

FuryVision AAV (V2)



Figure 1: Fury Drone with Transmitter

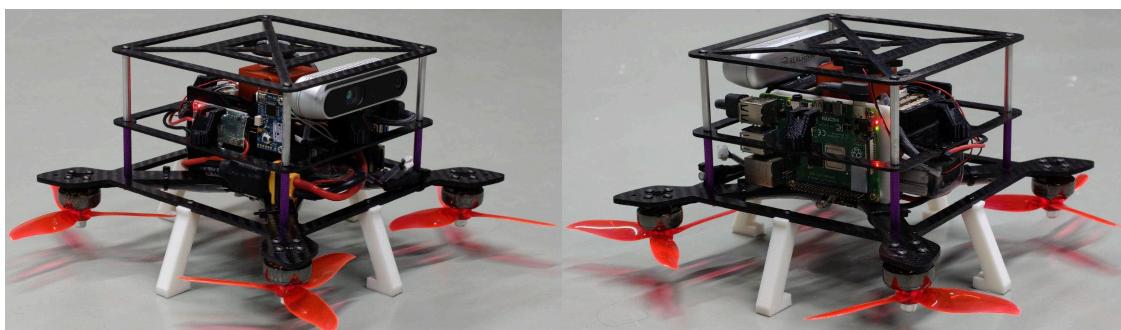


Figure 2 : Isometric View from Front

Figure 3: Isometric View from Back

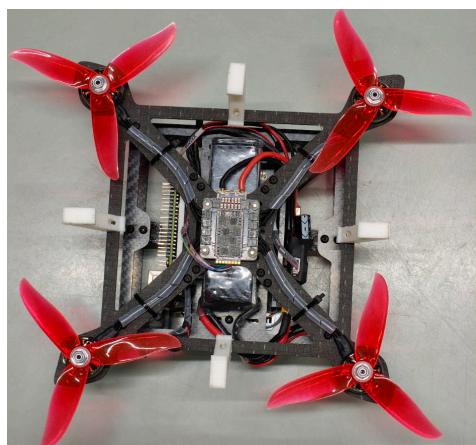


Figure 4 : Bottom View

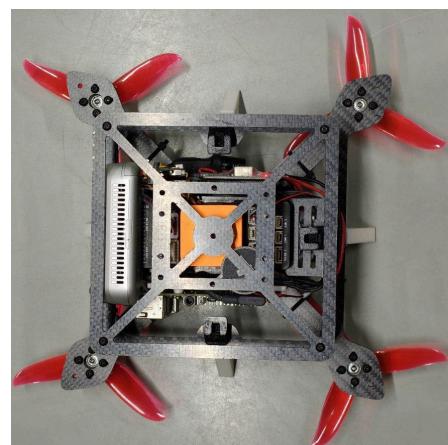


Figure 5: Top View

Components / Parts of Fury

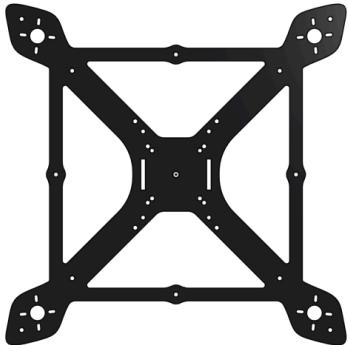


Figure 6: Base plate

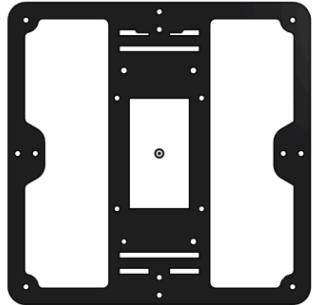


Figure 7: Middle plate

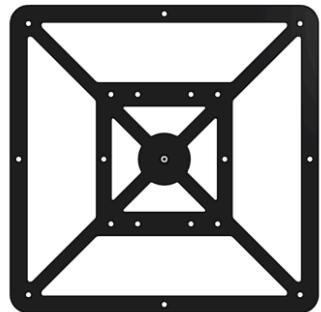


Figure 8: Top plate

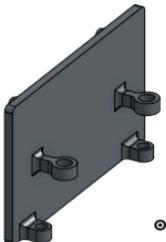


Fig. 9(a): Isometric view



Fig. 9(b): Side view

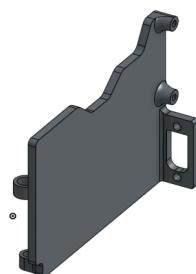


Fig. 10(a): Isometric view



Fig. 10(b): Side view

Figure 9: Raspberry Pi 4 mount

Figure 10: Power module mount

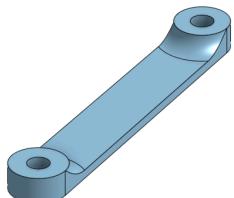


Figure 11: Flight controller holder

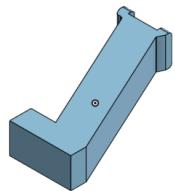


Figure 12: Landing gear



Figure 13: Cam mount

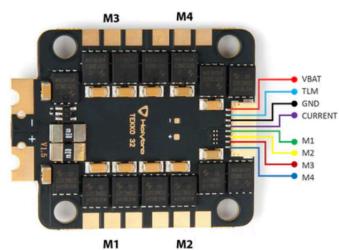


Figure 14: four in one ESC



Figure 15: BLDC Motor



Figure 16: Propeller



Figure 17: Flight controller



Figure 18: LiPo Battery



Figure 19: Intel Realsense depth camera d435i



Figure 20: Raspberry Pi 4 Model-B



Figure 21: X6B 2.4G 6CH i-BUS PPM PWM Receiver



Figure 22: Type C USB Cable

Connections Diagram:

