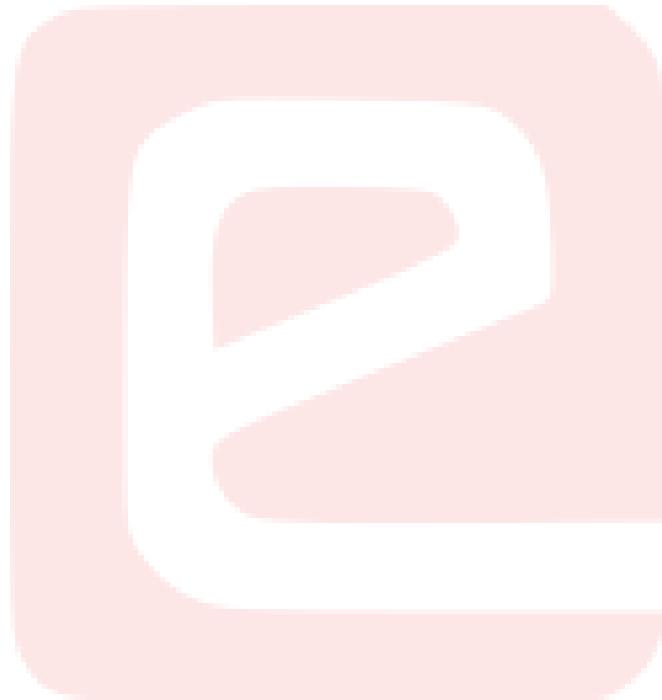


e-YSIP 2022

QUADCOPTER DESIGN



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Modulo-copter

Abstract

There are a lot of off the shelf components available when one set out to build a drone. However, as most components have different manufacturers, they are usually not inter-compatible, and it's a tedious task to make them work in unison. Our project aims to provide flexibility for novice to advanced drone enthusiasts to build drones by providing compatibility for most of the popular components available in the market.

Completion status

Due to a time constraint, we were unable to manufacture a working model of the Modulo-copter with parts made of the appropriate materials to provide light weight and structural stability. However, we finished the design part of the project, and successfully created a demonstration model made of 3-D printed parts, acrylic sheets and PVC pipes.

1.1 Hardware parts

- Carbon Fibre Plates
- Carbon Fibre Tubes
- Machined Aluminium Brackets and Cuffs

1.2 Software used

- Fusion 360



1.3. ASSEMBLY OF HARDWARE

Version: 2.0.13615

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1.3 Assembly of hardware

Step 1 - Landing Gear

- Insert the landing gear into and its mount and secure it with a screw.
- Align the mount with the bottom of the base plate and secure it with screws.

Step 2 - Arms

- Align the arm cuffs with the top part of the base plate and screw it in place on all 4 sides.
- Place the arms inside the arm cuffs and align the through holes.
- Place another arm cuff above each arm, and fix the arms to the cuffs using a screw through the hole.

Step 3 - Box and Top Plate

- Place the plastic box on the top of the base plate and align the screw holes.
- Put the top plate on top of the box and align the screw holes with the box and the arm cuffs.
- Screw through the box and arm cuffs to attach the top plate to the bottom plate.
- Put the RC link cover on top of the top plate and screw it in place.

Step 4 - Motor Mounts

- Attach two smaller arm cuffs each to the four carbon fiber square plates.
- Attach two more smaller arm cuffs each to the four plastic ESC mounting plates.
- Position the two sets of plates below and above each arm, and screw them to each other through the arm.



1.4. DESIGN PHOTOS

1.4 Design Photos



Fig. 1 - Canopy

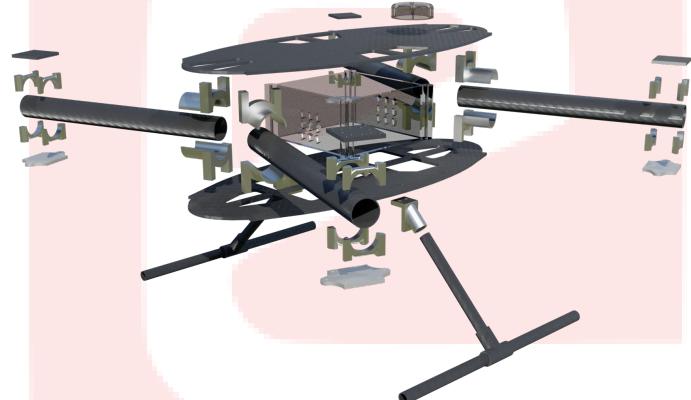


Fig. 2 - Exploded View

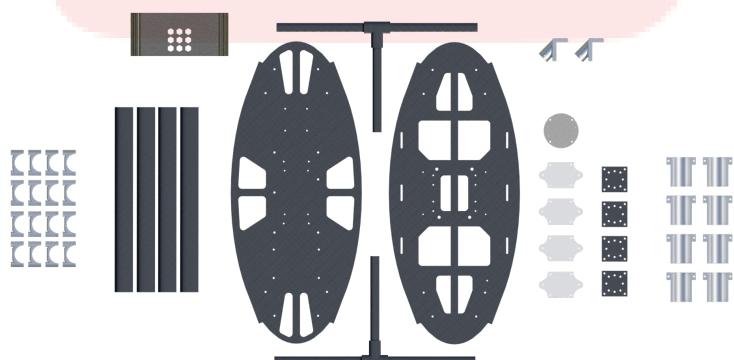


Fig. 3 - Parts List



1.5. FUTURE WORK

1.5 Future Work

- Increasing the aerodynamic efficiency of the canopy
- Exploring different materials for eco-friendly construction, making the chassis lighter
- 3D printed mounting plates to mount unsupported parts
- Making provisions for foldable arms and a retractable landing gear
- Designing a printable handbook containing a table for selecting components, and assembly instructions

1.6 Challenges

During this project, we faced the following challenges:

- Making the drone as light as possible to help accommodate heavier parts while maintaining structural stability
- Designing mounts for the motors which could also house ESCs to protect them from rain and weather
- Designing the optimal frame shape which can accommodate all components with minimal wasted space

Bibliography

- [1] Meivel, s & Maheswari, S., *Design and Aluminium framework of drone Using SOLIDWORKS*. International Journal of Grid and Utility Computing. 12. 85-97, 2020.