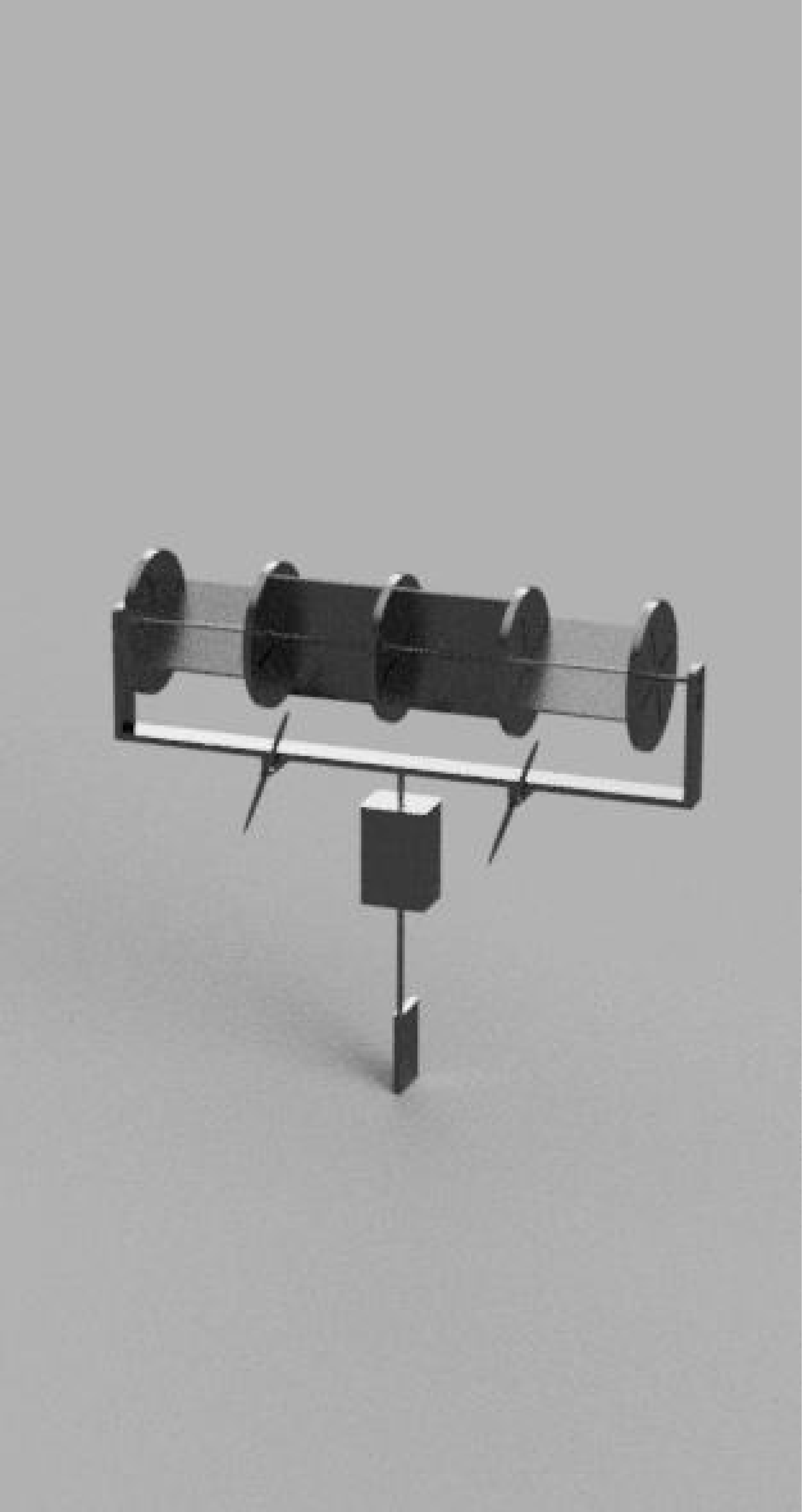
