

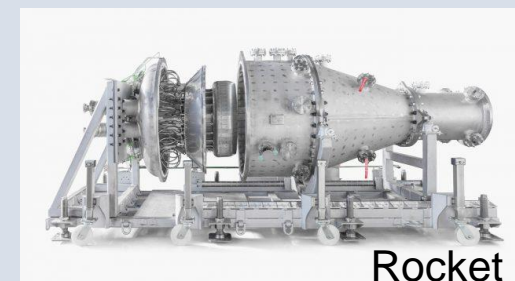
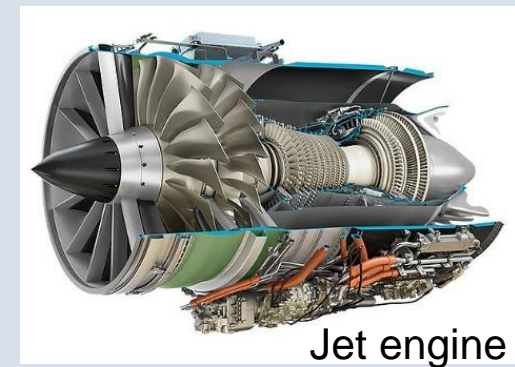
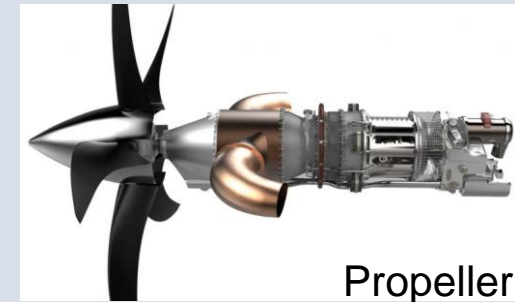
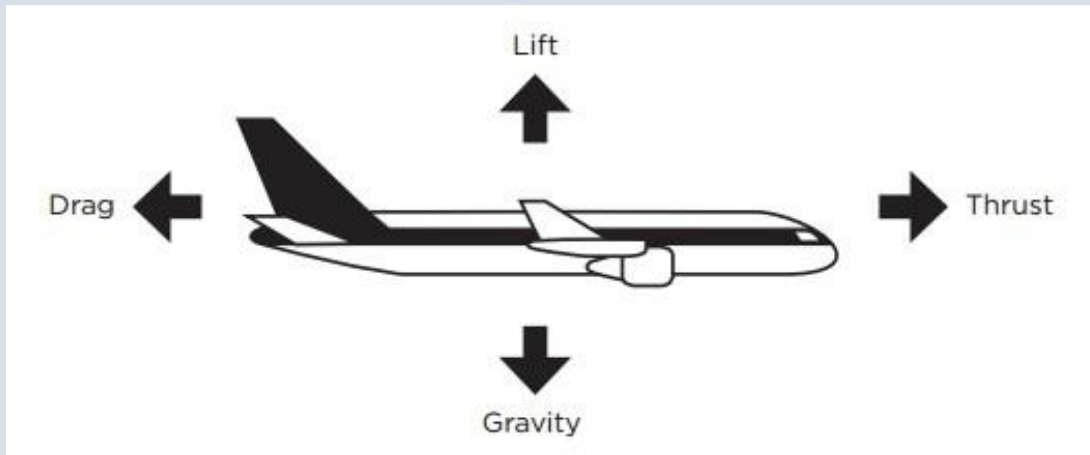
# ***WHY DO PLANES FLY?***

