Yeti Fist: The Wireless Snow Plow
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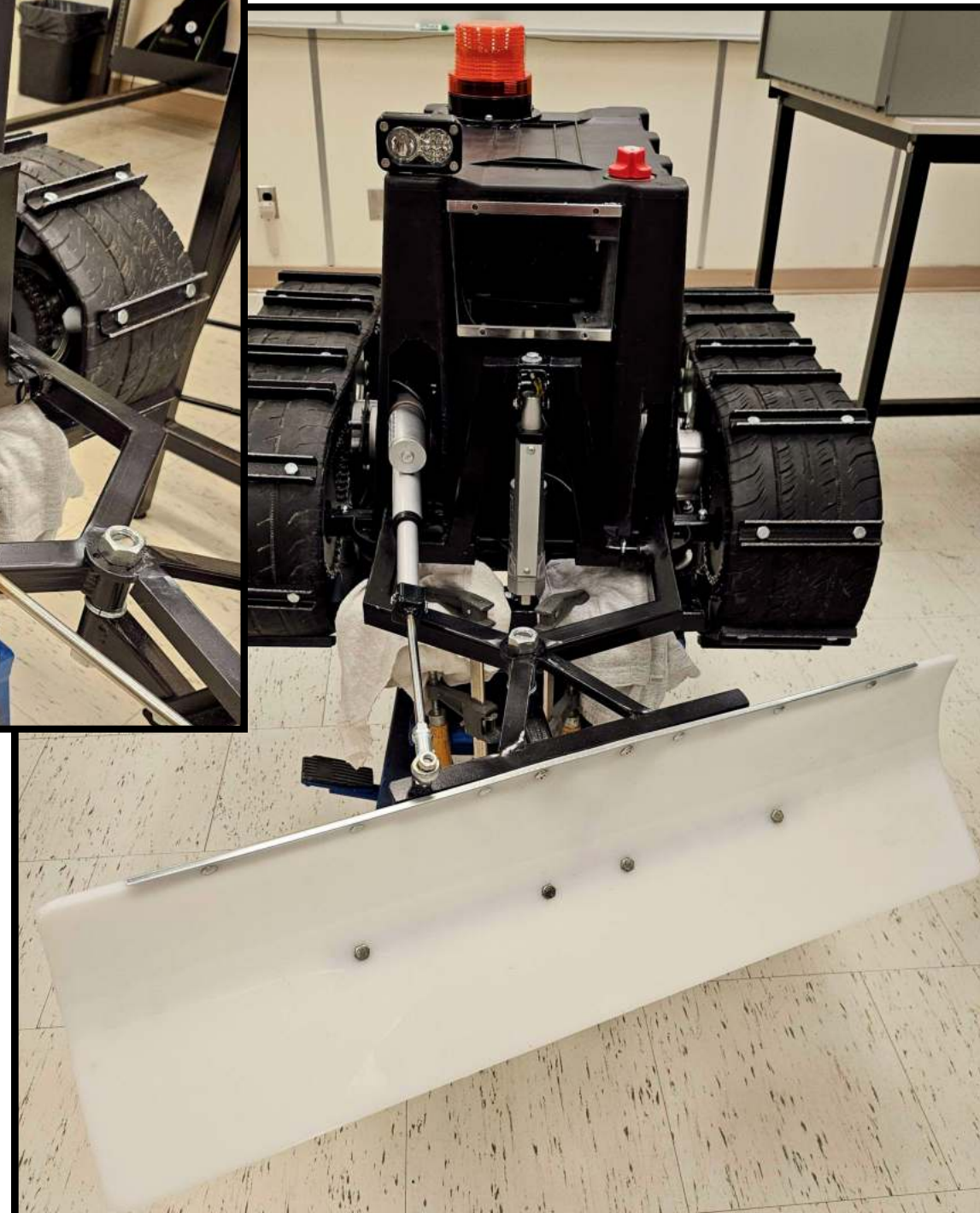
FACULTY OF ENGINEERING & APPLIED SCIENCE

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Our Project and Purpose

We want to enable home owners to plow their driveways from the comfort of the indoors. We aim to do this in a safe and effective manner through our project.

The Plow

We designed, built and programmed a wireless, remote controlled snow plow for this purpose. The plow is a twin tracked machine with a shovel on the front, a camera for directing the device, lights to see in the dark, and a controller that will be used inside the home, connected to a laptop.