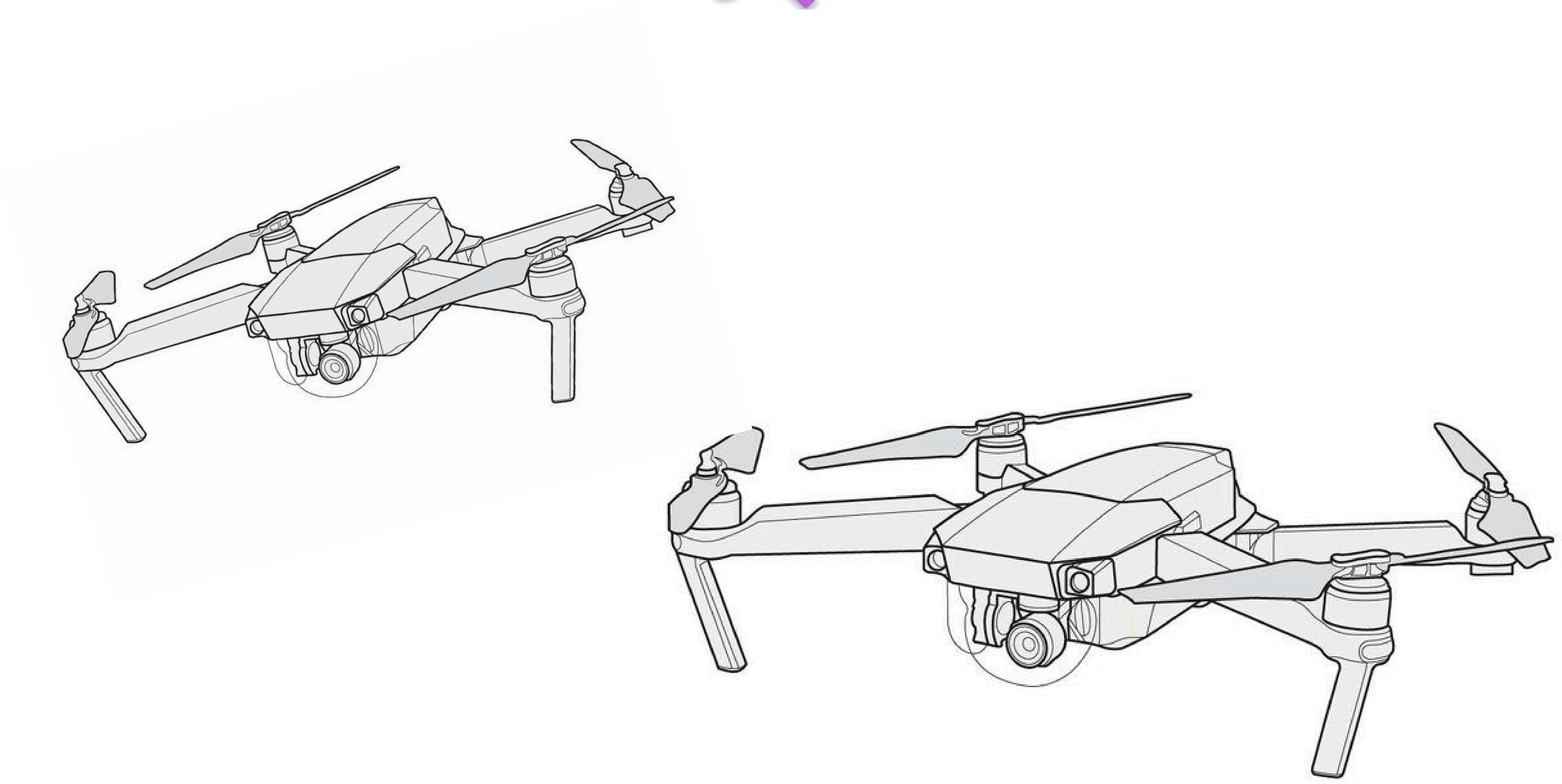


