

International Conference on Teaching and Learning through Games

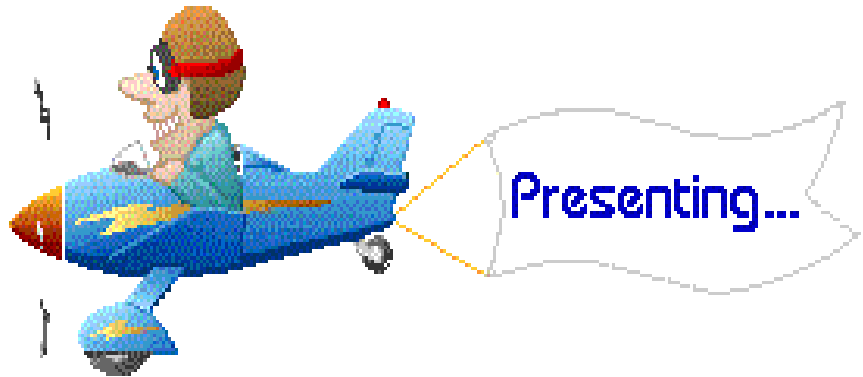
(iCoTLG)

2013



Pullman Hotel

20-22 October 2013



How

L o n g

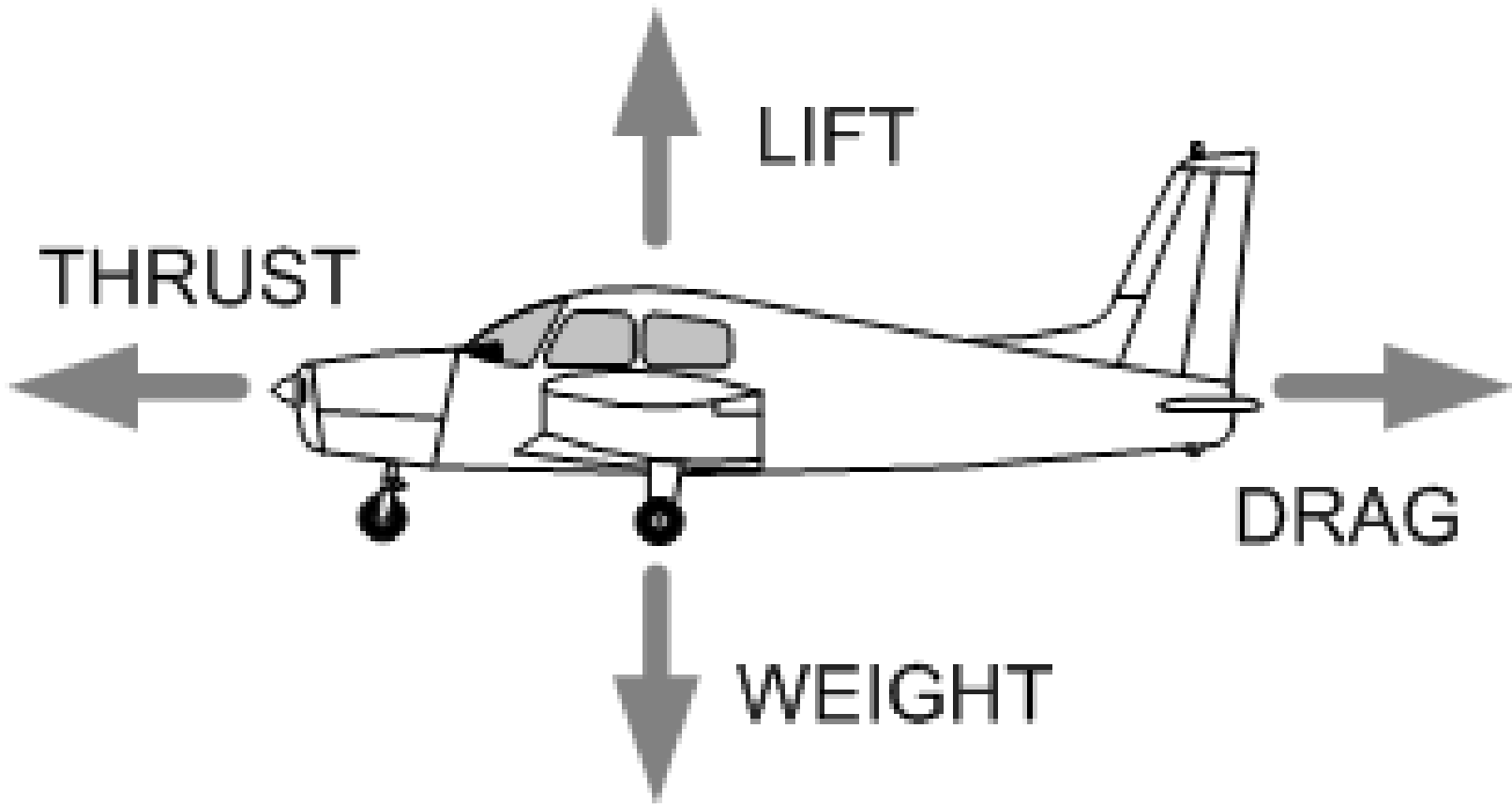
