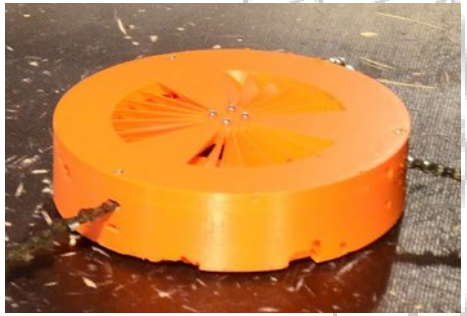
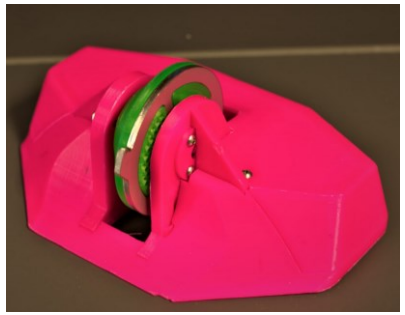
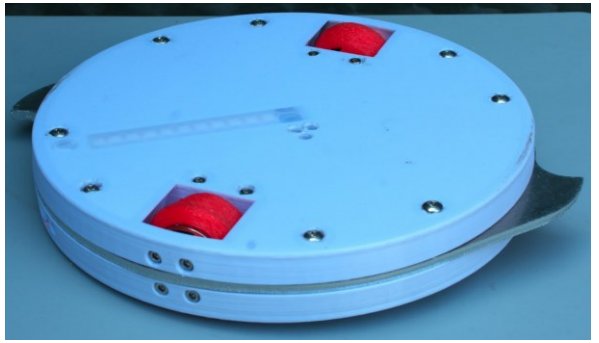
# RoboFetz 25/26

