

Forces

The forces that act on an aircraft and makes it fly are: Lift, Weight, Thrust, Drag.
In level flight, the lift and weight are equal. In order to move forward, the Thrust vector must be greater than the drag. Changes in any of the vectors will have a direct effect on the aircraft response. It will climb, descent, slow down or pick up speed.

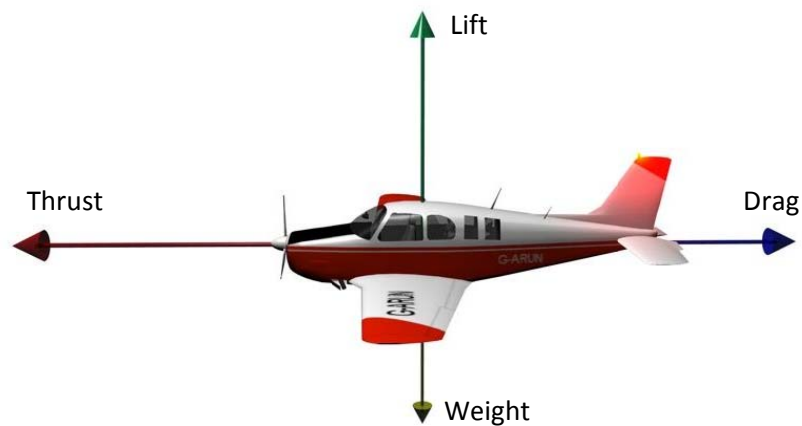
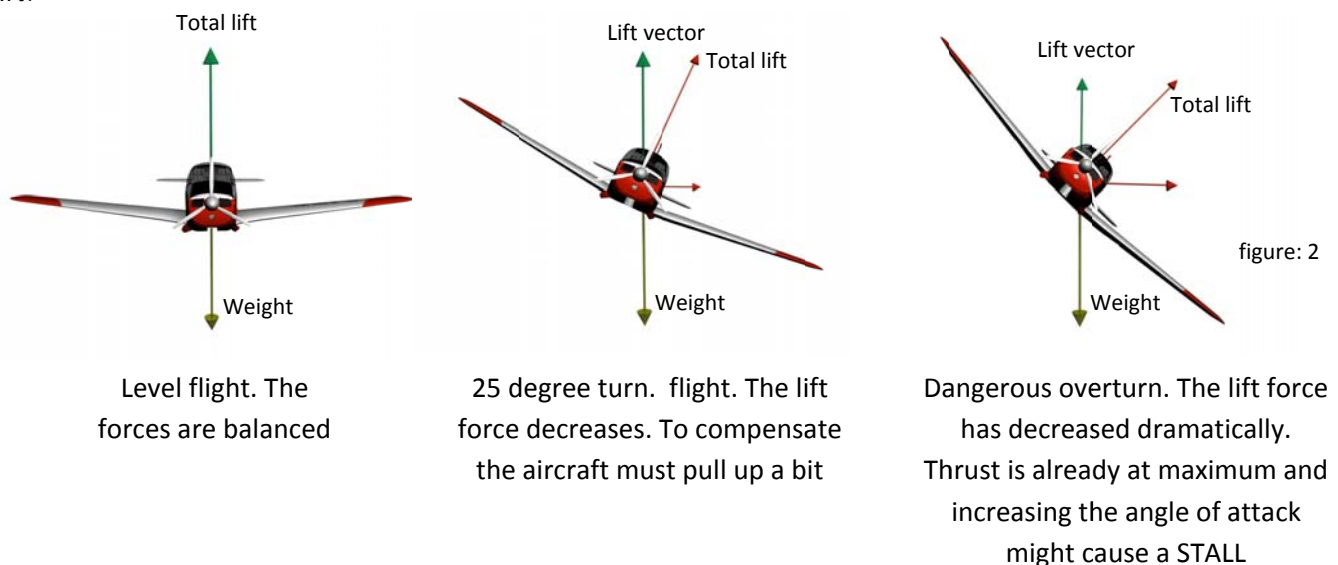


figure: 1

Turning

During a turn the force vectors will change. In order to maintain flight, depending on the situation, thrust must be increased or the angle of attack to compensate for the loss of lift.



