

# MANTA V1

## User Manual

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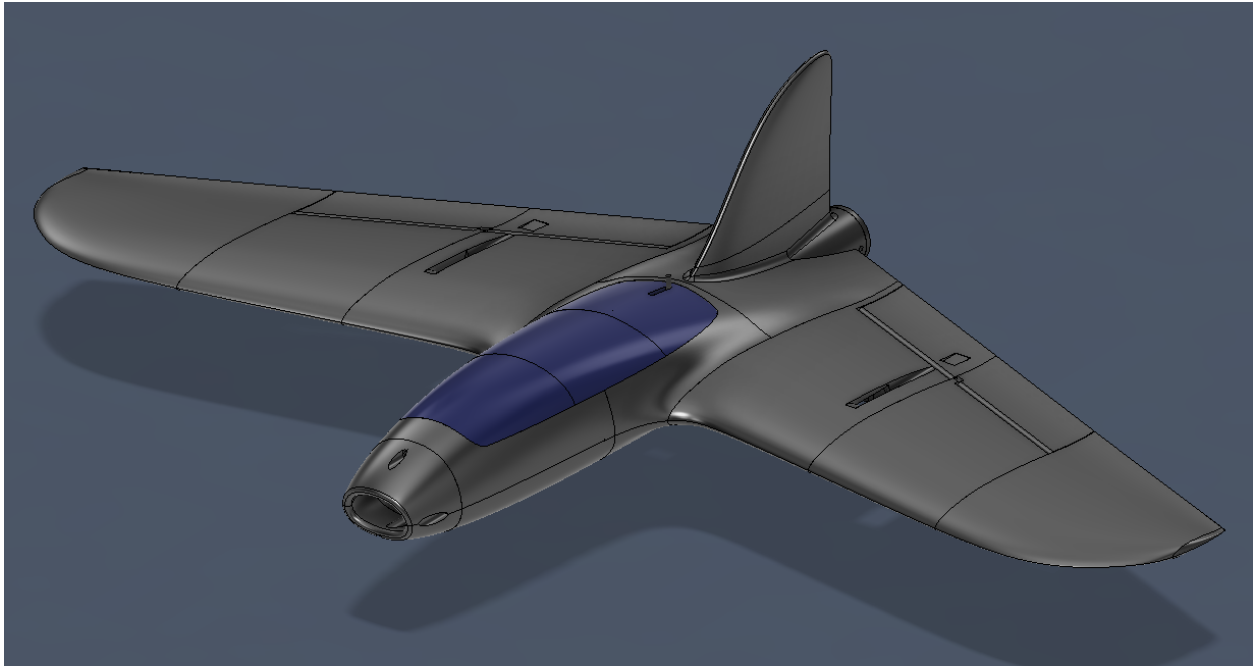


Figure 1: Fully assembled V1

## Introduction

**MantaDynamics** aims to make aeromodelling accessible to everyone by offering aircraft that are simple to print and easy to assemble. **Manta V1** is a fully **PETG** 3D printed plane designed for quick, straightforward construction with minimal tools and common adhesives such as **hot glue**, while remaining lightweight and durable. Built to comply with French **sub 800 g UAV** regulations, it provides a safe, practical, and beginner-friendly platform without compromising performance.

**Socials:** [Instagram](#)

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## Appendix

### General aircraft data

| General data      |                        |
|-------------------|------------------------|
| Wingspan          | 784 mm                 |
| Wing Area         | $11 \text{ dm}^2$      |
| Length            | 442mm                  |
| CG                | 10mm from leading edge |
| Print weight PETG | 360g                   |
| AUW               | 800g                   |
| Cruise speed      | 50 km/h                |
| Max speed         | Around 130 km/h        |
| Wing loading      | $72 \text{ g/dm}^2$    |

Table 1: General data and information

### Airfoil and Design Information

The design features a modified **MH61 airfoil** with increased reflex integrated into a compact, reverse swept flying wing configuration inspired by the TBS Chupito. The additional reflex improves inherent pitch stability and reduces trim drag, allowing the wing to **fly smoother** and more predictably without requiring constant control input. The reverse sweep **enhances maneuverability** and gives the aircraft a distinctive, aggressive appearance while maintaining **good balance** and **control authority**. The airframe is sized to comfortably house a **2200 mAh battery** at the center of gravity, supporting longer flight times and stable weight distribution. Overall, the design prioritizes **aerodynamic efficiency**, structural simplicity, and forgiving flight characteristics, resulting in a clean, lightweight, and reliable wing suitable for both **fast sport flying** and **FPV cruising**.