and

f a r

can you fly?

Principles of the Glider Model:

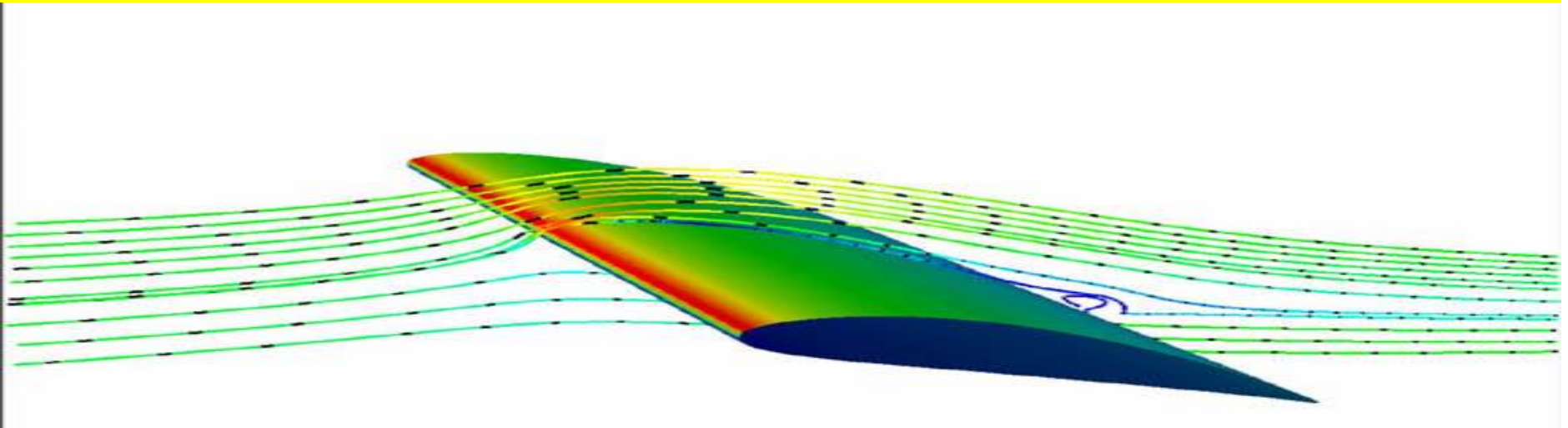
Gliders or sailplanes have no engine. They stay aloft by balancing the forces of



Lift is controlled by three factors:

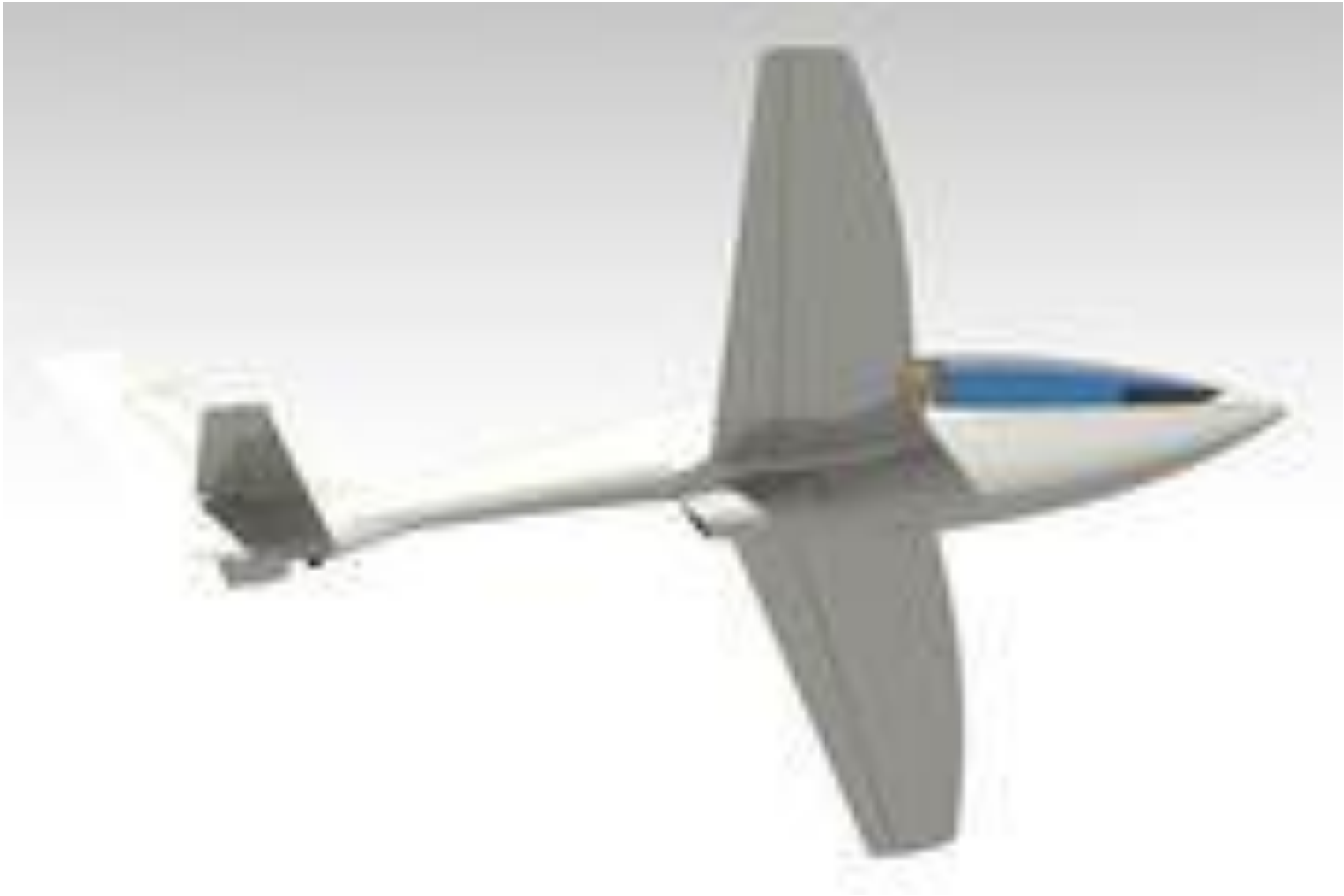
1. **Shape of wings and tails:** Its **aerofoil** shape causes air to flow faster on top than on bottom.

Air flowing faster over the top of aerofoil creates a **low** pressure region at the top (Bernoulli's Principle).