## ***A brief introduction to aerodynamics***

**Julio Martín Martínez**  
Aerospace Engineering Student

Why do planes fly? A brief introduction to aerodynamics

## FOUR FORCES ON AN AIRPLANE

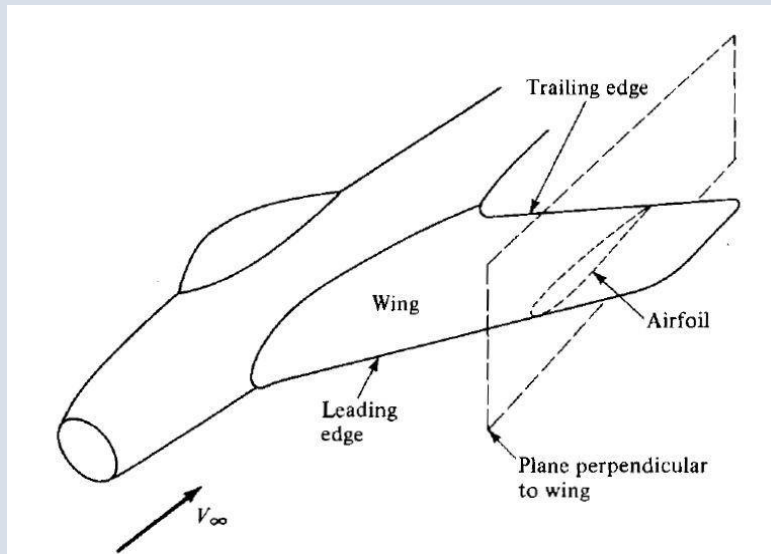


$$W = mg$$

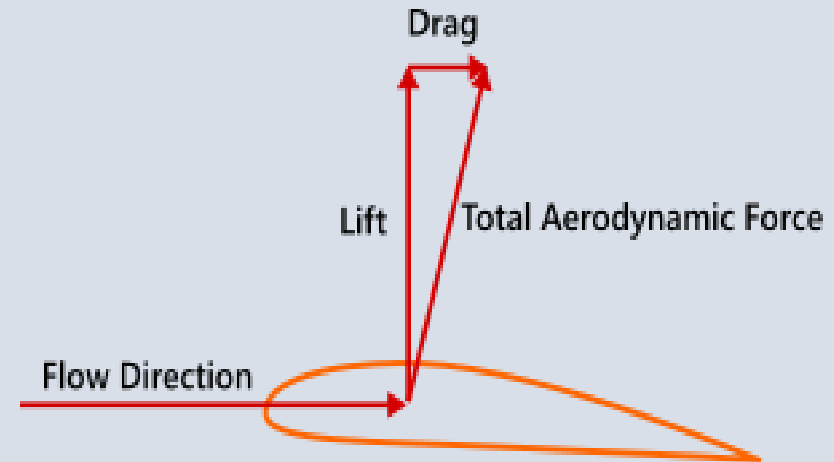
Weight of object = mass of object x acceleration of gravity

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## AERODYNAMIC FORCE



This is how the aerodynamic airfoil is defined.



Total Aerodynamic Force has two components: **lift** is the component that is perpendicular to the oncoming flow direction and **drag** is the component parallel to the flow direction.

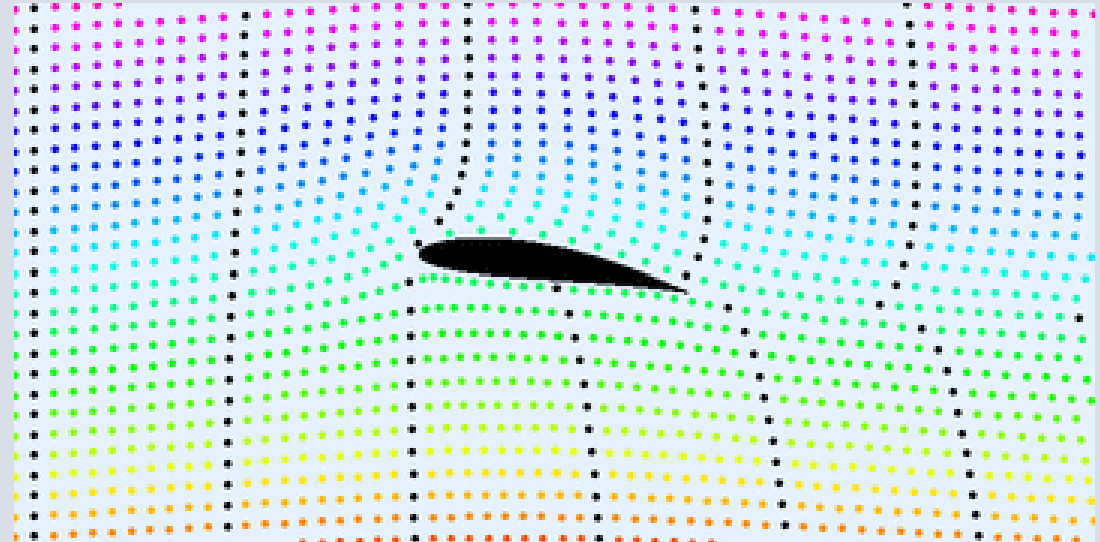
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## BERNOULLI'S PRINCIPLE

This principle states that there is a direct mathematical relationship between the pressure of a fluid and the speed of that fluid.

