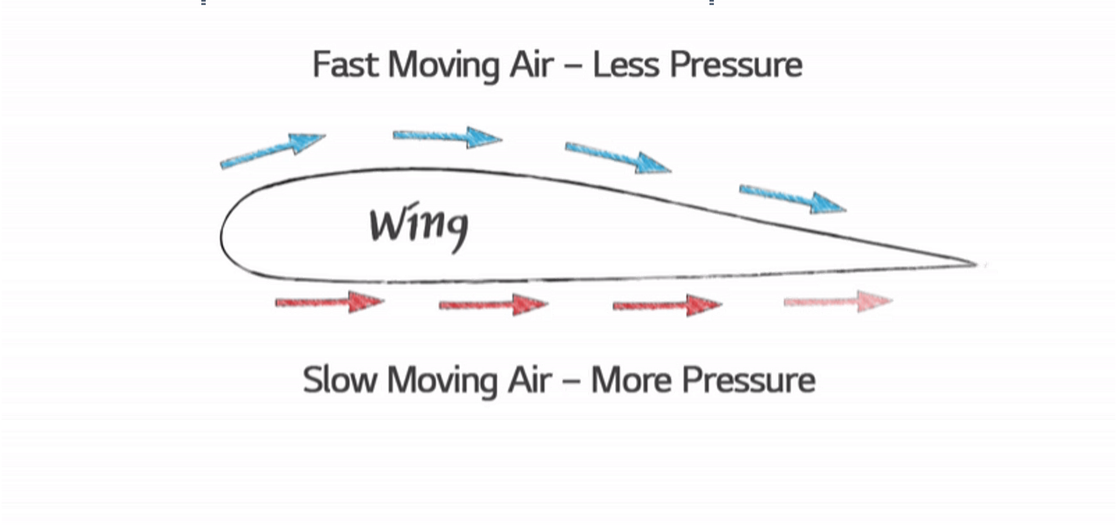
Aerodynamics is the part of fluid mechanics that studies gases in motion and the forces or reactions to which the bodies within them are subjected.

Fundamentals

Basic principles of flight

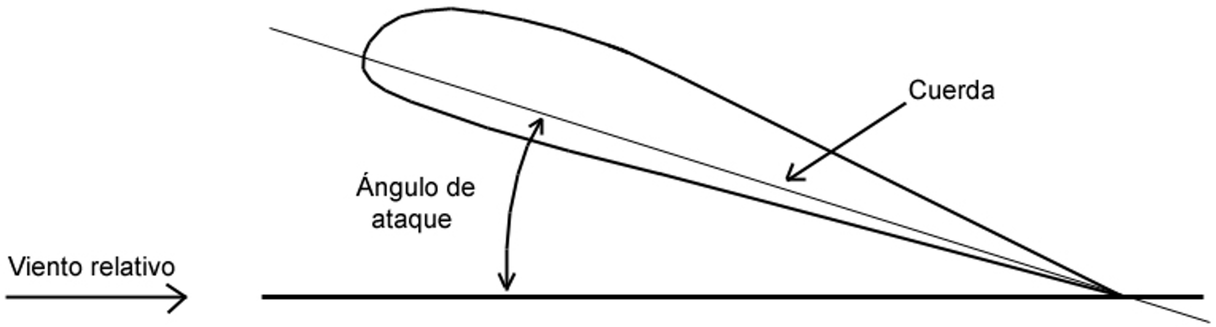
The wing of the aircraft generates lift due to a pressure difference between the upper and lower surface of the wing.

