RC FPV-Trike With Rear Steering Wheel

by markus.purtz

As I had some spare parts from my first FPV Rover, I've decided to build a RC car. But it shouldn't be just a standard RC car. Therefore I've designed a trike with a rear steering wheel.

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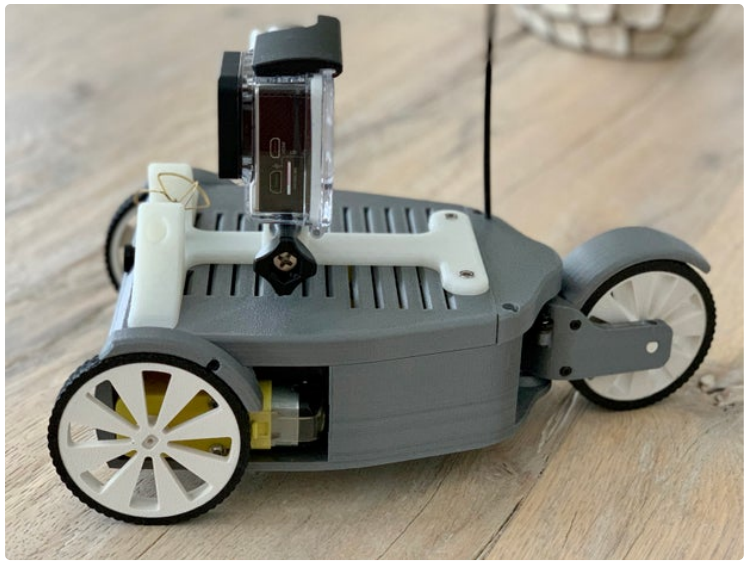
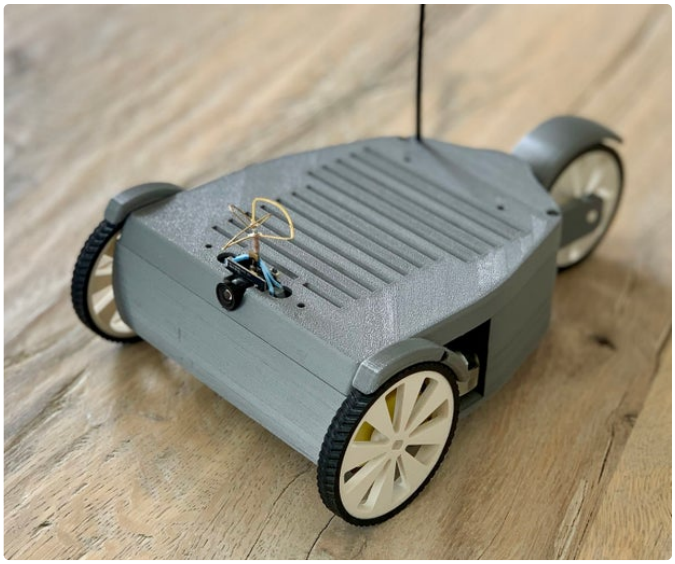








https://youtu.be/wLeIawSgQNw

Step 1: Parts to Print

Find all parts you need on Thingiverse

https://www.thingiverse.com/thing:3669829

I've printed all parts (beside the tires) in PETG. But any material is fine here. Tires are printed in TPU.

1x Body

1x Top part 1

1x Top part 2

1x Front fender left

1x Front fender right

1x Rear fender

1x Servo arm

2x Servo extension

1x Rear wheel attachment (Support needed)

1x Rear wheel

1x Rear tire (use TPU)

2x Front wheel

2x Front tire (use TPU)

Step 2: Parts You Need (BOM)

Here is the list with all necessary parts for the rover

2x Motors

2x ESC

1x Servo

1x 3S Battery

1x Transmitter/Receiver

16x 6mm x 3mm magnets

2x JST plugs

4x M2 Metal Ball Head Holder

2x 12mm x 8mm x 3,5mm bearings

2x 10mm x 5mm x 4mm bearings

2x M2 x 4mm screws

2x M2 x 8mm screws

12x M2 x 10mm screws

2x M2 x 12mm screws

2x M2 x 25mm screws

4x M3 nuts

4x M3 x 25mm button head screws

2x M3 x 14mm button head screws

1x AIO Mini FPV Cam

1x Rubber band (to secure the camera)

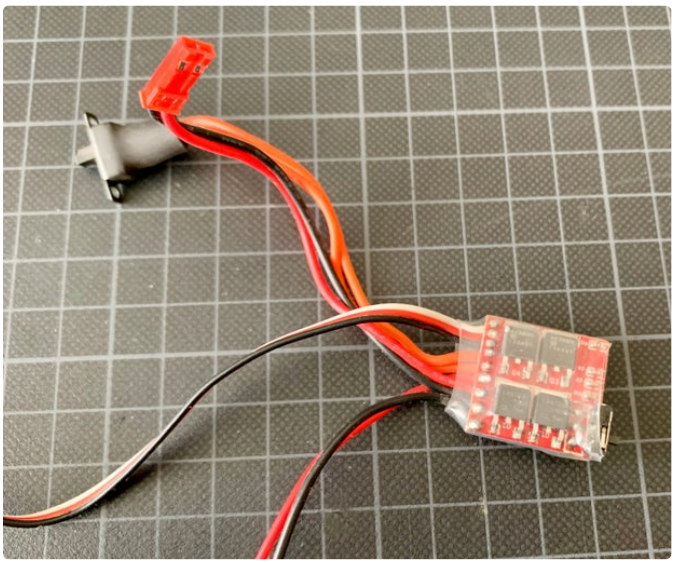
CA glue, hot glue gun, screw driver, some cable, soldering station

