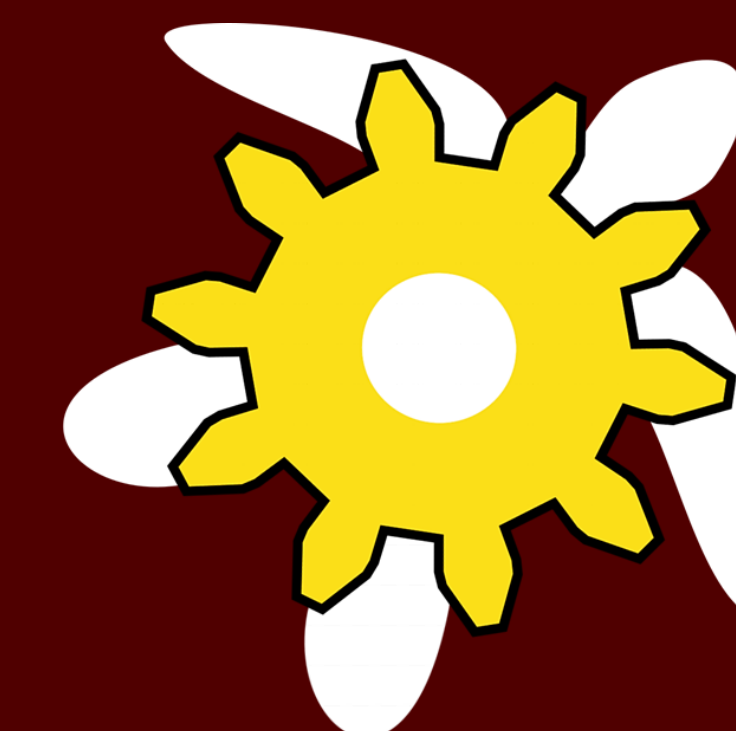




# TURTLE Combat Robotics(CMBT)

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## Combat Robotics

The Combat Robotics Team (CMBT) manufactures, designs, and competes combat robots in a variety of weight classes. Robot fights last a total of 3 minutes. Points are awarded for control and destruction of the opposing robot. The winner is the last robot standing or the team with the most points at the end of the 3 minute duration.

## Team Breakdown

### Weight Classes:

- 30 Pound (The Big Gig)
- 3 Pound (Rev's Revenge)
- 3 Pound(New Concept, TBD)

### Sub-Systems:

- Weapon – handles frontal design and weight
- Chassis – handles integration and hull strength
- Drivetrain – chooses motors and wheel count
- Electronics – inside chassis, runs systems

The CMBT projects contain four sub-systems that are the same across both weight classes. Members typically focus on one sub-system but maintain competency and contribute to multiple systems.



Figure 1. A live BattleBots Competition [BattleBots]

## The Big Gig (30 lb)

This is our oldest and heaviest robot. The Big Gig utilizes an 8 lb, asymmetric vertical spinner style weapon that is belt driven. It utilizes a chain driven tank drive system where each set of wheels is independently driven. The chassis is made up of segmented aluminum plates that bolt together for easy replacement. The chassis also has hardened steel forks for better control over competitors. The weapon and drivetrain are driven using three brushless motors with independent ESCs. All the electronics are powered by two 6s LiPo Batteries.