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## Exploded view

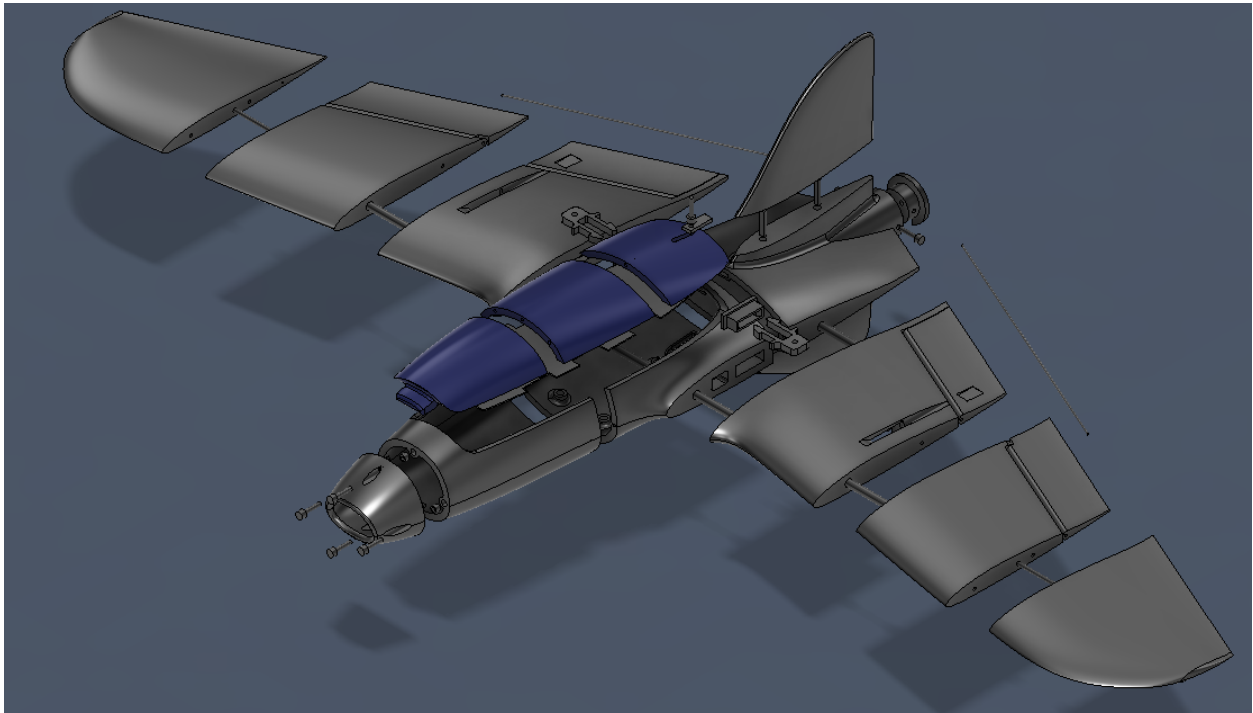


Figure 2: Exploded view 1

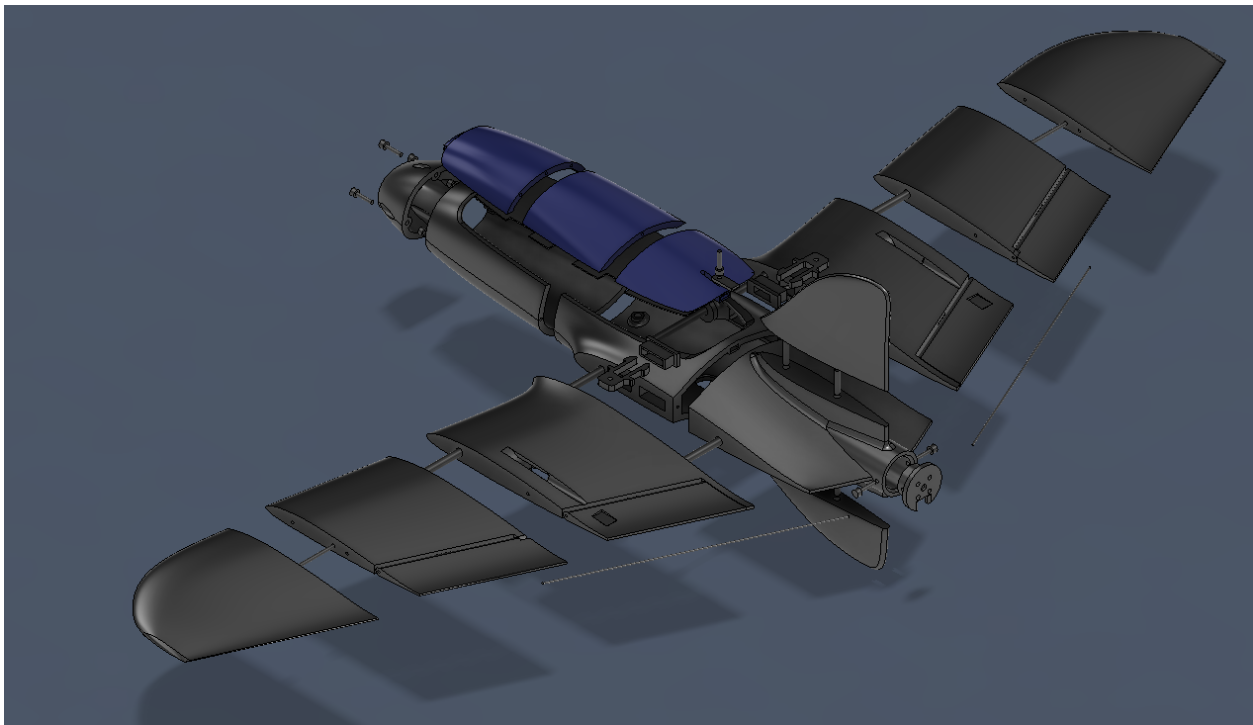


Figure 3: Exploded view 2

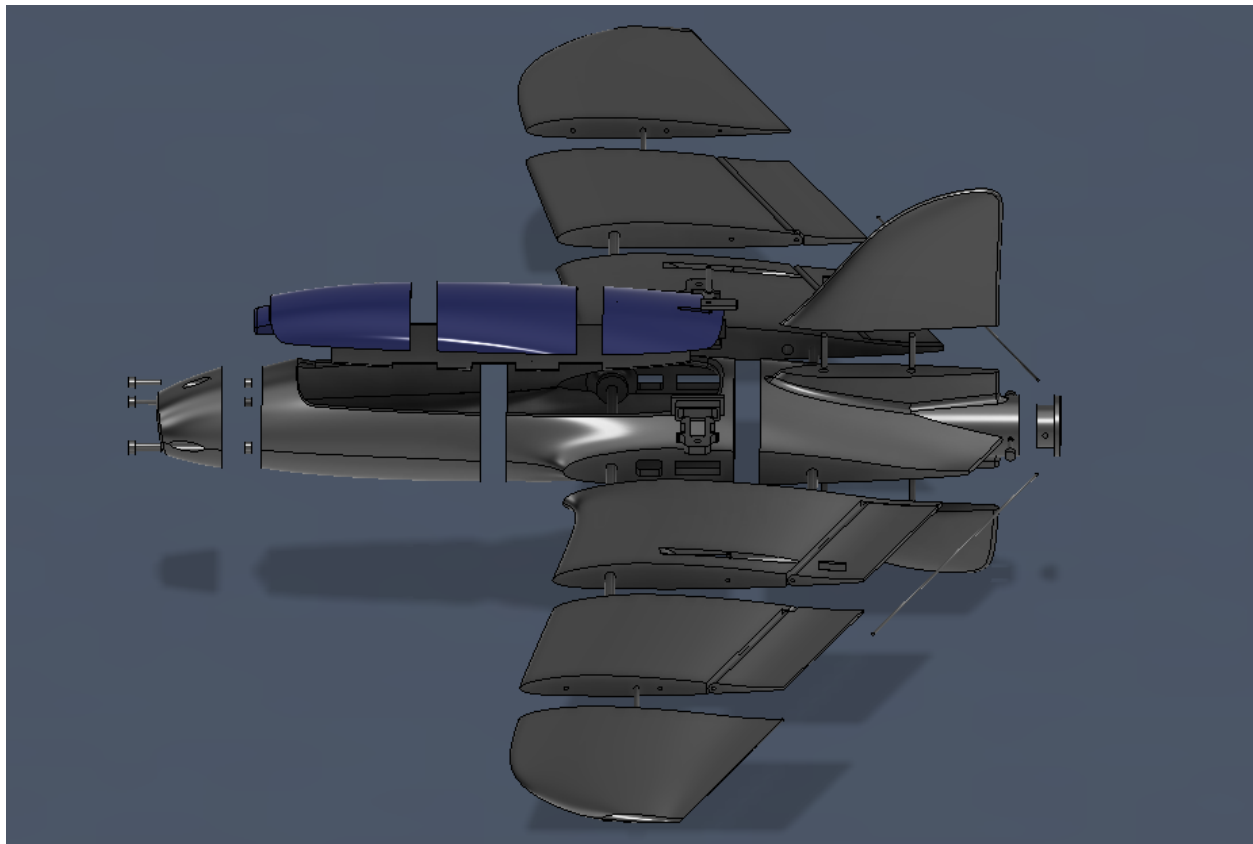


Figure 4: Exploded view 3

## Recommended RC equipment

| RC equipment      |                                                                                                                                                            |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Servos            | 2 x 9g servos                                                                                                                                              |
| ESC               | 35A - 45A ESC (F35A 3-6S - T-Motor for example)                                                                                                            |
| Motor             | Use a 2306 or 2207 motor with any ESC that, combined with a 5 inch prop, produces more than 1400 g of thrust. (Emax ECO II Series 2306 1700KV for example) |
| Propeller         | 5 inch tri blade 5040                                                                                                                                      |
| Gyro              | Hobbyeagle A3v2                                                                                                                                            |
| Battery           | 1500 mAh 6s (1300 - 2200 mAh) (200-350g) (The 1500 mAh was found to best match the 800g limit)                                                             |
| Receiver          | Any 6 channel receiver                                                                                                                                     |
| Camera (Optional) | DJI o4 (Work in progress)                                                                                                                                  |

Table 2: Electrical components

## Required RC accessories

| Accessories            |                     |
|------------------------|---------------------|
| Carbon tube            | 1 x (6 mm x 500 mm) |
| Carbon tube            | 1 x (6 mm x 280 mm) |
| Carbon rod             | 2 x (3mm x 150 mm)  |
| Steel rod flaps        | 2 x (1mm x 220 mm)  |
| Steel rod servos       | 2 x (1mm x 100 mm)  |
| 3 mm inserts           | 4                   |
| Screws                 | 4 x (3mm x 10mm)    |
| Screws                 | 7 x (3mm x 15mm)    |
| Servo rod connector    | 2 x (1mm hole)      |
| Filament inserts       | 11x (1.75mm x 13mm) |
| Spring from an old pen | 1                   |

Table 3: Required accessories to assemble the Manta V1

## 3d printed parts list + tools + printing settings

| 3d printed parts |                 |            |                       |               |             |
|------------------|-----------------|------------|-----------------------|---------------|-------------|
| Part             | Infill (Gyroid) | wall count | Top and bottom layers | Number needed | PETG Weight |
| Fus1             | 3%              | 1          | 2                     | 1             | 7g          |
| Fus2             | 3%              | 1          | 2                     | 1             | 25g         |
| Fus 3            | 3%              | 1          | 2                     | 1             | 34g         |
| Fus 4            | 3%              | 1          | 2                     | 1             | 44g         |
| Upper fin        | 3%              | 1          | 2                     | 1             | 11g         |
| Lower Fin        | 3%              | 1          | 2                     | 1             | 6g          |
| Canopy (1)       | 3%              | 1          | 2                     | 1             | 8g          |
| Canopy (2)       | 3%              | 1          | 2                     | 1             | 8g          |
| Canopy (3)       | 3%              | 1          | 2                     | 1             | 7g          |

|                |     |   |                    |   |     |
|----------------|-----|---|--------------------|---|-----|
| Motor mount    | 10% | 3 | 2                  | 1 | 15g |
| Pin1A          | 10% | 3 | 2                  | 2 | 6g  |
| PinRear        | 10% | 3 | 2                  | 4 | 4g  |
| PinClose       | 10% | 3 | 2                  | 1 | 1g  |
| Battery holder | 10% | 3 | 2                  | 1 | 12g |
| PinB           | 10% | 3 | 2                  | 2 | 4g  |
| WR 1           | 3%  | 1 | 5 bottom and 2 top | 1 | 33g |
| WR 2           | 3%  | 1 | 2                  | 1 | 21g |
| WR 3           | 3%  | 1 | 2                  | 1 | 20g |
| Flap R1        | 3%  | 1 | 2                  | 1 | 5g  |
| Flap R2        | 3%  | 1 | 2                  | 1 | 5g  |
| WL 1           | 3%  | 1 | 5 bottom and 2 top | 1 | 33g |
| WL 2           | 3%  | 1 | 2                  | 1 | 21g |
| WL 3           | 3%  | 1 | 2                  | 1 | 20g |
| Flap L1        | 3%  | 1 | 2                  | 1 | 5g  |
| Flap L2        | 3%  | 1 | 2                  | 1 | 5g  |

Table 4: 3d printed parts list and informations

| Tools         | Info                            |
|---------------|---------------------------------|
| 3d printer    | Recommended :)                  |
| Glue gun      | Or any strong glue              |
| Pliers        | To bend and cut the metal wires |
| Scalpel       | To clean the edges              |
| A saw/ Dremel | Cut carbon tubes                |

Table 5: Tools needed for assembly

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## Assembly

### Fuselage

Using **Fus (2)** and the threaded inserts, as seen in Figure 5. Position each threaded insert over the designated hole in the Fus part, then use the heated soldering iron to gently press the insert into the plastic until it is fully seated and flush with the surface. Keep the insert straight while applying light, steady pressure to ensure proper alignment. Allow the part to cool completely so the insert sets securely before continuing with assembly.