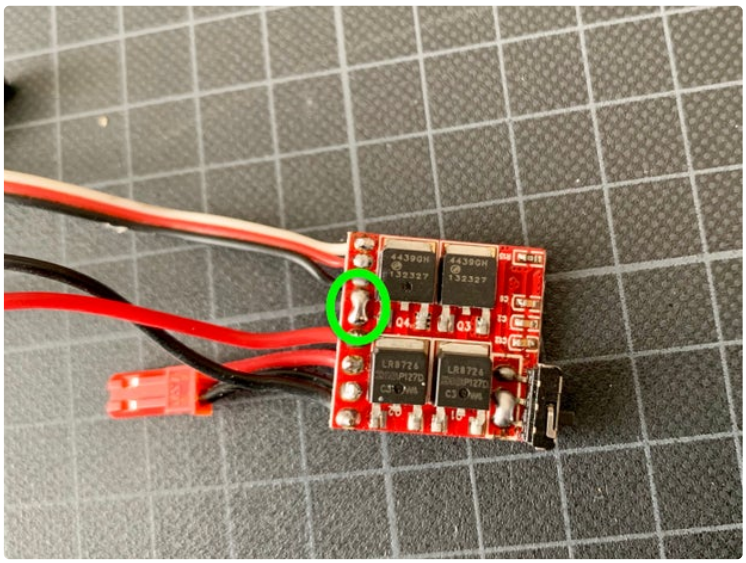
Step 3: Preparing Motors

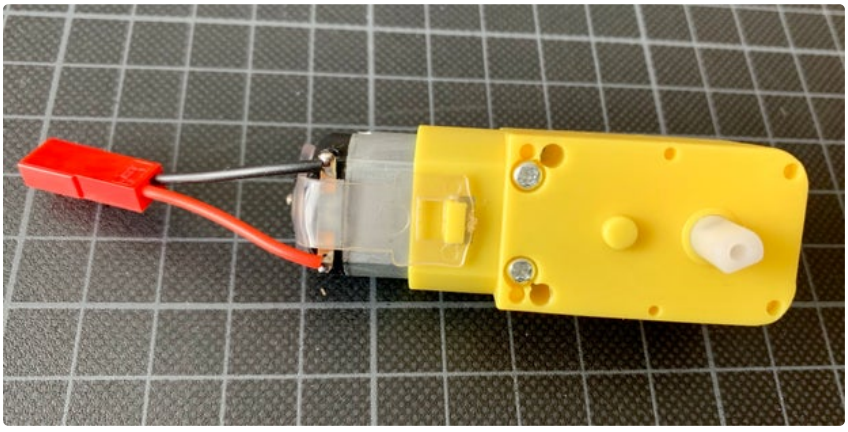
The ESCs have a switch which you can keep if you want. If not, unsolder the two cables and bypass the two pins. So the ESC is always "on".

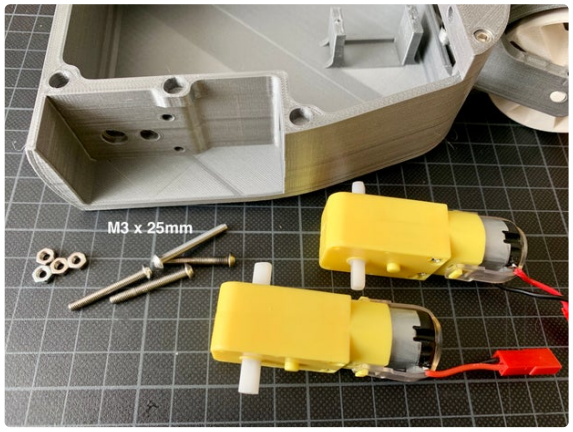
Solder the JST plug to the motor. You can solder the ESC directly to the motor, but it's easier to replace with the plug if something broken.

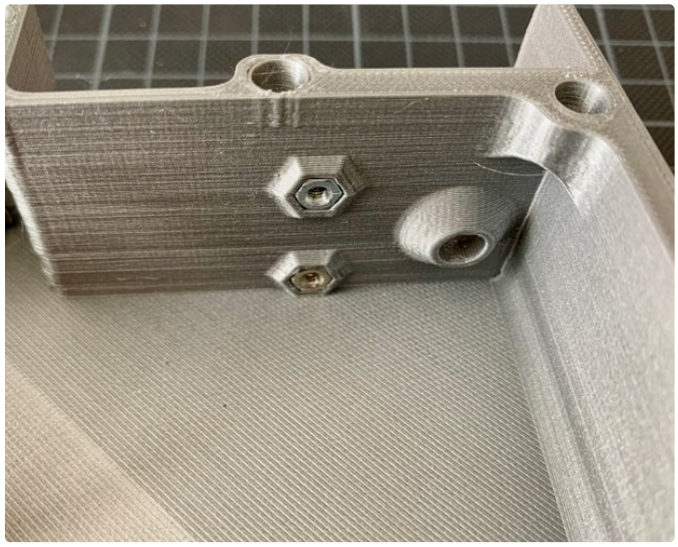
Add 4 M3 nuts to the body and attach the motors with 4x M3 x 25mm button head screws