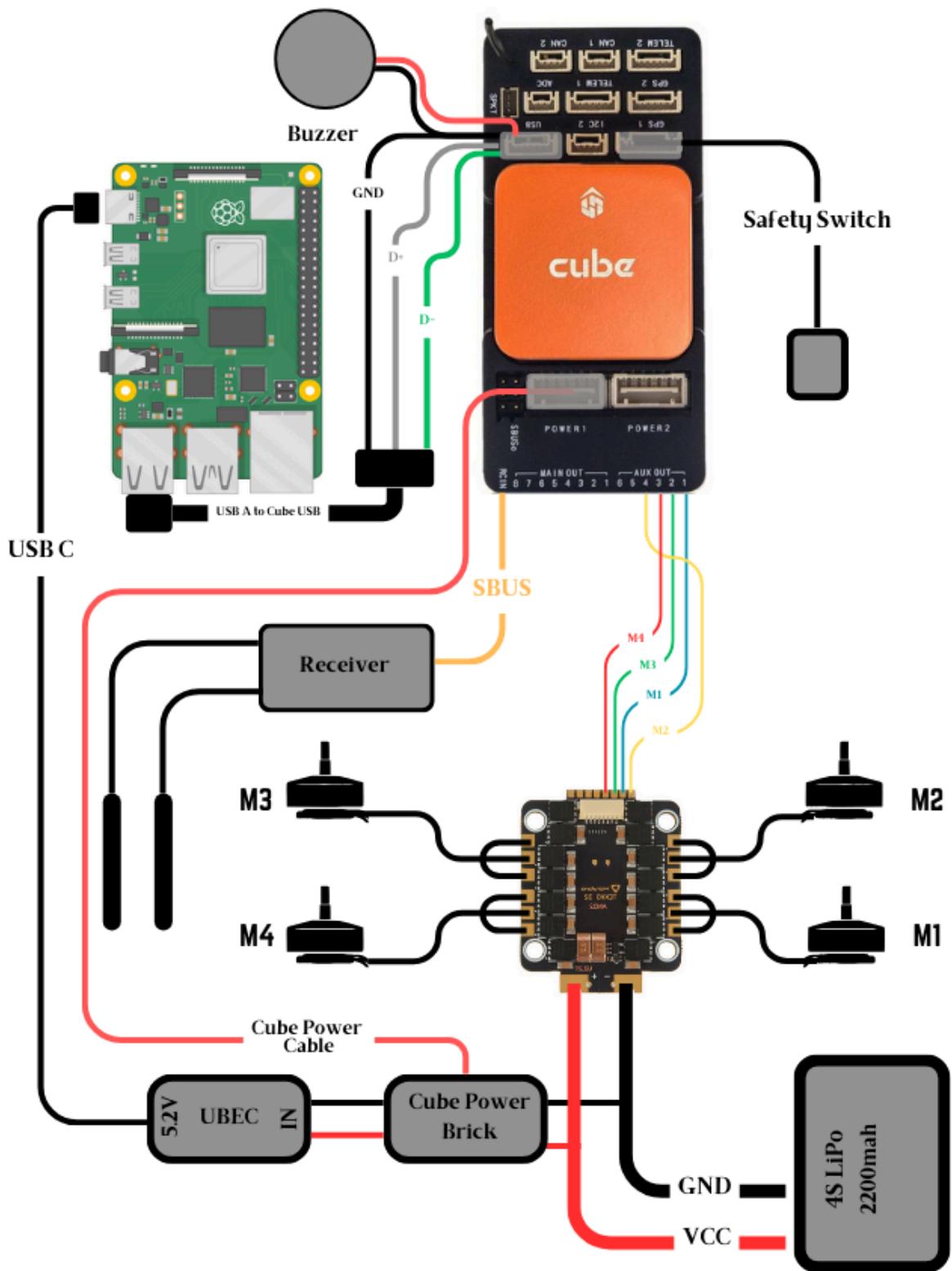


Figure 23: Wiring diagram of FURYVision AAV

Assembly Procedures:

Step 1: Base Plate Assembly

- **ESC Mounting:** Place the Electronic Speed Controller (ESC) on the carbon fiber base plate, fix it with M3*12 nylon spacers, and solder the motor wires to the ESC, ensuring proper connections.
- **Motors Fixing:** Fix the EMAX motors to the four arms of the base plate using M3 screws, securing each motor firmly.

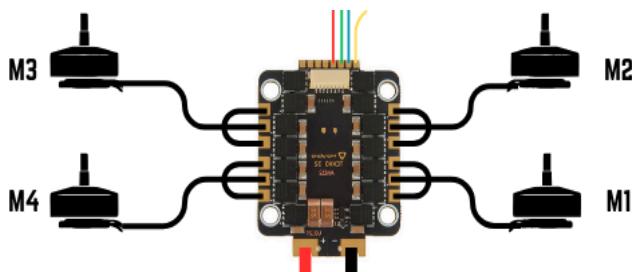


Figure 24: Motor Connection diagram

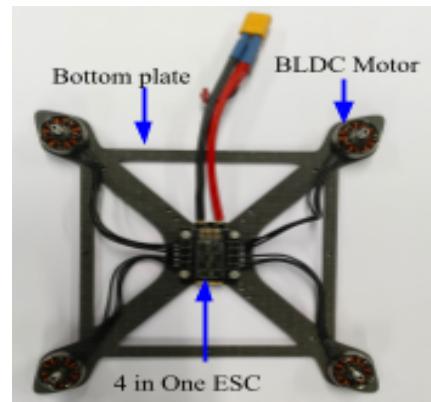


Figure 25: Assembled view of motors and ESC on base plate

Note: Refer to figure 24 for the detailed connection of motor and ESC

Step 2: Middle Plate Assembly and Top Plate Assembly

- **Fixing Flight Controller Holder:** Fix the 3D-printed flight controller holder onto the middle plate by using the screw M2.5*12.
- **Flight controller Mounting:** Place the Cube (Pixhawk flight controller) onto the holder and secure it with M2.5 x 12mm screws.