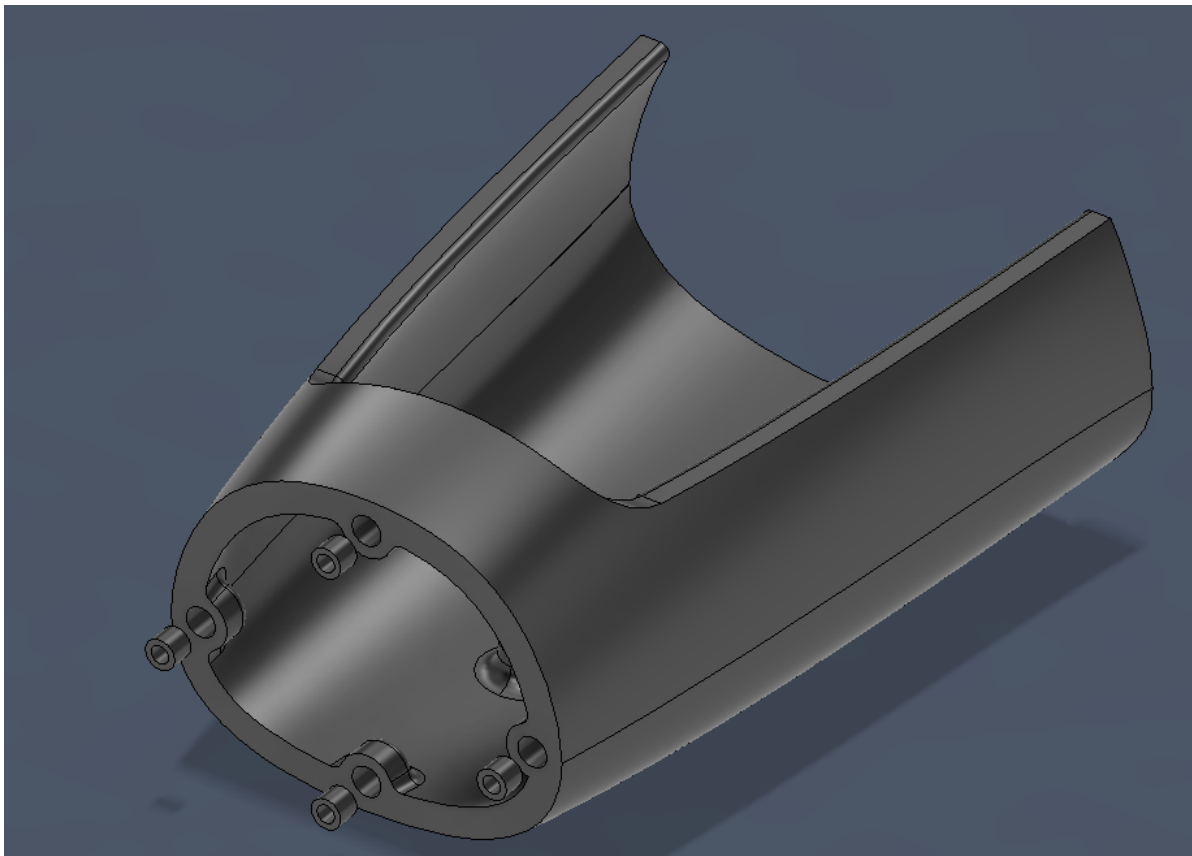


Figure 5: Fus (2) inserts

Attach **Fus (1)** to **Fus (2)** by aligning the parts and securing them with 10 mm M3 screws, as seen in Figure 6. Insert the screws through the designated holes and tighten them into the pre-installed threaded inserts until snug, ensuring the components are properly aligned and firmly fastened without over tightening.

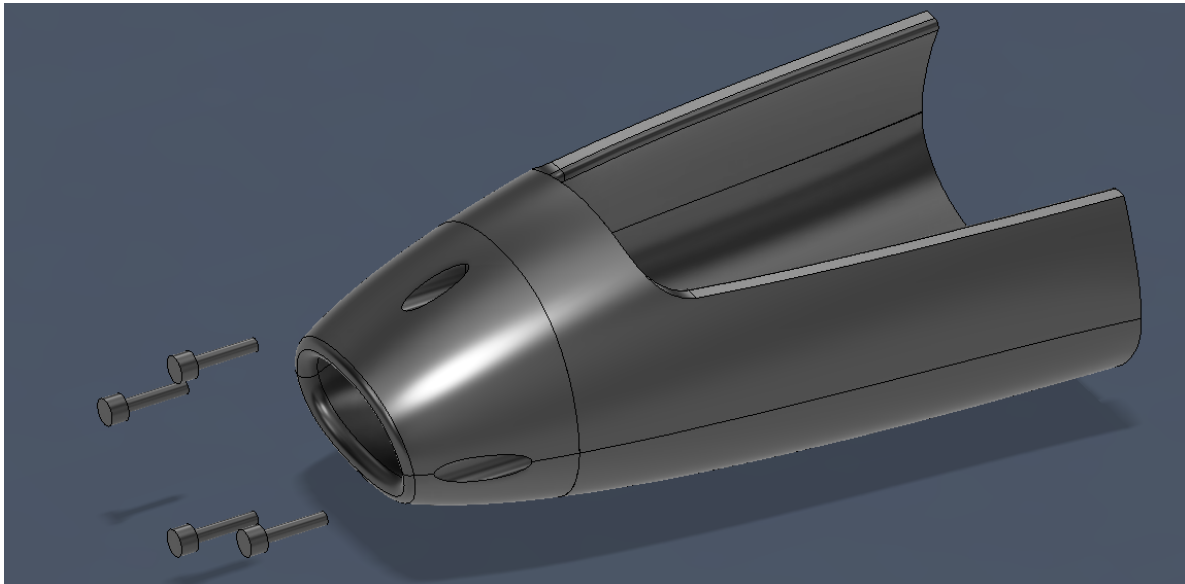


Figure 6: Fus (1) and Fus (2) assembly

Apply a small amount of glue to the outer surfaces of both **Pin 1A** parts. Align each pin with the square slots on **Fus (3)** and press them firmly into place until fully seated, as seen in Figure 7. Hold briefly to ensure proper adhesion and alignment, and allow the glue to set before proceeding with the next assembly step.

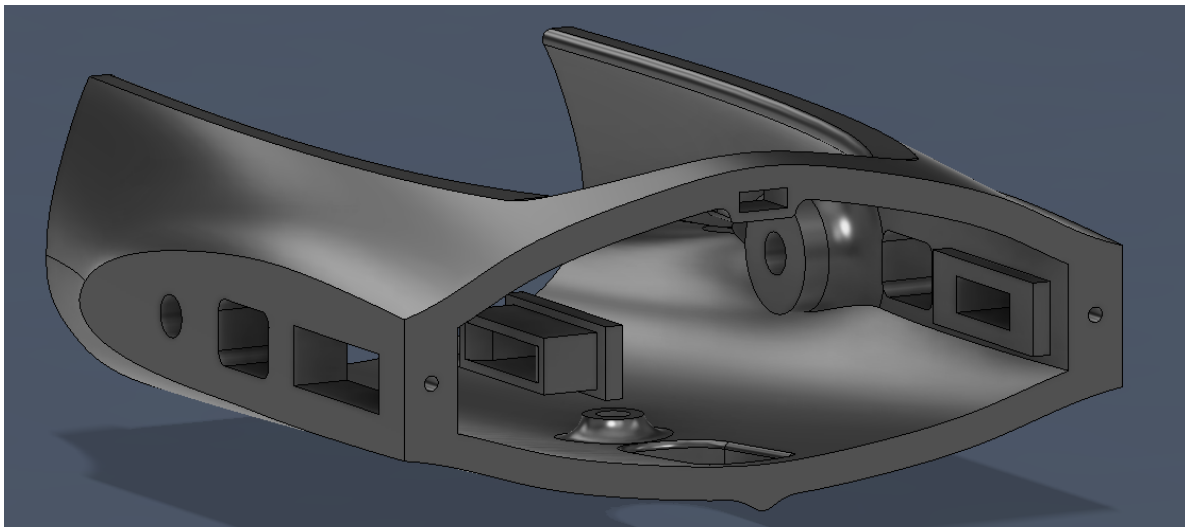


Figure 7: Fus (3) and Pin 1A assembly

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Apply glue to the 4 **PinRear** and insert them into the corresponding slots in the upper and lower fins. Once the pins are secured, apply glue to the contact surfaces and attach them to **Fus (4)**, pressing it firmly into place, as seen in Figure 8. Hold the assembly briefly to ensure proper alignment and allow the glue to set before moving on.