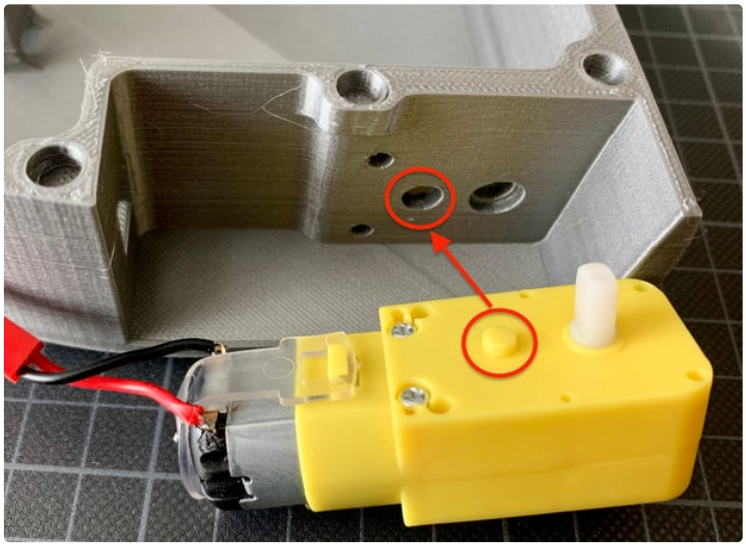


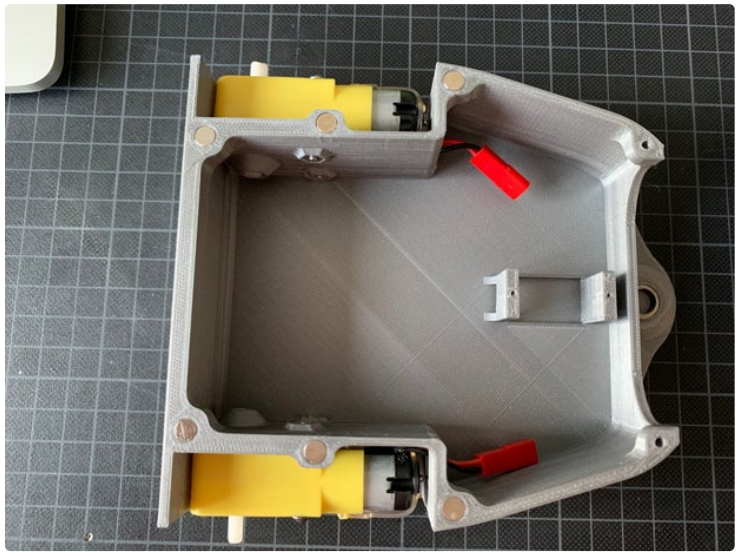








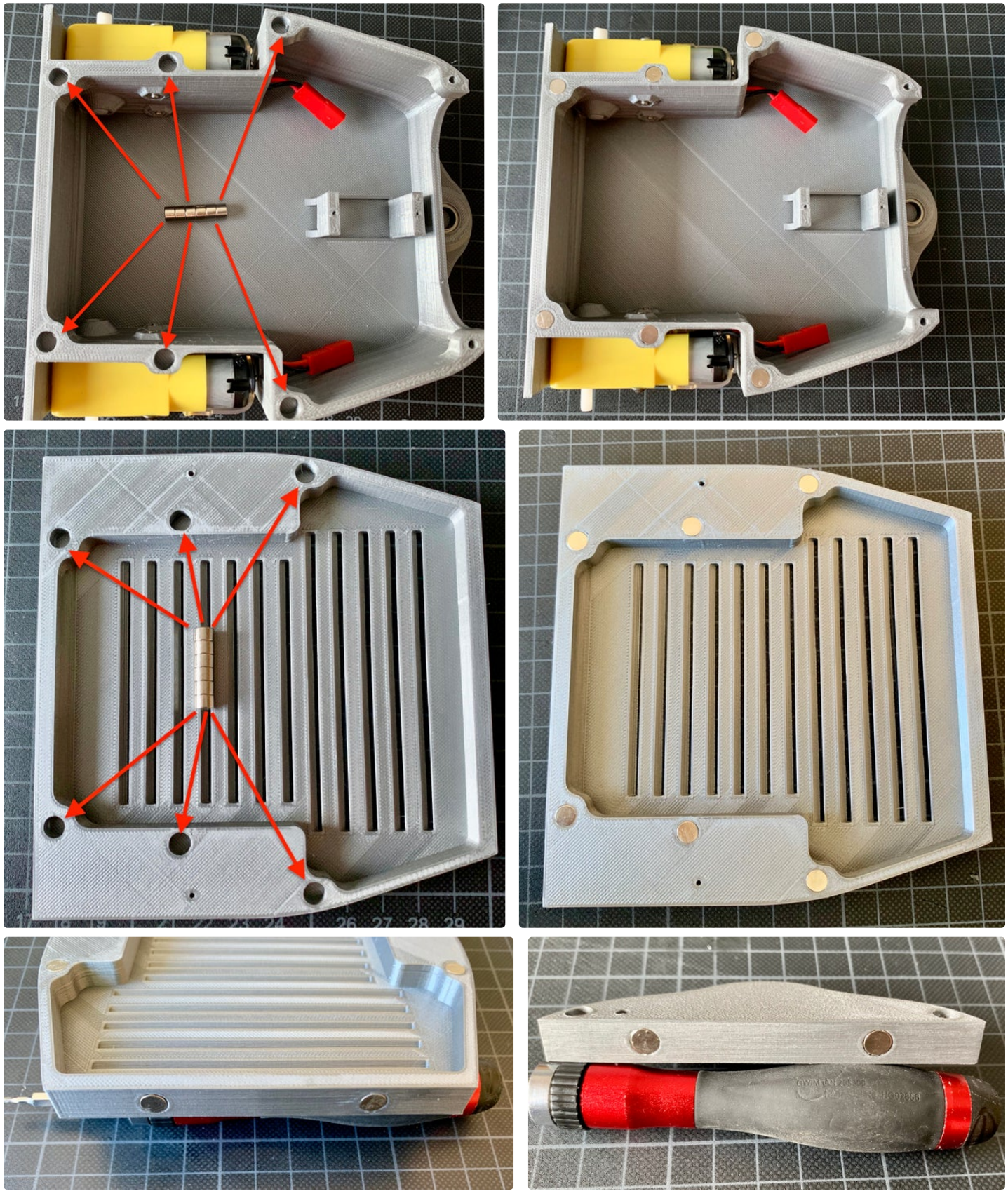




Step 4: Add Magnets to Body and Top

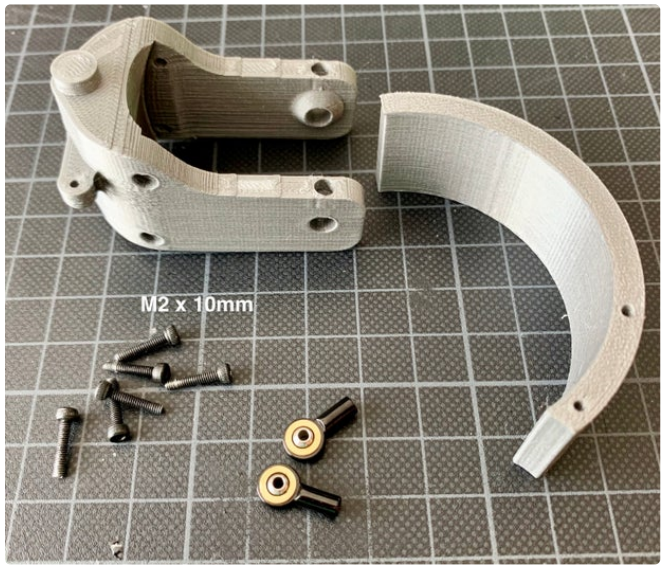
You need 16 magnets 6mm x 3mm for the body and the top.

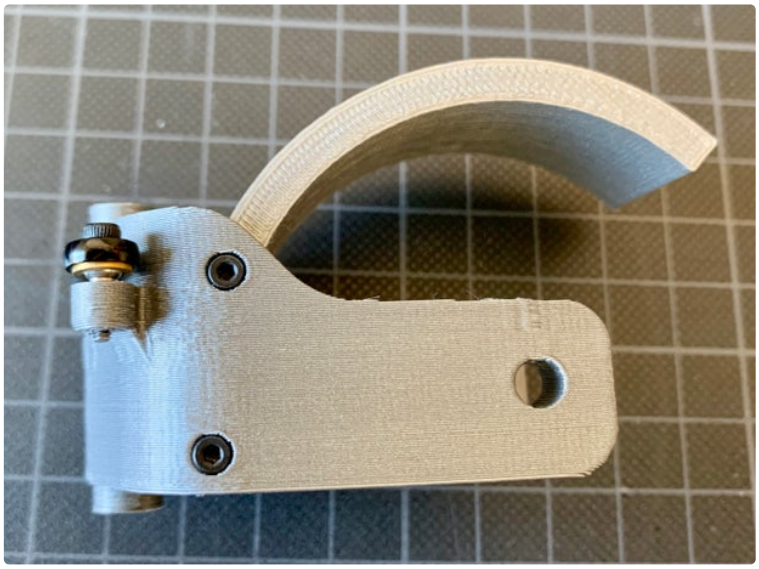
Use CA glue to keep them in place.