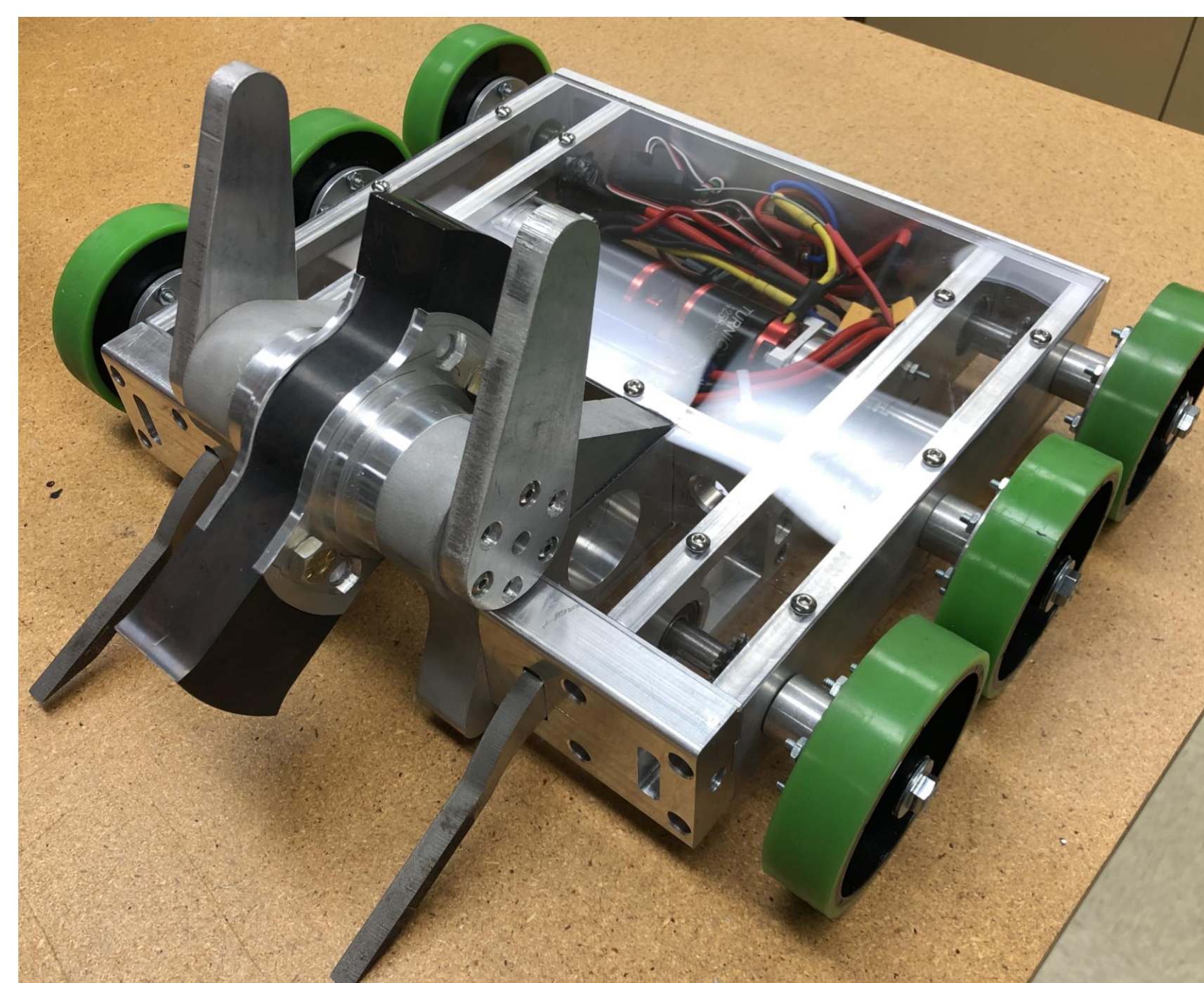


Figure 2. The Big Gig Fully Assembled.