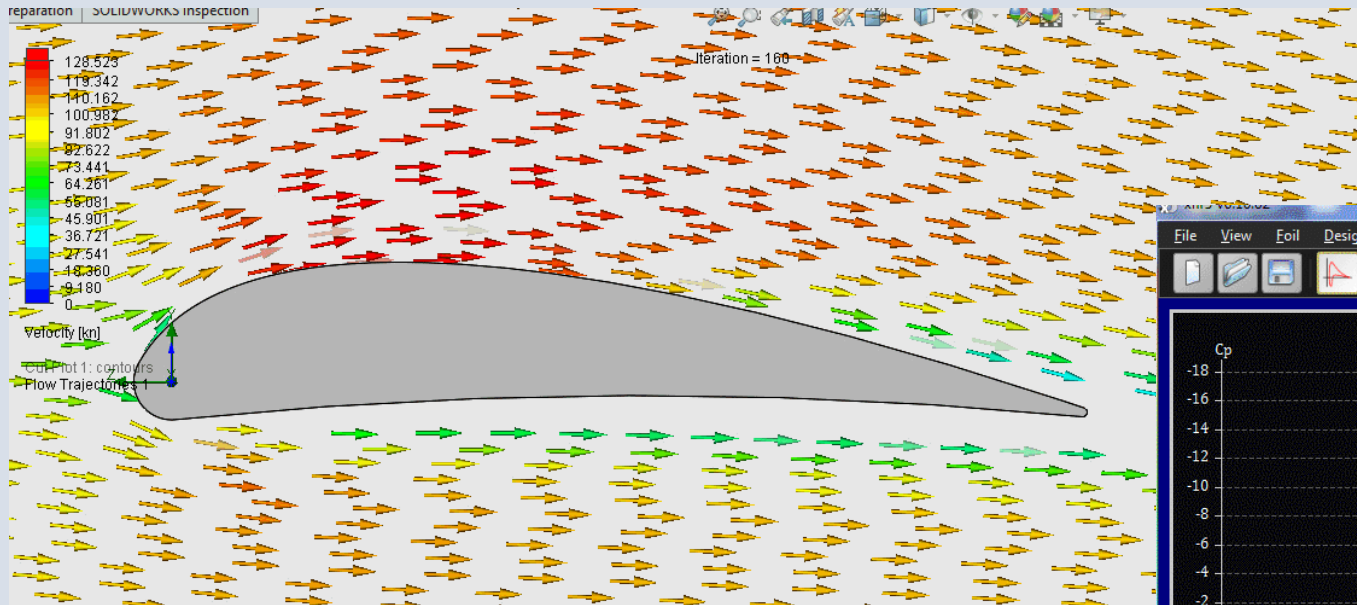
$$P + \frac{1}{2}\rho V^2 = cte$$

A marked speed difference between the upper-and lower-surface streamlines is shown clearly in the image animation, with the upper markers arriving at the trailing edge long before the lower ones



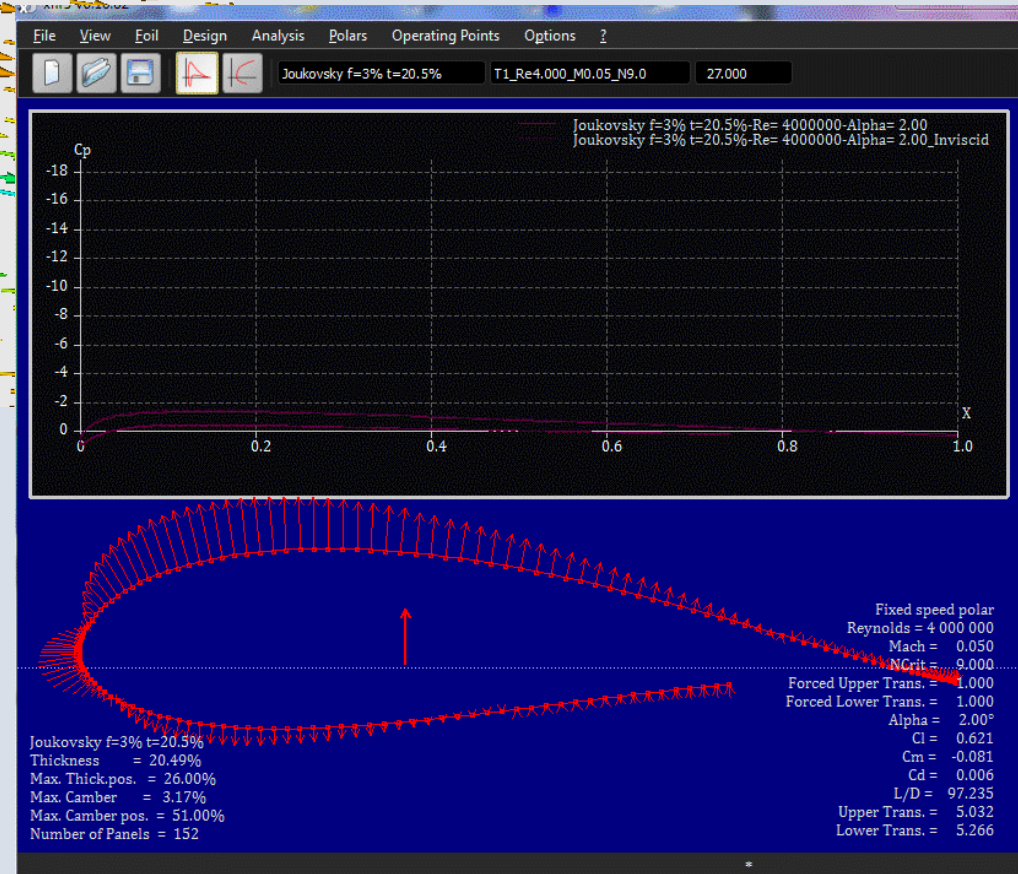


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In the first image obtained by software simulation tools we can appreciate the evolution of the speed of the different streamlines throughout the airfoil.

In the second one, the distribution of pressure is plotted.



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**ANY QUESTIONS?**