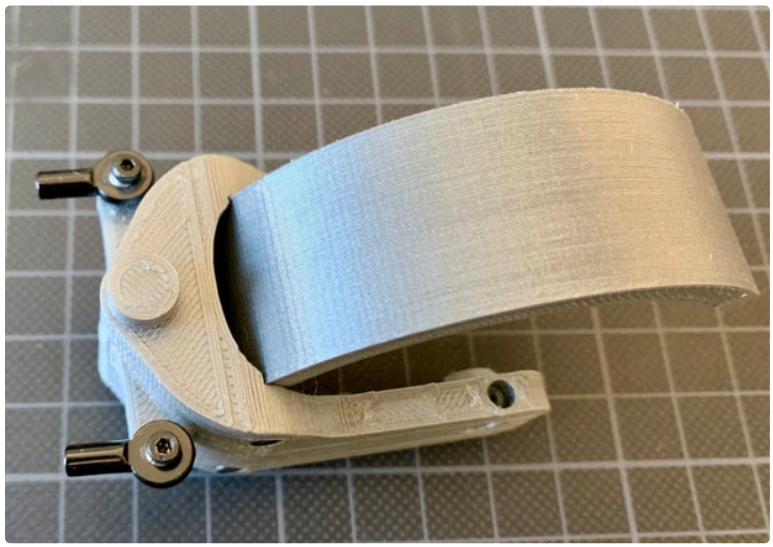


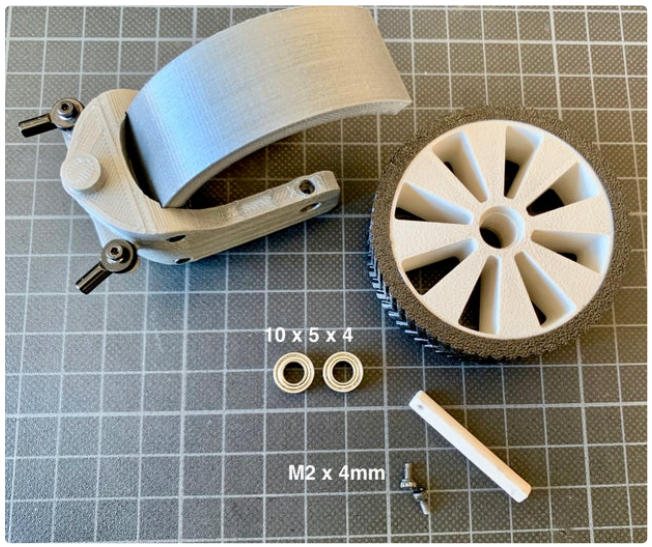
Step 5: Rear Wheel Attachment

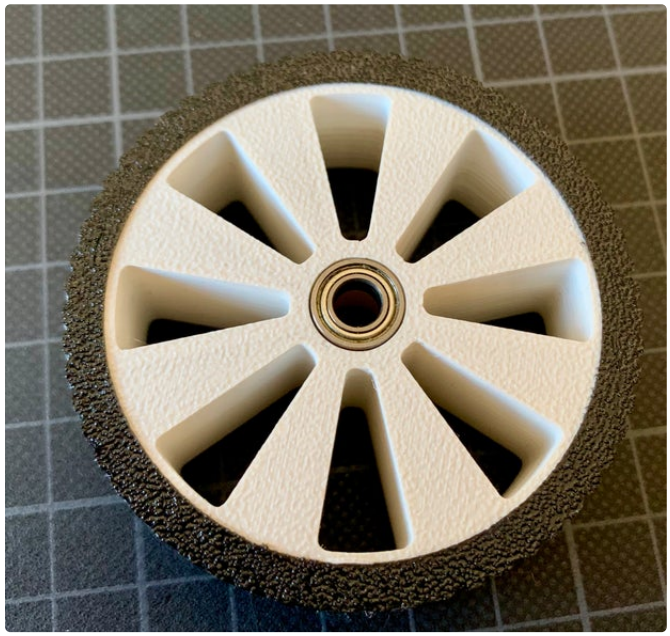
The rear wheel has build-in-support on one side where a bearing belongs to. Cut this with an exactor knife and open the hole