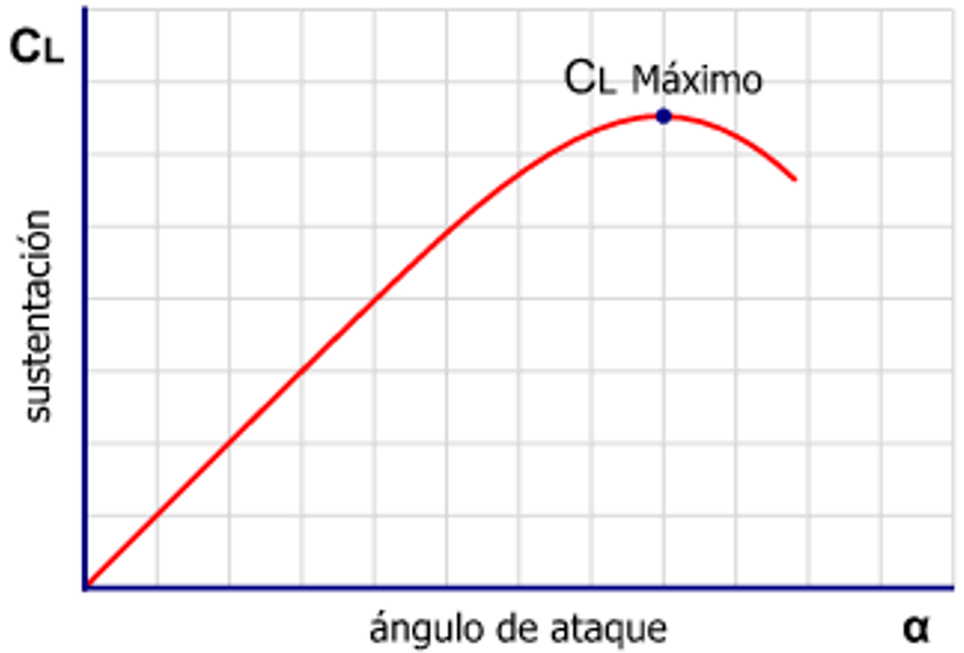
The upper surface of the wing has less static pressure than the lower surface, generating a resultant force against gravity. In subsonic it is explained by the Venturi effect. In a constriction, the circulating air increases its speed and decreases its pressure.