Aeromodelling Club, IITG

collaborates with

Kalam Labs

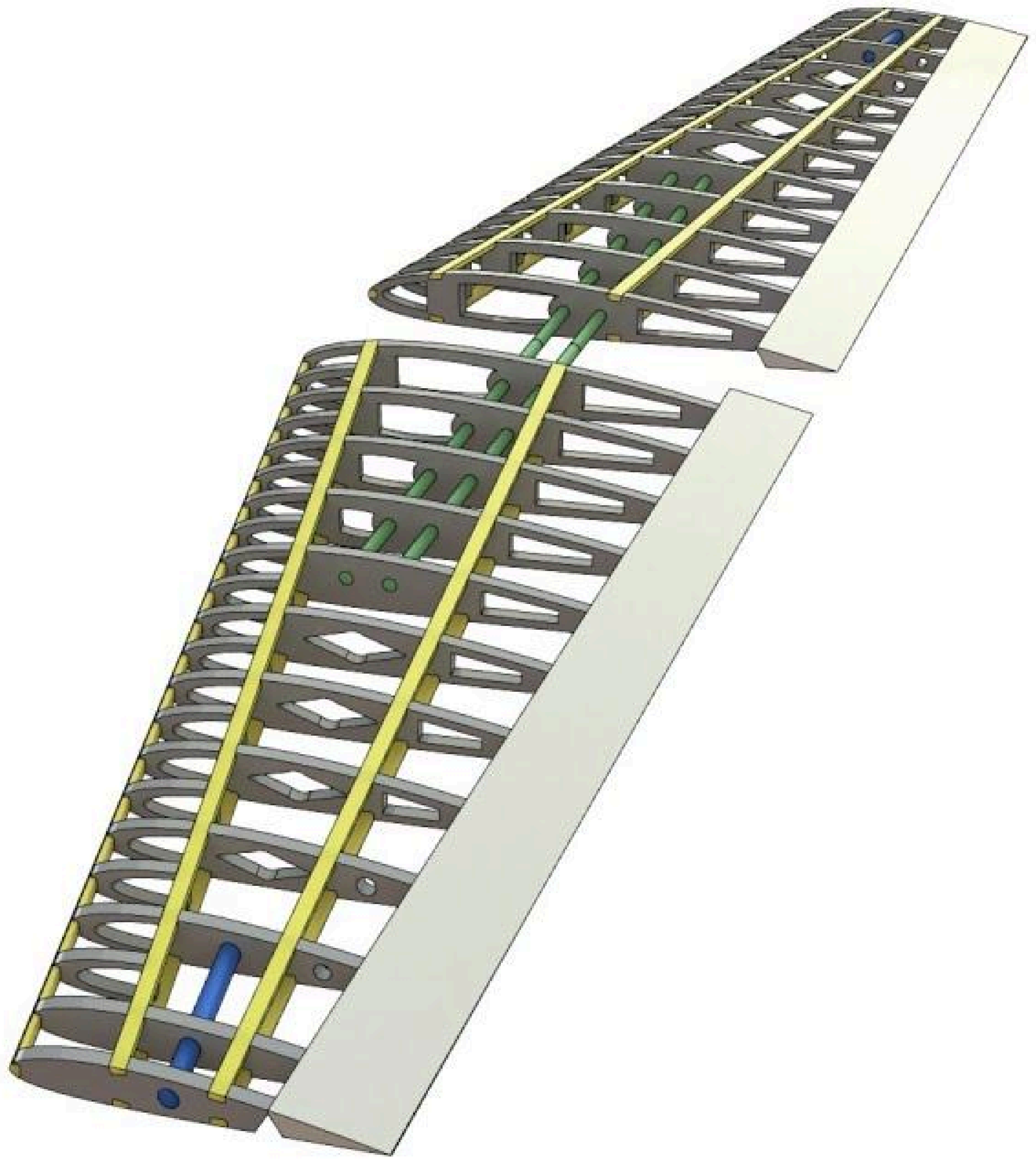


Aeromodelling Club, IITG

Soaring to New Heights

- **Black Raptor 2.0** - inspired by F-22 fighter jet with thrust vectoring engines
- **Raven 2.0** - A tilt rotor VTOL (vertical take-off & landing)
- Reaper - A scaled prototype of a MALE UAV MQ-9

