

Project Overview

Create a wireless ECG monitor that can be used in a surgical environment while being as noninvasive as possible.

Dr. Faeza Kazmier - Watson Clinic

Desired Deliverables

- Patient Comfort
- Accurate and Efficient
- Sterile and Durable
- Can be Integrated with Existing Equipment

Major Tasks

CS Task

Program the Arduinos to project the precise signal to the monitor

ME Task

Design and create the housing for the device

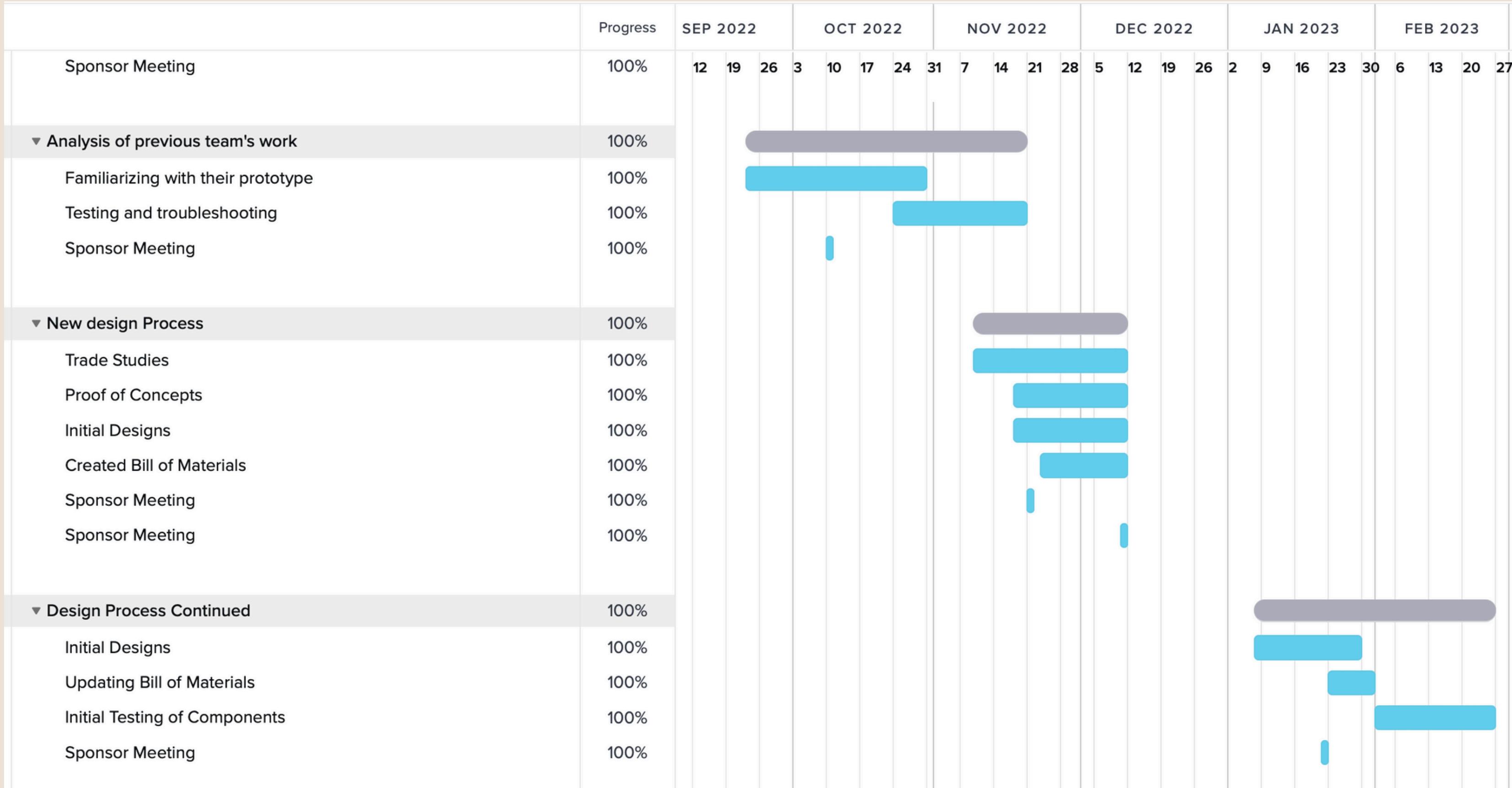
CE Task

Design battery module and solder components