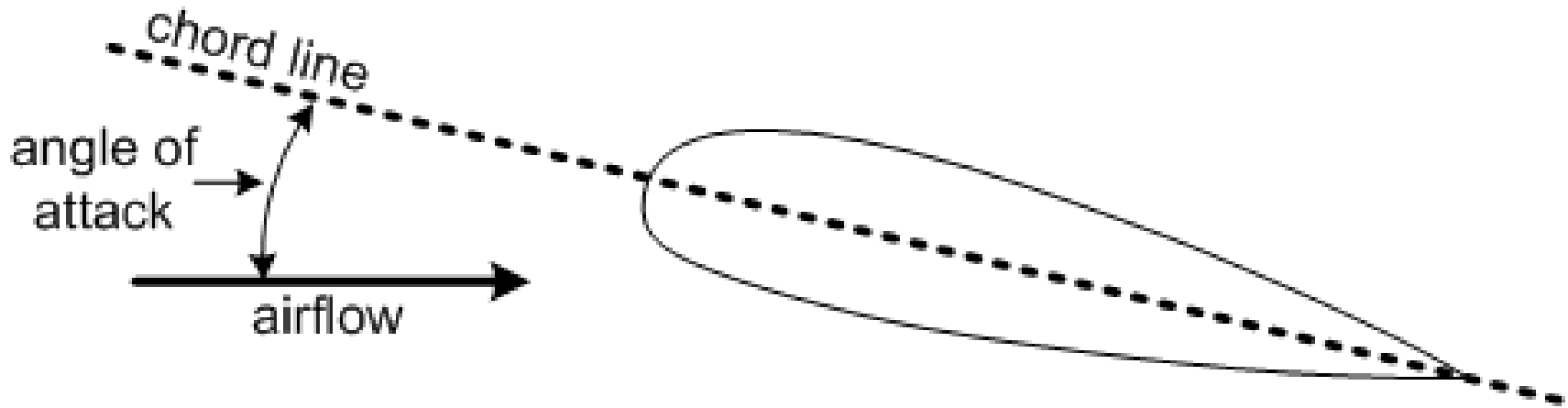


The slower flowing air below creates a **high** pressure region.