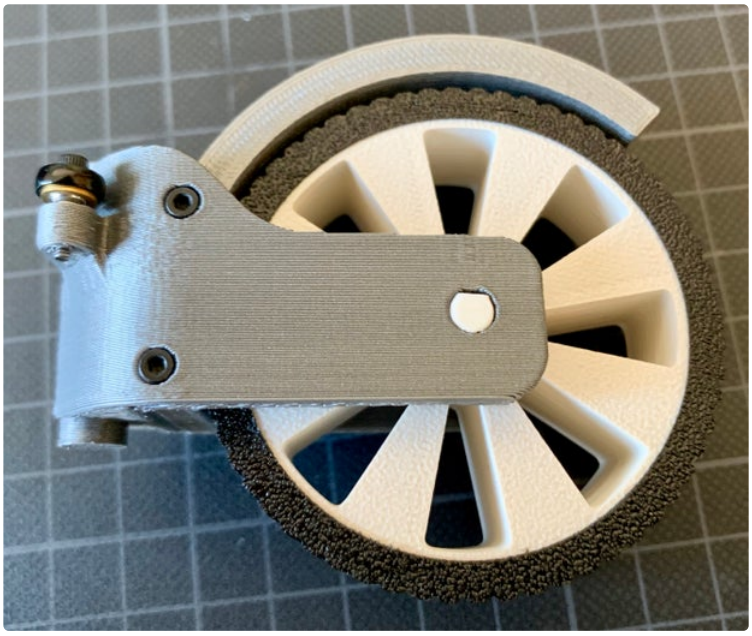


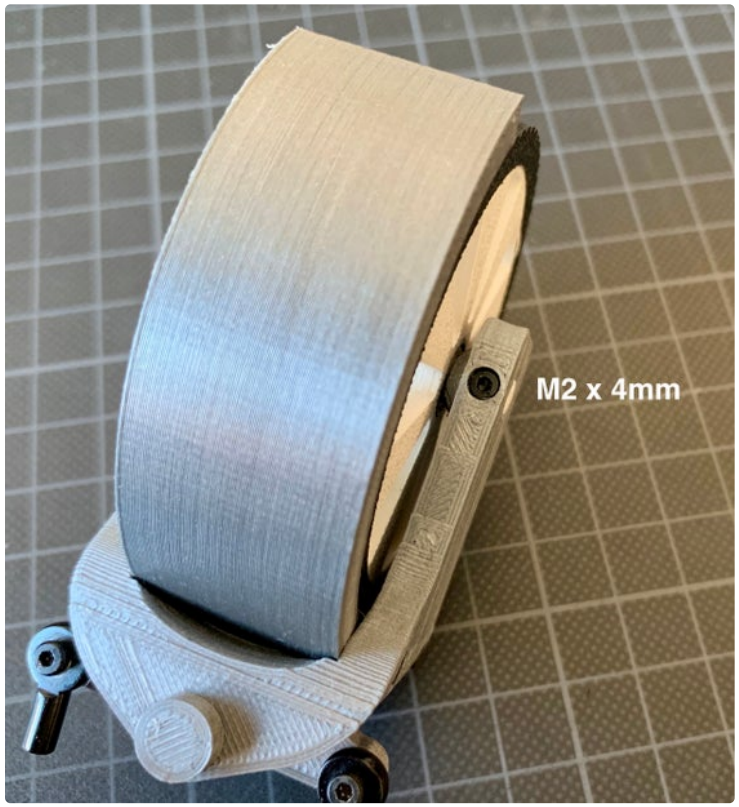






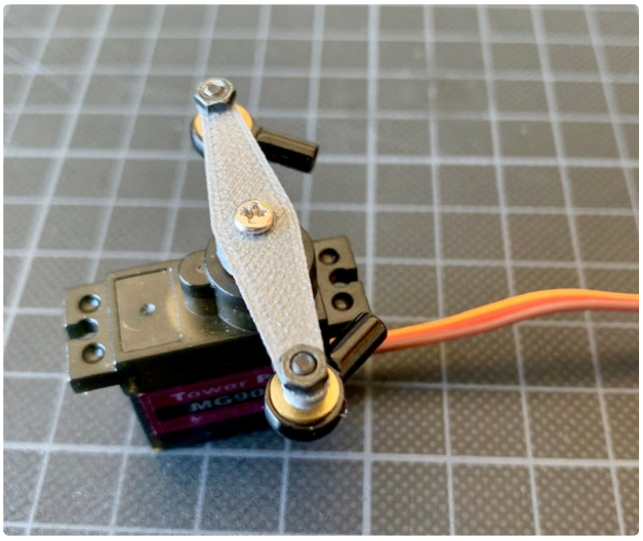


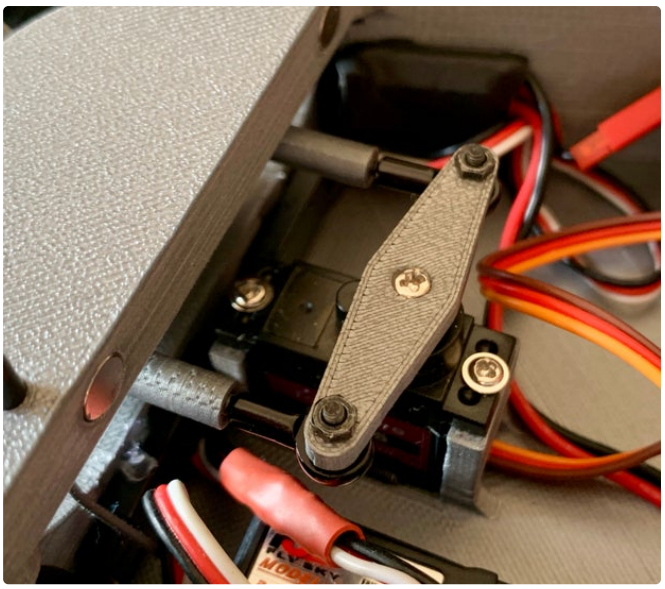




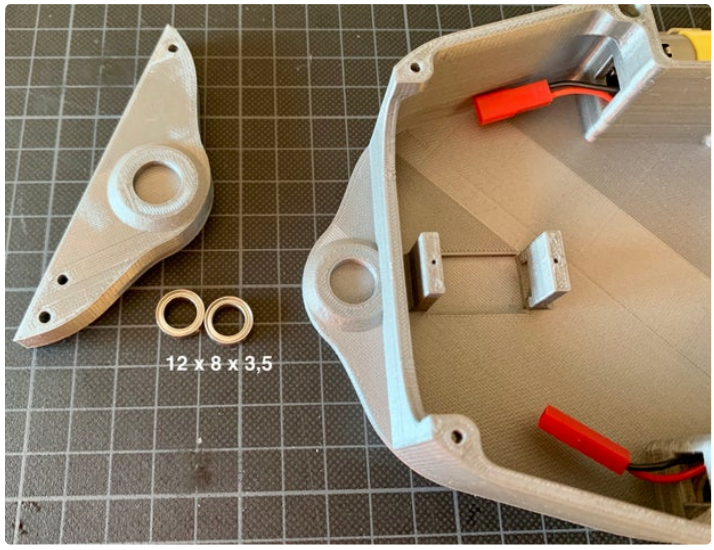
Step 6: Prepare Servo and Servo Arm

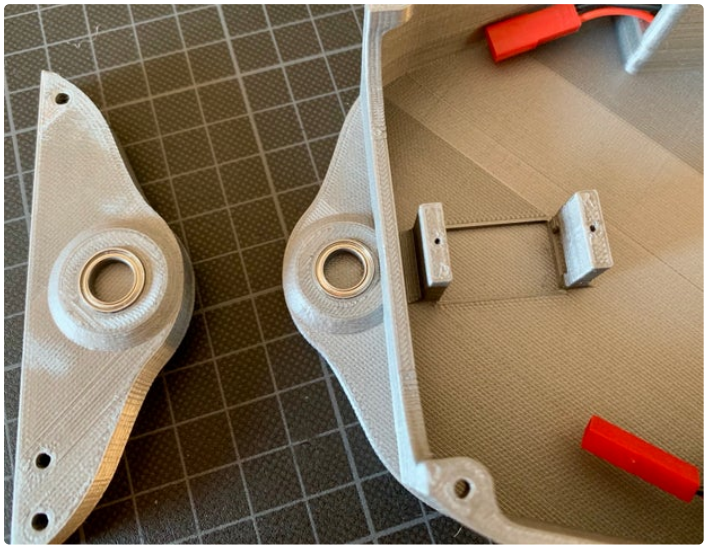
Cut the edges from the original servo arm to fit into the enlarged servo arm.

