



FPV-Wing-Racer (rev.2)



Whitespace

[VIEW IN BROWSER](#)

updated 10. 4. 2025 | published 10. 4. 2025

Summary

mirrored from <https://www.thingiverse.com/thing:6622923>

[Hobby & Makers](#) > [RC & Robotics](#)

Tags: [drone](#) [rcplane](#) [airplane](#) [fpvracer](#) [fpvracing](#)
[droneracing](#)

Print. Fly. Crash. Repeat. Round 2!

After the initial version has been out for some time now. It's time for some improvements,
thanks to some feedback from the community

- I got rid of the click-in system and replaced it with proper screws
- Added another version that supports cams with size 14x14mm
- Adjusted wing structure to work with PETG
- Now PETG is recommended for the Wings, PLA still works
- New Winglet design.

mirrored from [FPV-Wing-Racer \(rev.2\)](#) by Whitespace - Thingiverse

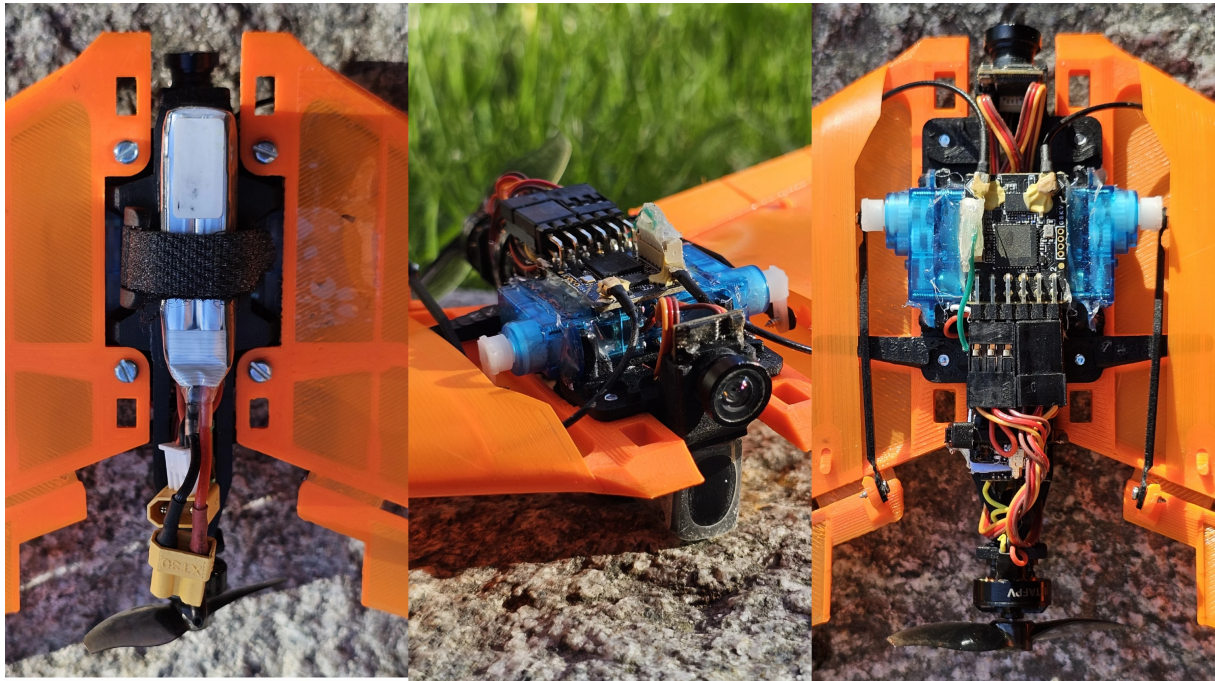
Some technical details:	Value	Unit
span width	360	mm

weight	80*	g
top speed	~ 70**	km/h
climbing speed	~ 6**	m/s
glide ration	1.5:1	-
thrust to weight ration	>1	-
printing time	~ 4	h
building time	~ 30	min
print material	PLA+PETG	-

*with 300mah batt; **just an estimation

If you are further interested in this project or need building support, do not hesitate to contact me directly or write me on Instagram (@phil.white98) or Discord (astro_phil) or join the discussion on [reddit](#).