2. The greater the **surface area**, the greater the amount of air pushing up on the wing.



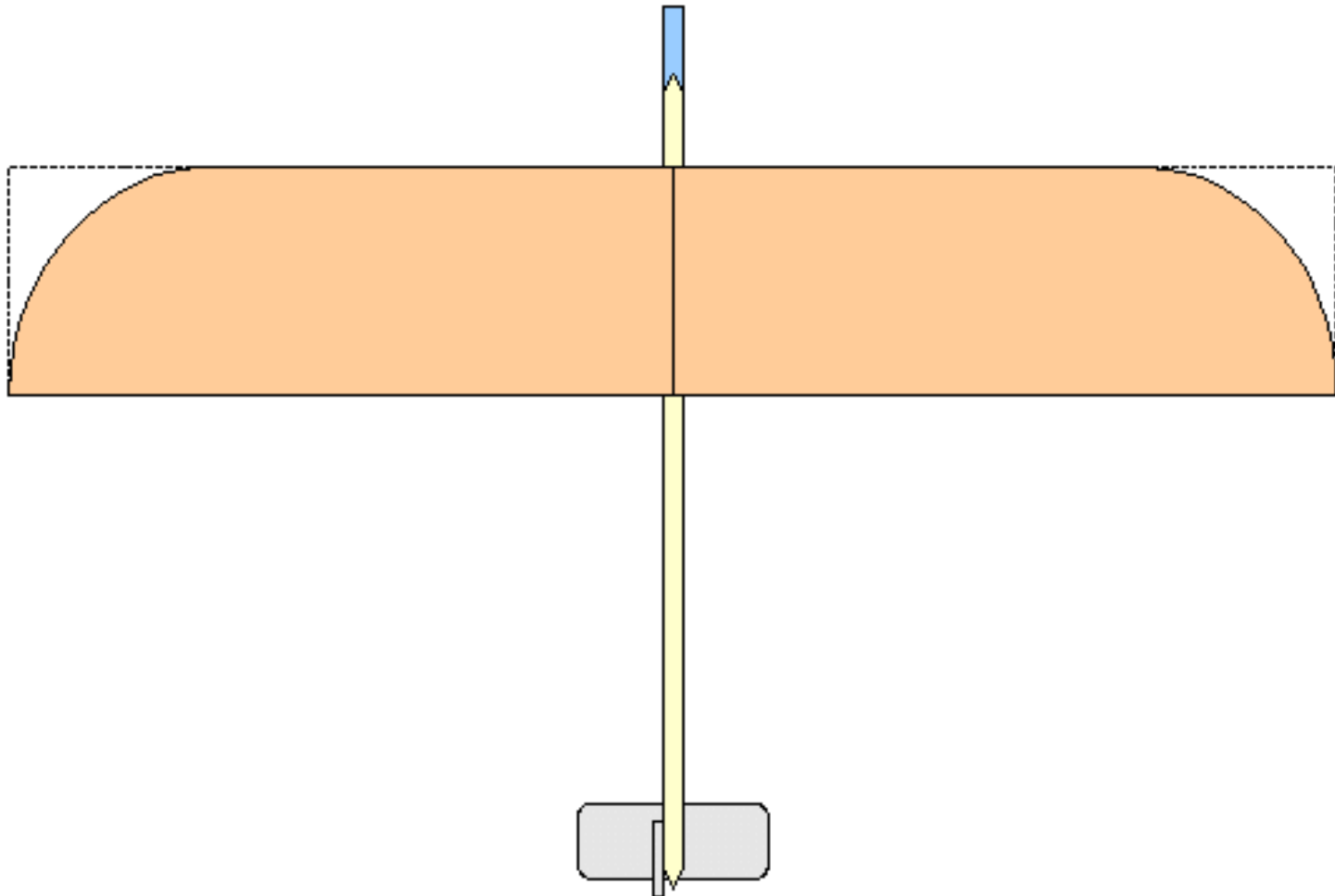
3. **Angle of Attack** - the angle at which the wing strikes the air.



Decreasing the angle of attack means decreasing the amount of air hitting directly on the bottom, which gives the wing **less lift**.

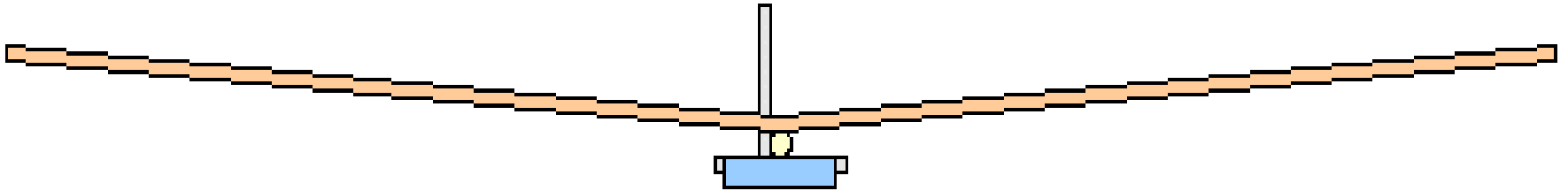
Increasing the angle of attack will generate **more lift but less speed** - *but only up to a point.*