Fundamentals

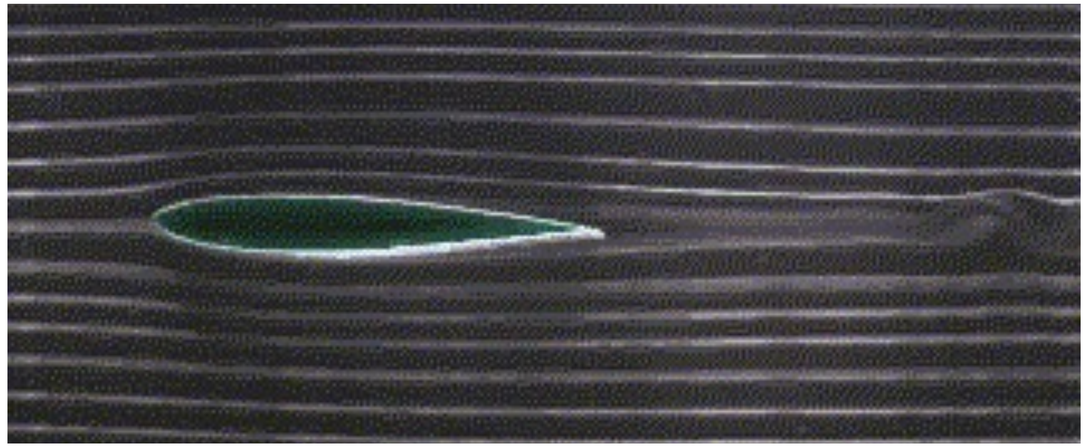
Angle of Attack



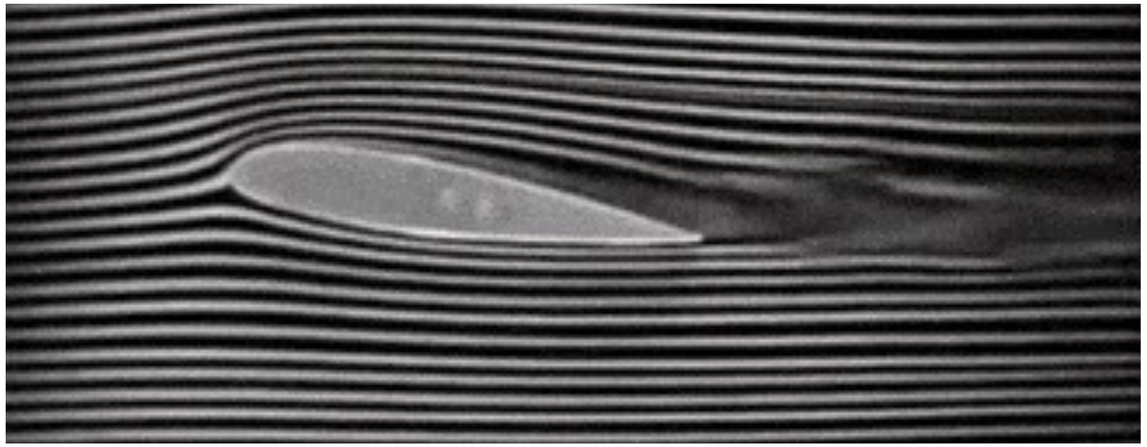


Fundamentals

Angle of Attack



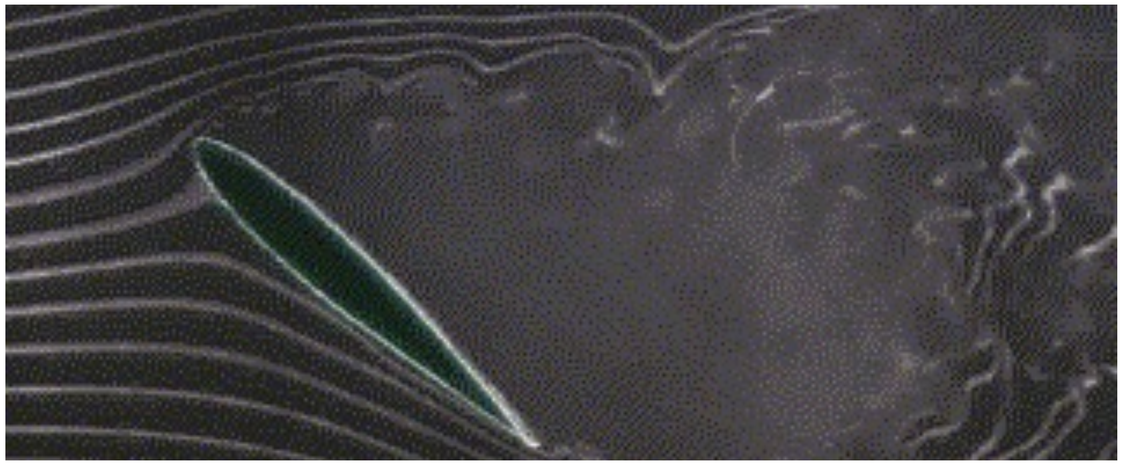
Low Angle of Attack



High Angle of Attack

Fundamentals

Stall

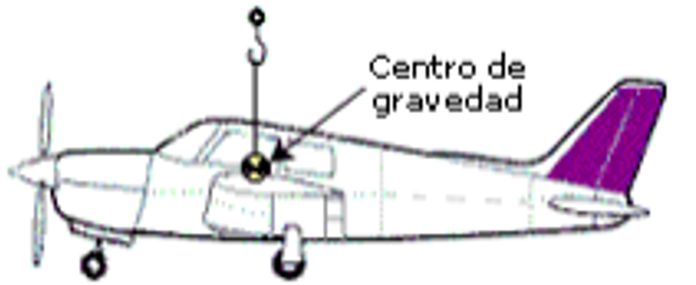


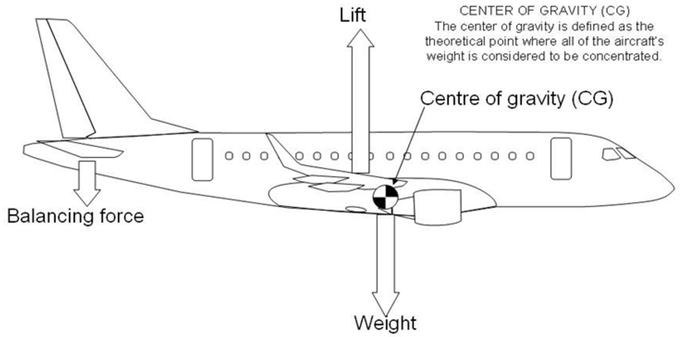
Aerodynamic forces

CG and CP

The center of gravity (C.G.) is the point of application of the resultant of all the forces of gravity that act on the different material masses of the aircraft.

The center of pressure (C.P.) is the point of application of the resultant of all the lift forces acting on the aircraft.