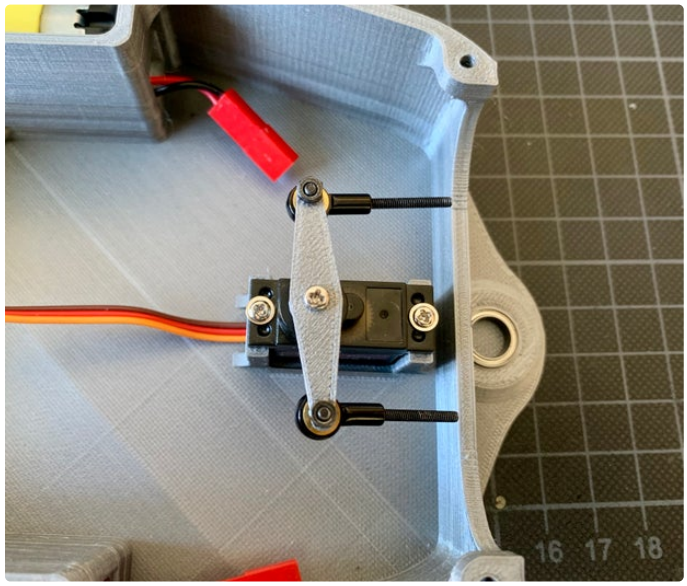


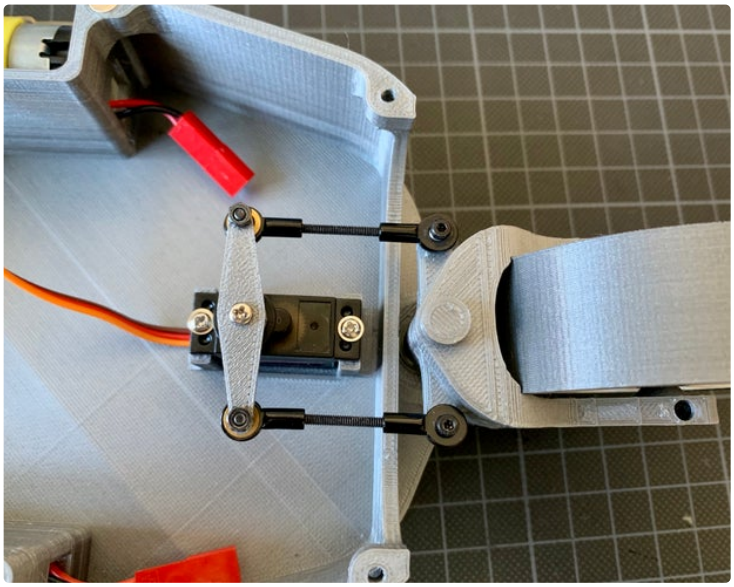


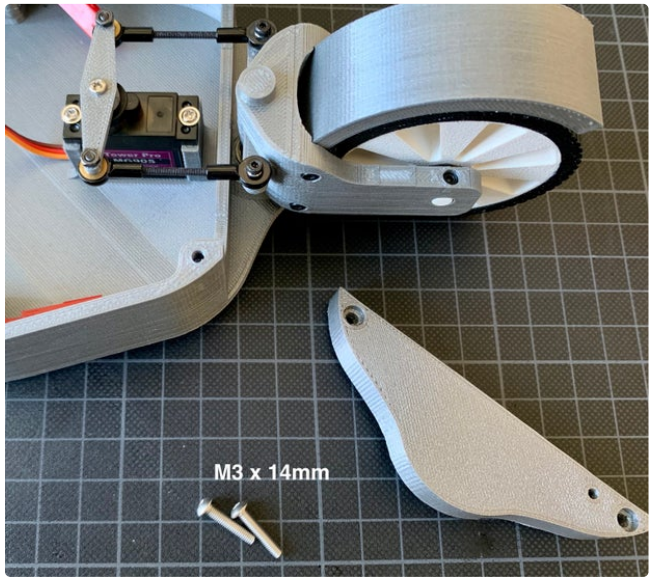
Step 7: Attach Rear Wheel to Body

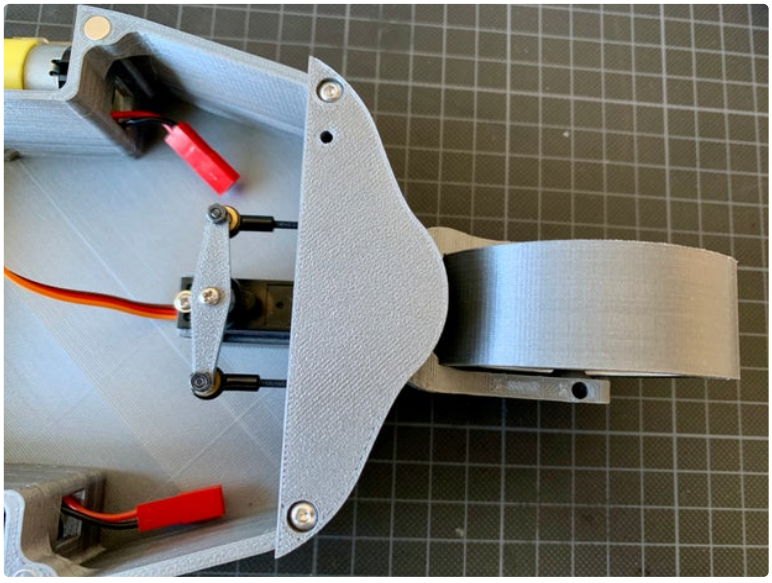








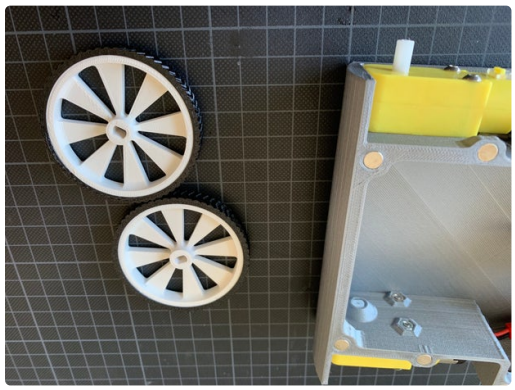


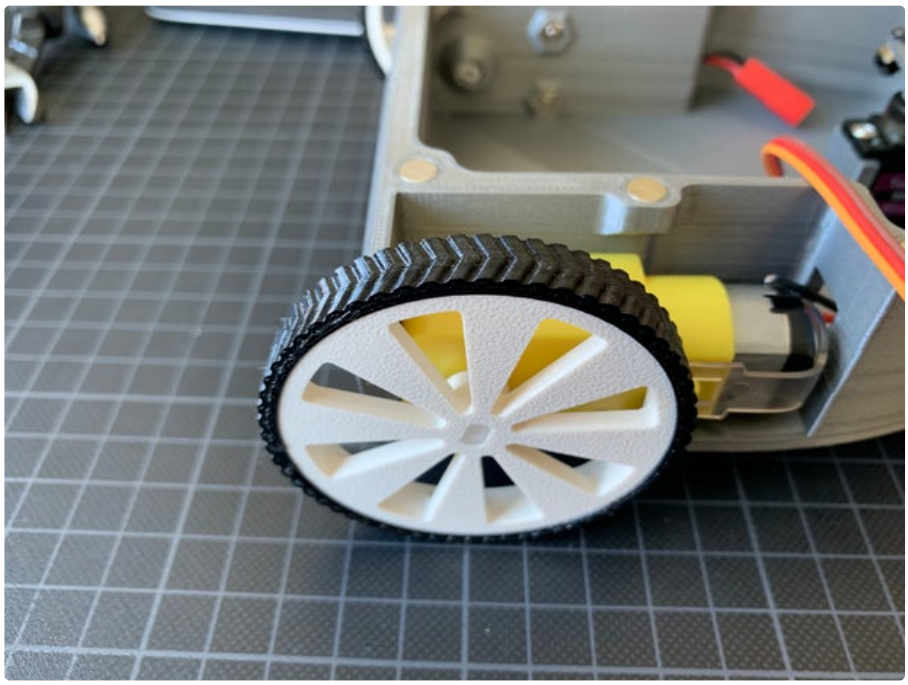