Building a model airplane

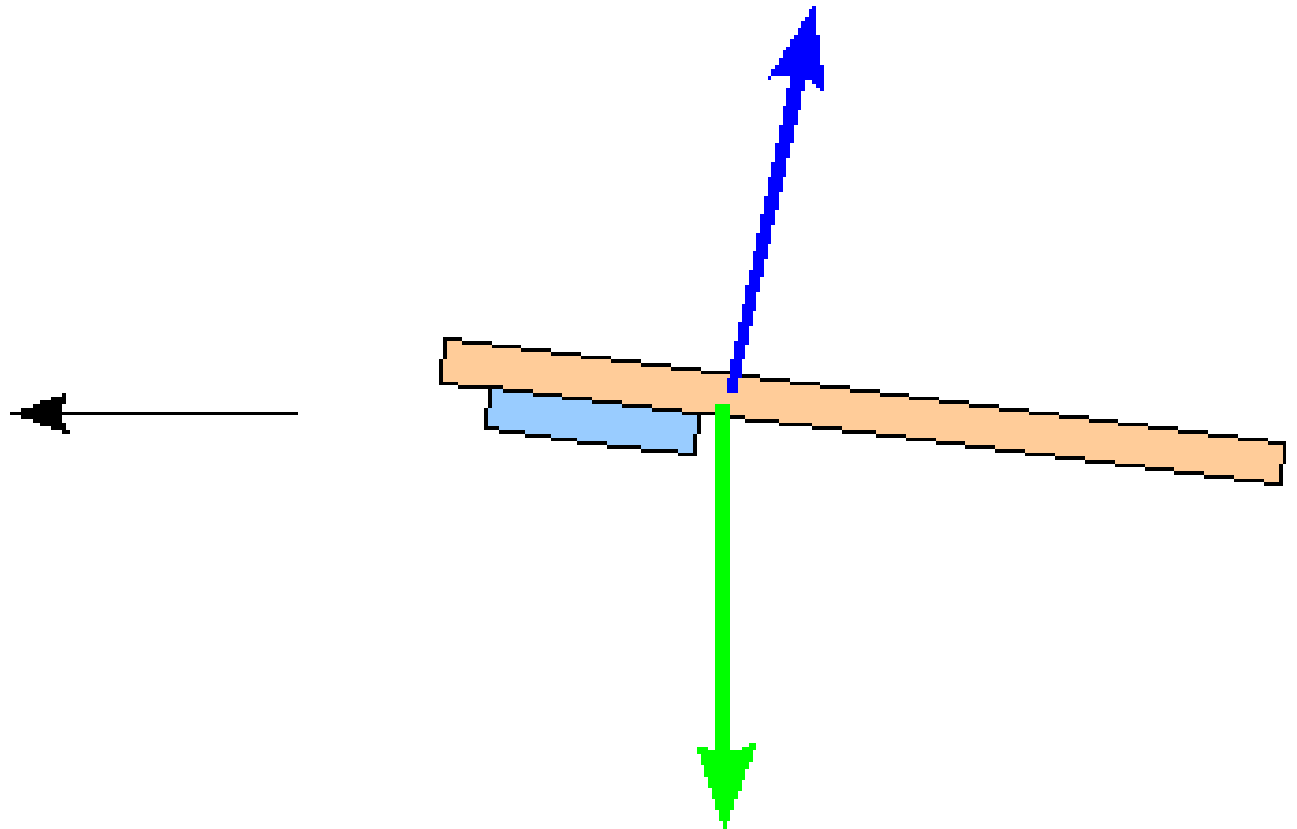


The rounded wing tips at the ends of the wings are used to decrease turbulences and vibrations during flight.