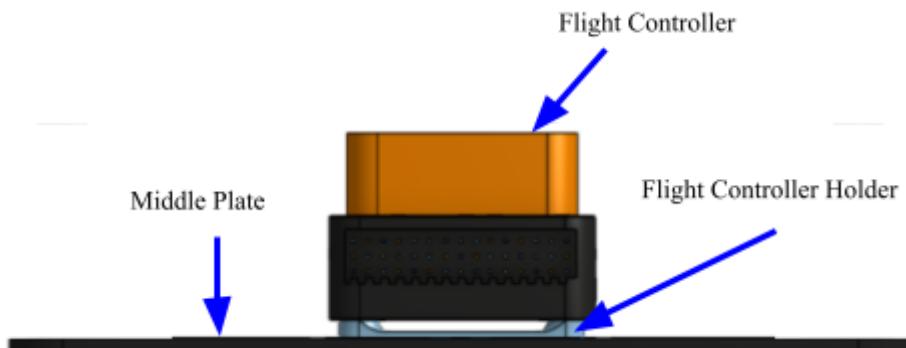


Figure 26: flight controller on the flight controller holder

- **Top and Bottom spacer fixing:** Fix M3 x 45mm spacers to the 4 top and bottom corners of the middle plate as shown in Figure 27.

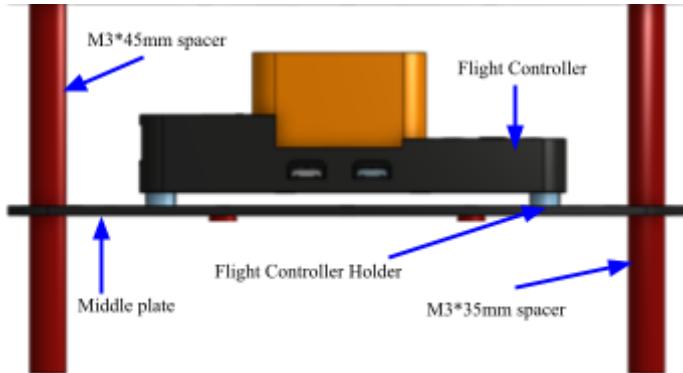


Figure 27: assembled view of middle plate with spacers

- **Top plate fixing:** Fix the top plate using M3 screws on M3*45mm spacer, and ensure the secure fit.



Figure 28: Assembled view of top plate on the spacer

Step 3: Raspberry Pi 4 Mount Assembly

- **Inserting Thread:** Insert threads into the 3D-printed Raspberry Pi 4 mount to support secure connections.
- **Fix Raspberry Pi:** Secure the Raspberry Pi onto its mount.