Designed in Blender <https://www.blender.org/>



Print Settings

These settings are essential for the wings, elevons and winglets. Also try to over extrude the initial layer so that it will have a strong cohesion and I also recommend printing the first layer at ~25mm/s

Parts with the ending R must be printed twice but the second one is mirrored

Only the base part needs support. Support on print bed only is sufficient.

Item	Value	Unit
Layer height	0.15	mm
Initial Layer height	0.15	mm
Wall line Count	3	-
Horizontal Expansion (CURA)	-0.05	mm
XY-Size Compensation (Prusa)	-0.05	mm
Elefantfoot Compensation (Prusa)	0.00	mm
Top/Bottom Pattern	Line	-
Line Direction	[61,151]	deg
Infill Density	20	%
Infill Pattern	Line	-
Connect Infill lines	True	-
Infill line Direction	90	deg

Use Top/Bottom Line direction [-61,-151] for the ****left wing**** and [0,90] or [90,0] for everything else!

And print the Wings out of PETG if possible. It's more durable.

The elevons are only for replacement the wing already has one attached.

In case of scaling issues

The dimension (X)x(Y)x(Z) of the parts in [mm] :

- + **Base** : 70x84.1x15.1
- + **Wing** : 207x178x10.3
- + **Winglet** : 1.8x89.5x48.3
- + **Elevon** : 165x21.1x10.3
- + **Rod** : 9.1x52.5x1.5

Parts I used

- (Motor) BETAFPV 1103 11000kv
[AliExpress](#) [getFPV.com](#) [RC-Hangar.de](#) [FPV24.com](#)
- (Servo) D-Power AS-106BB Servo, Nano or any equivalent in size
[AliExpress](#) [Modellbau-Berlinski.de](#) [getFPV.com](#)
- (ESC) T-Motor 3D / 4D Brushless Regler F3P BPP-4D 2S-4S mit BEC
[AliExpress](#) [Premium-Modellbau.de](#) [T-Motor](#)
- (BATT) Tattu 300mah 2S 75C 7.6V Lipo (up to 550 mah batts possible)
[AliExpress](#) [FPV24.com](#) [getFPV.com](#)
- (VTX) TBS unify pro32 nano
[AliExpress](#) [FPV24.com](#) [getFPV.com](#)
- (CAM) BETAFPV C02 FPV Micro Camera
[AliExpress](#) [getFPV.com](#) [RC-Hangar.de](#)