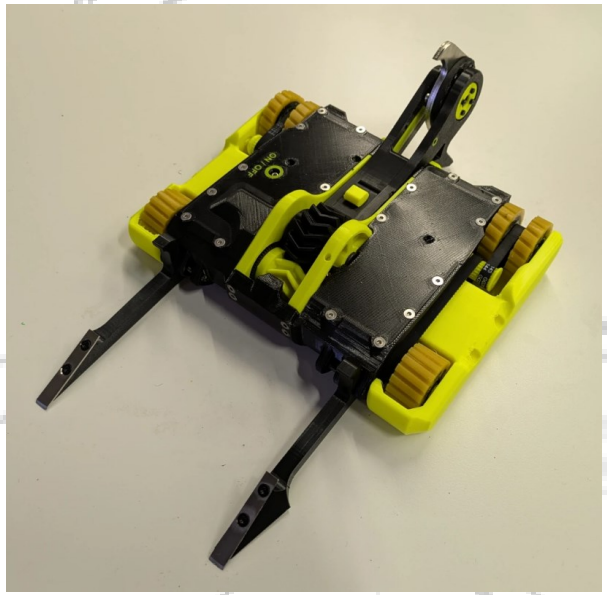
## Experience and lessons learned

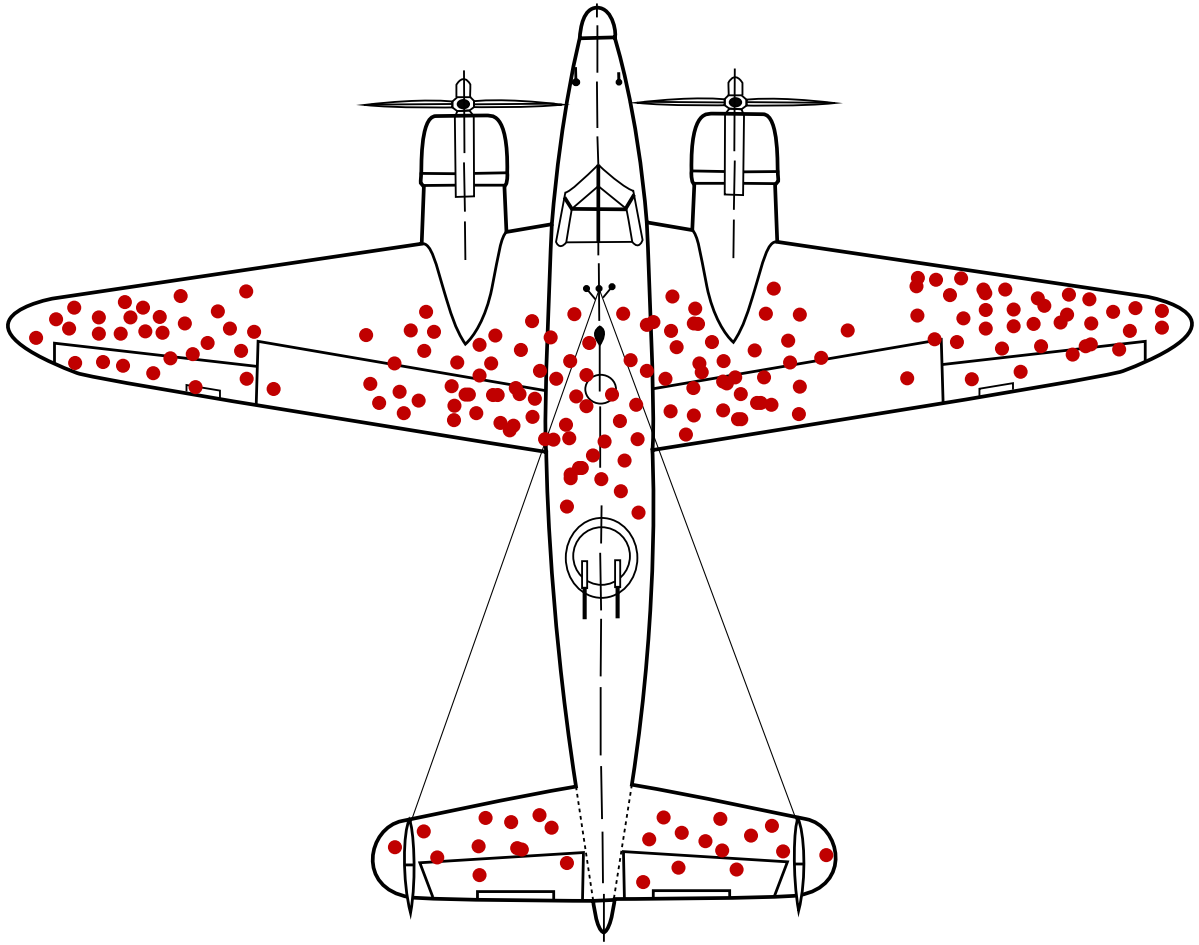
Robo Fetz



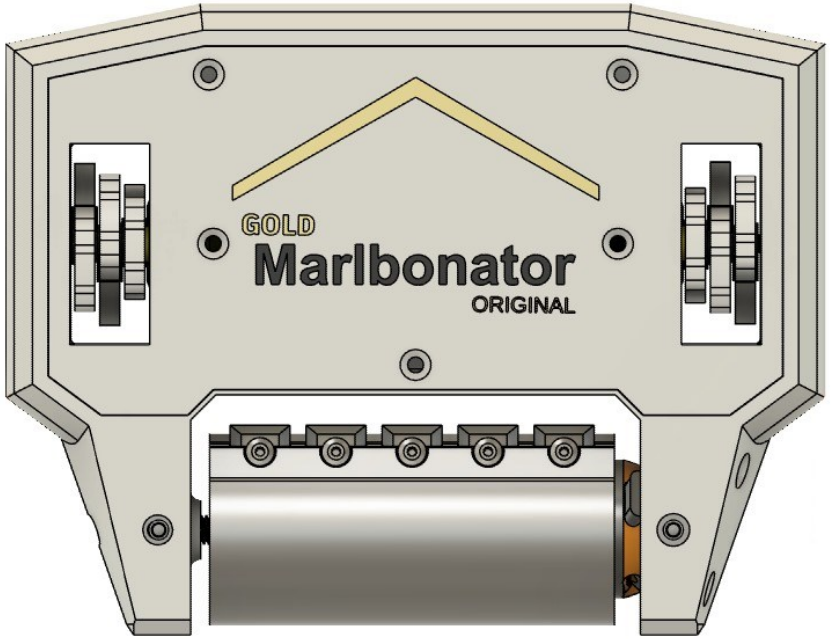




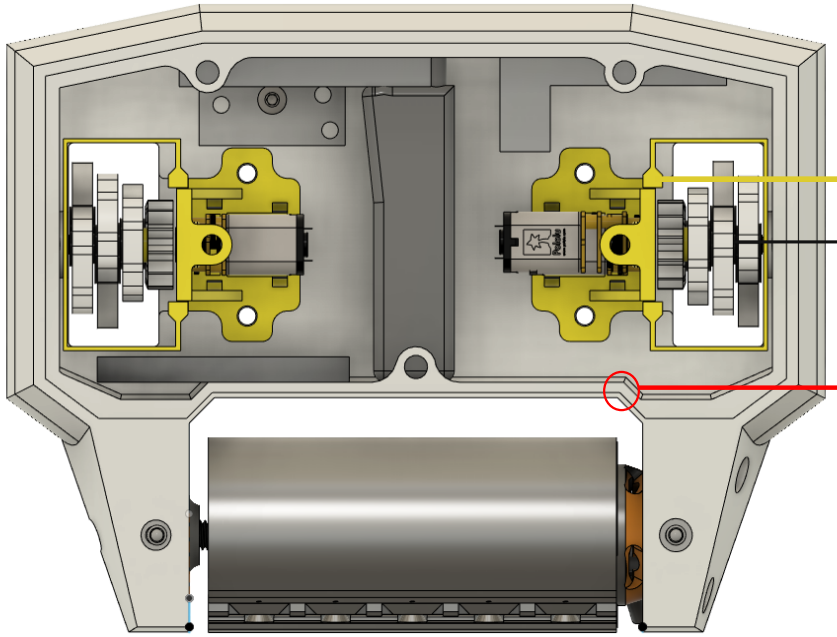




**Survivorship bias or survival bias is the logical error of concentrating on entities that passed a selection process while overlooking those