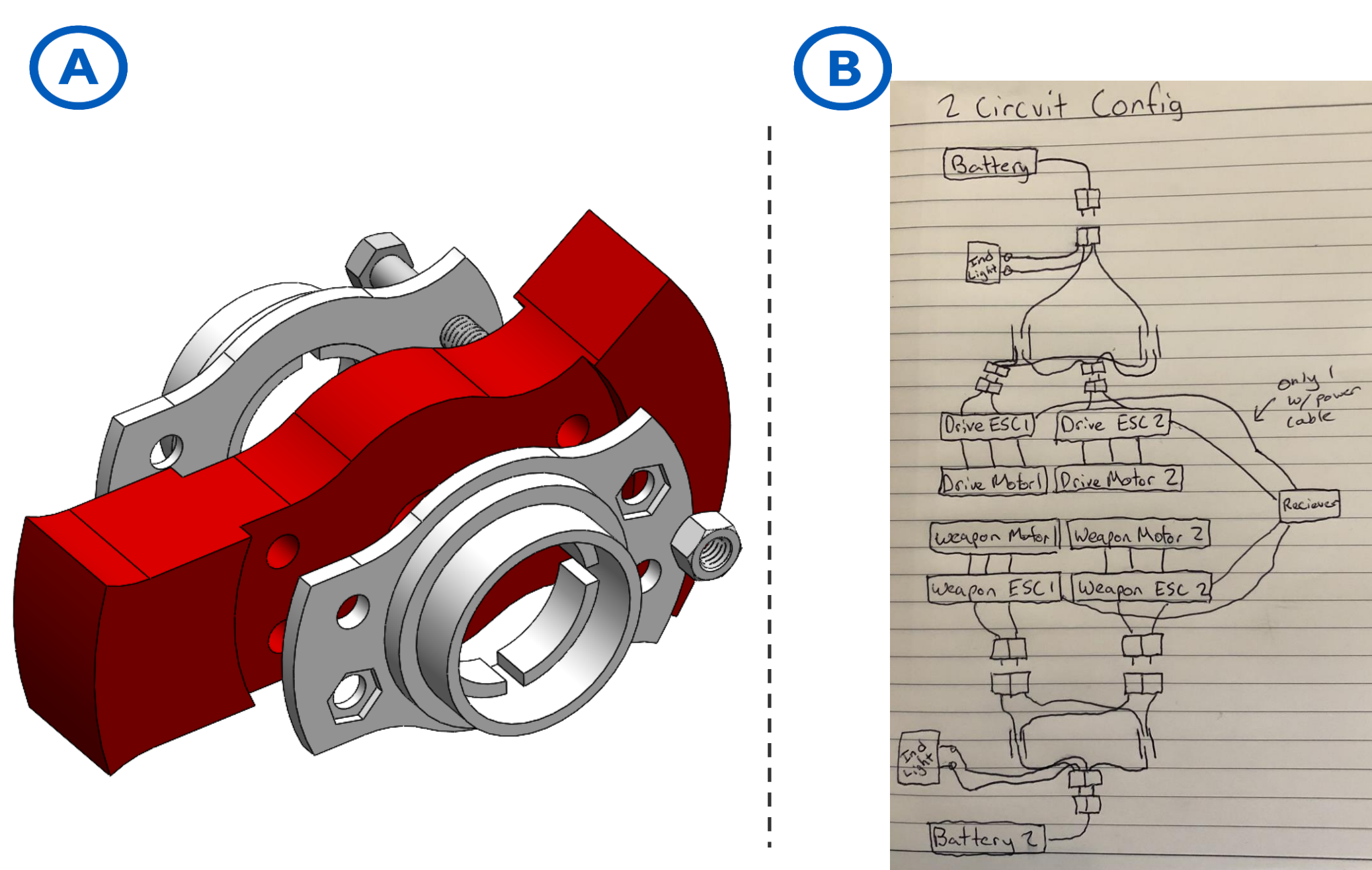


Figure 3. The Big Gig Weapon Assembly (A) and Electronic Block Diagram (B)