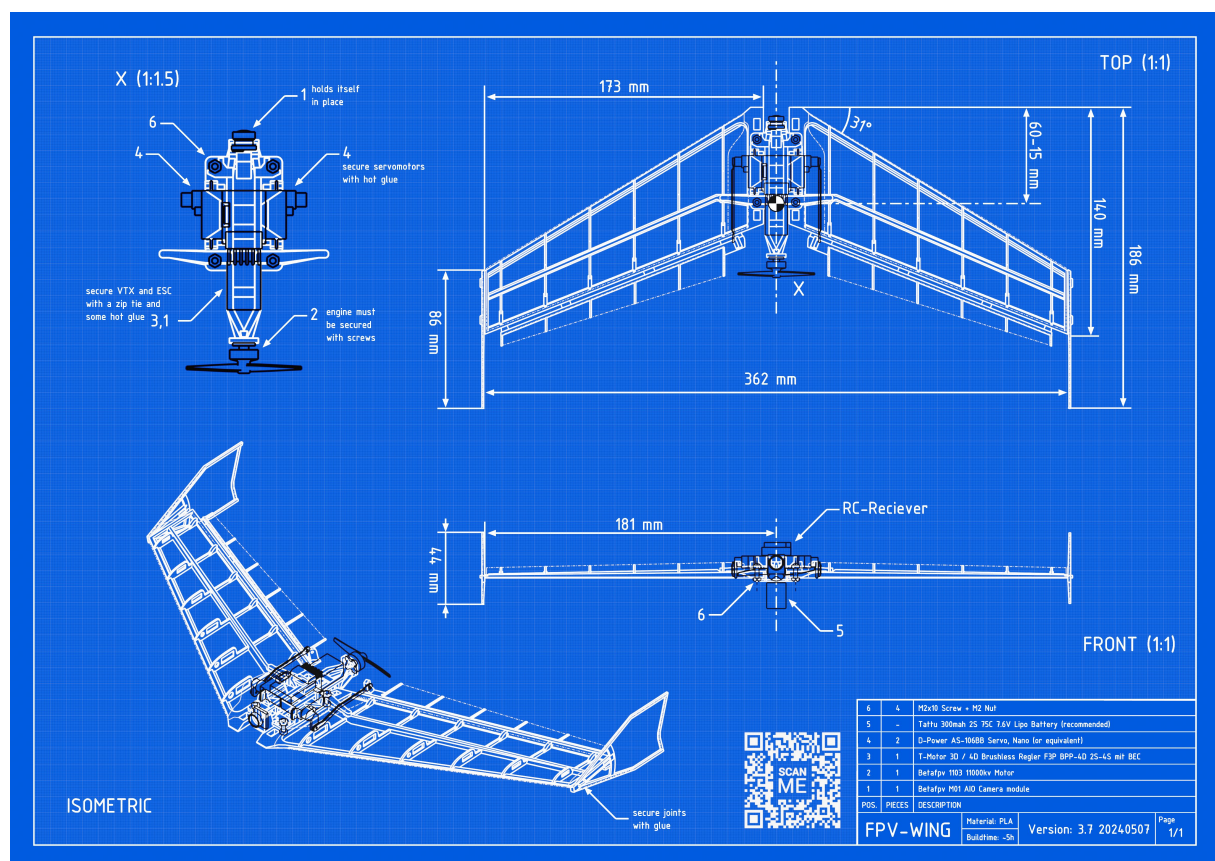
- (PROP) Gemfan 2015 2" 2-Blade Propeller
[AliExpress FPV24.com](https://www.aliexpress.com/room/FPV24.com) [getFPV.com](https://www.getfpv.com)
- (RX) FrSky Archer R4 ACCESS 2,4 GHz Empfänger OTA
or any 4-Channel PWM receiver for example [Premium-Modellbau.de](https://www.premium-modellbau.de)
- 4x M2x10 Screw and M2 Nut

If you want to use another camera and motor, please use the Custom File.

Warning: Do not exceed 95g of TOW

Disclaimer: I'm not connected or responsible for the content of the given links. Nor did i receive any sort of sponsorship.!!!