that did not. This can lead to incorrect conclusions because of incomplete data.**




- **Simple**
- **Robust**
- **Elaborate**

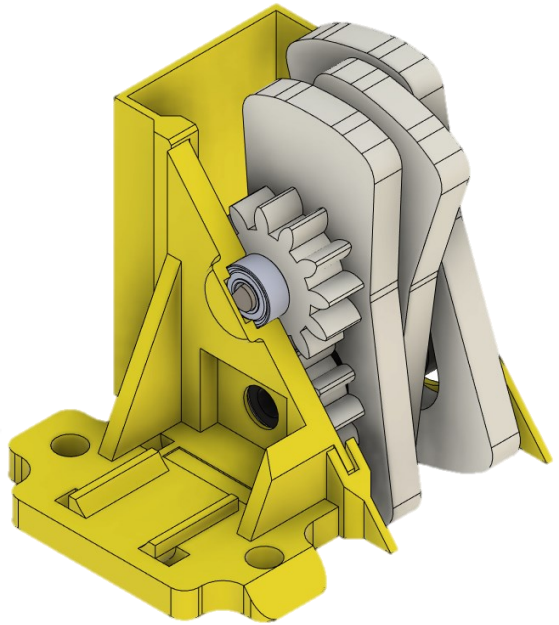


- ~~Simple~~
- Easy to repair
- ~~Robust~~
- Redundant
- ~~Elaborate~~
- Tested

# Repairability

## Modularity

- Replaceable funtional units
- Assign build spaces (blackbox construction)