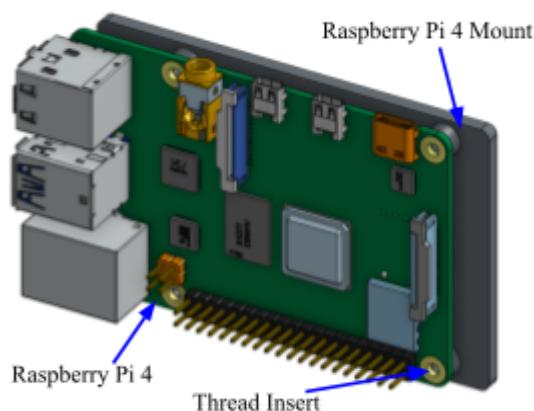


Figure 29: Assembly of Raspberry Pi 4 on the Raspberry Pi 4 Mount

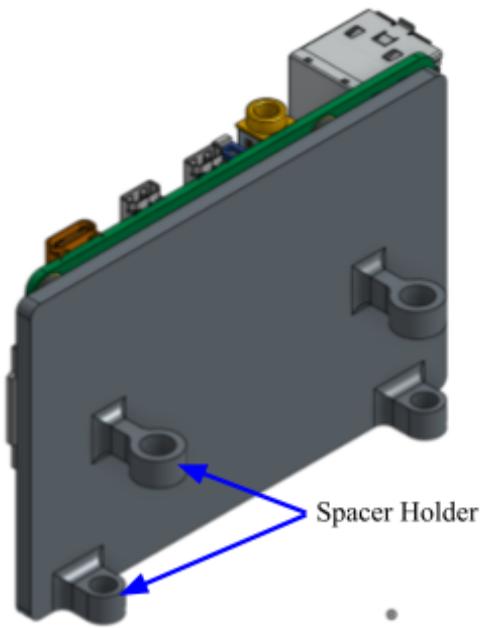


Figure 30: side view of Raspberry Pi 4 mount

- **Prepare USB Cable:** Take a USB Type-C cable and cut it into two parts.
 - a. Use one part of the cable to connect the Raspberry Pi 4 to the flight controller. Connect the Type-A end to the Raspberry Pi and solder the other end to the buzzer connector on the flight controller. Refer to figure 22 for wiring setup.
 - b. Use the other part of the cable to power the Raspberry Pi: Connect the USB Type-C end to the power port on the Raspberry Pi and the other end to the UBEC.

Note: Connect the negative (black) and positive (red) wires to the respective terminals of the UBEC output, ensuring correct polarity to avoid component damage. Some USB cables may have green and white wires, which should be cut carefully to prevent any contact during power connection.

Step 4: Customization of Power Brick Module

- **Preparation:** Begin by carefully removing the connectors at both ends of the power module, ensuring precise handling to avoid damage to internal components.
- **Selection of XT60 Connector:** Select an XT60 connector suitable for the power requirements of the FuryVission AAV, taking into account factors such as current rating and compatibility with existing wiring



Figure 31: Power Brick



Figure 32: Modified Power brick

- **Soldering Procedure:** With meticulous attention to detail, solder the XT60 connector to the power module, and also solder the red and black wire of JST 2 pin connector (for separate power supply for

raspberry pi) into the positive and negative terminal adhering to correct polarity to prevent electrical damage and ensure compatibility with standard battery connectors.

- **Inspection and Testing:** Thoroughly inspect the solder joints for proper connection and integrity, verifying polarity alignment and continuity. Conduct comprehensive testing to validate the functionality and safety of the customized power module before integration into the drone assembly.
- Once the power module has been customized with the XT60 connector, the next step is to integrate it with the UBEC (Universal Battery Eliminator Circuit). This critical component plays a pivotal role in regulating voltage levels and providing clean, stable power to the electronic systems of the Fury drone

Step 5: Power Module Mount Assembly

- **Inserting Thread:** Insert threads into the 3D-printed power module mount to securely hold components.
- **Fixing RC Receiver:** Mount the RC receiver using an M2 x 8mm screw.
- **Fixing Power Brick:** Attach the power brick securely onto the mount.
- **Fixing UBEC:** Fix the UBEC onto the mount, ensuring all components are tightly secured for stable power management and signal reception.

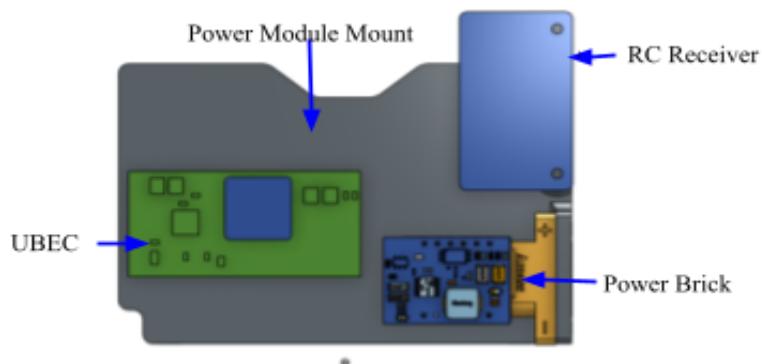


Figure 33 : CAD View of the Placement of RC Receiver, Power brick and UBEC on the Power Module Mount