Level flight. The forces are balanced

25 degree turn. flight. The lift force decreases. To compensate the aircraft must pull up a bit

Dangerous overturn. The lift force has decreased dramatically. Thrust is already at maximum and increasing the angle of attack might cause a STALL

Basic control Surfaces

Aircraft flight control surfaces allow a pilot to adjust and control the aircraft's flight attitude

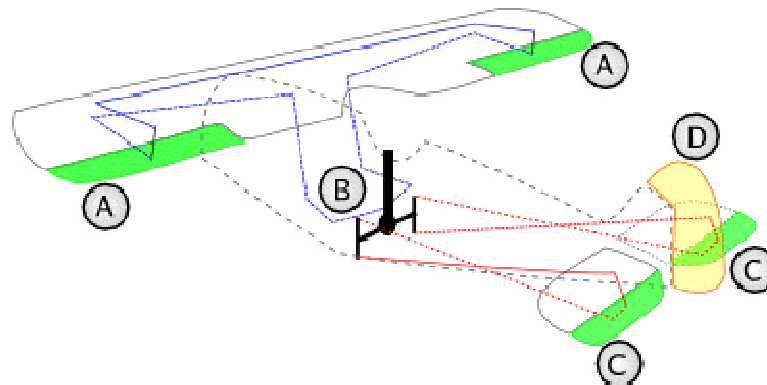


figure: 3

A: Ailerons

The ailerons are the primary control surfaces of bank (rolling)

C: Elevators

The elevators are the primary control surfaces for pitch (pitching)

D: Rudder

The rudders are the primary control surfaces for yaw (yawing)

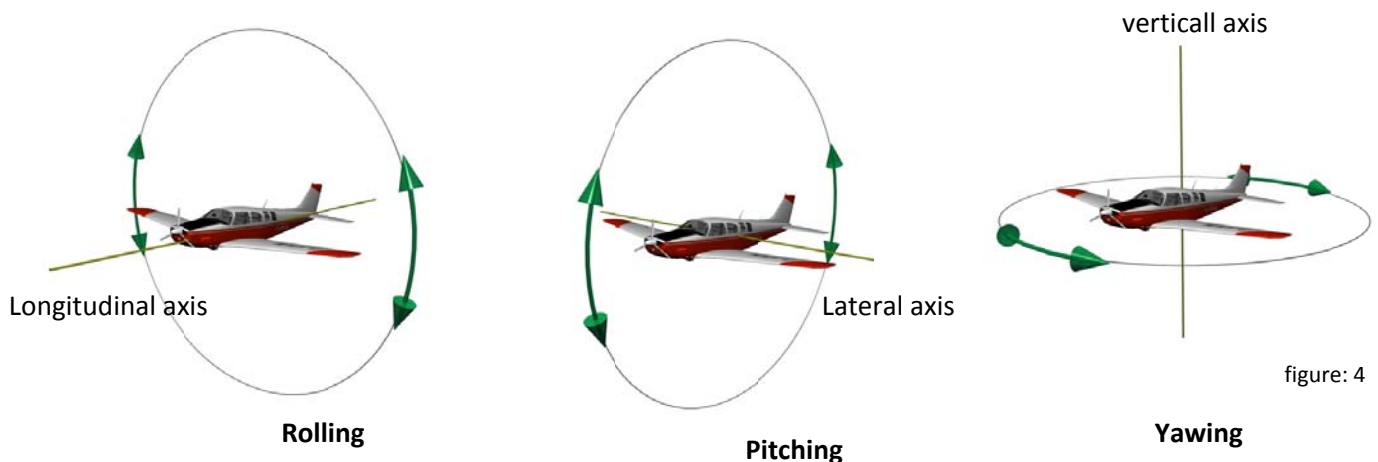


figure: 4

The longitudinal axis passes through the aircraft from nose to tail. Rolling motion changes the orientation of the aircraft's wings with respect to the downward force of gravity. The pilot changes bank angle by increasing the lift on one wing and decreasing it on the other. This differential lift causes bank rotation around the longitudinal axis. The ailerons are the primary control of bank. The rudder also has a secondary effect on bank.

The lateral axis passes through an aircraft from wingtip to wingtip. Pitch changes the vertical direction that the aircraft's nose is pointing.