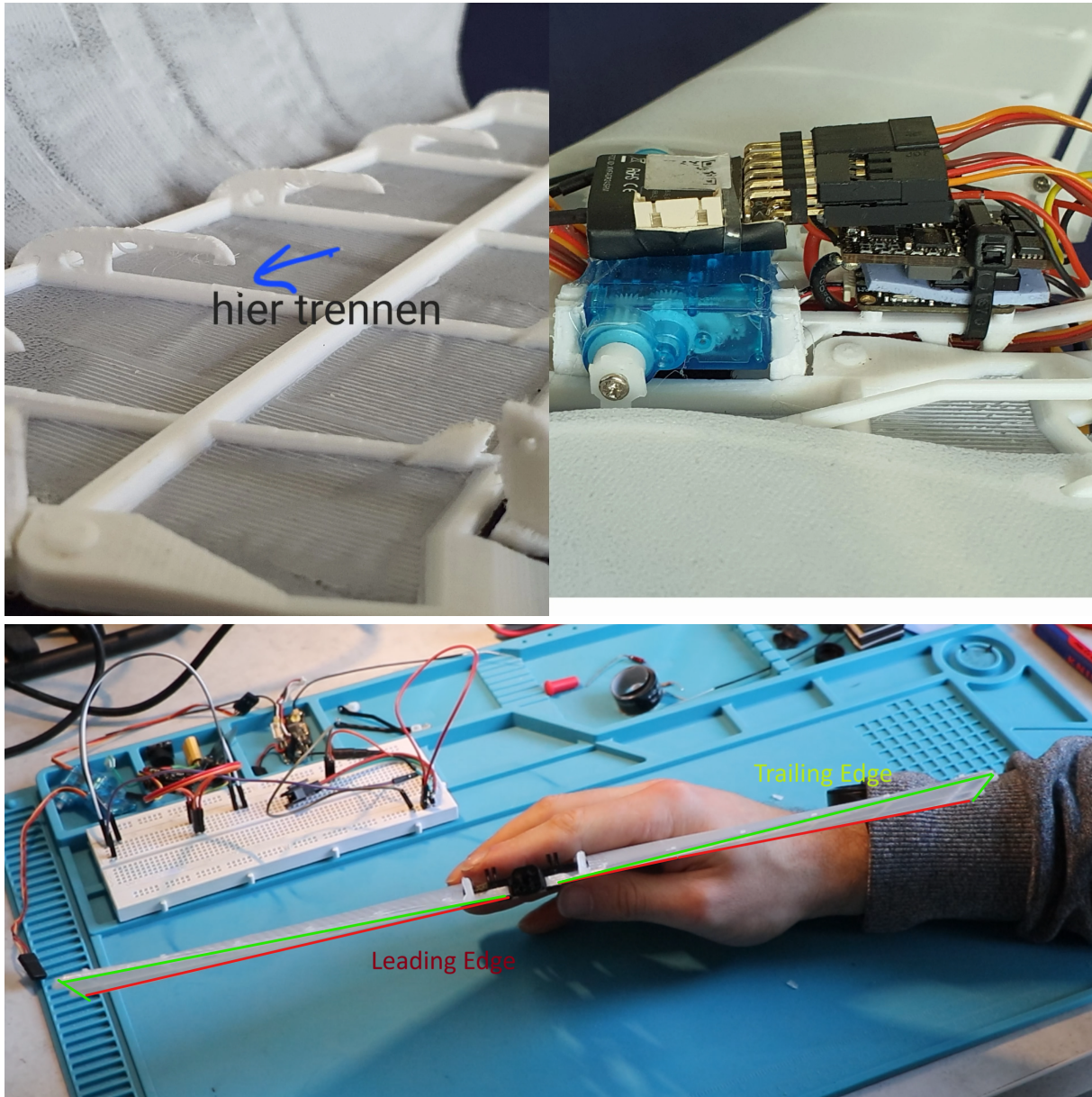
Building Steps



Wings

1. Cut out a little piece of the wing structure as marked in the photos but leave the three outer ones out and only cut the three inner ones. They are supposed to work like springs and keeping up the tension of the airfoil.
2. Screw the wings from below. In some cases, the screw will already have enough grip in the PLA without any nut.