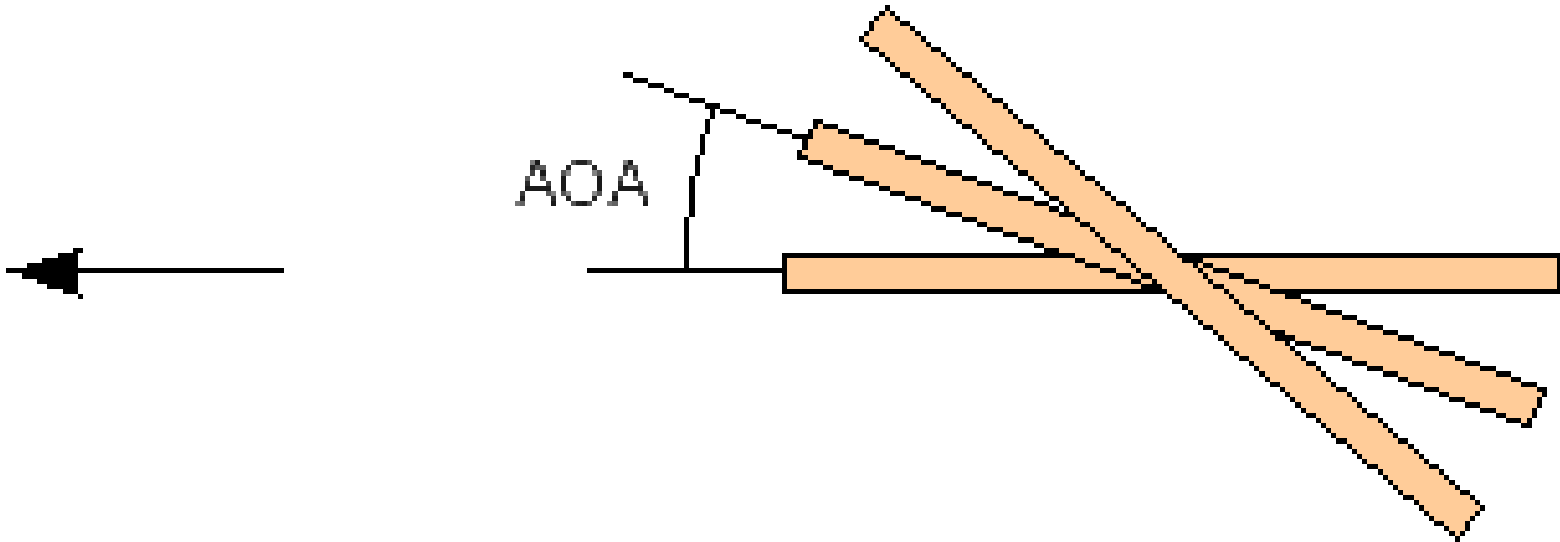
- You can **bend the wings** slightly upward so as to increase stability.



- **Insert a 50 cent coin** at the base of the plane, just in front of the wings, a short distance from the front edge.



To launch.....



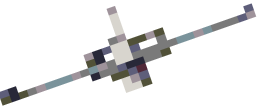
- If the angle of attack (AOA) is **low**, the wings **lift less**.
- On the other hand, a **high** angle will lead to a **low speed** of flight.

By tuning the AOA, you can determine whether your glider

(a) flies the **longest distance**

or

(b) stays the **longest time** in the air.



For your glider to **fly far**, you need

- A **high lift** with the **least wing drag**.
- If AOA = zero, no lift is created at all. Only drag is present.
- Thus, the ***ratio*** between the wing lift and the wing drag must be as **high** as possible.
- Try using an AOA of about

<http://www.youtube.com/watch?v=2IDroRUhPr0>

Joe Ayooob Throwing Style.wmv

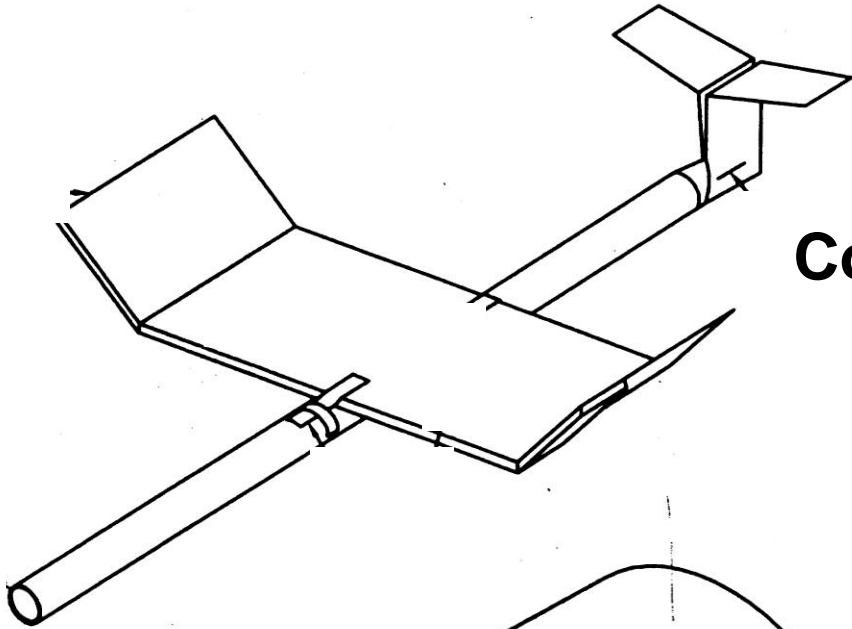
For your glider to stay the **longest time**
in the air, you need.....