- **Albatross** - A solar powered glider with increased flight time.
- **Heron -** Water landing & Takeoff drone
- **Microraptor -** Microsized version of black raptor with improved engine mechanics
- **Hovercraft** - a vehicle that travels over land or water



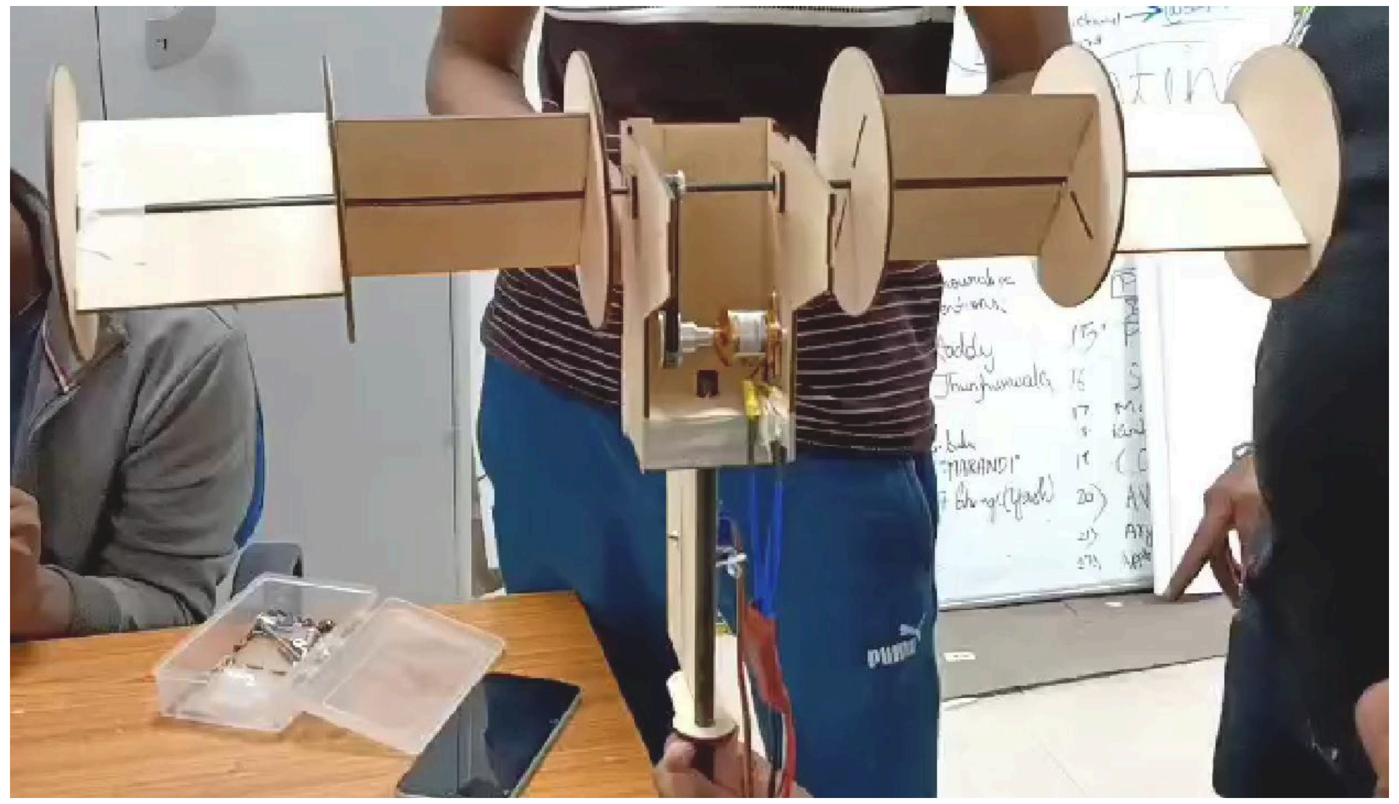