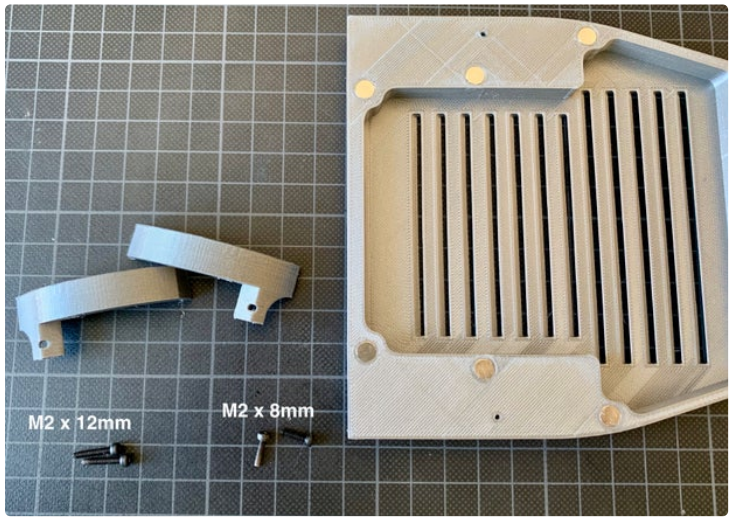
Step 8: Front Wheels and Electronics

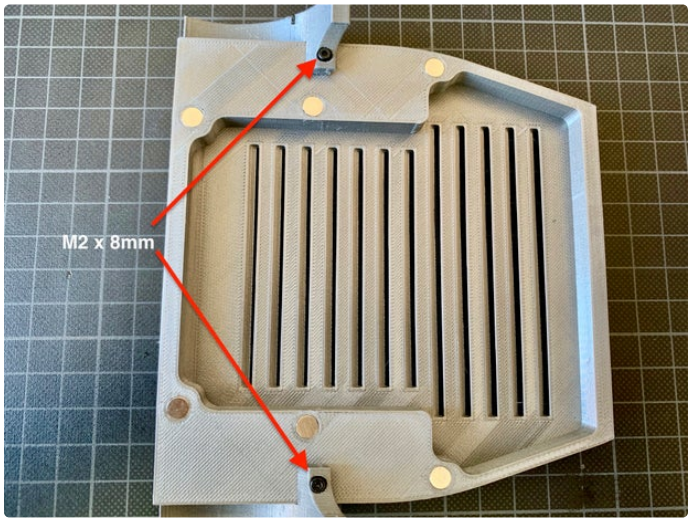
Attach the front wheels to the motors. They should press-fit to the motor shaft.

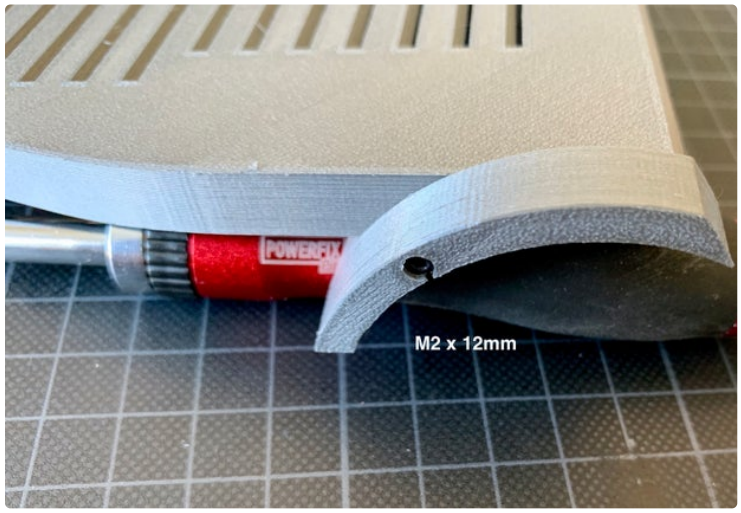
To secure the ESC to the body use hot glue, velcro or double sided tape.