## Rev's Revenge 3.0 (3 lb)

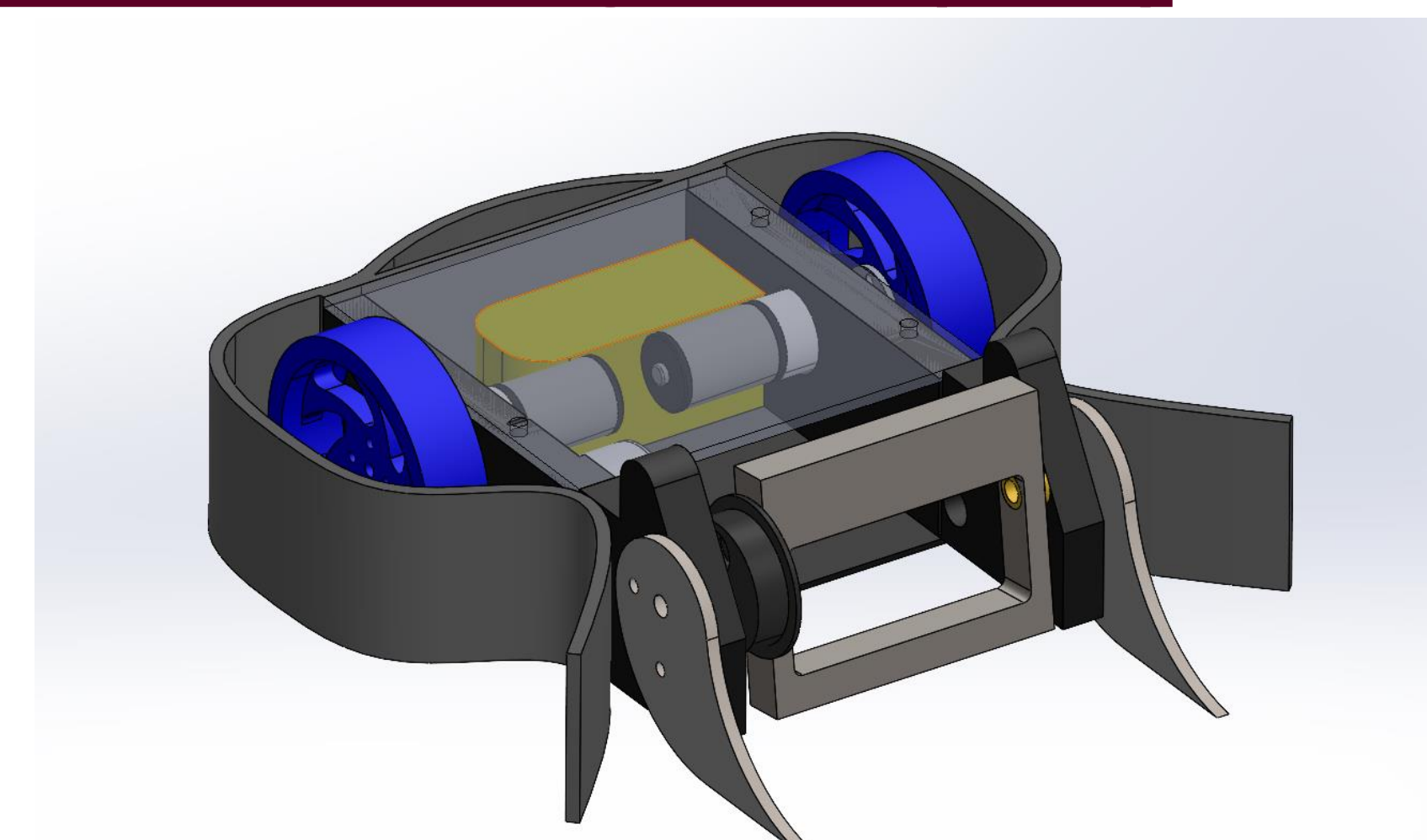


Figure 4. SolidWorks Renderings of Rev's Revenge.

Rev's Revenge underwent a partial redesign over this semester. The new design (Rev 3.0) utilizes a bolt together hybrid polycarbonate and TPU chassis. The weapon is a 0.7 lb asymmetrical beater-bar. It is driven by a brushless DC motor with an independent ESC. Rev 2.0 is driven by two brushed DC motors that share a dual channel ESC. The electronics are powered by a single 3s LiPo battery. For competition, the circuit will have a screw in kill switch to open or close the circuit quickly.

