3-D Printed Blended Wing Drones

Development Engineering Project under the supervision of Dr. Srikant Padhee

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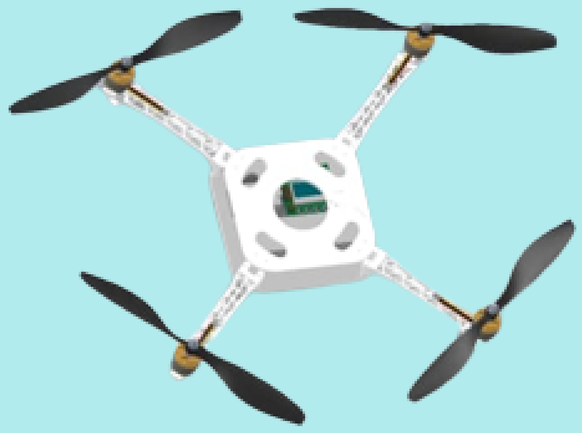
Introduction

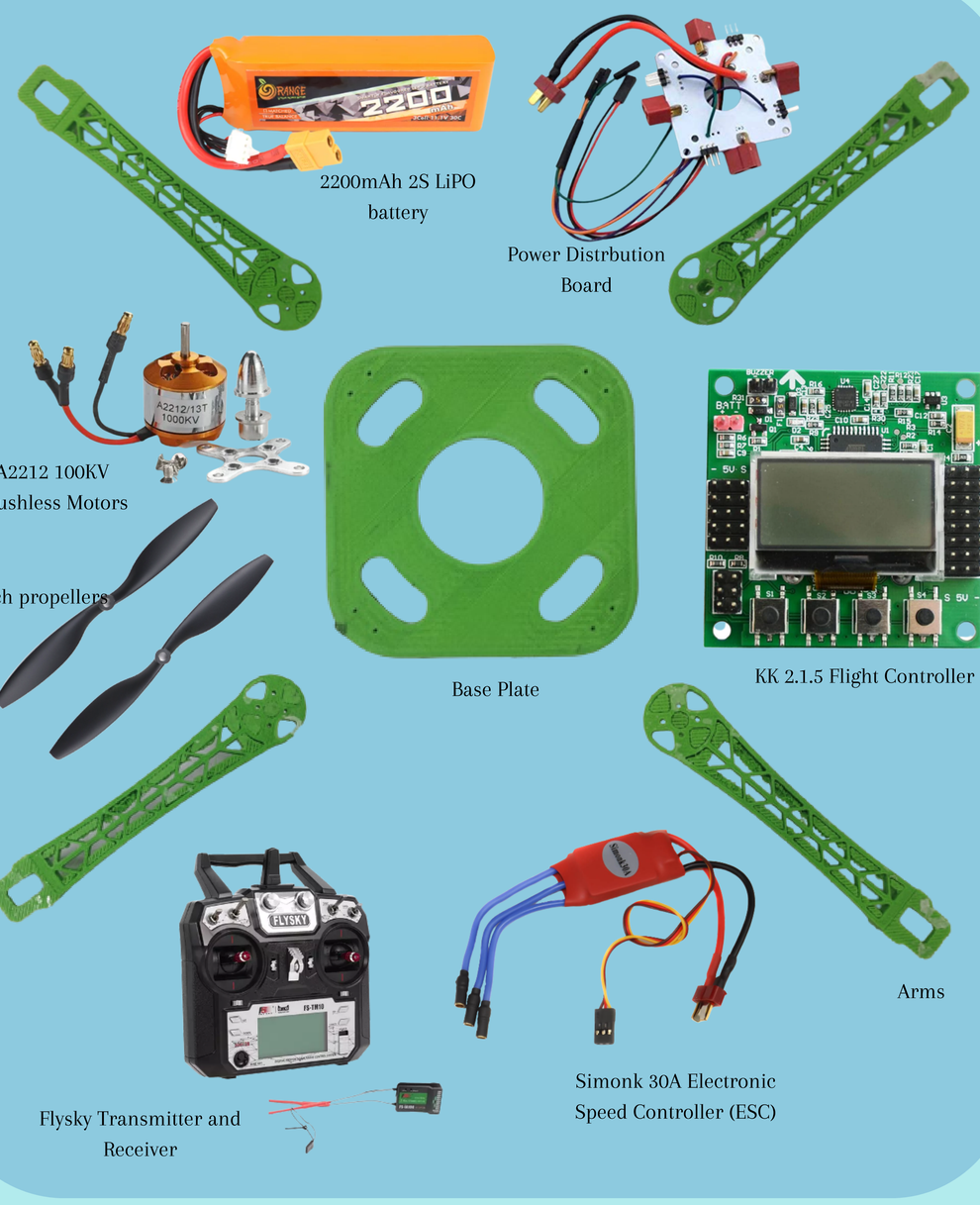
- Blended wing drones have integrated wings and body design, providing several advantages:
- Advantages include improved aerodynamics, increased lift, longer endurance, reduced fuel consumption and noise levels, and increased payload capacity.
- Limitations include limited maneuverability, design complexity, increased production costs, and limited flexibility for modifications.
- 3D printing technology like FDM and SLA, are commonly used for drone manufacturing.
- Lightweight and durable materials are preferred along with FDM technology being used to build complex shapes.
- Use of 3D printing technology has the potential to improve the production process and design of blended wing drones.
- They find applications in military operations, cargo delivery, environmental monitoring, and aerial surveying.