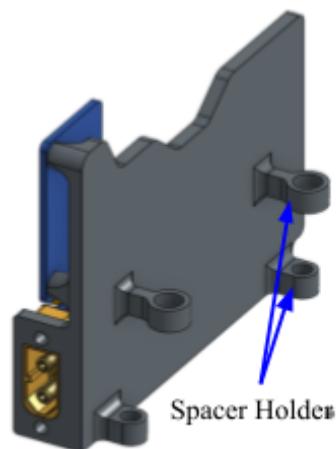


Figure 34 : side view of Power Module Mount

Step 6: Fixing RPi 4 Mount and Power Module Mount to the Middle Plate

- **Fixing Spacer:** Fixing 4 spacers of M3*35 mm to the middle plate for fixing the RPi 4 Mount and Power Module Mount

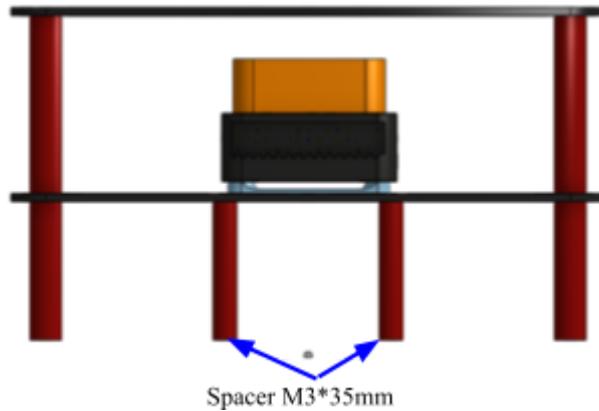


Figure 35 : assembled view of 4 spacers on the middle bottom side of middle plate

- **Fixing Both Mounts:** Place both the Raspberry Pi 4 mount and the power module mount onto the middle plate, then secure them in place using M3 screws.

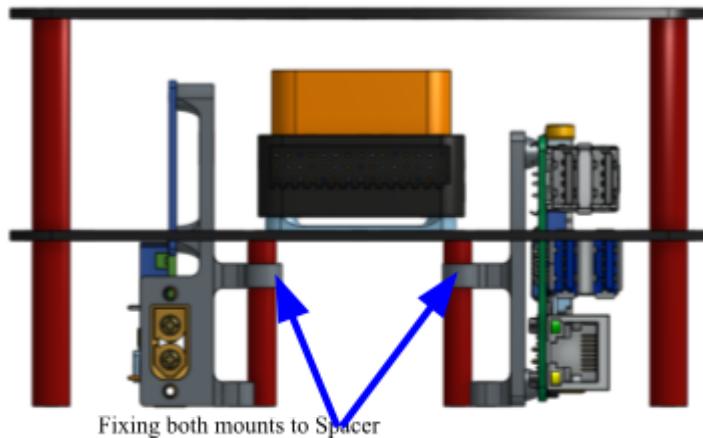


Figure 36 : Assembled view of both mounts on spacers

Step 7:ESC and Pixhawk Motor Connection

- Connect Motor 1 to AUX OUT1, Motor 2 to AUX OUT2, Motor 3 to AUX OUT3, and Motor 4 to AUX OUT 4 as per the wiring diagram.
- Attach the ground pin from the ESC to any available ground on the Pixhawk's AUX OUT.

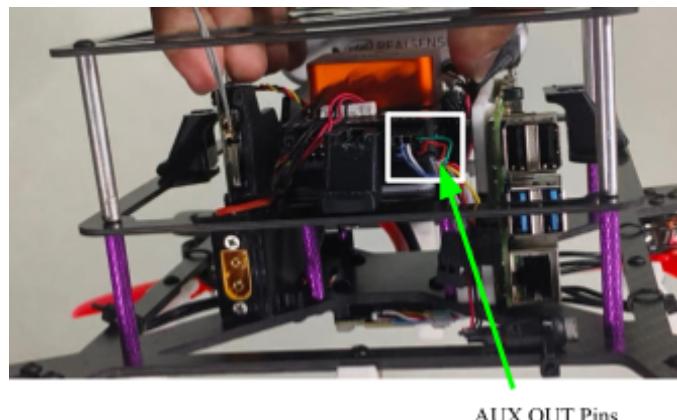


Figure 37: Connection of ESC to AUX pins of Flight controller

Step 8: Camera Mount Assembly:

- Insert thread into the 3D-printed camera mount fixing hole to fix the RealSense camera to the middle plate of the drone frame.