## Rev 2.0 vs Rev 3.0

- Improved Chassis Strength and Durability
- Lighter armor
- Chassis now baseplate with 2 walls
- Now properly under 3lbs

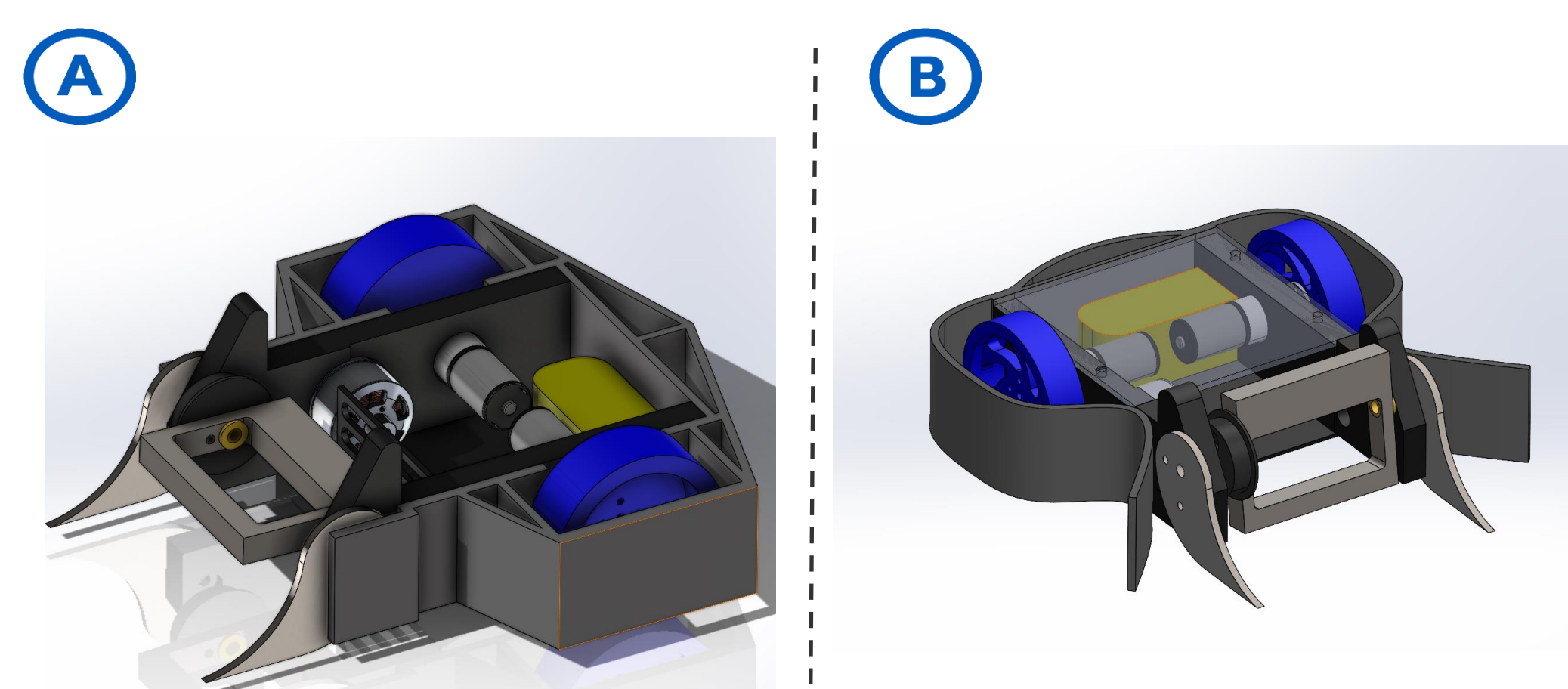


Figure 5. Rev 2.0 (A) and Rev 3.0(B)

## Future Work

### The Big Gig:

- Solder drive ESCs and test drive
- Find a Safe Testing Environment for weapon
- Find Local Competitions

### Rev's Revenge:

- Optimize wall and casing prints for durability
- Add a kill switch to the circuit for safety
- Test weapon destructiveness at an external site
- Compete in Spring 2025 at Spring Showdown

### A Third Robot:

We Currently have enough electronics to fully furnish a second 3 lb robot. There are currently three options for a third robot: build a wedge bot to train drivers with. Build a clone of Rev 3.0 to test design changes before implementing them on the main bot, or design a new bot from the ground up (name suggestions welcome). In any case, the team will gain invaluable competition experience in house to improve event performance. The current leading design is an active wedge.