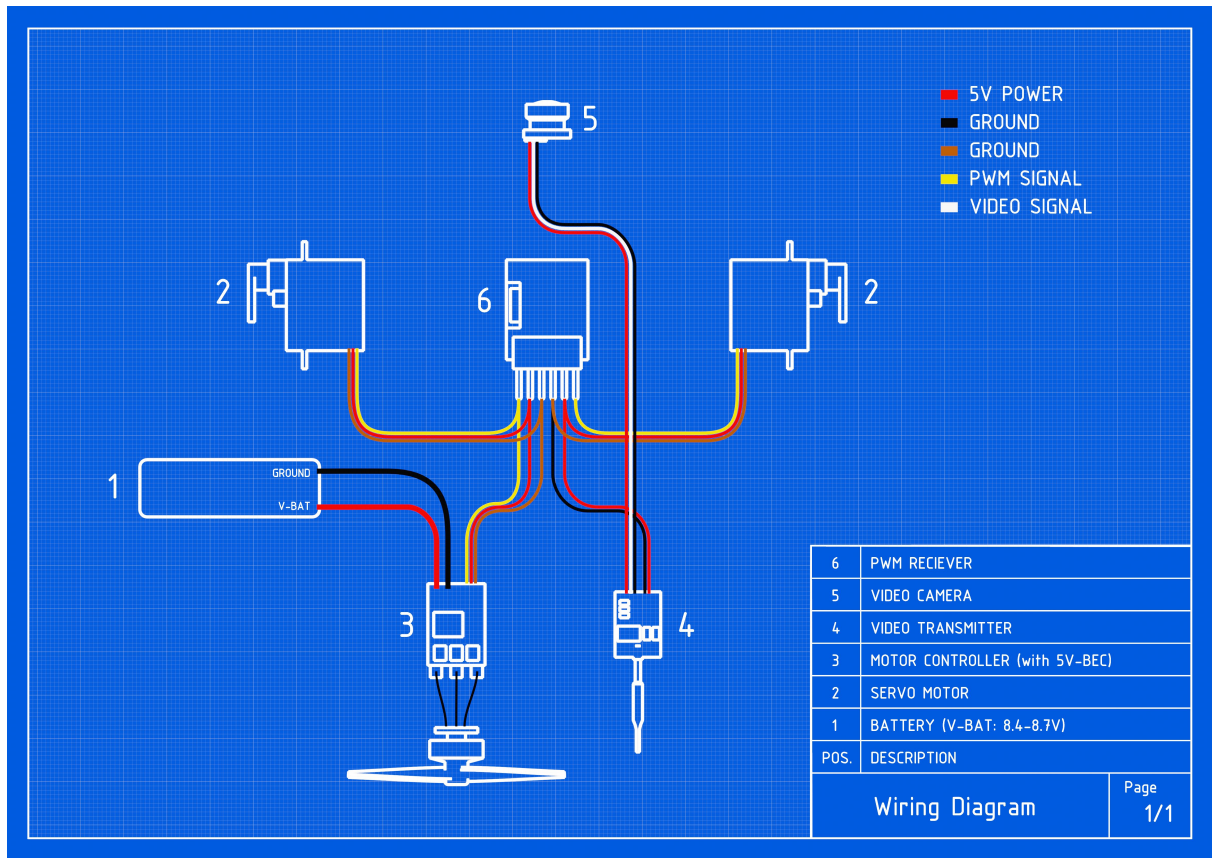
3. Now start folding the wings and click the top part into the little hooks on the trailing edge of the wing. If done correctly the ****outside of the wing should pitch down with a few degrees ($\sim 10^\circ$)****. As shown in picture above. Also the Winglets / Vertical Stabilizers should align with the main fuselage. Not pointing to much up or down! This Feature is called "wing twist" https://en.wikipedia.org/wiki/Wing_twist.
4. Connect the winglets to the connectors at the wing tips, you might secure them with some glue
5. Connect the elevon to the servo with the steering rod.



Base Part

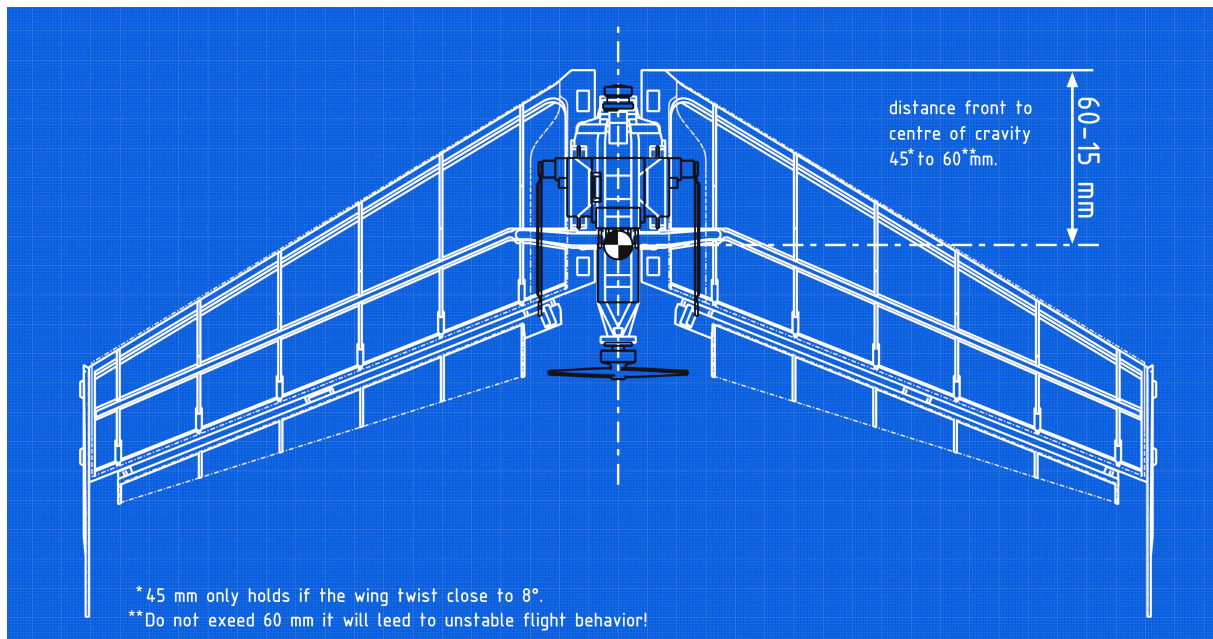
1. Put the cables of the servo motors through the base
2. Secure the servo motors with some hot glue to the base part
3. Secure the VTX and the ECS with a zip tie and some hot glue