The vertical axis passes through an aircraft from top to bottom. Yaw changes the direction the aircraft's nose is pointing. Ailerons also have a secondary effect on yaw.



NAVIGATION

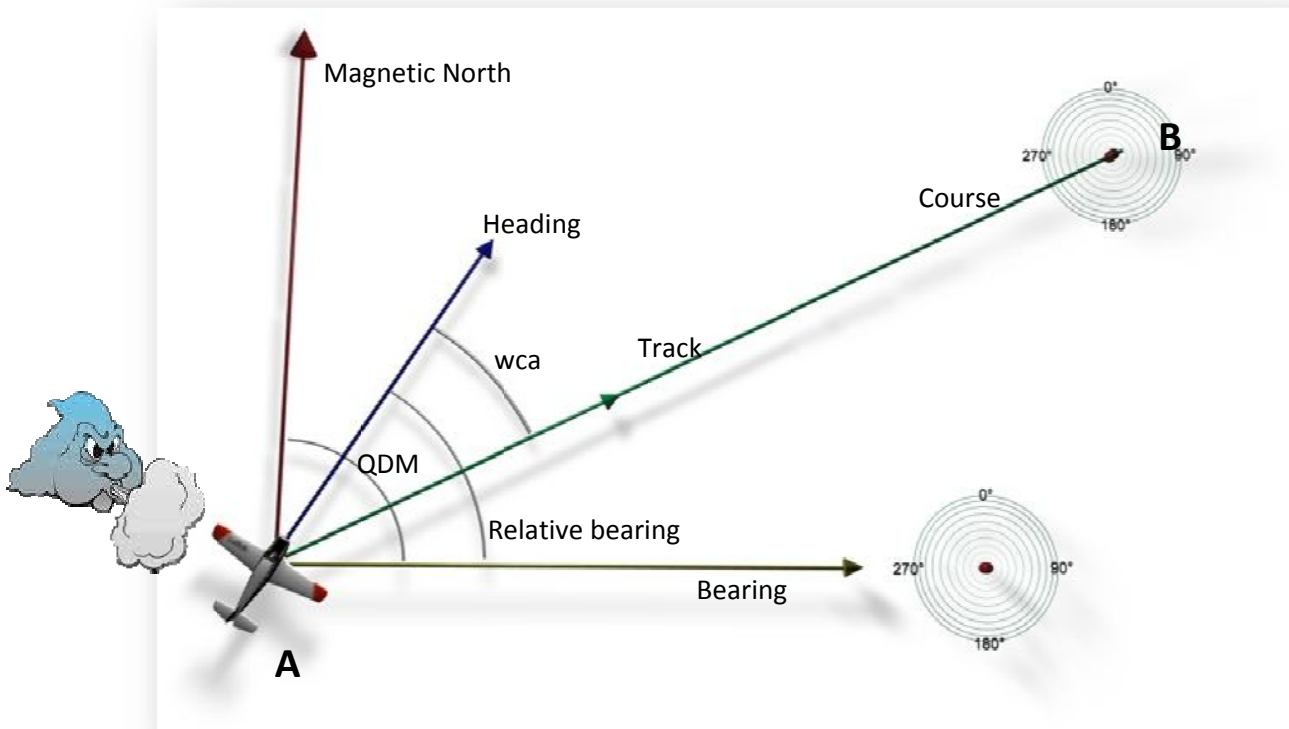


figure: 5

Heading

The heading is the direction that the aircraft's nose is pointing.

Track/Course

The track or *course over ground* is the actual path followed by the aircraft from A to B

Crosswinds deflect the aircraft from its original heading. The amount of this deflection depends on the aircraft speed, the wind speed and the angle of the wind in relation to the aircraft. In order to fly a specific track/course, the wind correction angle (WCA) is computed in advance and is frequently checked while "enroute"

The angle between heading and track is also known as the drift angle or crab angle.

Bearing

The bearing is the direction from your location to any distant point in degrees based on the magnetic north (QDM) or the aircraft heading (relative bearing).

In fig 5 the QDM (magnetic bearing to the station) is approx. 90° while the Relative bearing to the station is approx. 60°

