FT Flyer Swappable [The Dart]

Team information

TEAM NO: 11.

SUBJECT: Model airplane and design.

Team members:

Ahson (Pakistan).

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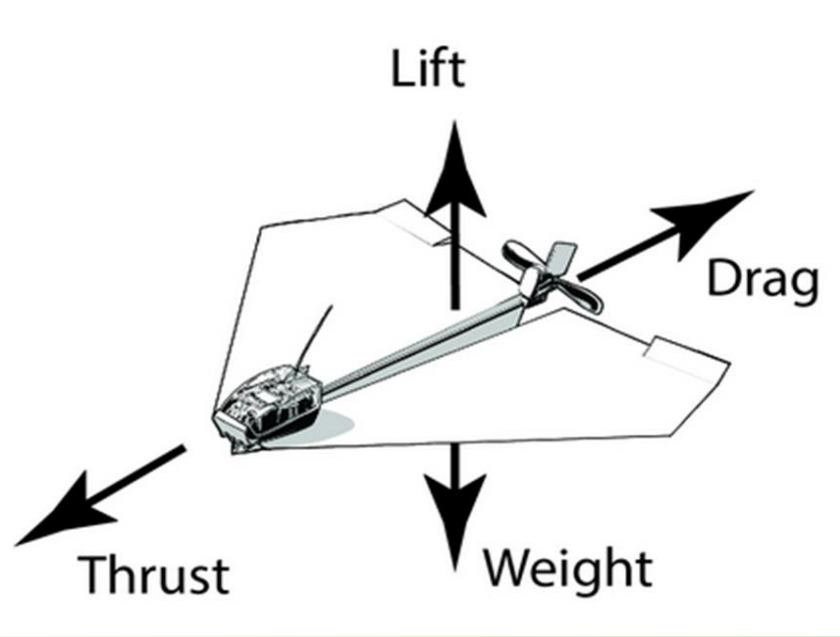
Scientific principles.

The FT Flyer Swappable is a like a large paper plane, but more complex. The system includes an electro-magnetic motor with a fan. The fan cause thrust. The thrust causes the plane to move forward.

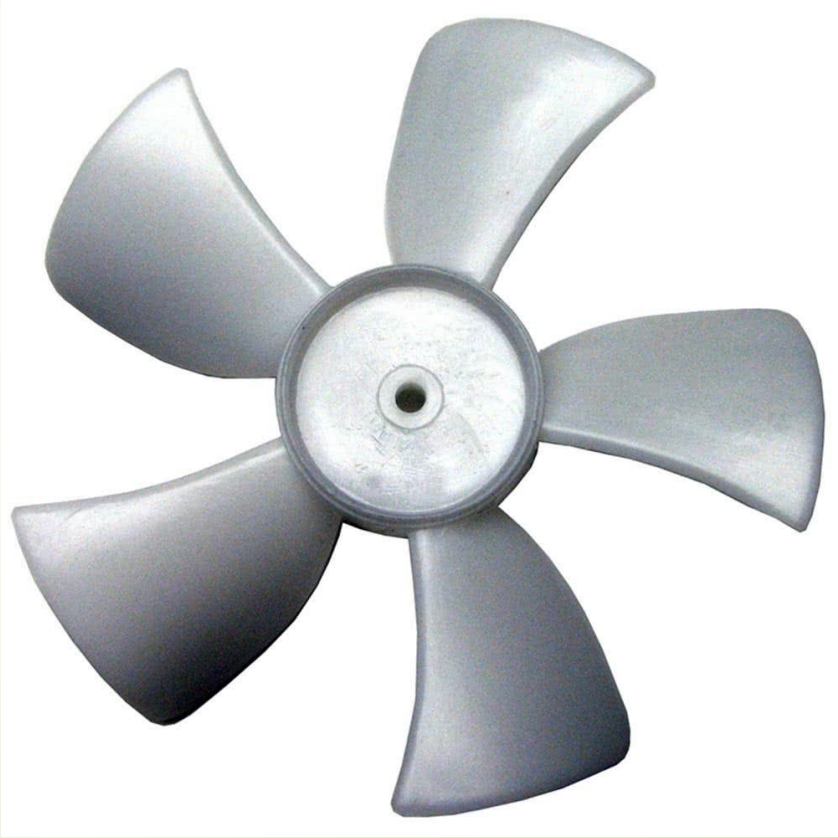
How the plane flies.