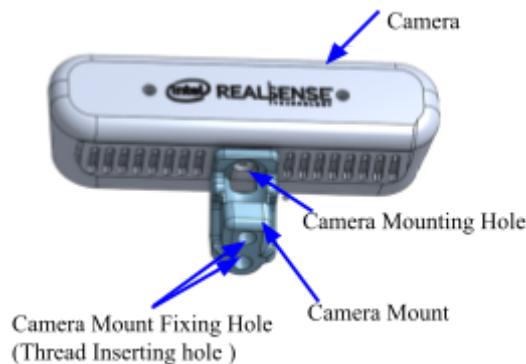


Figure 38 : CAD View of Assembled camera mount

- Securely attach the camera mount to the middle plate.

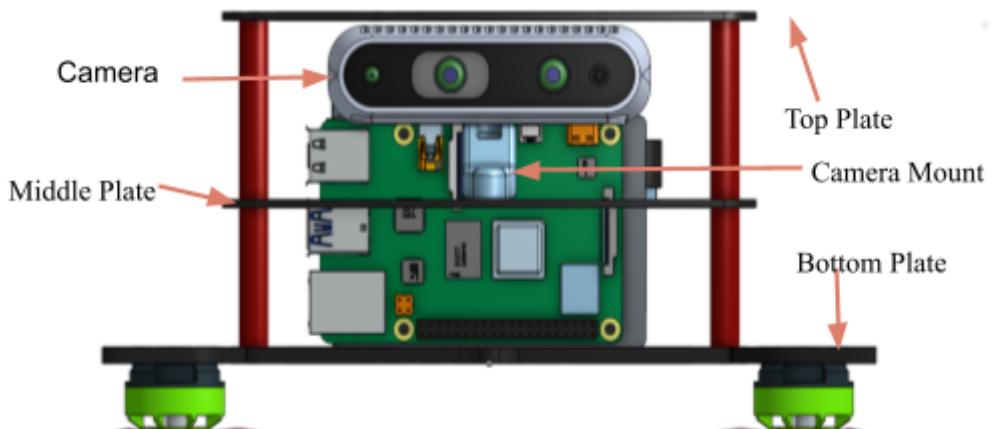


Figure 39 : CAD View of Assembled camera mount on middle plate

Step 9: Fixing Landing gears

- Insert the thread into the thread insert hole.
- Securely attach the four landing gears to the bottom side of the bottom plate.

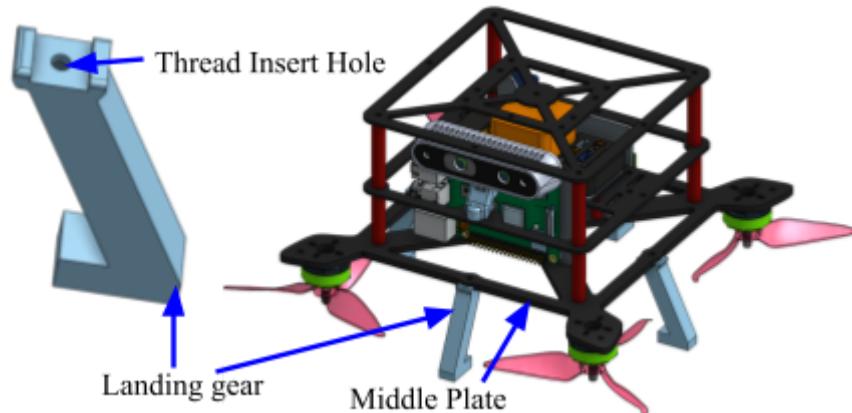


Figure 40 : CAD View of landing gears on fury drone frame mount

Note: Please refer to the figure for proper alignment and positioning while fixing the landing gears.