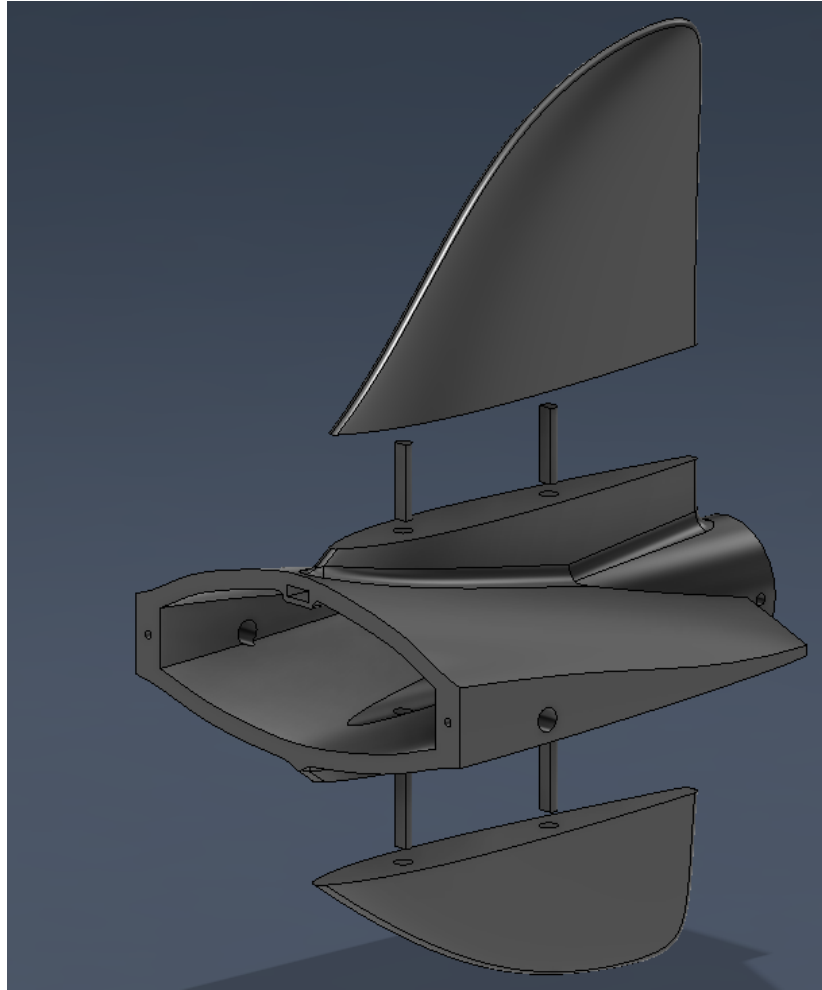


Figure 8: Fus (4) and Fins assembly

Assemble **Fus (1)**, **Fus (2)**, **Fus (3)**, and **Fus (4)** by aligning them in order as seen in Figure 9. Insert the five filament inserts into the designated holes between the fuselage sections. Apply glue to the mating surfaces and press the fuselage parts firmly together, ensuring all inserts are properly seated and the sections are aligned. Hold the assembly in place until the glue sets securely.

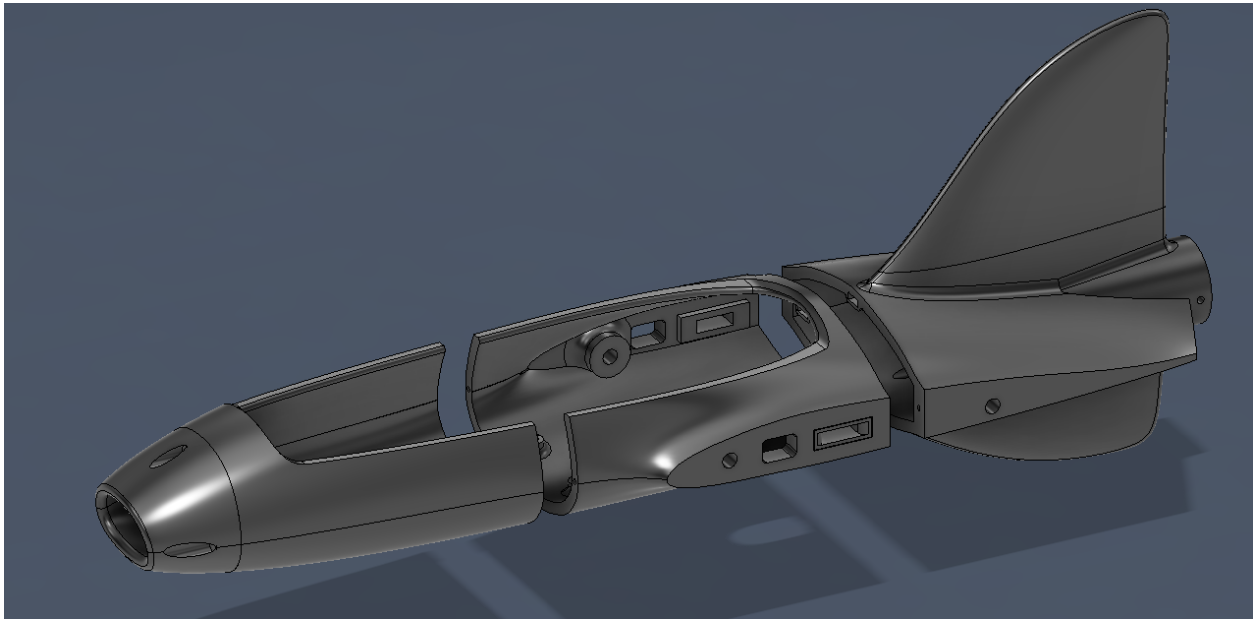


Figure 9: Fuselage assembly

Apply glue to the **battery holder** and position it on the fuselage , using the holes as guides to ensure correct placement as seen in figure 10.

Next, mount the motor onto the **motor mount** using the appropriate M3 screws (two or four, depending on the motor type) and tighten them until the motor is firmly secured. If your motor cables are long enough, you can already attach the motor holder using M3 × 15 mm screws, aligning it securely with the fuselage. More information about it in the electronic assembly part and figure 22.

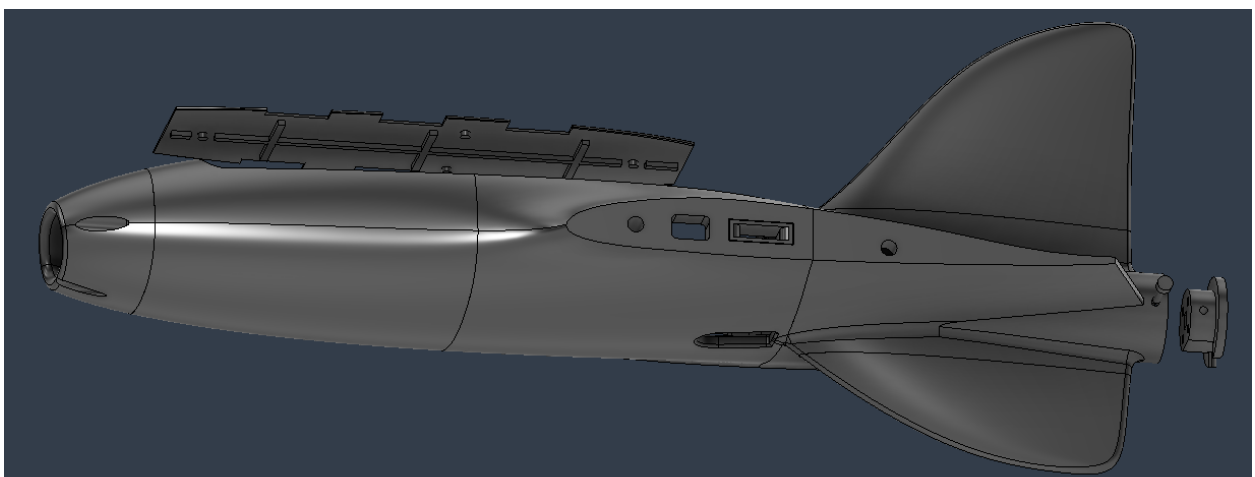


Figure 10: Battery holder and motor mount assembly

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Insert the four filament inserts into the designated holes on the canopy parts. Apply glue to the mating surfaces of **Canopy (1)**, **Canopy (2)**, and **Canopy (3)**, then carefully press them together, ensuring proper alignment as seen in figure 11. Hold the assembly until the glue sets securely and the canopy parts are firmly bonded.