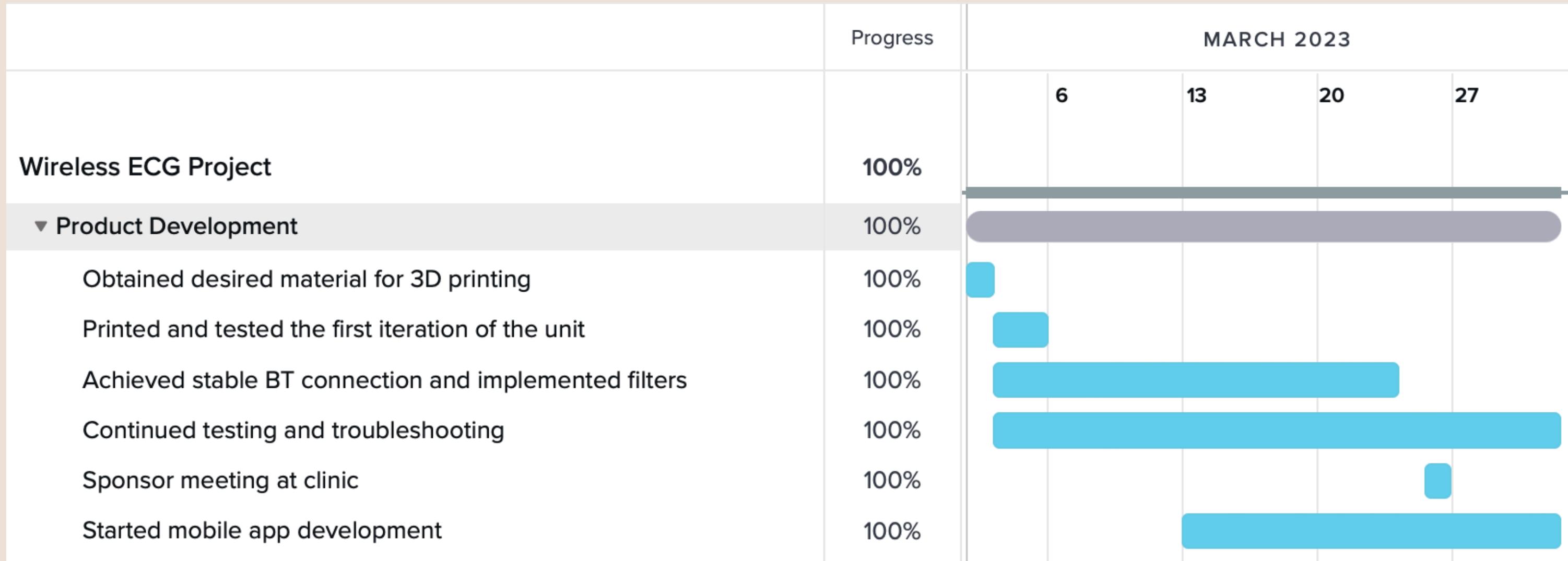
EE Task

Implement filters and assist with choosing components

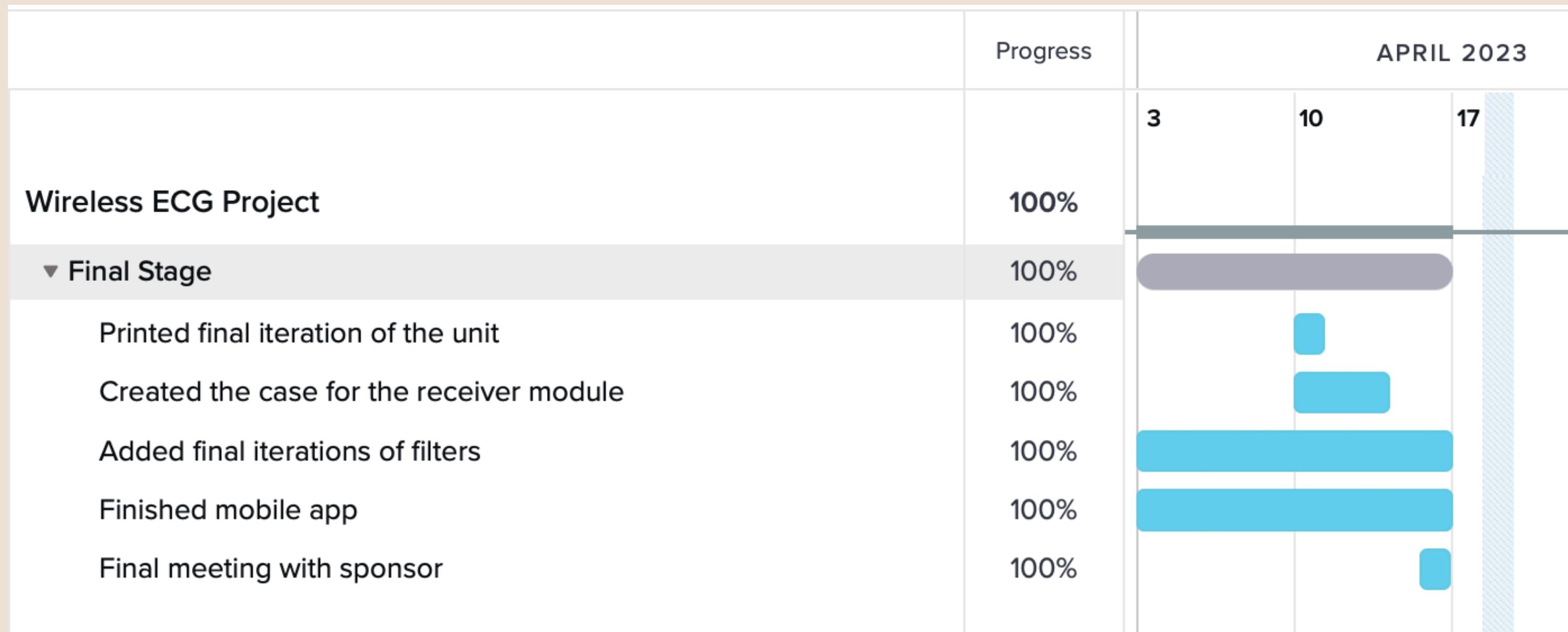
Gantt Chart



Gantt Chart



Gantt Chart

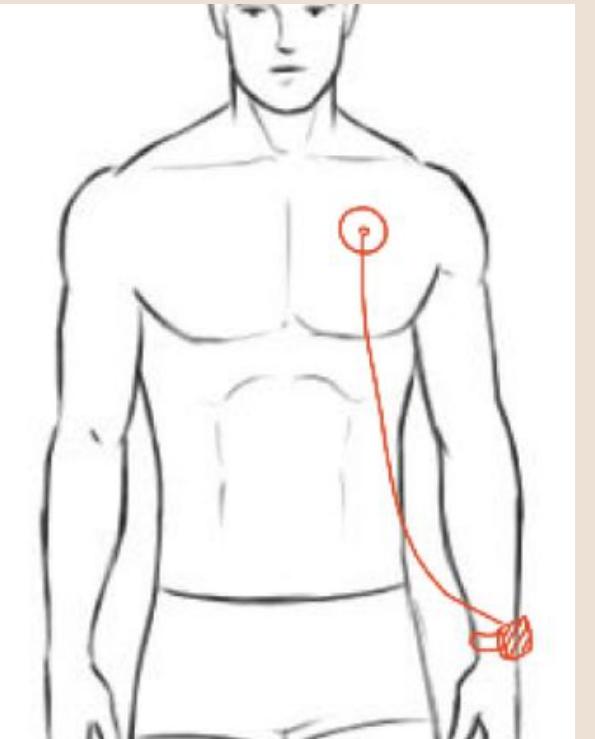
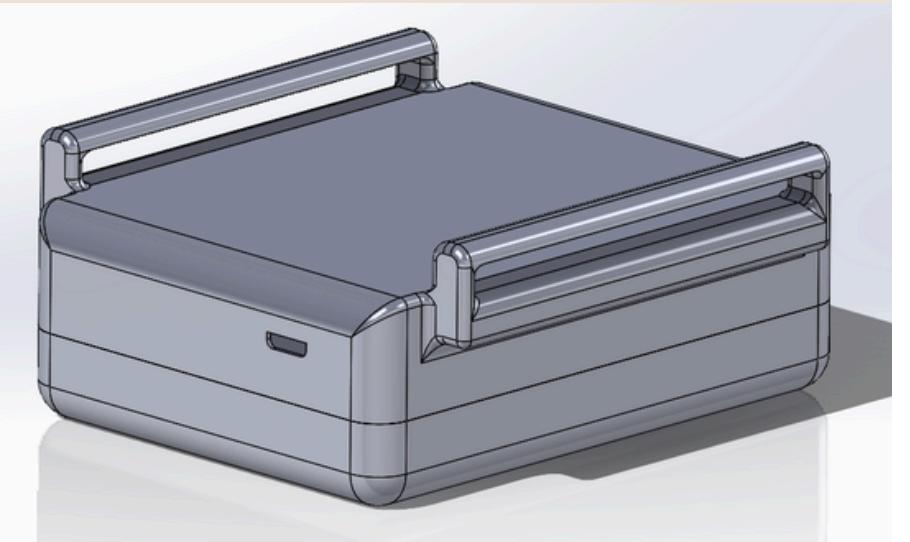