How The Machine Works
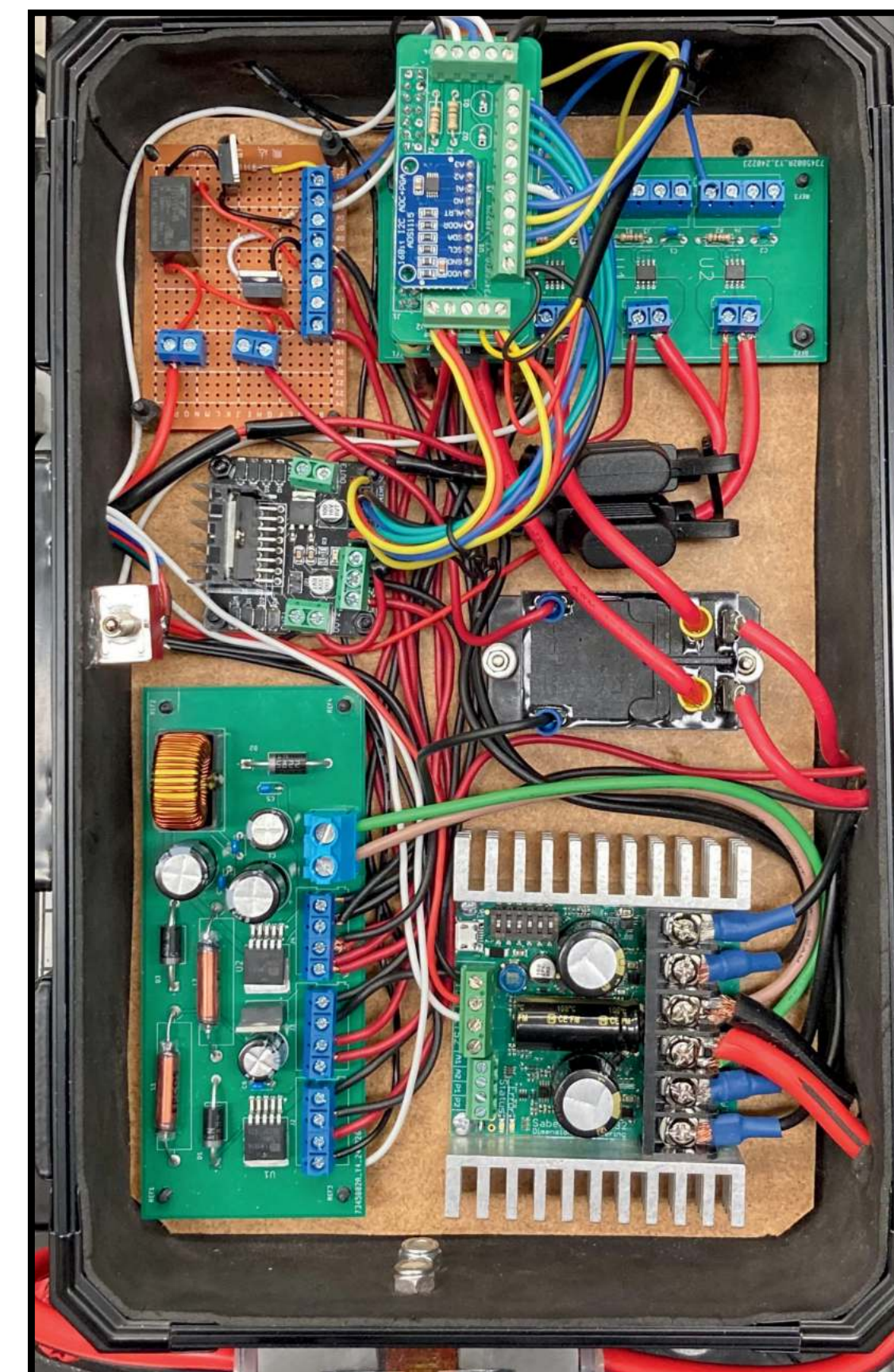
Controls are sent from a specially designed controller powered by an Arduino. The controller connects to a computer that passes the information to the machine via Wi-Fi.

The brain of the plow, a Raspberry Pi Zero 2 W, interprets the incoming control information and decides what to do and how to move.

There is a 24v motor driver to control the track motors, and a 12v motor driver to control the shovel motors. We use a pair of relays within the system to control the lights and to E-stop the motors in an emergency.