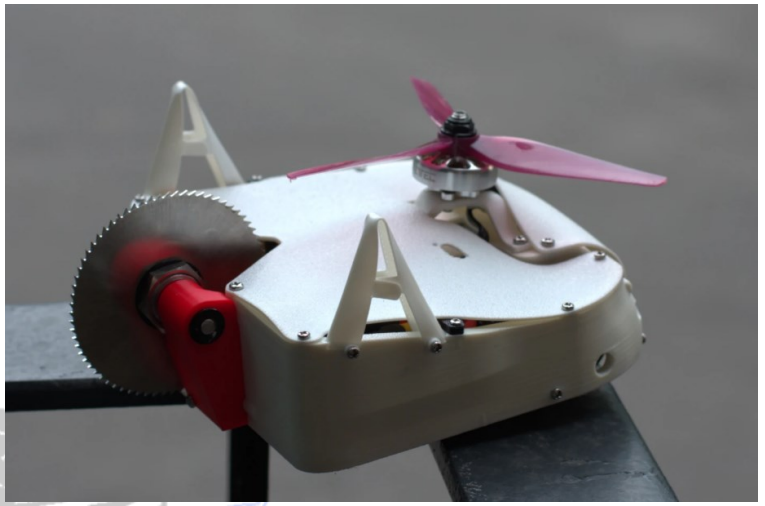
## Unified screws

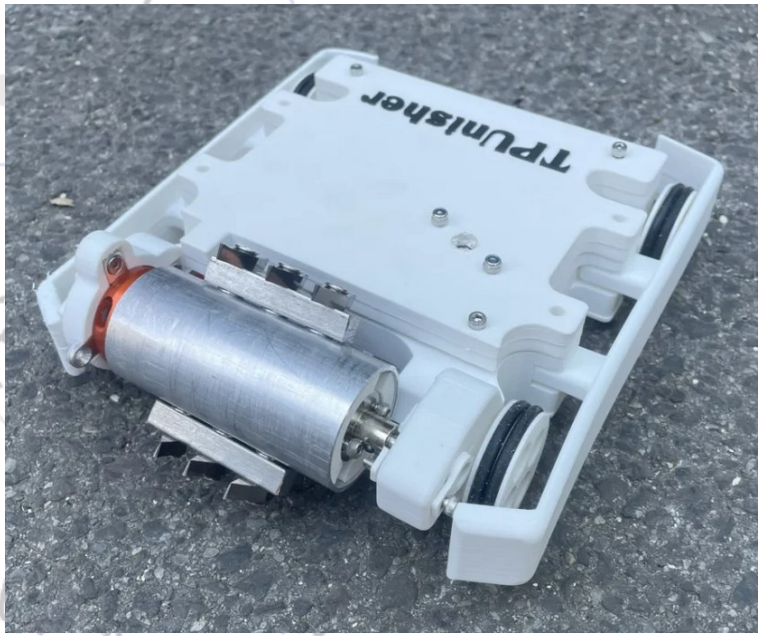
- Few types of screws, same heads

## Heat inserts:

# Redundancy

- Propellers, Ventilators
  - Cooling
  - Contact pressure
  - Movement advantage
- Drive
  - More than one motor per powertrain
  - Different modes of locomotion
- Weapon
  - Secondary weapon
  - Secondary bot?





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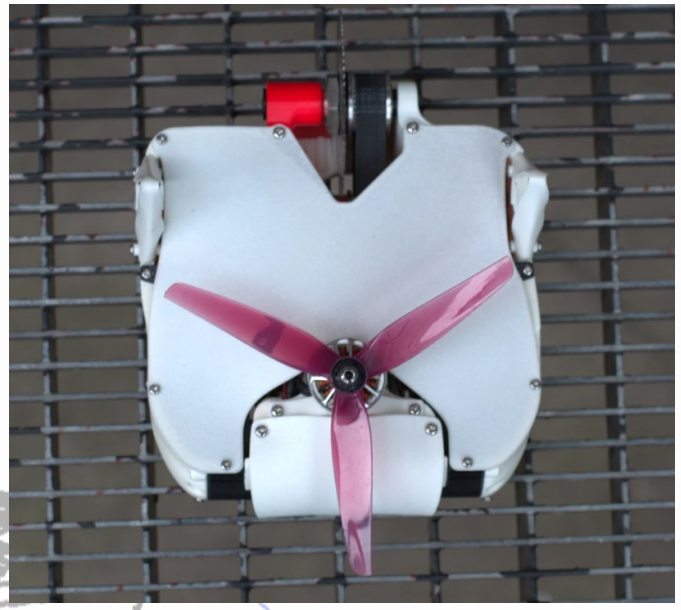
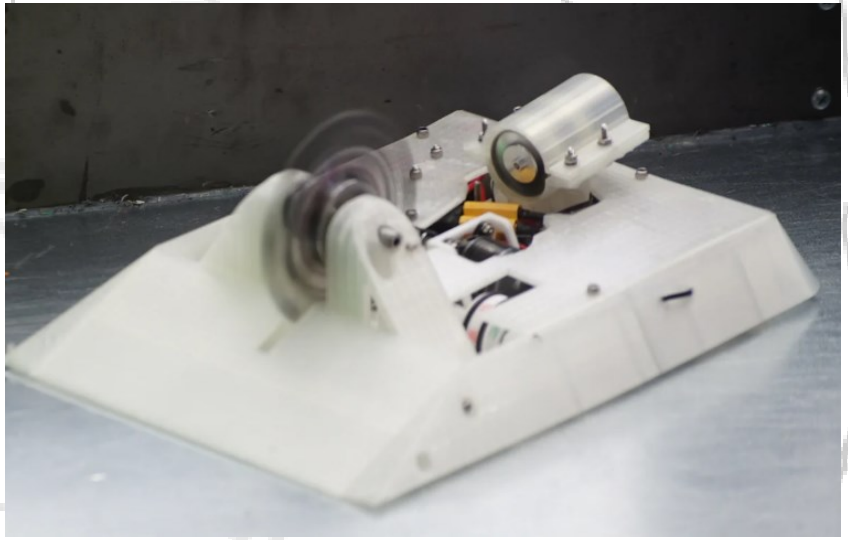