- To fly slow by launching at a **bigger AOA**.
- At the same time, the AOA must not be too big as to create a **high drag**.
- Try using an AOA of about

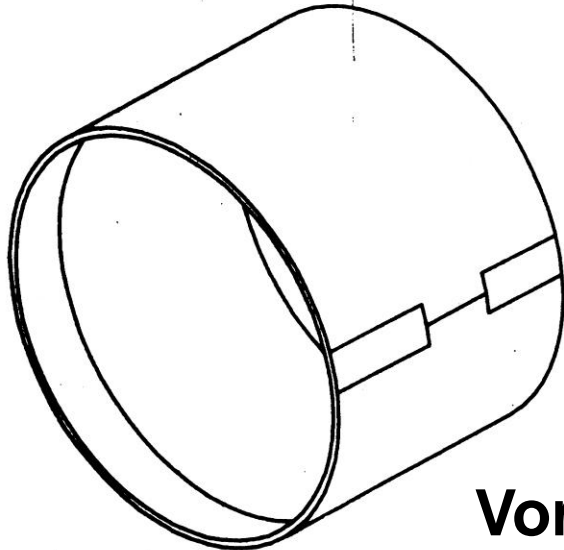
<http://www.youtube.com/watch?v=LyP3ybvl9f8>

longest paper airplane flight ever!! .wmv

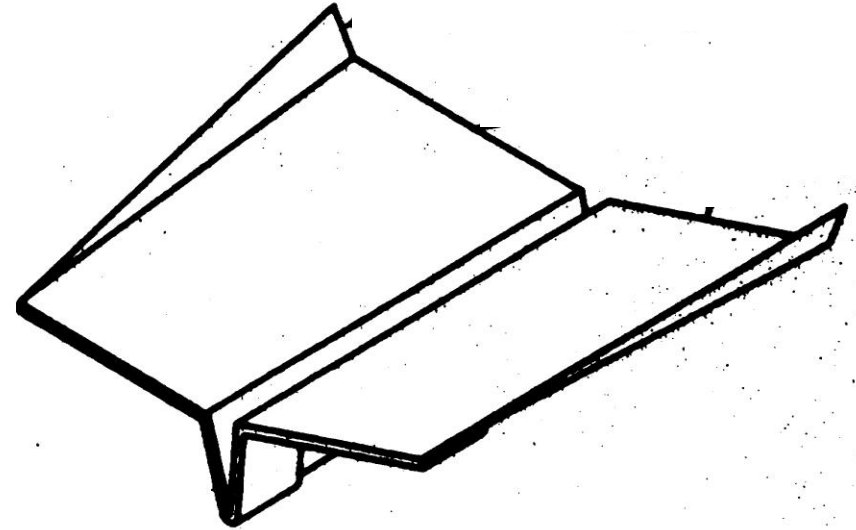
Different glider models



Condor



Vortex



Hornet

The Winners are....



Competition

- Cooperative group to design a **vortex** able to achieve maximum
(a) flight time and
(b) distance.