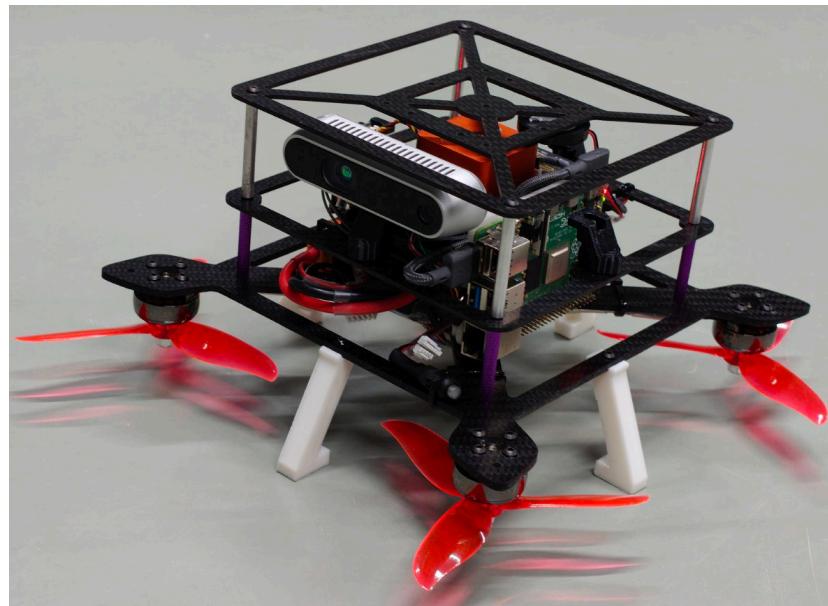


Figure 41: Completely assembled FURY Drone

Step 10: Battery Connection

- Connect the GenX 14.8V 4S 2200mAh 40C / 80C Premium Lipo Lithium Polymer Battery to power the system.

Note: Check the polarity during connection to prevent short circuits and ensure proper testing. Secure all connections and inspect the battery for damage before each use to avoid potential hazards.

Step 11: Optional Hardware

- GPS and telemetry modules are optional hardware components. Connect the GPS module to the **CAN1** port and the telemetry module to the **TELE1** port; both can be mounted on the top plate of the drone.

Step 12: Motor Direction Verification

- Check motor direction: right side (from the facing direction) and diagonal motor should rotate counterclockwise, while the remaining motors should rotate clockwise.
- If any motor rotates in the wrong direction, swap any two of its wires to correct it. For detailed guidance, refer to [this link](#).

<https://ardupilot.org/copter/docs/connect-escs-and-motors.html>

Note: Remove propellers during ESC calibration. Please refer to the file *installation.md* for calibration.

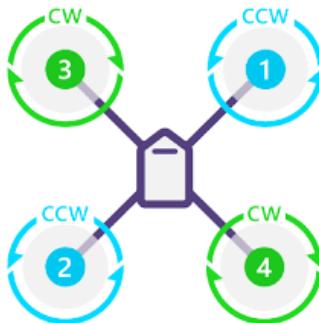


Figure 42 : Direction of motors

Step 13: Propeller Mounting

- Mount 5x5.5-inch propellers on the motors according to their rotation direction.

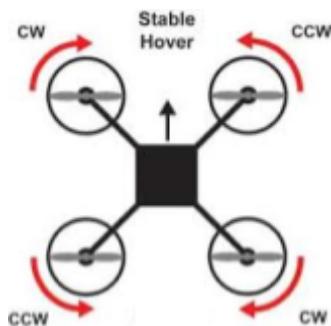


Figure 43 : Direction of propellers

Note: For configuration and calibration, please refer to the file *installation.md*.