Aeromodelling Club, IITG

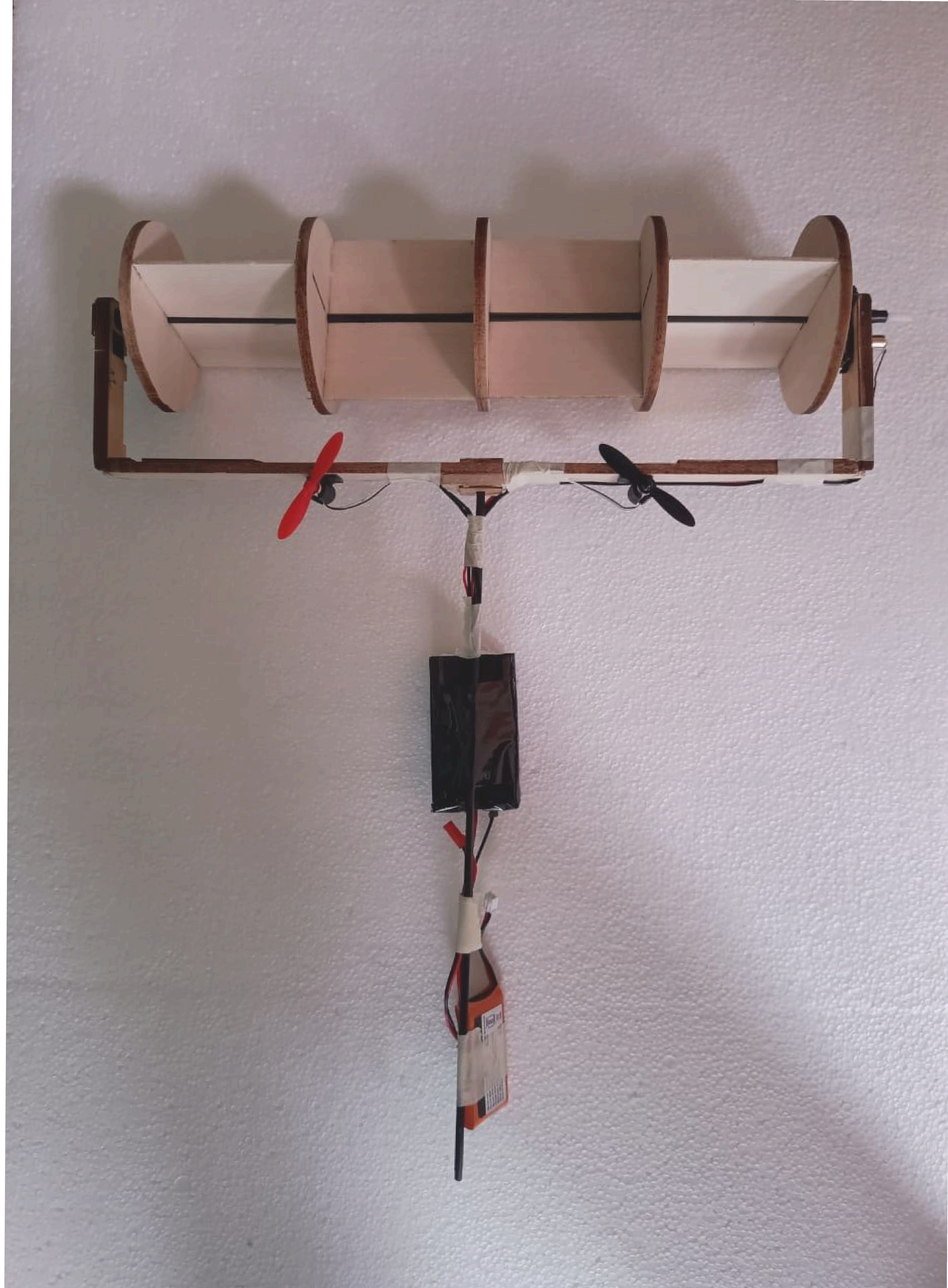
Our Achievements

- Silver Medals at **Inter IIT 9.0 and 8.0**
- Bronze Medal at **Inter IIT 7.0**
- Reaper Project selected for **IEDC funding**
- Invited by the State government to conduct aerial surveys during the Assam floods in 2022