4. The camera should hold itself in place
5. The motor can be screwed into the back of the base part
6. I glued the Receiver on top of the servo motors (like it's shown in the images above)
7. Use a battery strap or zip ties to secure the battery under the aircraft



Some Tipps for the first Flight

- channel setup [guide](<https://doc.open-tx.org/manual-for-opentx-2-2/model-setup-examples/basic-elevon>)
- This thing will go quite fast for its size, **be sure to have enough space**
- When you start it, throw it 45° upwards and give it some speed. Otherwise, it might be a hassle to get to the controls fast enough.
- Keep up the speed to get around sharper turns. It will start rolling in the opposite direction of the motor running, if it gets to slow / the wing tips start stalling, due to motor torque.
- Avoid pitching the engine to max in slow turns it will eventually turn the whole wing upside down caused by torque generated by the motor.
- This thing is designed to pitch upwards with increasing speed. You might need to trim it.
- **Don't be surprised about its bad glide ratio. It's a racer not a glider. On the other hand, you have better speed control**
- Fly it FPV! It's more **Fun**



----- Development History -----A Good Start

Sometimes, a starting point is all you need. That's exactly what this first try was. I had no idea about what is important if you design a delta wing, so I startet with something that looked like it could fly, ... not very surprisingly ... it didn't! But Nothing to give up here. Lessons learned. Let's try a different approach.

Air is good, Airfoil is better!

Switching from a flat profile to an airfoil felt like a move in the right direction. It did not fly yet, but that could be explained by the CG being too far to the front. After fixing that, it "flew" for the first time. Well, it somewhat flew, but it was still very unstable in its flight characteristics. Hard to control and even harder to land.

If you have a look at the Video, you can see how the main fuselage has been moved further towards the rear.

More Wing More Good

To see it fly for the first time was the motivation boost I needed. Now I could start to try different ideas to optimize the flight characteristics. First of all, I increased the wingspan to the maximum size that fitted on my printer. Furthermore, I noticed with the positioning of the upper airfoil locking holes (whatever to call them) I was able to tune the wing twist in the correct direction. This feature helped to delay the stall behavior of the overall wing and lead to more stable and sharper turn with lower speed. In