Aerodynamic forces

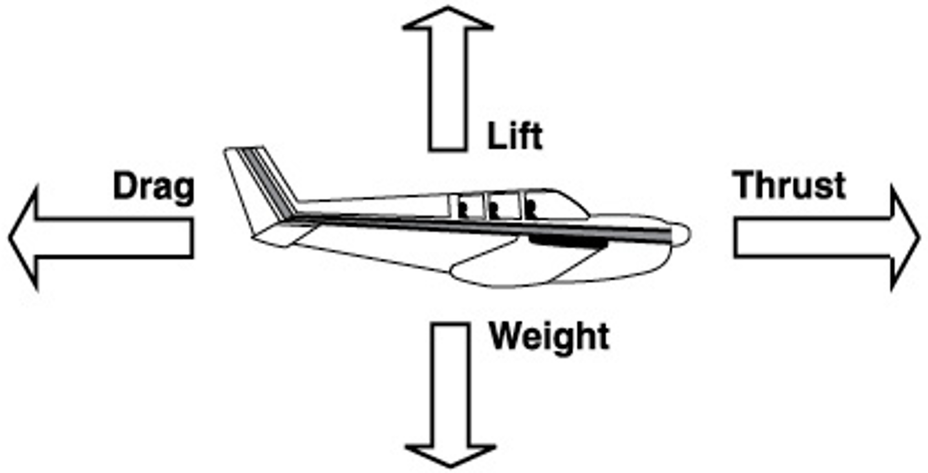
The four forces

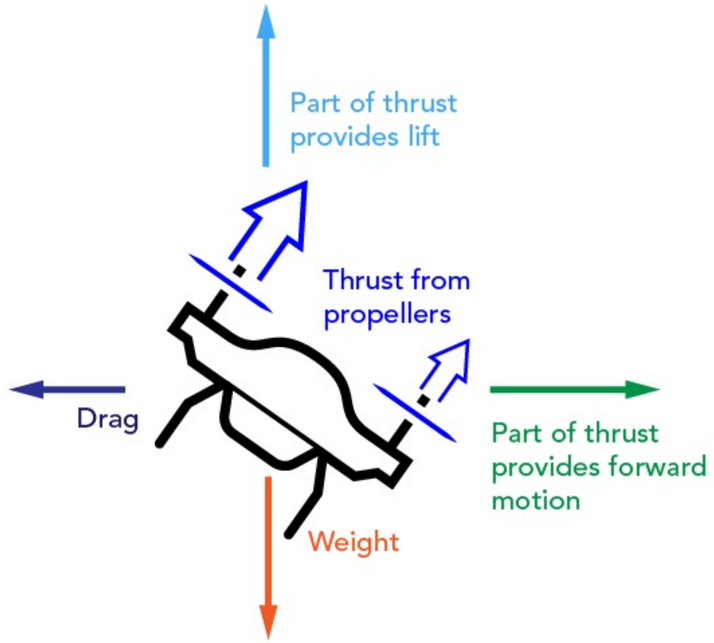
Lift (L)

Weight (W)

Thrust (T)

Drag (D)





Aerodynamic forces

Lift

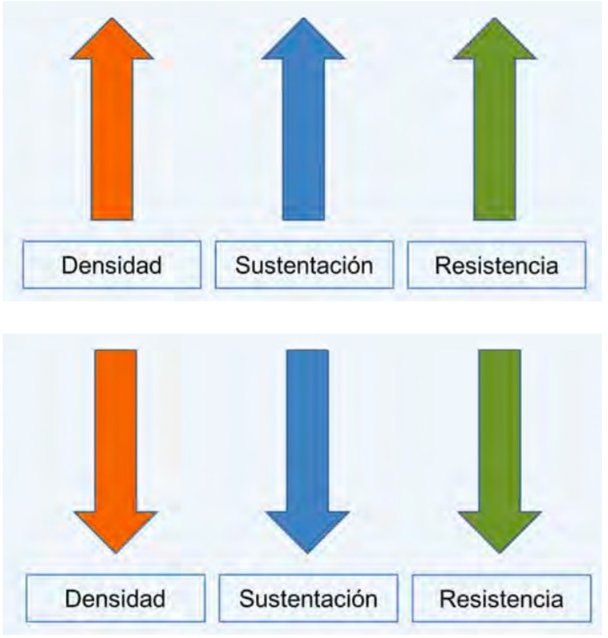
$$L = C_L \frac{1}{2} \rho V^2 S$$

Aerodynamic forces

Density

It is the amount of air mass per unit volume. Air density is greatly influenced by atmospheric conditions. It varies as follows:

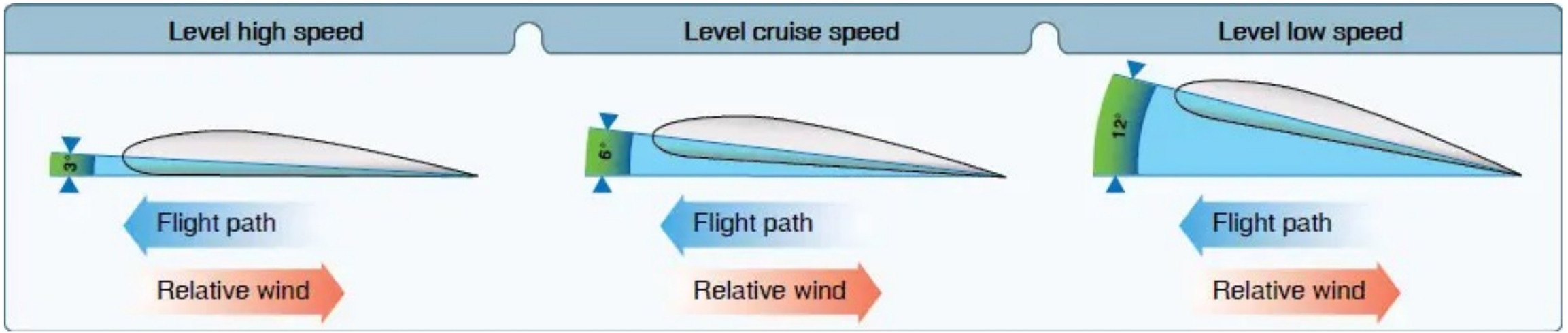
High density	Low density
- Temperature	+ Temperature
+ atmospheric pressure	- atmospheric pressure
- Altitude	+ Altitude
- Humidity	+ Humidity



