

Combat Robotics (CMBT)

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Combat Robotics

The Combat Robotics Team (CMBT) designs, manufactures and competes combat robots in a variety of weight classes. Robots with a variety of active weapons, body types, and drive trains compete to knock each other out or to control the fight by other means. Robot fights are 3 minutes, the winner is the last robot standing or by a judge decision.

Team Breakdown

Weight Classes:

- 30 Pound (The Big Gig)
- 3 Pound (Rev's Revenge)
- 3 Pound(currently unnamed)

Sub-Systems:

- Weapon
- Chassis
- Drivetrain
- Electronics

The CMBT projects contain four sub-system that are the same across both weight classes. Members typical 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.

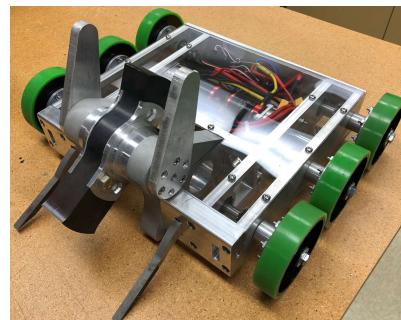


Figure 2. The Big Gig Fully Assembled.

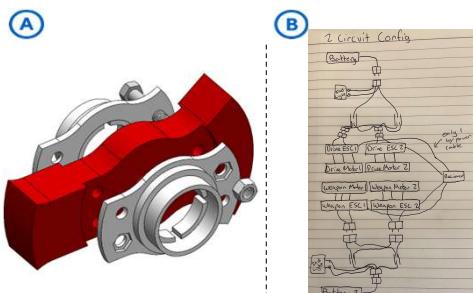


Figure 3. The Big Gig Weapon Assembly (A) and Electronic Block Diagram (B)

Rev's Revenge 3.0 (3 lb)

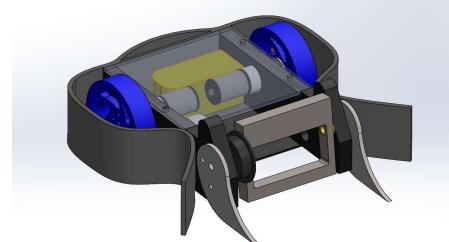


Figure 4. SolidWorks Renderings of Rev's Revenge.

Rev's Revenge is our newest robot that underwent a full 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 actually under 3lbs



Figure 5. Rev with 6 iterations of chassis designs

A Bot In Progress

This semester we dove head-first into designing a new and improved 3 lb robot (name TBD).

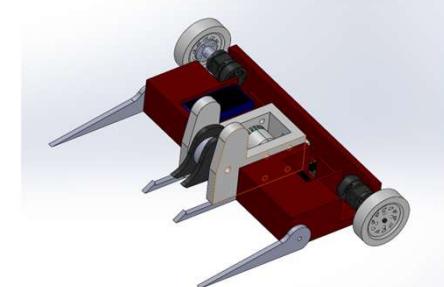


Figure 6. SolidWorks Renderings of unnamed robot

Out with the old, in with the new:

This robot blows Rev's Revenge out of the water, here's why:
Improved electronics – lightweight, powerful, and compact electronic components were used.

Efficient Design – chassis includes integrated cable management and built-in electronics compartments for efficiency and durability

Balanced Stats – This design maximizes control, defense, aggression, and durability.

Still to be done:

- Design mounting/assembly features
- Electronic system assembly
- Prototyping
- Redesign, optimize, maximize



Figure 7. View of electronics layout