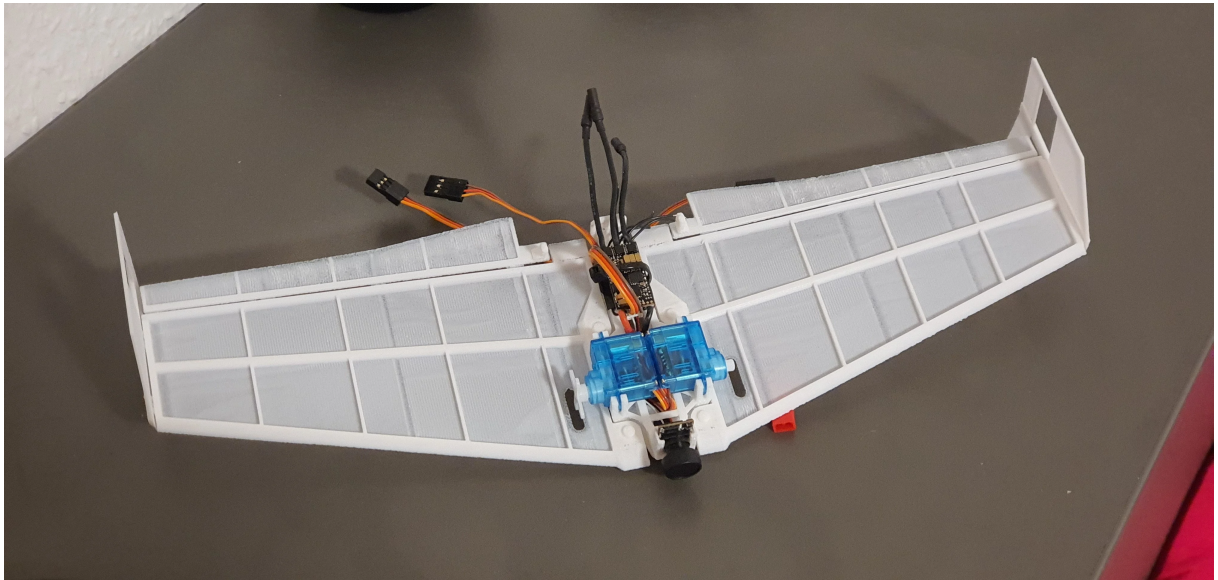
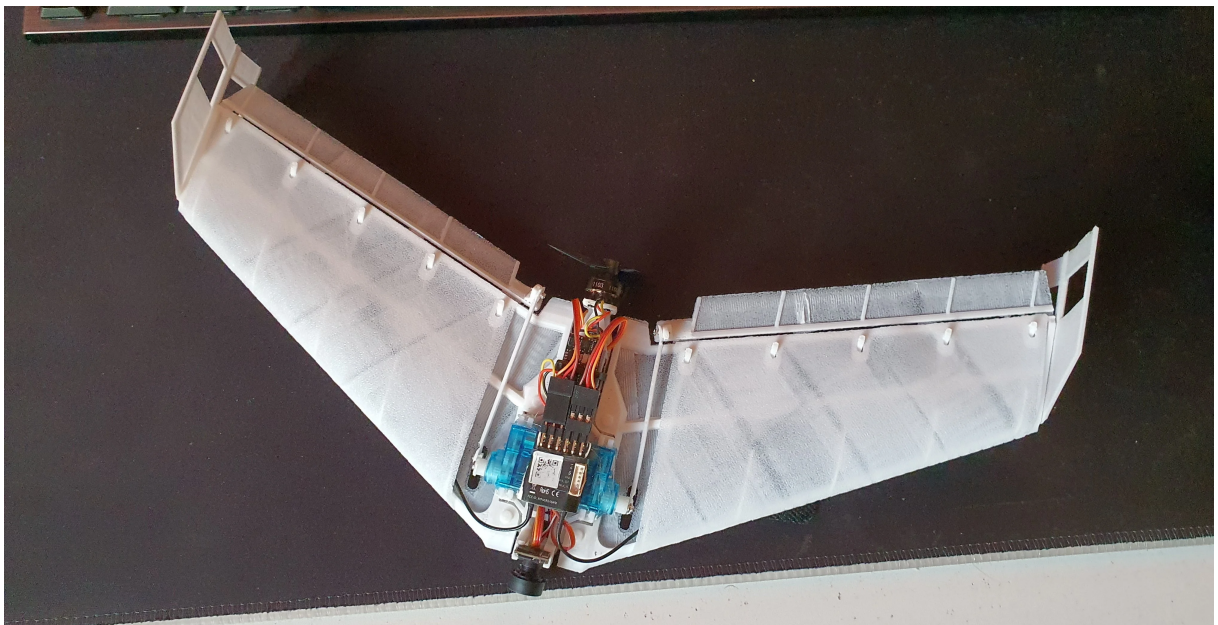
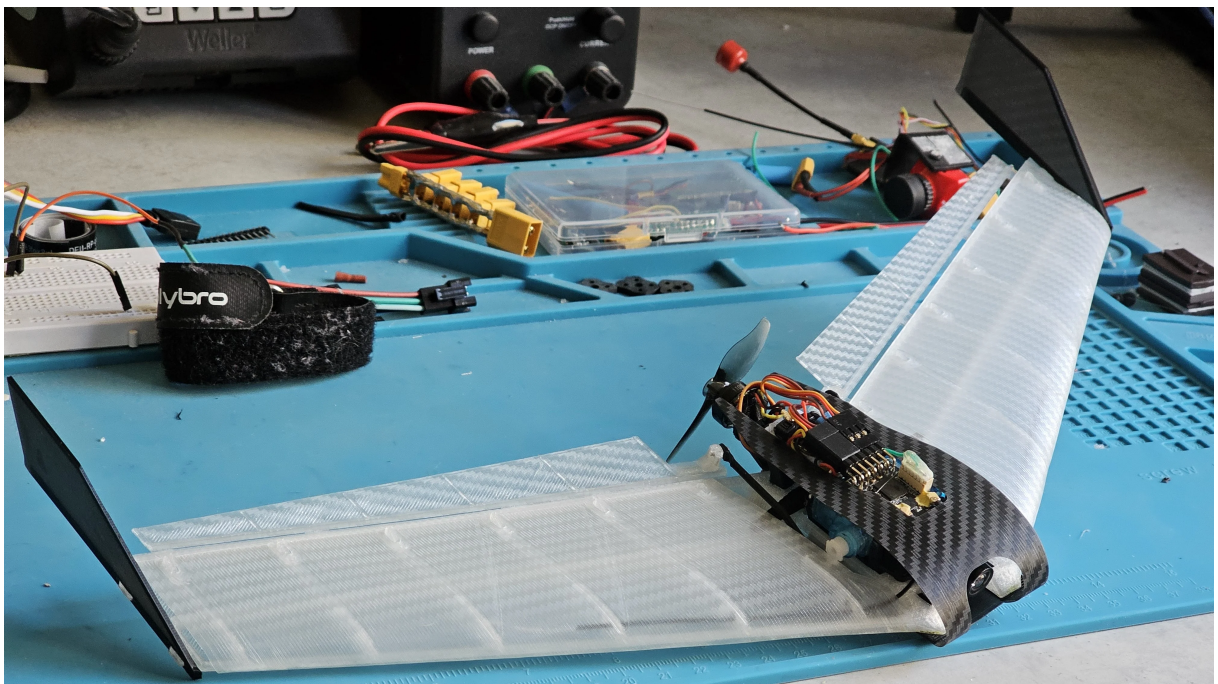
addition, I noticed that printing on a non-textured print bed gives a way smoother wing surface - which is nice.