CAD Model of Drone

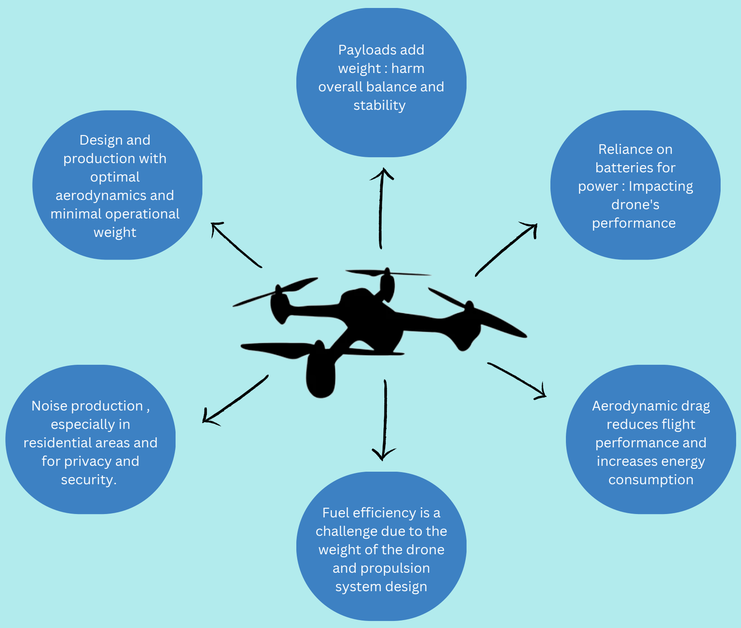


Assembled Drone

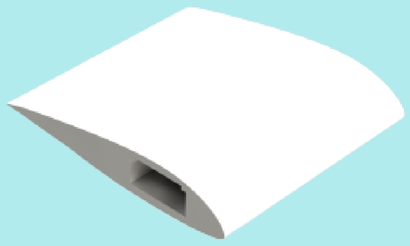
Drone Components



The Problem

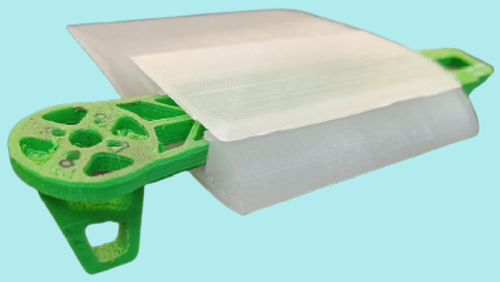


Blended wing profile



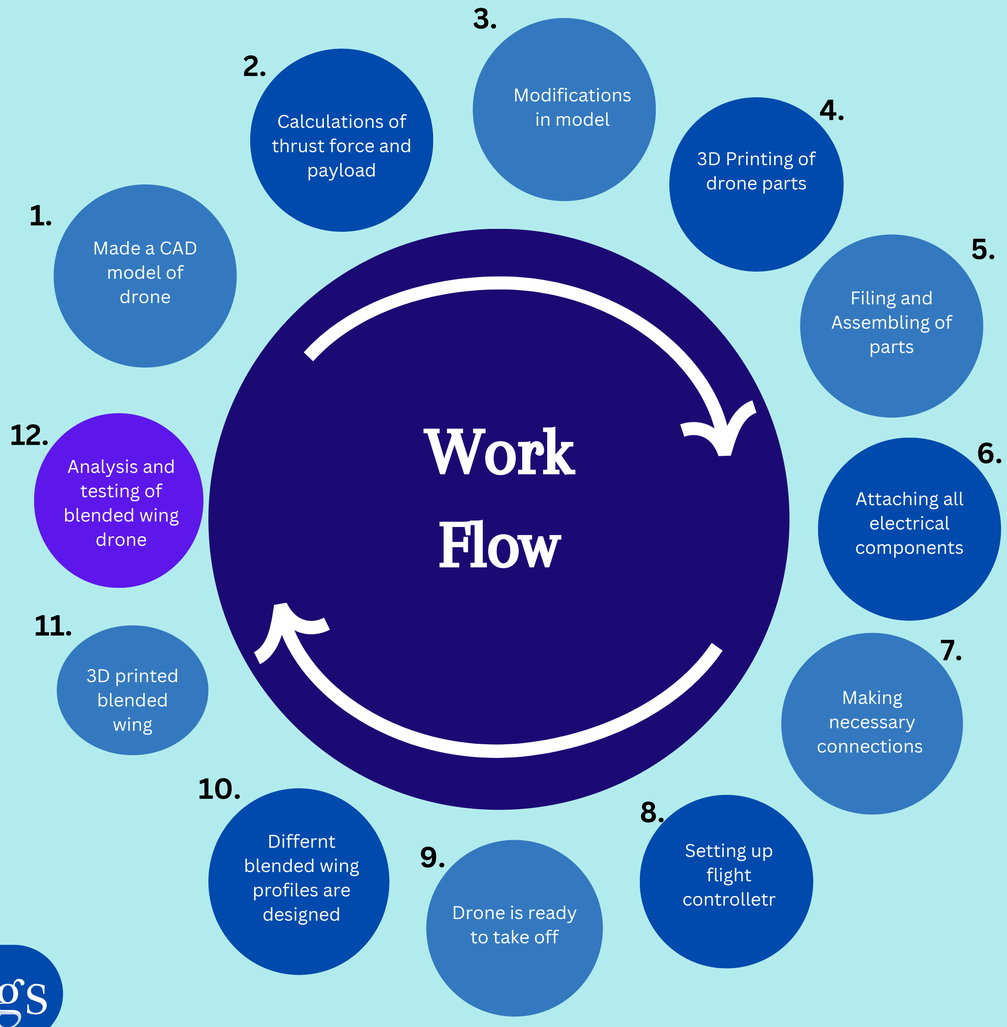
CAD Model

3D printed blended wing



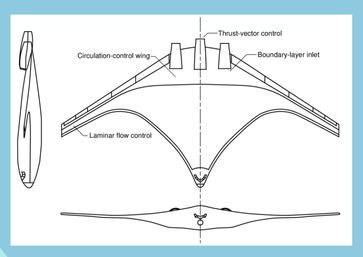
Blended wing on one arm of the drone

Work Flow



Proposed Solution

Using Blended wings concept for drone wings



Benefits of Blended wings

Advantages of using blended wing are:

- This design can accommodate more payloads without compromising the balance and stability of the drone.
- Design reduces drag and improves the overall aerodynamic efficiency of the drone.
- The unique shape smooths the airflow over the drone's body, reducing turbulence and noise.
- Moreover, improve lift and stability, allowing the drone to operate at lower speeds and reduce noise.

Conclusion

In the project, we started with the cad modelling of the normal drone assembled using 3D printed parts (which include 4 arms, 2 middle plates). The thrust calculations done to get an idea of dimensions and the modifications are done in the model. The drone has reached to only assembling state and no testing and further parameter analysis are done due to the late shipments and unavailabity of various parts.