T-Magnus effect Plane

Where science meets fun





T-Magnus effect Plane

Educational Value for Children

1. **Magnus Effect**

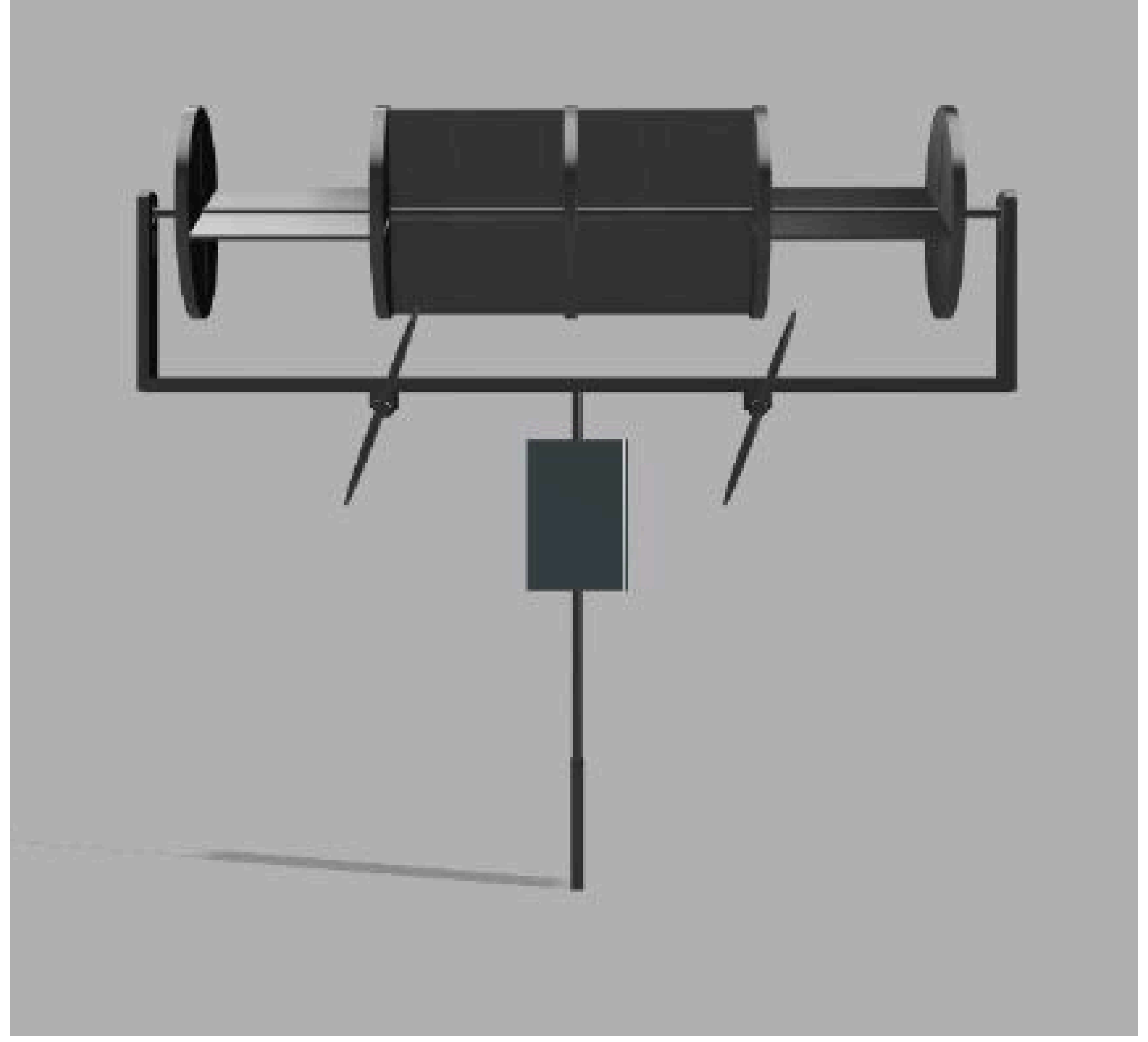
   Understanding underlying principles

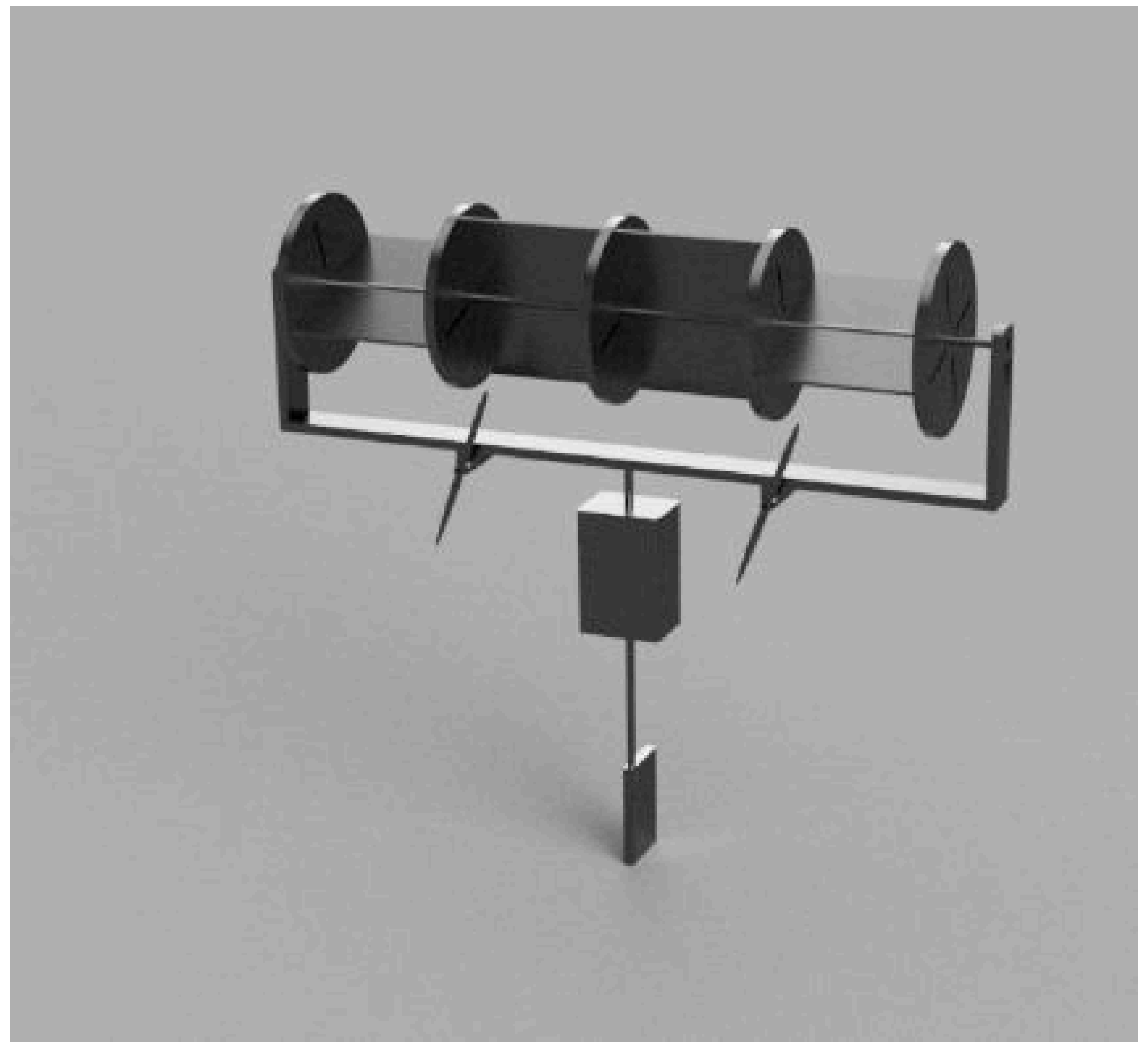
2. **Aerodynamic Effects**

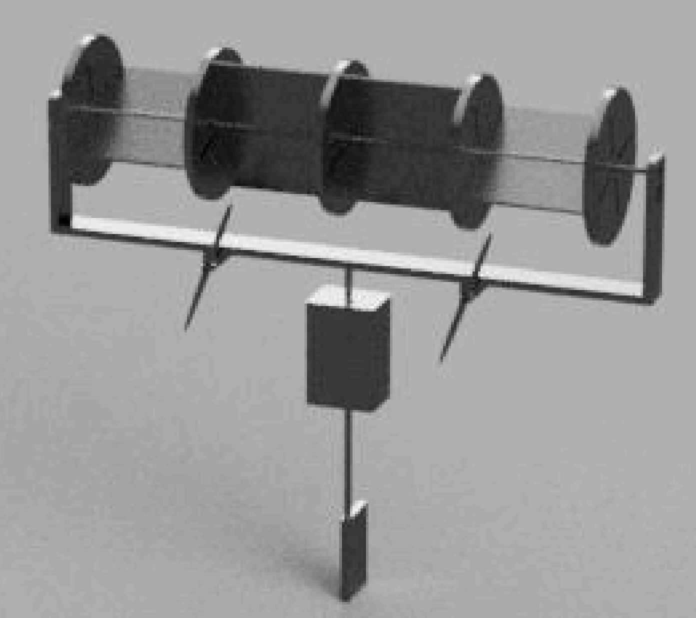
   Better shows lift & drag dynamics of an airborne body

3. **Challenging Conventions**

   Pushing the boundaries of traditional flight mechanics







T-Magnus effect Plane

An engineering perspective

1	2	3
Reduced Risk of Stalling	**Simpler Payload Mechanics**	**Improved Wing Loading**
Stall need not be monitored by pilot	Addition of payload to design is simplified	Stress distribution of a cylindrical cross section is more lenient.