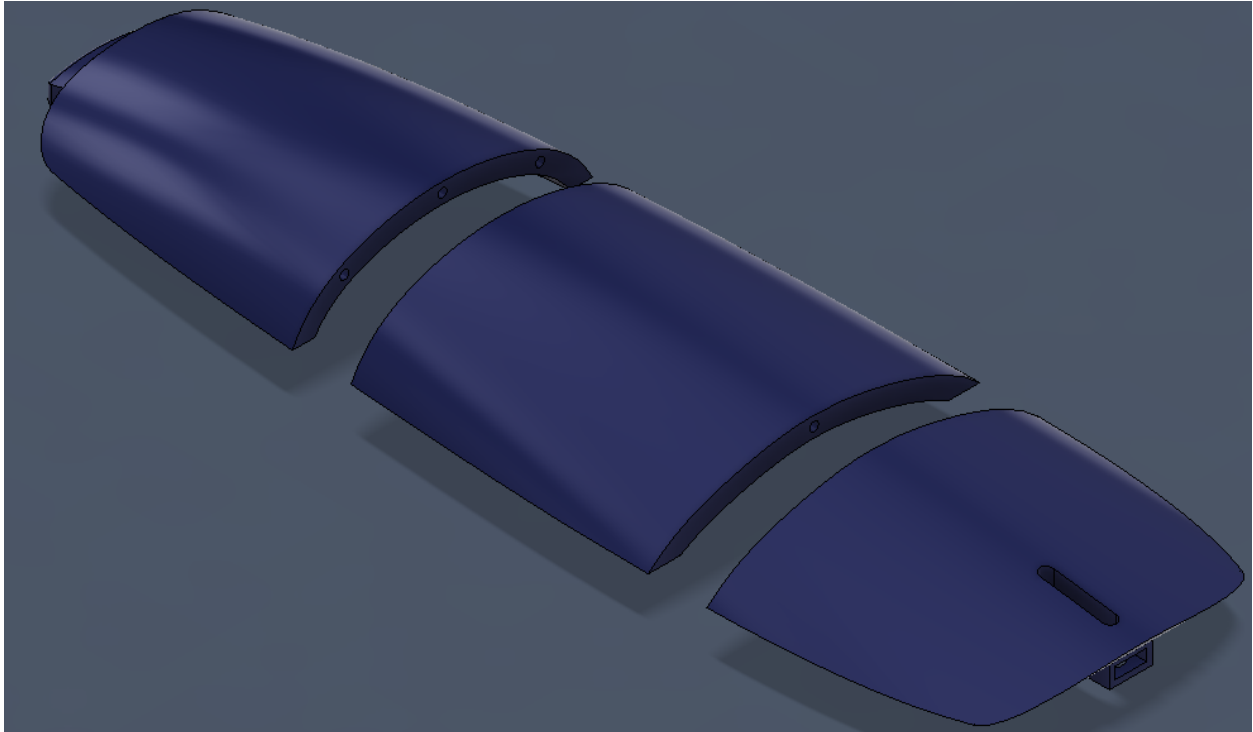


Figure 11: Canopy assembly

Insert the **PinClose** into its slot, ensuring it fits loosely. Secure it by fastening the last M3 × 15 mm screw through the designated hole. Then, apply glue to attach the spring to the back of the hatch, holding it in place until the adhesive sets firmly.

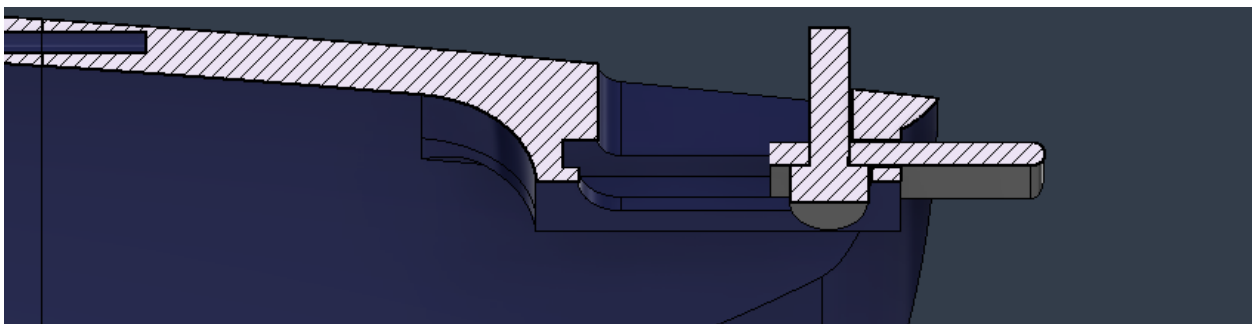


Figure 12: Locking mechanism assembly

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The fuselage assembly is now complete as seen on figure 13. All components, including **Fus (1) through Fus (4), the pins, filament inserts, canopy, battery holder, motor holder, and hatch**, have been properly secured with screws and glued where needed, resulting in a fully assembled fuselage ready for the next stage.

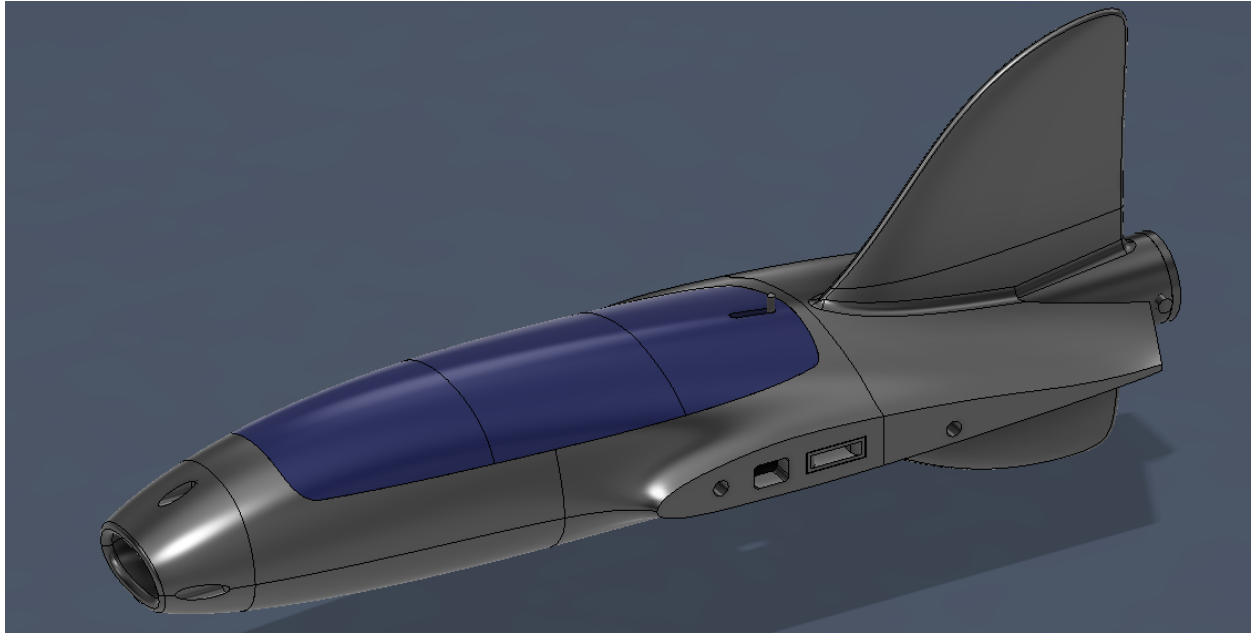


Figure 13: Finished fuselage

## Wings assembly

The left and right wings are assembled using the same steps. Follow the identical procedure for both sides, ensuring all components are aligned correctly and secured.

Insert the longer carbon rod through **WL 1** and **WL 2** to connect the two wing sections as seen in figure 14 and figure 15. Place a filament insert into the small hole, then apply glue to the mating surfaces and press **WL 1** and **WL 2** firmly together. Hold the assembly until the glue sets to ensure a strong, aligned joint.