Screw It

Now after the first public version was out for some time now, I got some feedback from the awesome community <3. One of the most mentioned problems was that the **click-in system** was a pain to click-in and easily breaks in crashes and then you must move all the electronics to a new base part. That's why I introduced the **screw-in system**, which now should be easier to repair.

Ca(nope)y

Yeah. The Canopy ... I tried to find a design which follows the lightweight 1-Layer idea, but nothing has worked so far. Most of the iterations totally screwed the flight dynamics and stalling was again a big issue. Maybe I will find a suitable solution for this problem in the future. maybe ...



Model files



fpv-wing-v37-wing_print_r.stl

☐ To be mirrored



fpv-wing-v37-winglet_print_r.stl

☐ To be mirrored



fpv-wing-v37-base_betafpv_print.stl



fpv-wing-v37-servo_shaft_print_r.stl

☐ To be mirrored



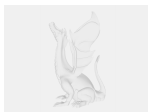
fpv-wing-v37-elevon_print_r.stl

☐ To be mirrored



fpv-wing-v37-base_custom_print.stl

☐ Optional



cad-model.blend

License

This work is licensed under a
Creative Commons (4.0 International License)



Attribution—Noncommercial—Share Alike

- ✗ | Sharing without ATTRIBUTION
- ✓ | Remix Culture allowed
- ✗ | Commercial Use
- ✗ | Free Cultural Works
- ✗ | Meets Open Definition