Flight Controller

Implementing Kalam Labs FC into our plane

- We worked on implementing the fixed wing Flight controller deviced by Kalam Labs to **improve flight stability.**
- This also eliminated the need for a transmitter to fly our plane as it can be simply manoeuvred by using a **mobile phone.**
- With the flight controller the plane turns into a children friendly sized plane.

Further Modifications

How we are working to improve the model

1. **Phased Rotors**
   Phase difference reduces wobbling
2. **Twisted Cylinder Rotor**
   Increased downwash enhances lift
3. **Blade Protrusions**
   Turbulent boundary layer flow reduces friction drag

References

Kutta–Joukowski lift [edit]

On a cylinder, the force due to rotation is an example of Kutta–Joukowski lift. It can be analysed in terms of the vortex produced by rotation. The lift per unit length of the cylinder L', is the product of the freestream velocity v_∞ (in m/s), the fluid density ρ_∞ (in kg/m^3), and circulation Γ due to viscous effects:[2]

$$L' = \rho_\infty v_\infty \Gamma,$$

where the vortex strength (assuming that the surrounding fluid obeys the no-slip condition) is given by

$$\Gamma = 2\pi\omega r^2$$ [*citation needed*]

where ω is the angular velocity of the cylinder (in rad/s) and r is the radius of the cylinder (in m).