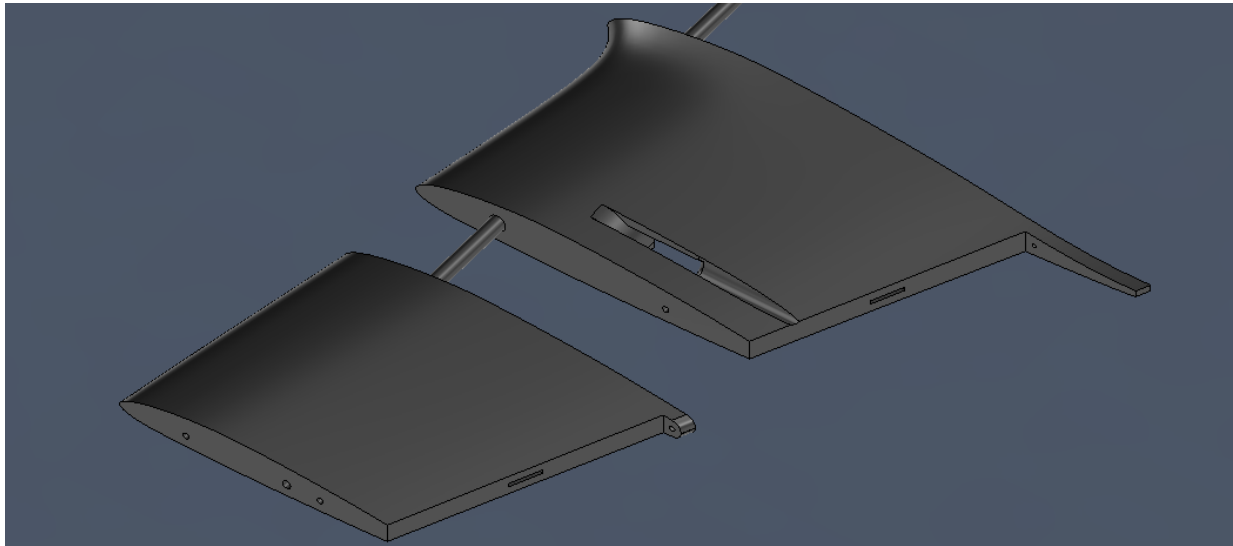


Figure 14: Representation of Figure 15

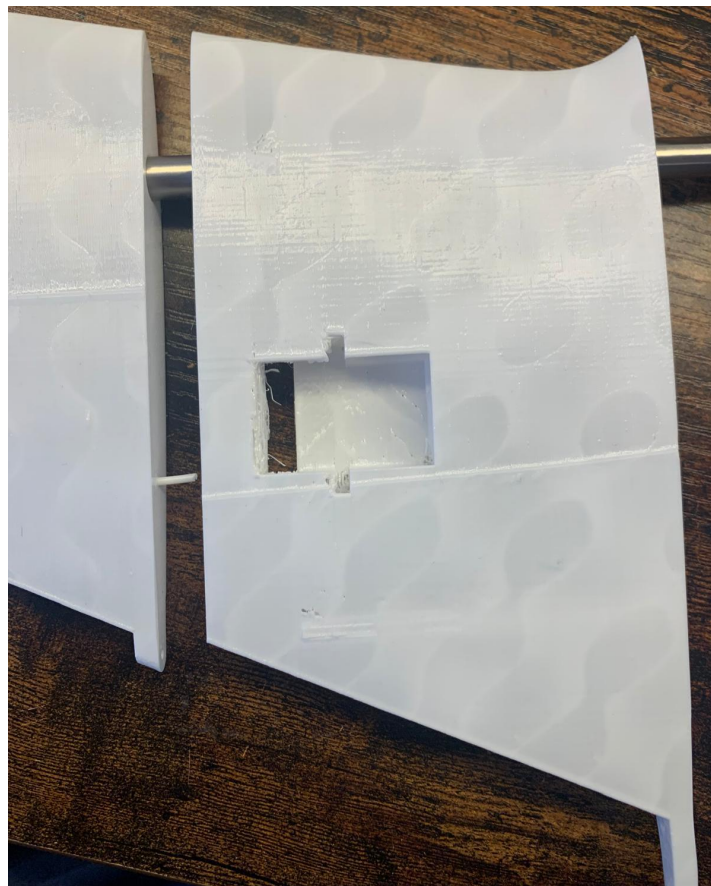


Figure 15: WL 1 and 2 alignment

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Apply glue to the mating surfaces of **Flap L1** and **Flap L2** and press them firmly together, ensuring they are properly aligned as seen in figure 16. Hold the parts in place until the adhesive sets to form a secure, unified assembly.

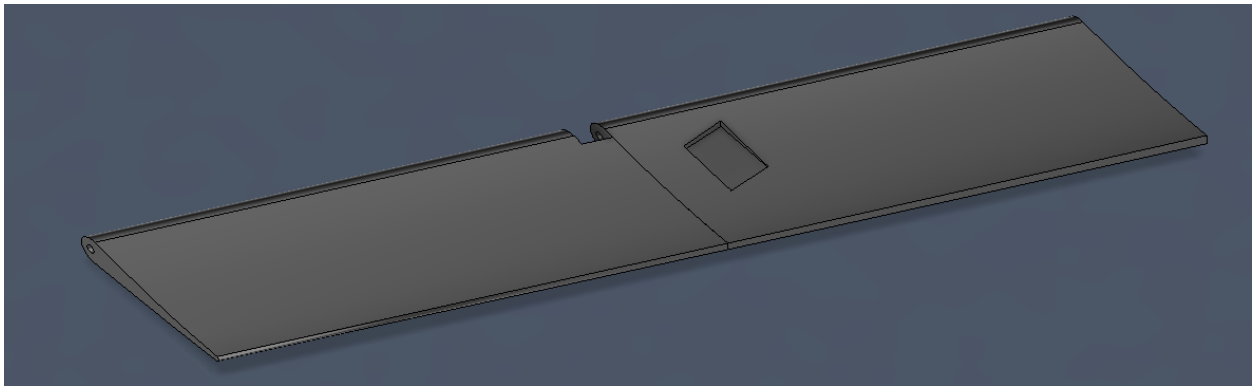


Figure 16: Flaps assembly

Align the flap with the wing assembly and insert the 1mm x 220 mm connecting rod fully through the corresponding holes in **WL 1** and **WL 2**, ensuring it passes straight and seats securely, as seen in figure 17. This will hinge the flap properly to the wing, allowing for correct movement and alignment.

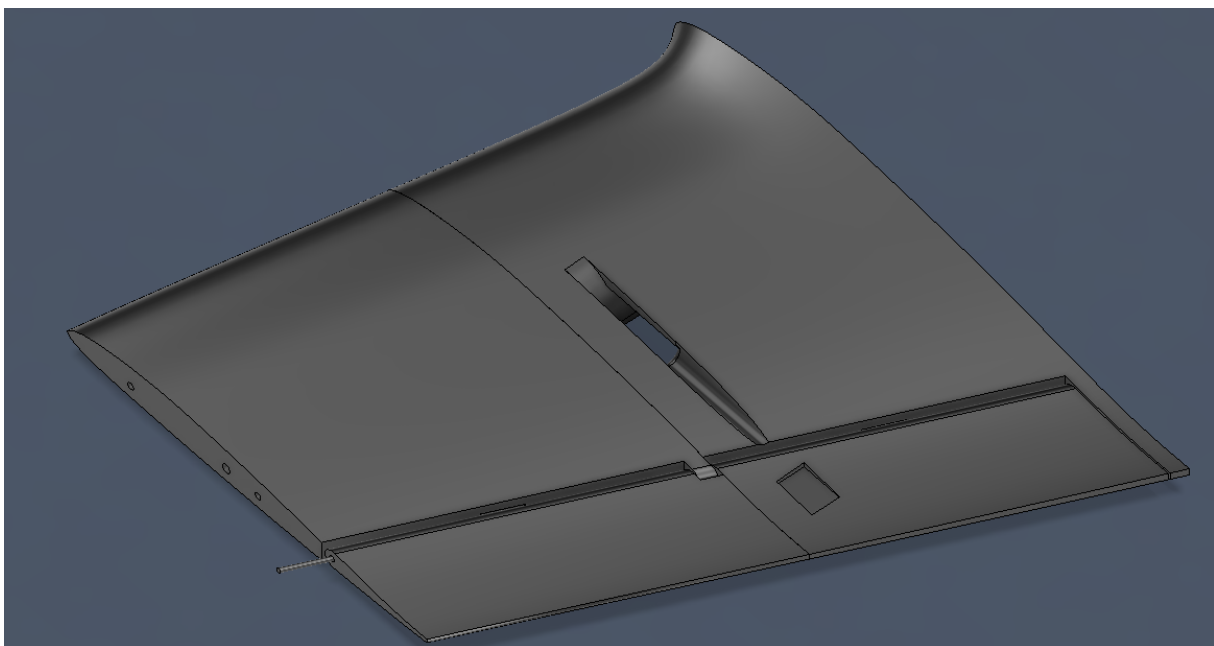


Figure 17: Wing and flap assembly

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Insert the 150 mm × 3 mm rod into the center hole of the wing assembly. Place filament inserts in the designated holes to ensure proper alignment of the wing sections as seen in figure 18, then apply glue to the contact surfaces and press the parts together firmly. Hold the assembly until the glue sets to create a strong, aligned joint.

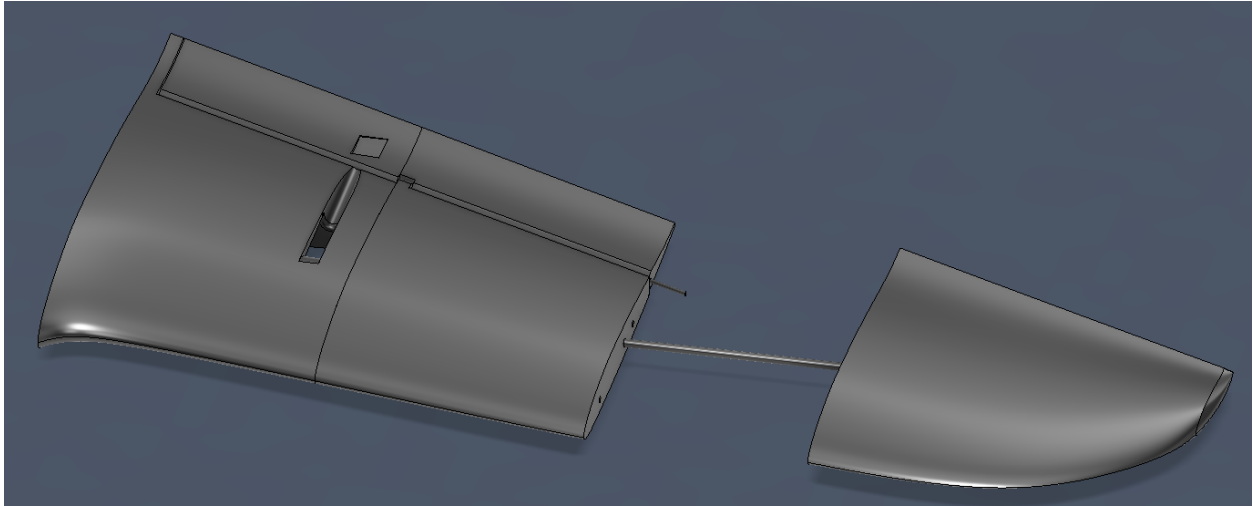


Figure 18: Final wing assembly

In order to make sure that **Pin B** fits perfectly you can precheck before gluing, if it does not, it is important to trim slightly the inside of the clip (show), add glue inside the slot and Insert Pin B in the wing (orientation does not matter) as seen in figure 19.