Customer Needs, Evaluation Criteria

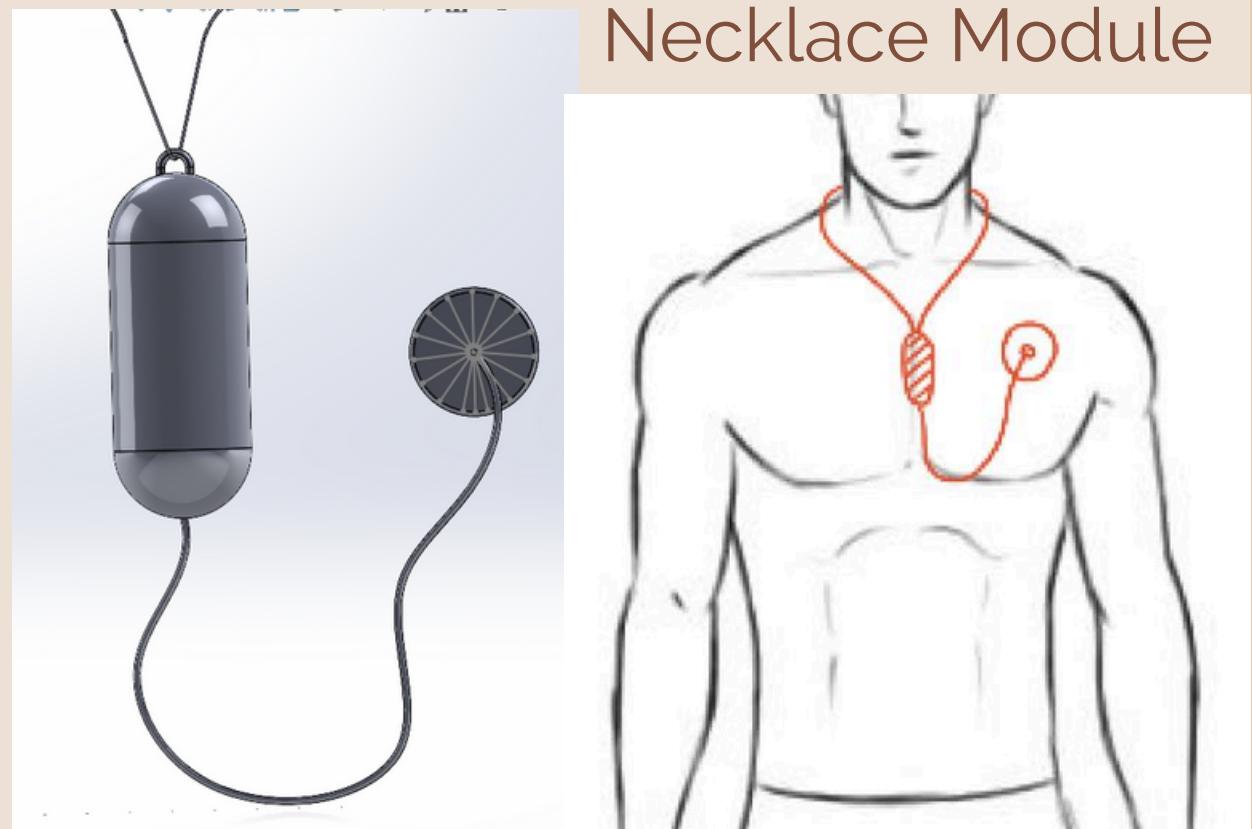
- Unit should interface with the existing hospital monitor
- Unit must be universal for all patients
- Unit must be capable of repeated sterilization
- Unit must have security features to transfer sensitive data
- Unit must transfer accurate data in a time-efficient manner
- Unit should be able to operate for at least 12 hours on battery charge