# Testing



## Bot

- Impact resistance
- Drive

## Arena

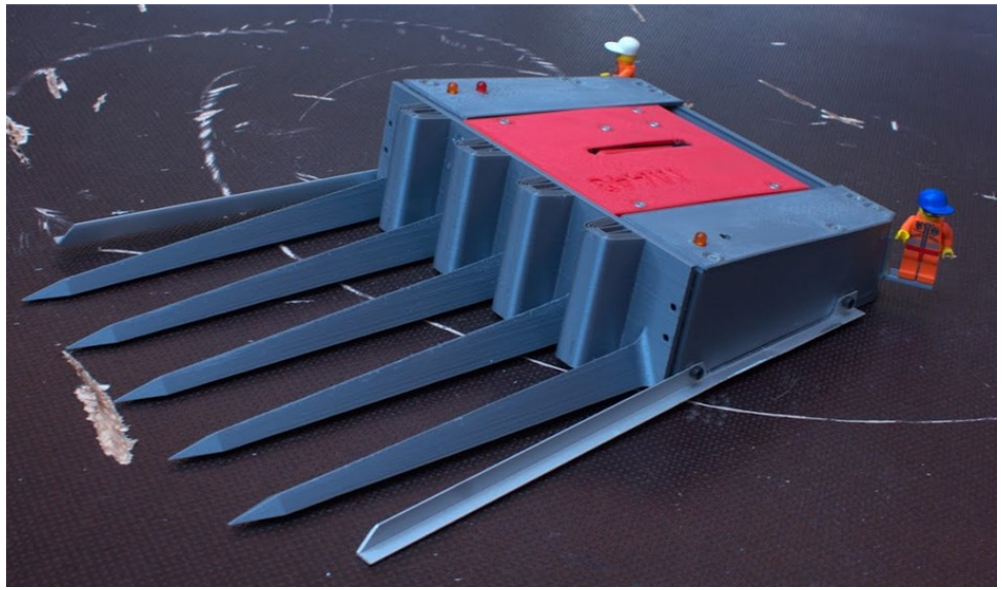
- Edges
- Traction

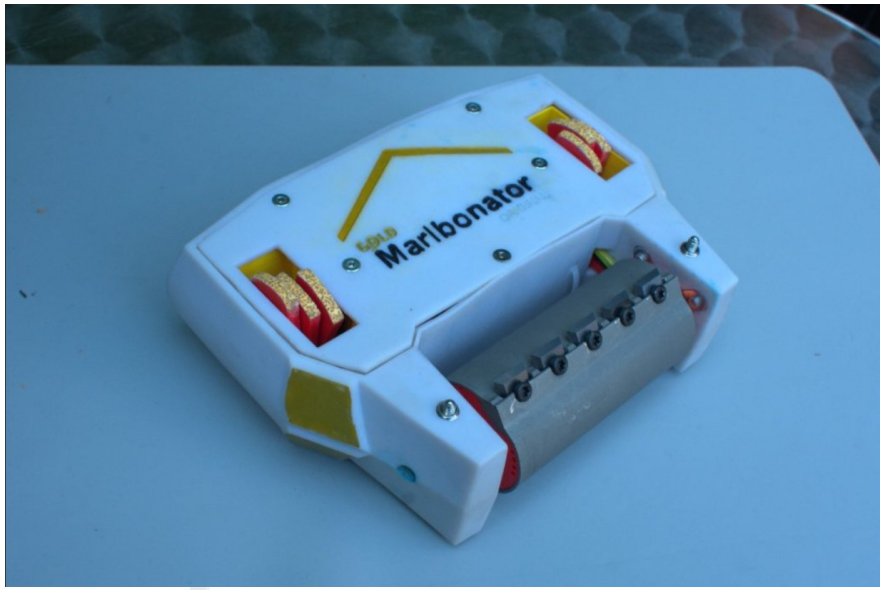
## Opps

- Weapon damage

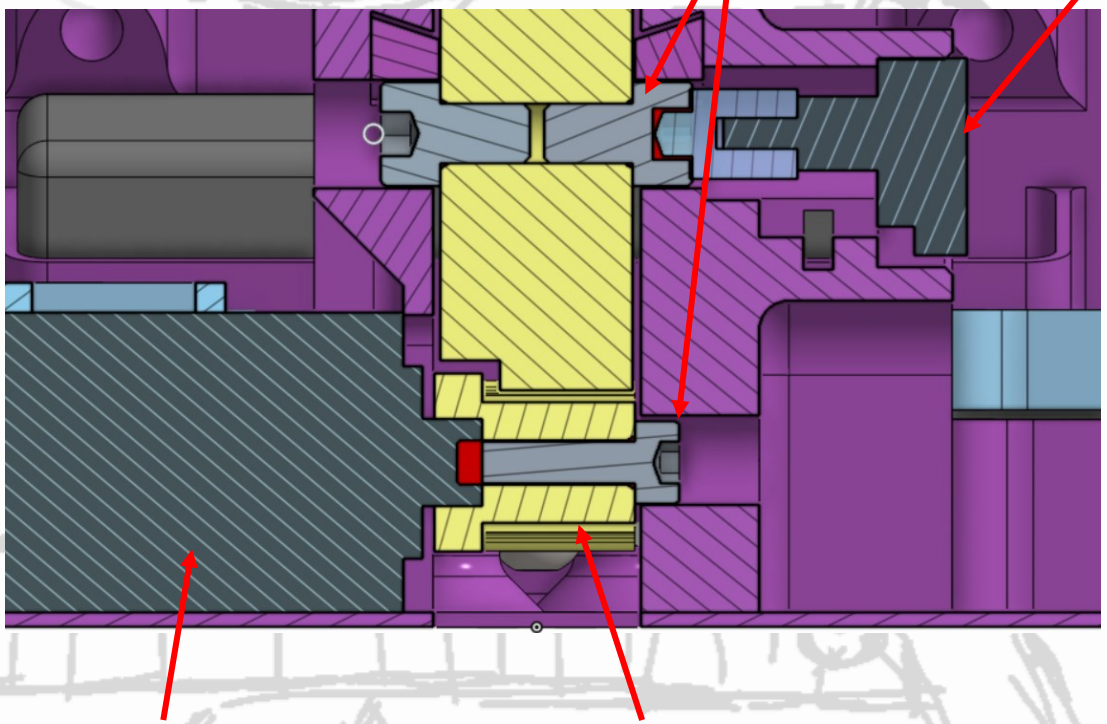
# Chassis construction

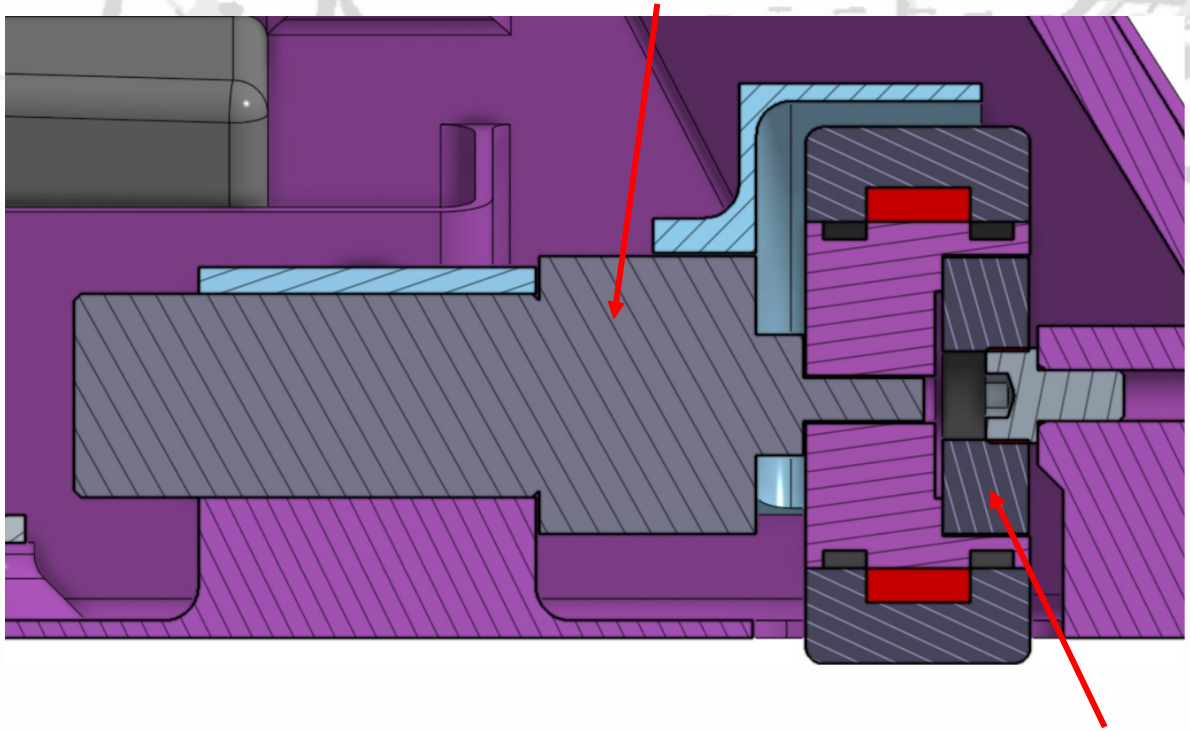
Screwed together parts vs. Singular fullbody chassis