Flight dynamics

Level Flight

$$L = C_L \frac{1}{2} \rho V^2 S$$



Flight dynamics

Climb

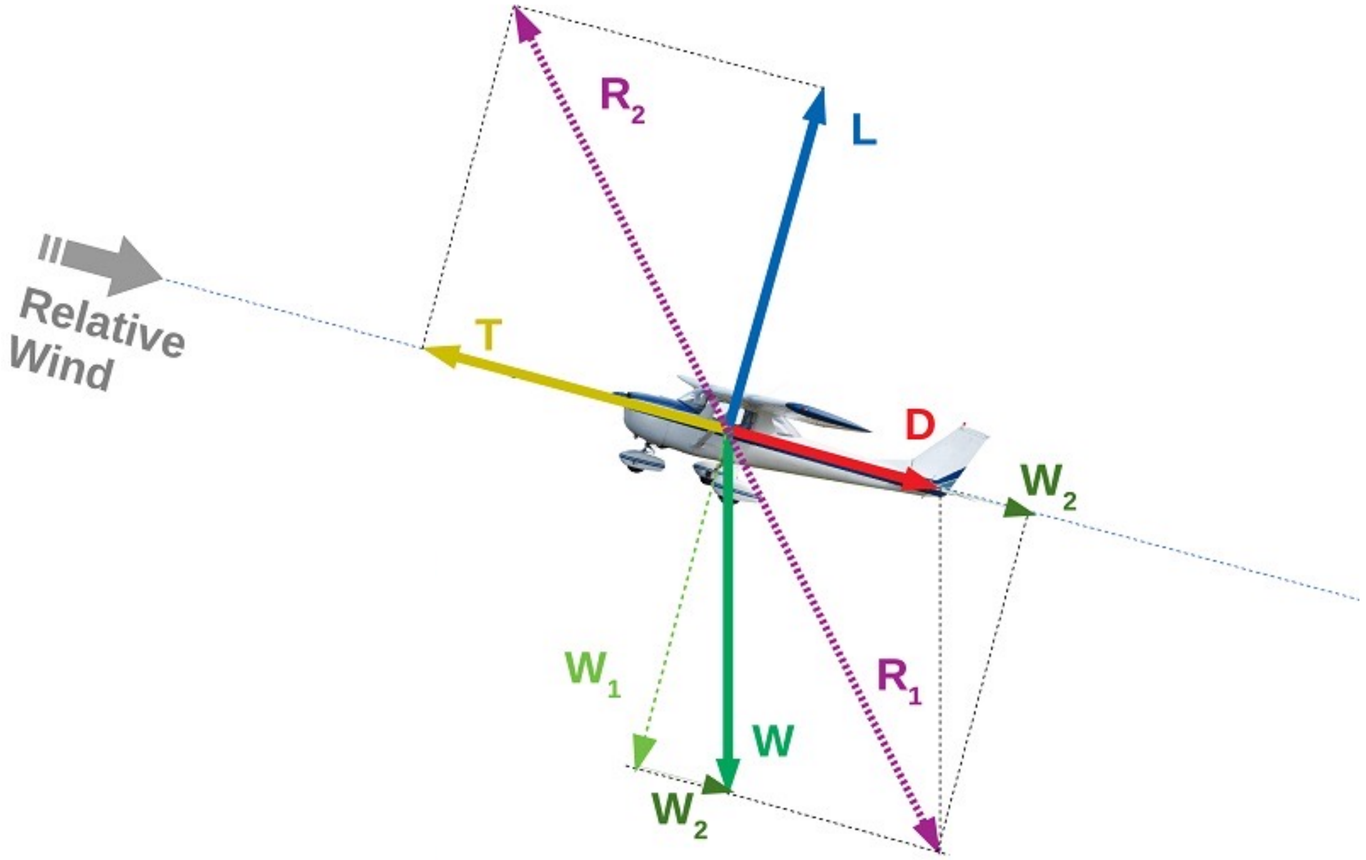
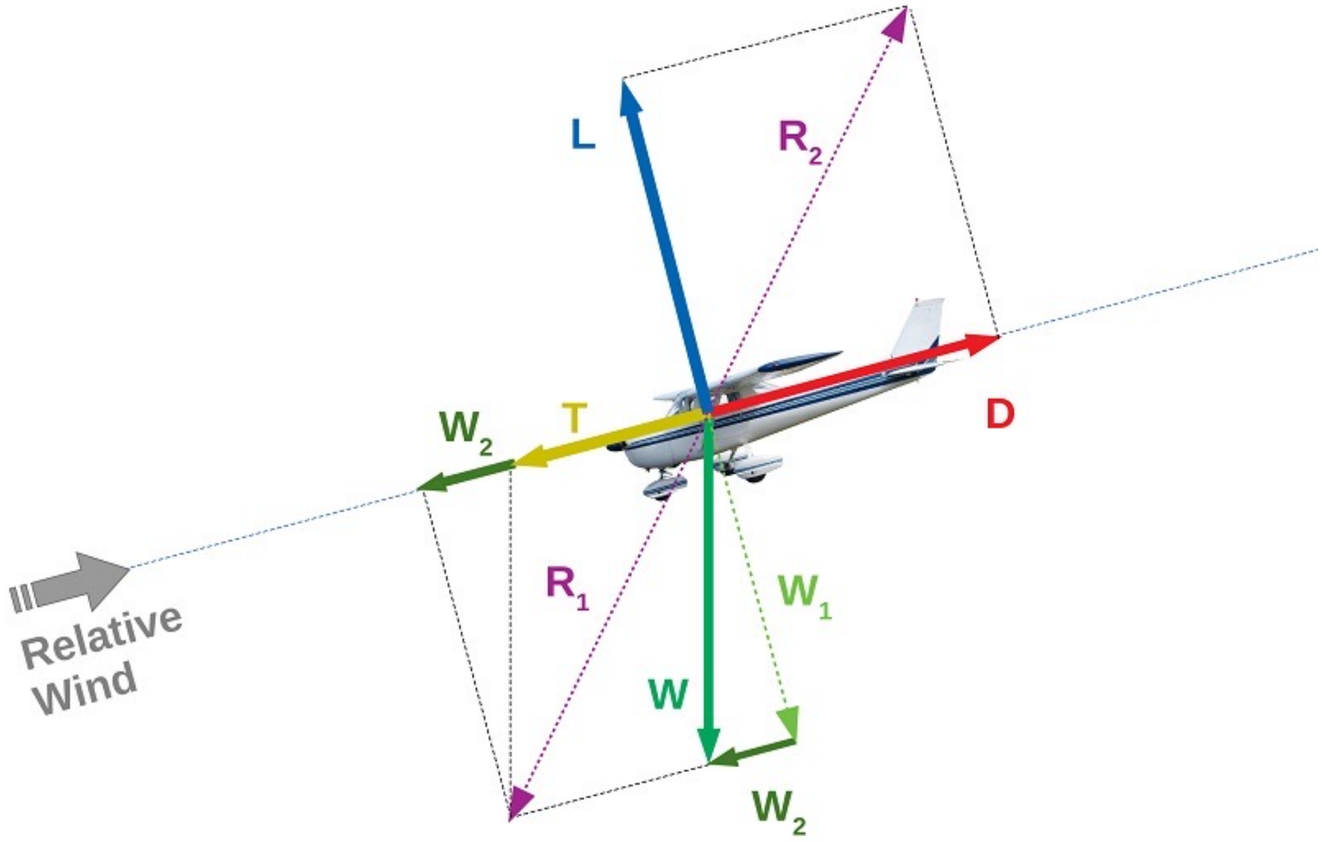