The current through the motors is monitored to ensure they are running safely. If current rises too high, the Pi will shut down the motors using the relay.
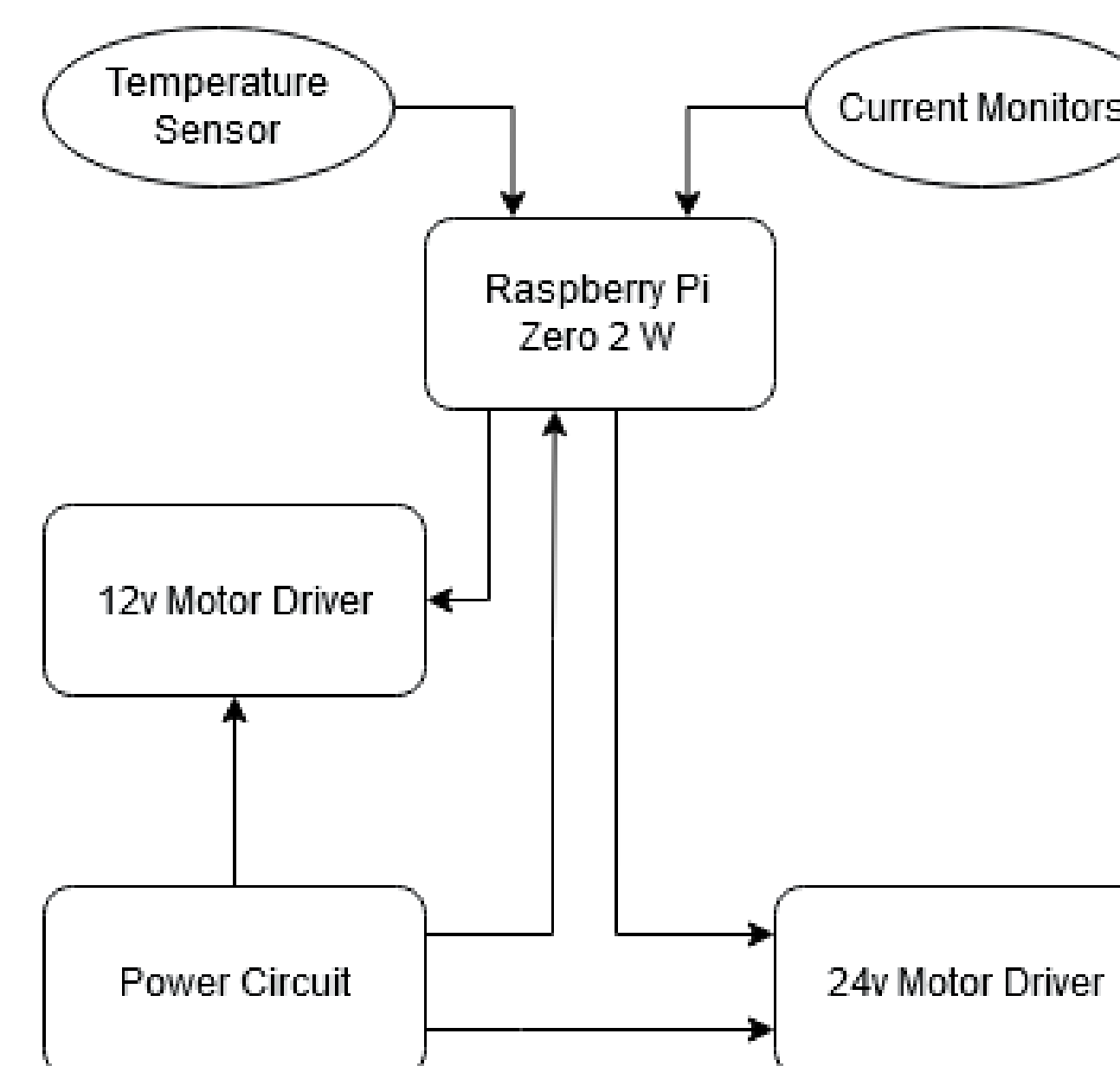
Final Specifications

- Control Distance (free air) - 100ft
- Camera Distance (free air) - 30 - 40ft
- Battery - 2 hours of average use
- Weight - <200lbs
- Push Limit - >250lbs
- Delay (worst case) - 300ms
- Delay (average) - 150ms
- Current Monitoring - (+-)0.5A
- Temperature Monitoring - (+-)0.5 deg.
- Weather Proof (Unofficial) ~ IP2/3
- Operating Temperature - (-)25 deg.
- Camera - 640x480, 24fps