# Bearings, load distribution



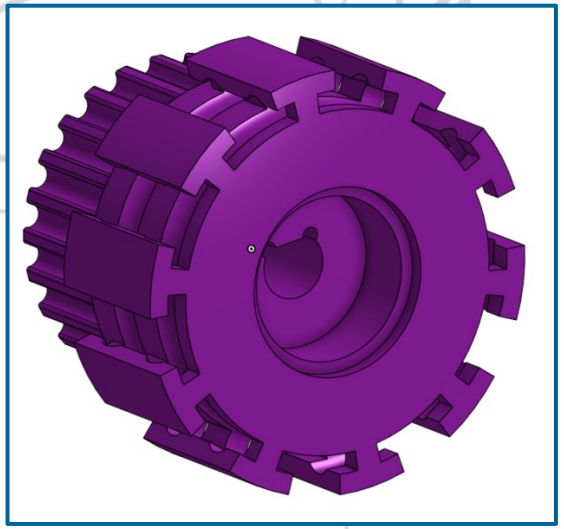



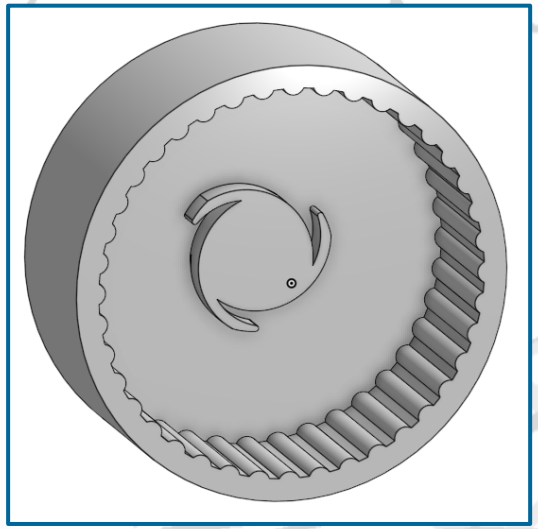
# Tolerances

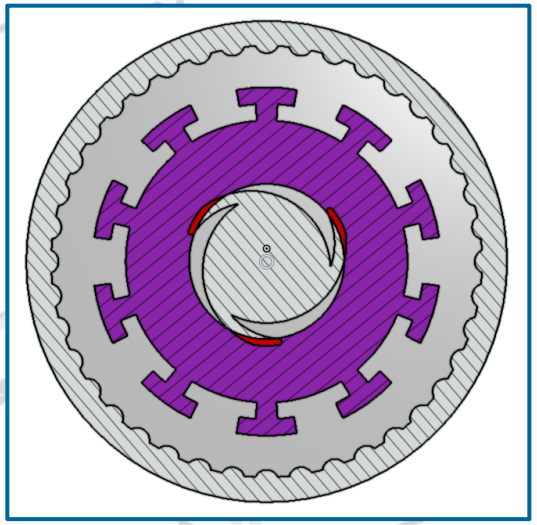
- Fit is dependent on:
  - Material
  - Color
  - Manufacturer
  - Age
  - Printing direction
  - Printing temperature

***TESTPRINTS!***

- If possible avoid:
  - One flexibel part
  - Draft angles

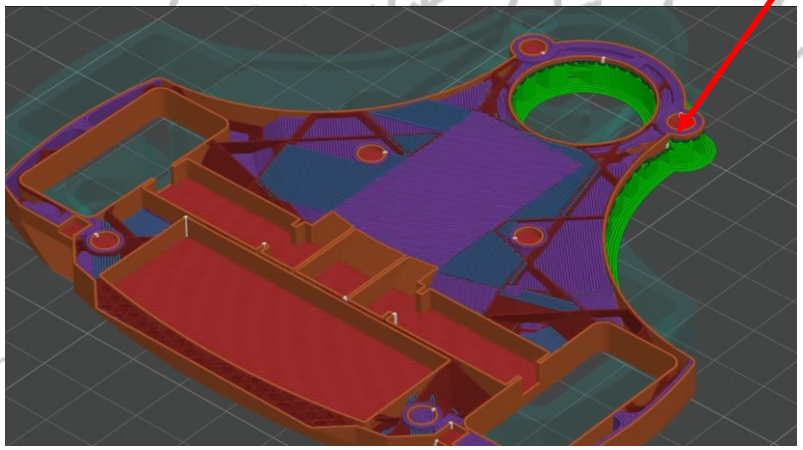


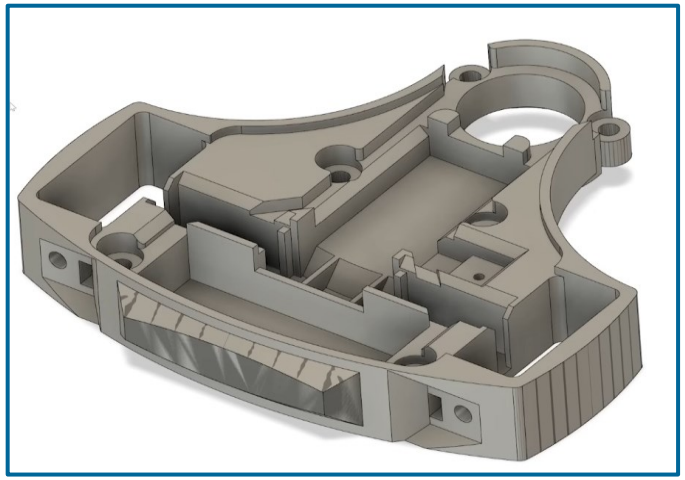




# 3D printing

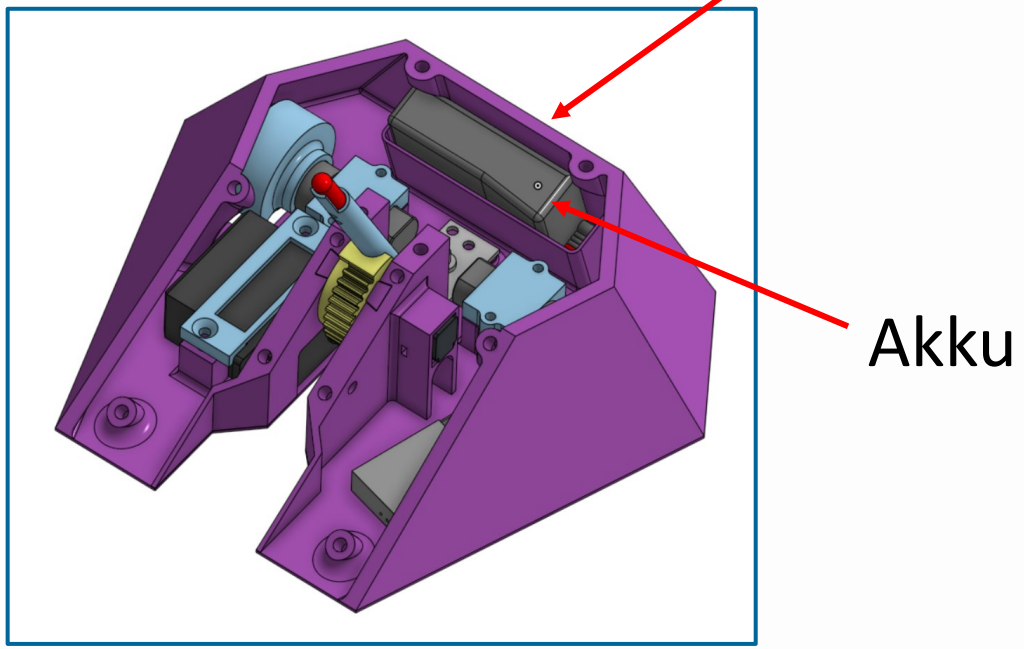
- Anisotrope material properties
- Angled printing
- Thick outer walls with reduced wall-lines (puffer zone)
- Wall thickness and high infill only where necessary(Modifiers)
- Heat inserts (beware: TPU)