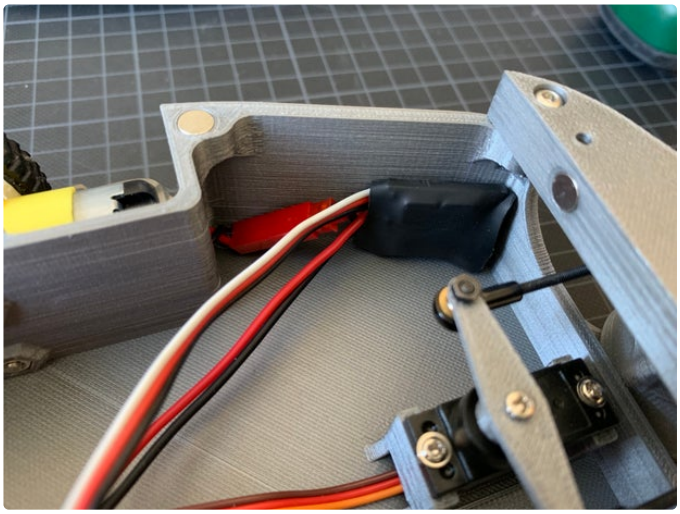


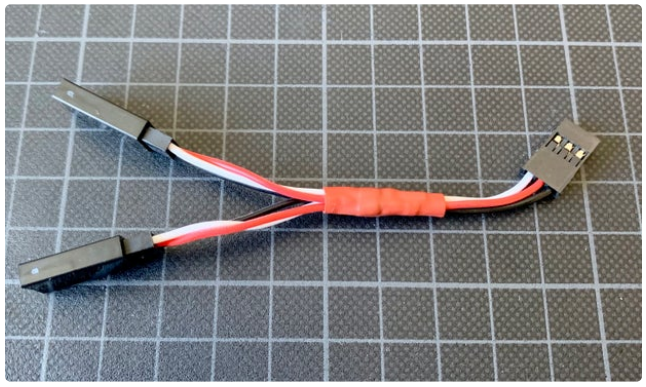


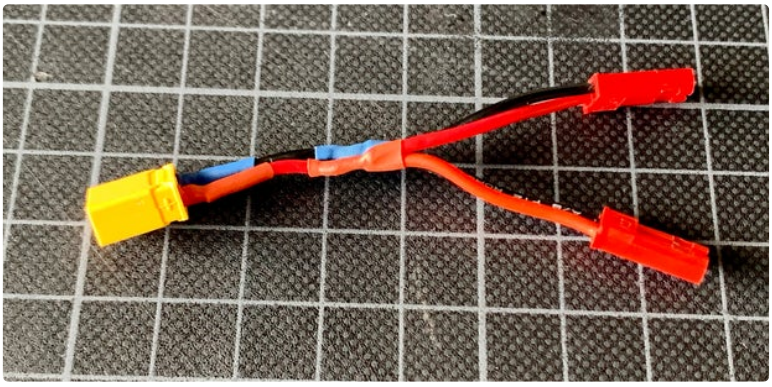


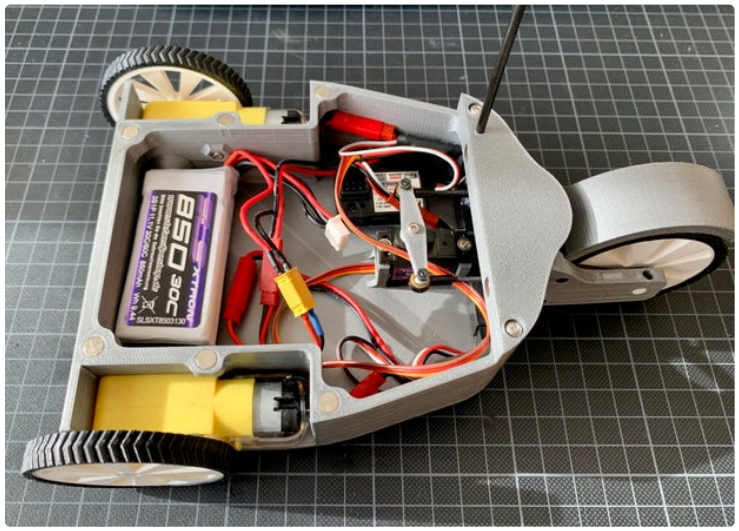












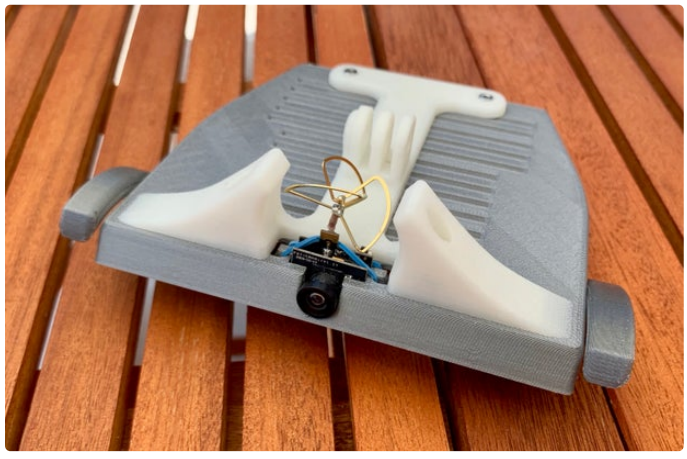
Step 9: FPV-Camera and GoPro Mount (optional)

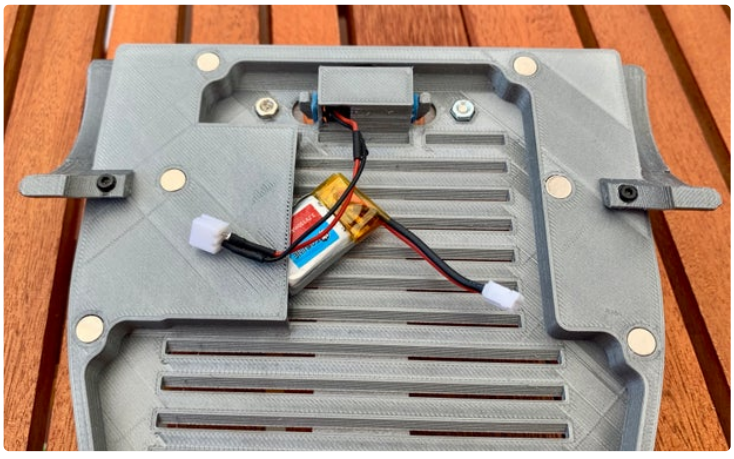
If you use a FPV-Camera, I do recommend to use one of the protectors. I use the one where I can attach the GoPro to it.

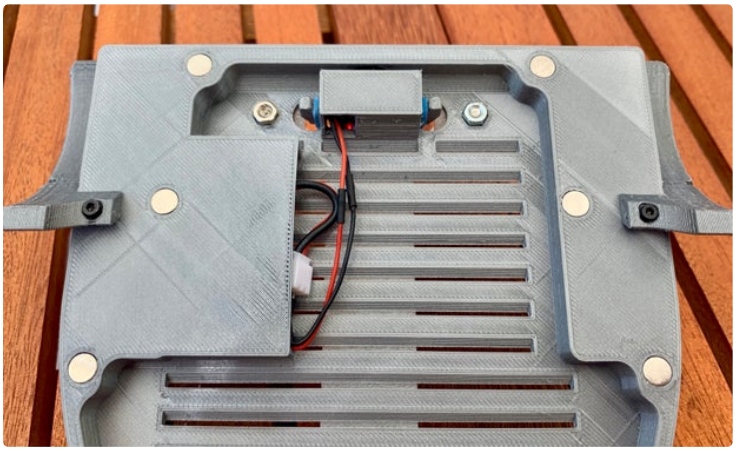
To secure the FPV-Camera, you'll need one rubber band.

In my case, the camera is powered by an own battery. It is a small 1s from an Eachine E010. For this, the top has a compartment where you can place the battery.

If you want to power the FPV-Camera from the trikes battery, you'll need a step-down-converter, as the trike uses 3s.







Oh wow! I thought you were controlling each of the motors to turn the front wheels at different speeds in order to guide the car.
Tutoapp 9AppsShowbox"}"

Since I didn't see anything attached tot he GoPro, I presume you are simply using the ***GoPro App*** to view the video on-the-fly. Nice build... I like that all the major parts can be printed... and I like the use of the magnets to close the cover. Nicely done.

Thanks a lot. The GoPro is used only for recording. For FPV I use just the little AIO camera.
If you want to use the GoPro as FPV cam, you need an additional FPV transmitter.

I must have missed the section where you showed how to *wire up the camera and what software to use*... I'll have to read it over again after work. Thanks.

There is no section yet, as I did it two days before my holidays :-D
As I have the trike with me, I'll try to do this in the next days.

The AIO camera needs 3.7v. So you would need a step-down converter from the 12v.
As I had some spare parts from my tiny-whoop clone (batteries) I use these to power the cam. So you don't have to solder a step-down to the battery and you don't have to unplug the camera, if you take the top down.

Nice... I'll have to look into that camera. Alternately... if you have your cell phone with the GoPro App... you could use that... I've tested it up to 400 feet.

Hi askjerry,

I've included a new step to this instructable for the FPV cam. Hope this helps you. If you have any further questions, let me know

Oh wow! I thought you were controlling each of the motors to turn the front wheels at different speeds in order to guide the car.
Unless I am misunderstanding this.: The front wheels turn at the same speed, and the back wheel does the steering, which means that the front wheels are dragging.
if not then what makes the front wheels turn at different speeds?

I'm tinking the same. Also the whole steering would be much simpler that way.

With the right transmitter, this shouldn't be a problem. But then you have to dismount the servo for steering, so that the rear wheel is "loose". But with this it would be hard driving backwards.

Hi John,
the two motors run at the same speed and steering happens by the rear wheel.
I don't know if it is possible to run the motors on different speed with this transmitter.

For my FPV Rover (https://www.instructables.com/id/FPV-Rover-V20/) I use "differential thrust". But for this I use the Taranis as transmitter with a lot more functions.

What would make this a outstanding build would be to include a pan/tilt mechanism for the FPV camera. That would take an already good project and add a bunch more capability to it.

Legit point. I have that in my FPV-Rover (https://www.instructables.com/id/FPV-Rover-V20/) Maybe I'll find a way to include a servo for this somewhere

Clean design.....do you see an advantage of a steerable rear wheel over a swivel wheel and diferential drive wheels?

Well, I wouldn't call it advantage, but the steering is "aggressive" with a rear steering wheel. It's like driving backwards with your car and steering.

Great instructable. What receiver did you use with the fpv camera?

Hi, I use my Fatshark goggles (http://bit.ly/2WZi6U8)

This is slick! Love the design, very well done! :)

Thanks a lot. Hope to see a build from you here and on thingiverse