Figure 5

$$L = C_L \frac{1}{2} \rho V^2 S$$

Flight dynamics

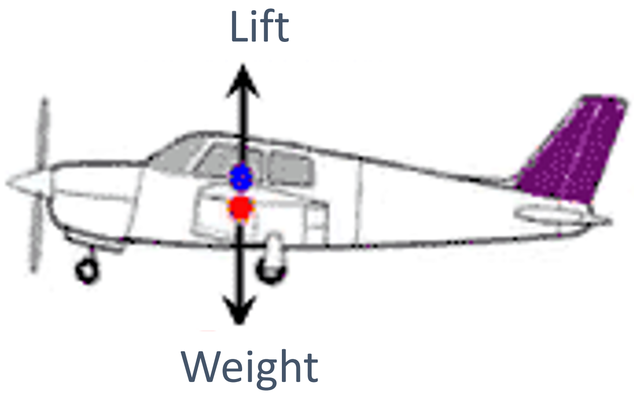
Descent

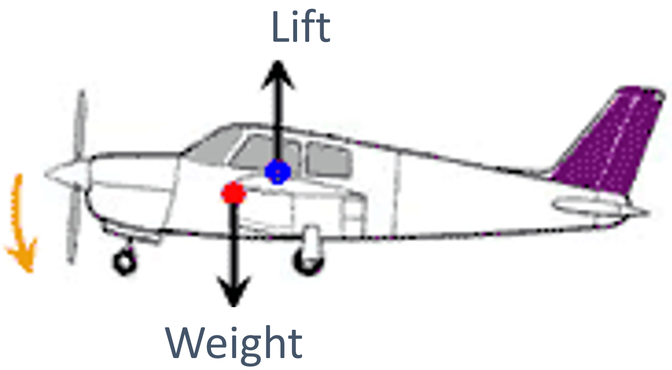


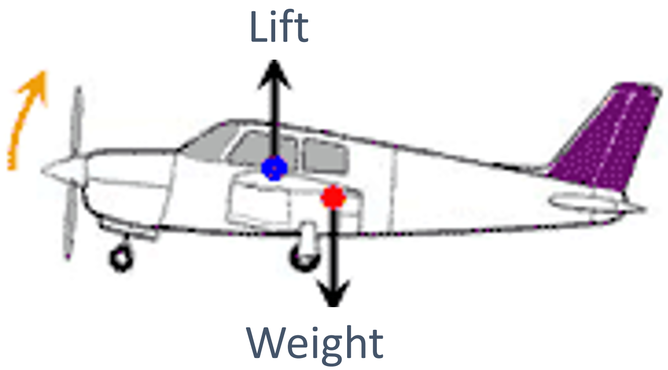
$$L = C_L \frac{1}{2} \rho V^2 S$$