# Elektronik Kit

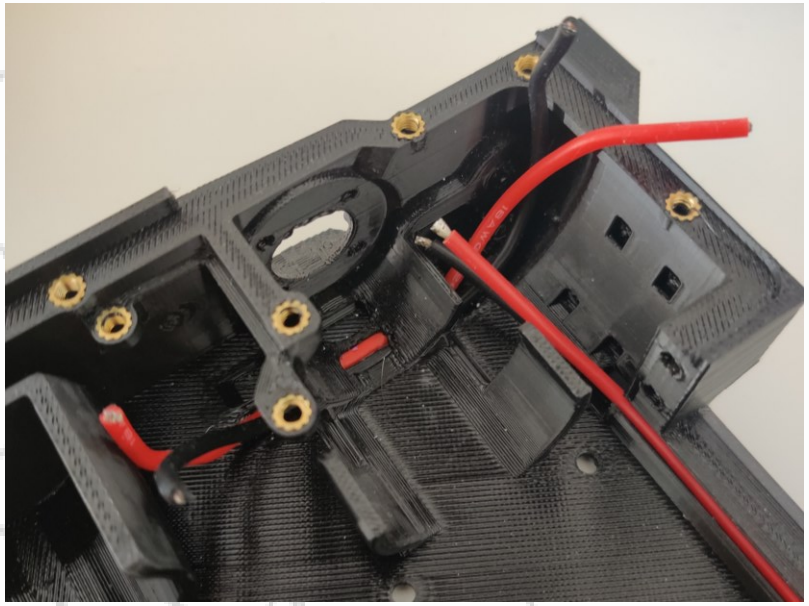
- N20 Motors trade light for robust
- BLDC Motors have limited potential for lifting
- How big to choose the size of the battery
- Supply of servos over reciever critical
- Switches switch from:
  **5V-5V auf 0V-5V**
- Bearings are a powerful component, but heavy

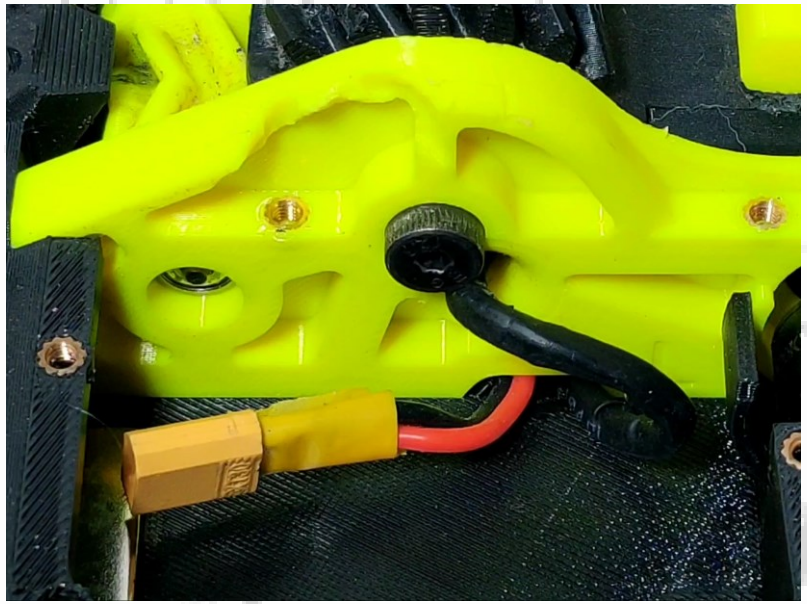


# Cables

When placing components think about cable runs.

- Acessable wiring – for assembly, repair and inspection
- Soldering inside cramped spaces between fights is not easy
- Shield wiring from moving components inside the robot. (gears, outrunner bldc)



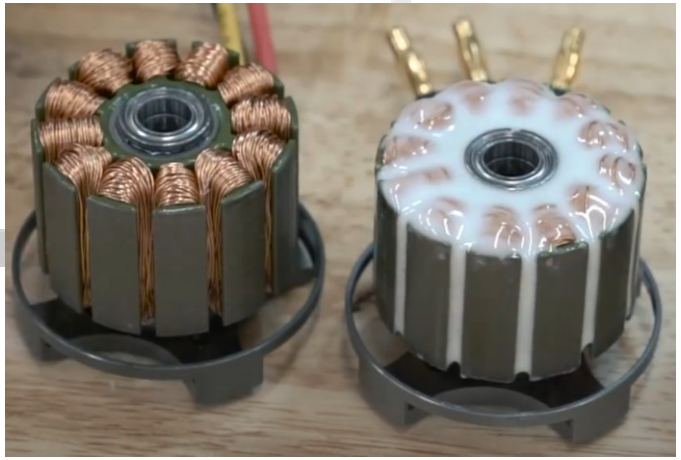


# Customise brushless motors

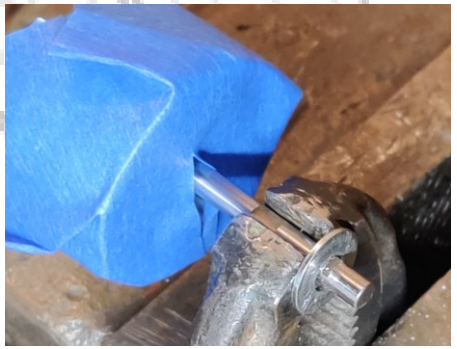
- Battle hardening - securing the magnets in the magnet ring/stator with epoxy