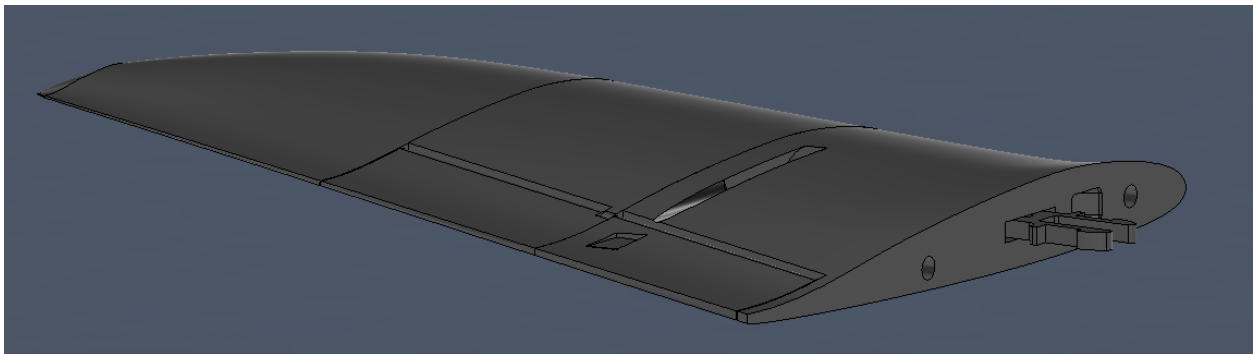


Figure 19: Clip assembly

Insert the carbon rods into the wing and fuselage, carefully guiding them so the servo cable does not get pinched or caught. Push the rods fully in until they click into place, securing the connection as seen in figure 20. Repeat the same process for the second wing, ensuring both wings are properly attached and aligned.

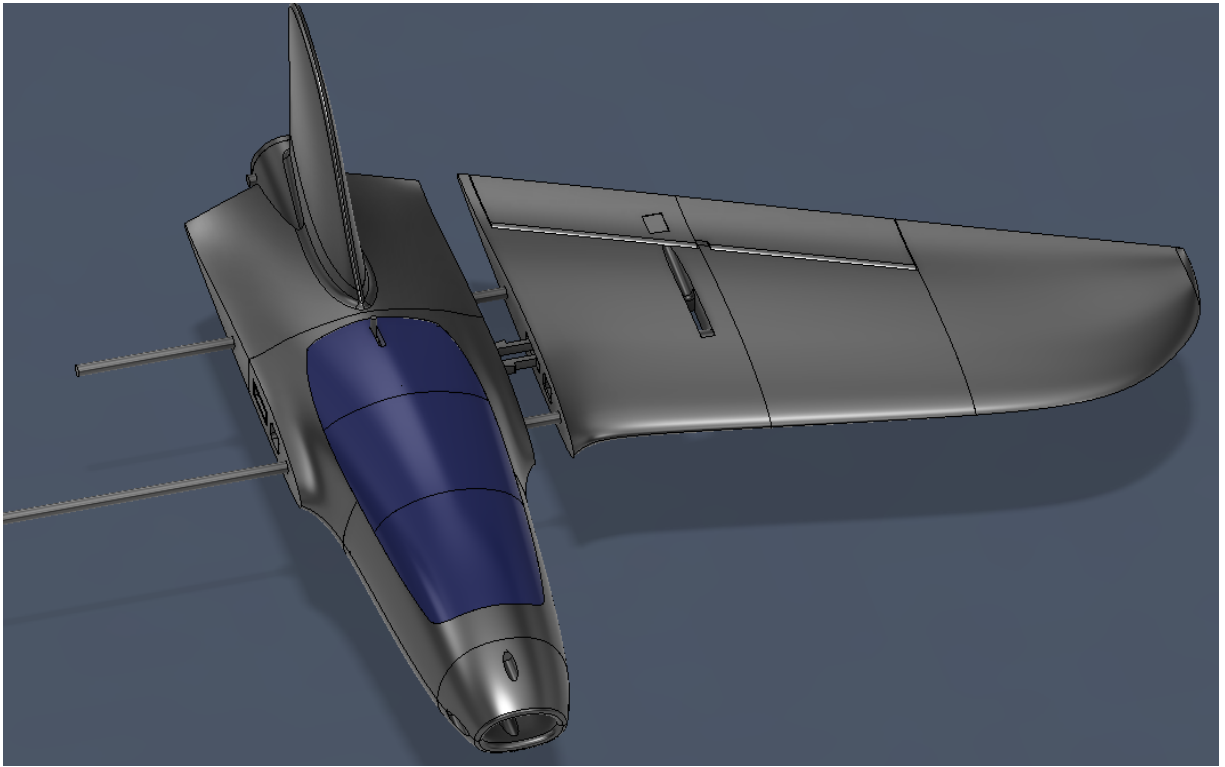


Figure 20: Fuselage and wing assembly

The plane assembly is now complete as seen in Figure 21. You can proceed to install the electronics inside the fuselage and attach the control horns to the appropriate surfaces, preparing the aircraft for final setup and flight.

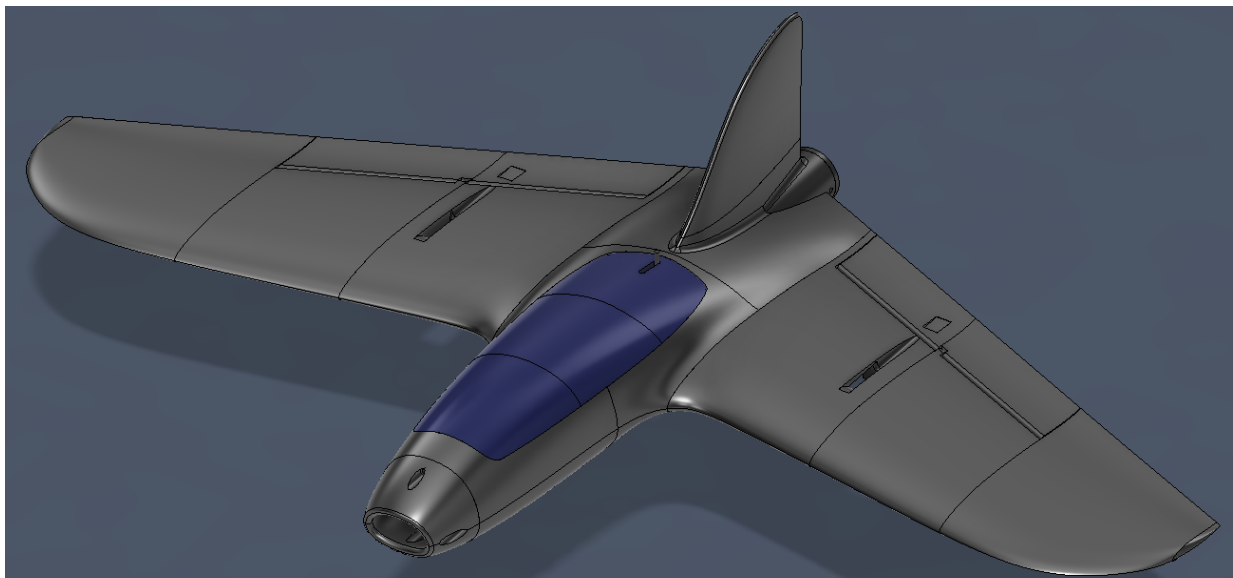


Figure 21: Finalized Manta V1

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## Electronic assembly

The electronic assembly consists of three main parts: the motor assembly, the servos, and the internal installation of the electrical components.

### Motor assembly

Pass the mounting screws through the back of the motor plate and fasten the motor in place using two or four screws as seen in figure 22. Route the motor cables through the center and guide them through the designated slot. The cables may be slightly pinched when tightened, this is normal and helps secure them to prevent damage or disconnection during a crash. Slide the completed motor assembly into position and secure it with two M3 × 15 mm screws. Ensure the cables are long enough to reach the ESC, if not, connect the motor to the ESC before installing the motor assembly.



Figure 22: Motor assembly

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## Servo assembly

First, center the servo control horn. Route the servo cable through the designated slot, as shown in Figure 23. Apply a small amount of glue to the inner mounting surface of the servo, then position it so the control horn passes through the wing. This orientation keeps the control surfaces on the top side, helping protect them during landings. Add glue beneath the servo and press it firmly into place to secure it, as shown in Figure 24.

To install the control horn on the wing, apply glue to the base of the horn as shown in figure 25, then press it firmly into position on the control surface. Insert the 1 mm pushrod through the second to last hole of the servo arm and the top hole of the control horn. Secure the pushrod using a servo rod connector.