Stability and maneuverability

CP and CG

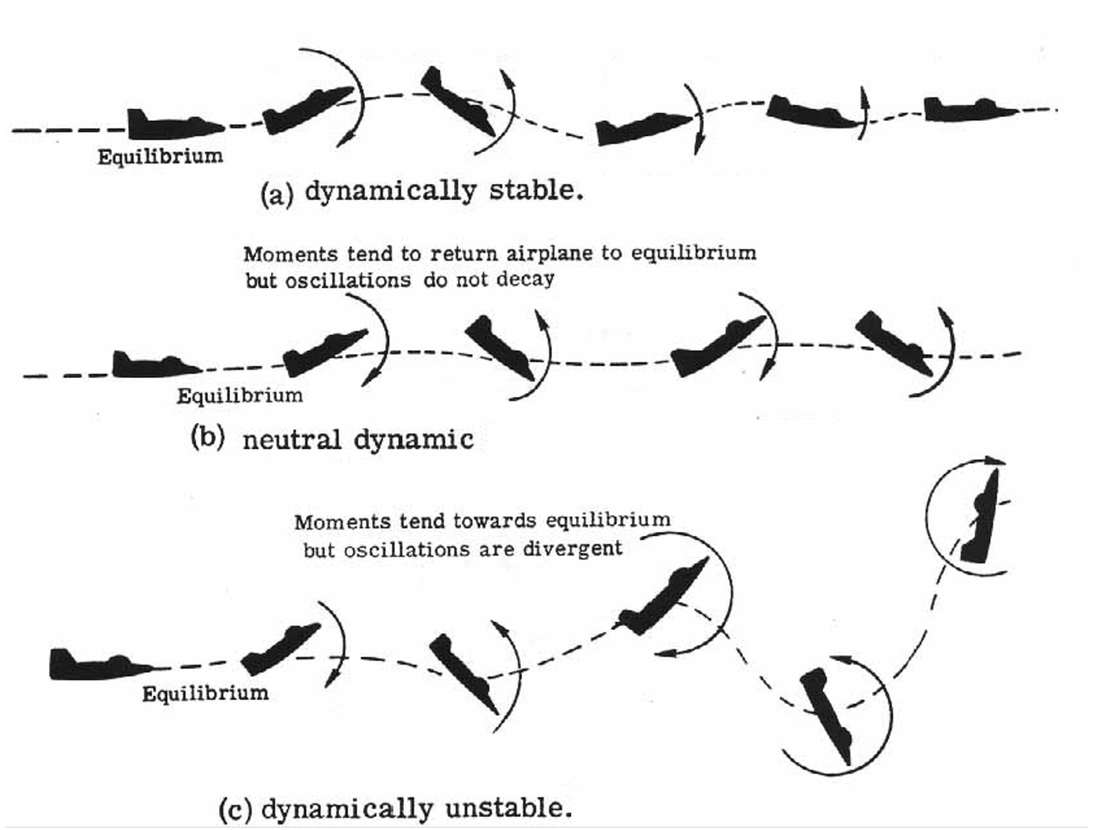


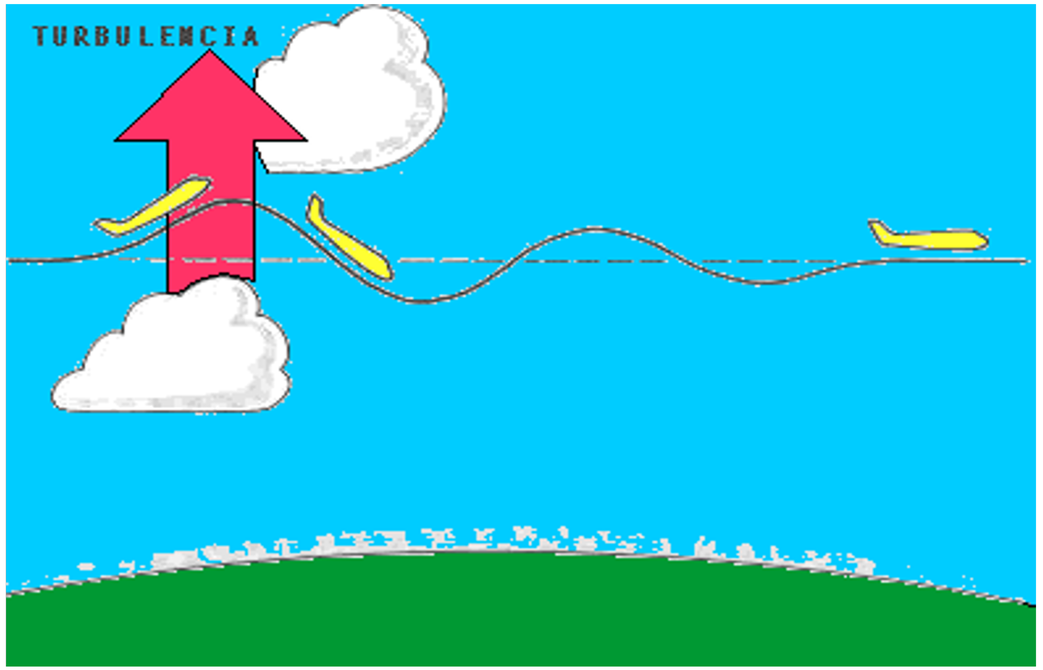




Stability and maneuverability

Behaviour





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