**Pro**
- Magnets won‘t shatter as easily

**Cons**
- Motor runs hotter
- Can be unbalance

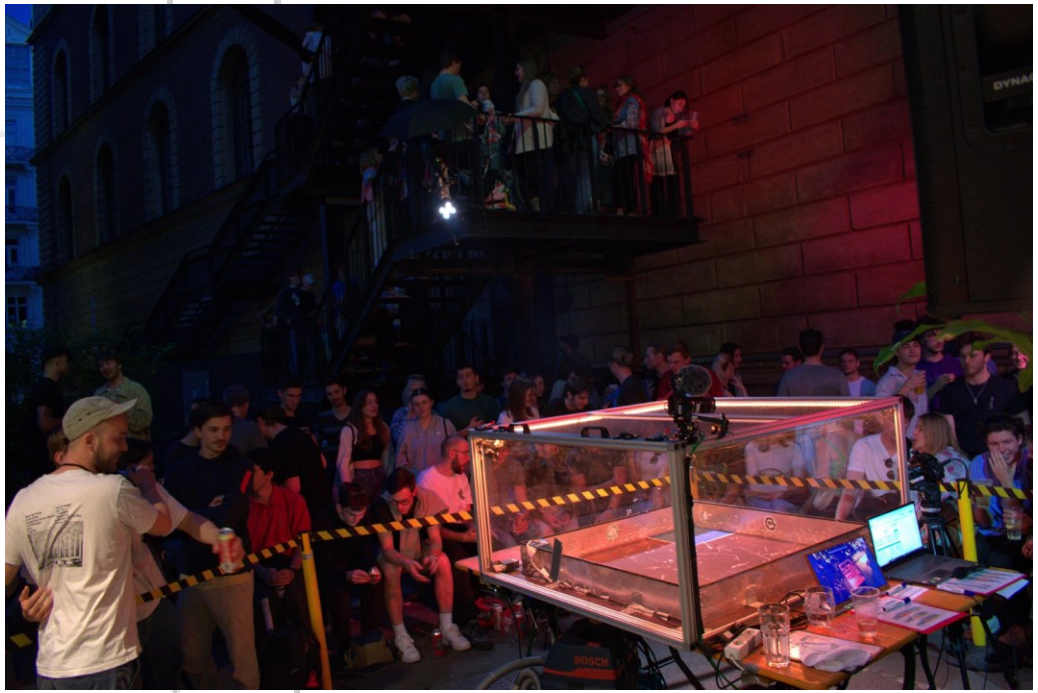


*Careful!* - avoid metal on stator magnets when cutting shafts



# Event

- **Print spare parts!** – can‘t repare what you can only replace
- **Bring Tools!** – we have communal resources, but if everyone needs to use them, no one can
- **Plan for bot repairs in between fights** – optimize for repair speed



# Links

**Semaf Electronics: Elektronikkomponenten:**

https://electronics.semaf.at/

**Rotorama: Drohnen-Shop:**

https://www.rotorama.com/

**Roboter Bausatz: Roboter / 3D Druck Zubehör:**

https://www.roboter-bausatz.de/

**Modellbauwelt: RC-Zubehör:**

https://www.modell-hubschrauber.at/

**Igus Zahnräder: 3D Modelle:**

https://www.igus-cad.com/default.aspx?treeid=10301

# Videos

**3D Druck - Slicer Tipps (Maker's Muse):**

https://www.youtube.com/watch?v=iziTcOLKfFc

**3D Druck - Angled Printing (CNC Kitchen):**

https://www.youtube.com/watch?v=7aJ4dDyyf20

**3D Druck - Passungen (Slant 3D):**

https://www.youtube.com/watch?v=XKrDUnZCmQQ

**3D Druck und Konstruktion (Maker's Muse):**

https://www.youtube.com/watch?v=5iYzsogmnac

**Silikonreifen (DrumBotics):**

https://www.youtube.com/watch?v=wSwuph2TEll

**Combat Robot Evolution (DrumBotics):**

https://www.youtube.com/watch?v=cybo_r-qmvU

**Combat Robot Evolution (Broken Link Robotics):**

https://www.youtube.com/watch?v=W3bZtFYrtWA

**Combat Robot Evolution (Engineered Chaos):**

https://www.youtube.com/watch?v=fblkqPEUAwE

**Spinner Design (Team Just 'Cuz Robotics):**

https://www.youtube.com/watch?v=uQZUa15e-mk

**Spinner Design (Team Panic):**

https://www.youtube.com/watch?v=LG9cAdSwhh4

**Aren-Hill Bot (Skorpios Battlebot):**

https://www.youtube.com/watch?v=y6I7TM3gg_4

**Combat Robot Event (Robot Rebellion):**

https://www.youtube.com/watch?v=HqBlde4CI9A

**Combat Robot Event (Alex's Alchemy):**

https://www.youtube.com/watch?v=Y4bFJFHDUi0

**Combat Robot Event (Skorpios Battlebot):**

https://www.youtube.com/watch?v=DuI-y-zcdLQ