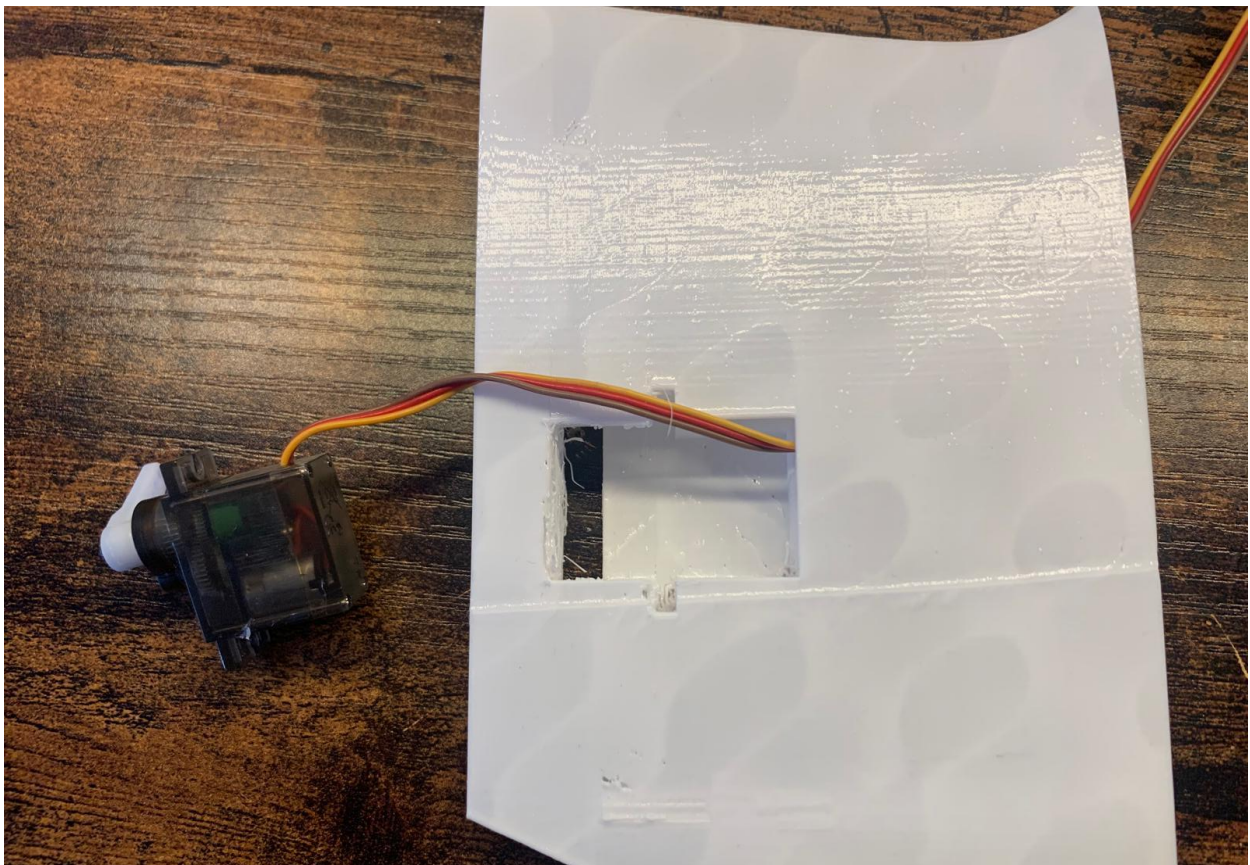


Figure 23: Running the cable through WL 1

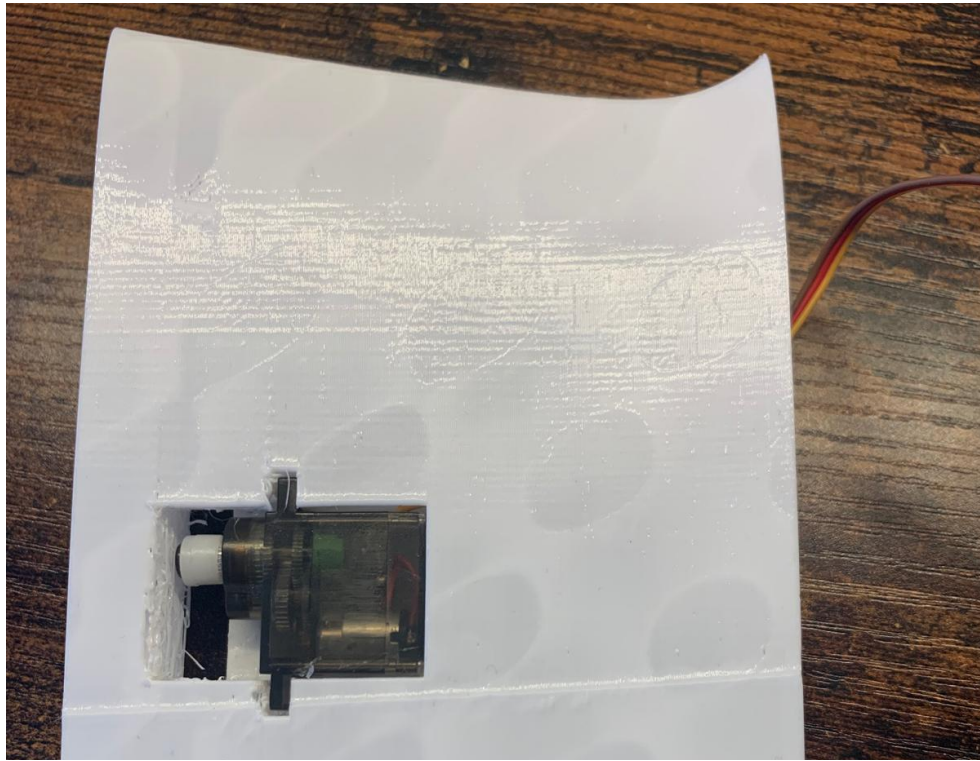


Figure 24: Securing the servo to the wing



Figure 25: Servo assembly

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## Internal electronics assembly

The electronics inside the plane can be arranged to your preference. Custom mounts may be created as needed, and the current battery support can be modified or replaced. Threaded inserts can also be added to securely mount additional electronic components. If you plan to use a SpeedyBee F405, this is also supported, and a dedicated mount can be designed specifically to fit it.

## Tuning:

The flap and aileron travel is still being tested, but aim for approximately **15 mm upward** and **12 mm downward** movement as a starting point for setup and tuning.

To find the **center of gravity (CG)**, refer to Figure 26 and support the plane at the indicated balance points, located **10 mm from the leading edge** of the wing. Adjust the battery or internal components until the aircraft balances level or with a slight nose down attitude.

It is recommended to mark the battery position inside the plane once the correct balance is achieved to avoid repeated adjustments. You may also place a small drop of glue on each side to mark the CG reference points. Since the center of gravity is still being fine tuned, slots have not been incorporated into the wing design yet.

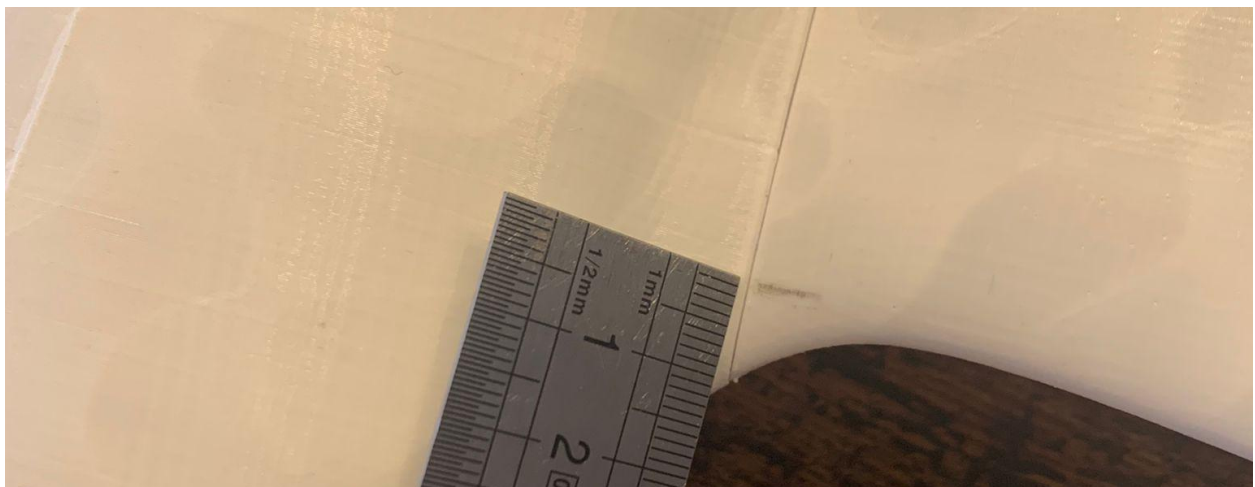


Figure 26: CG placement

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## Your Manta V1 is now completed



Figure 27: Finished Manta V1

Thank you for following this assembly guide. If you have any questions or need clarification at any step, please don't hesitate to ask, I'm happy to help!