- There are four forces acting during the flight of the plane:
- **(1) Lift.**
- **(2) Gravity force or Weight.**
- **(3) Thrust.**
- **(4) Drag.**
  Lift and Drag are considered aerodynamics forces because they exist due to the movement of the Airplane through the Air.
- wings make lift by changing the direction and pressure of the air that crashes into them as the engines shoot them through the sky.



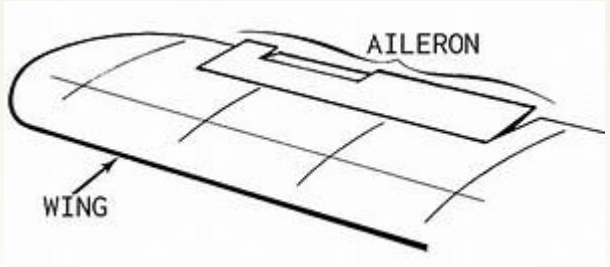
What exactly happens in the plane?

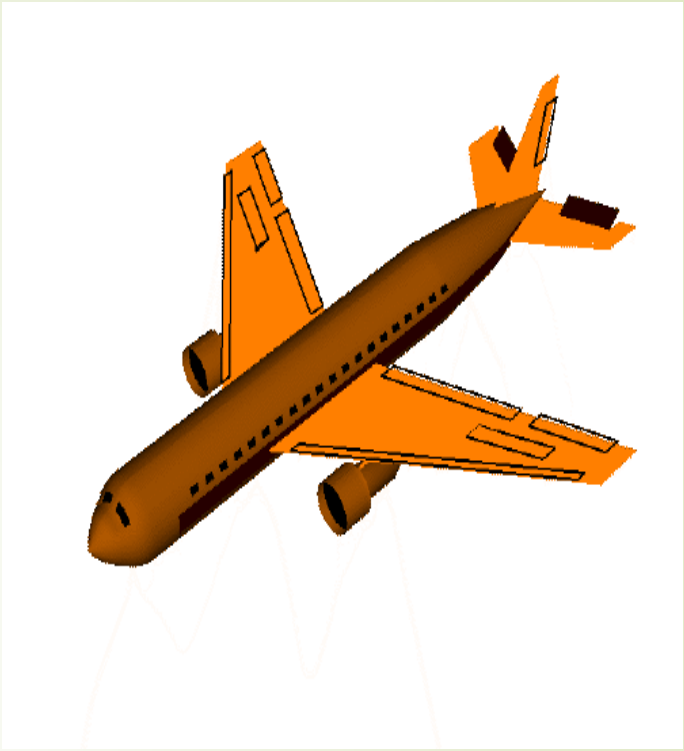
- The shape of rotor blade pushes the air forward.
- Newton's third law of motion:
- To every action there is always opposed an equal reaction. Meaning there is an equal force opposing the direction of the air pushed by fan. So a force as powerful as the plane pushes the fan- and the whole plane for that matter- forward. So the faster the rotor rotates, the powerful the force that pushes the plane forward.



Forces acting upon the flyer.

- **Drag:**
  Drag is the aerodynamic force that opposes an aircraft's motion through the air. Drag is generated by every part of the airplane (even the engines!
- **Lift:**
- Lift is the component of this force that is perpendicular to the oncoming flow direction.
- **Weight:**
- It contrasts with the drag force, which is the component of the force parallel to the flow direction. Lift conventionally acts in an upward direction in order to counter the force of gravity, but it can act in any direction at right angles to the flow.
- **Thrust:**
  Thrust is the force which moves an aircraft through the air. Thrust is used to ov ercome the drag of an airplane, and to overcome the weight of a rocket.





- **Aileron:**

Ailerons can be used to generate a rolling motion for an aircraft. Ailerons are small hinged sections on the outboard portion of a wing. Ailerons usually work in opposition: as the right aileron is deflected upward, the left is deflected downward, and vice versa

- **Elevators:**

Elevators are flight control surfaces, usually at the rear of an aircraft, which control the aircraft's pitch, and therefore the angle of attack and the lift of the wing. The elevators are usually hinged to the tail plane or horizontal stabilizer.

Constructing the flyer

- The flyer body contain two separated parts(wings), each part can be folded which is fixed in a specific position by a triangular-shaped fragment.
- Two small plastic rods hold the motor between the two wings.
- The main motor and the two smaller servo motors are all attached to the receiver which responds to the controller.

- Each wing has a servo motor connected to the controller which changes the position of the ailerons which act as elevators.
- We connected wires through soldering.

The Concluded Ensemble