Proof of Concepts - Housing

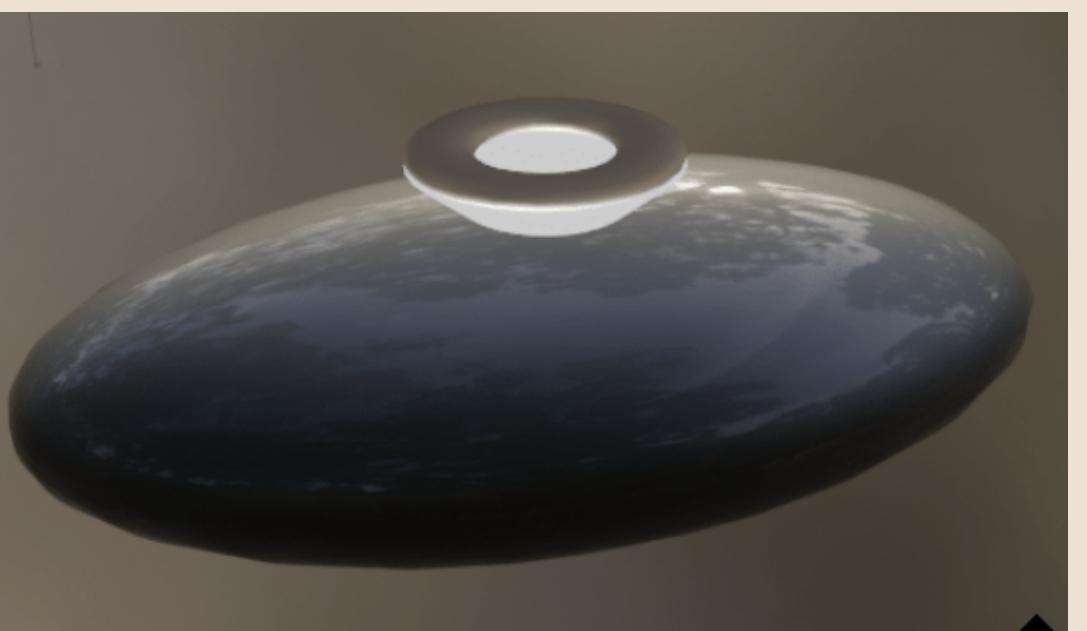
Variant 1:
Wrist Module



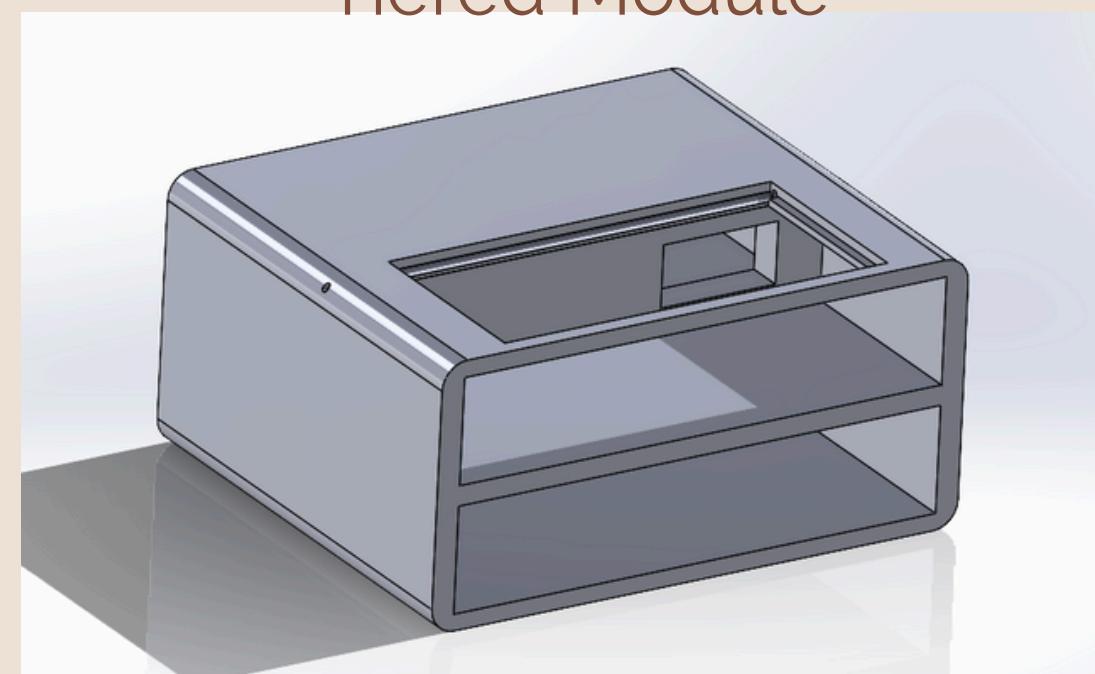
Variant 2:
Necklace Module



Variant 3:
Electrode-Inclusive Module



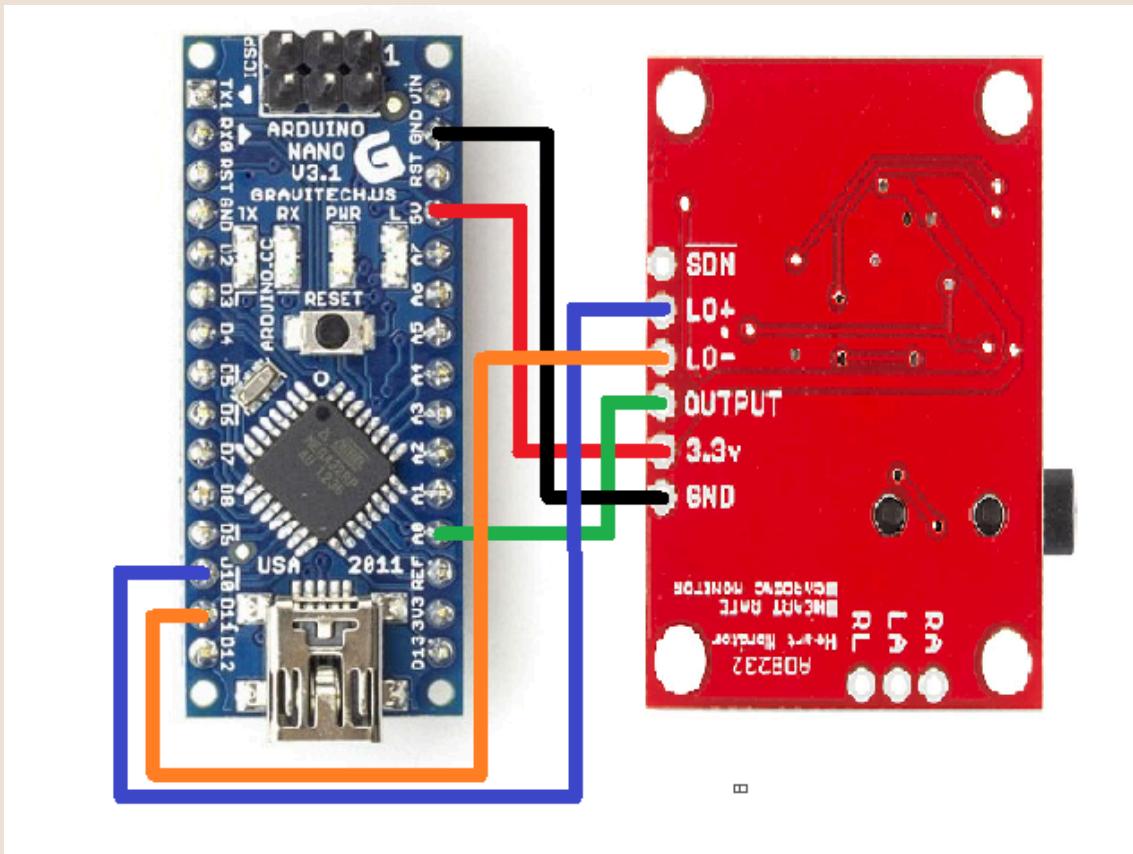
Variant 4:
Tiered Module



Proof of Concepts - Electrical

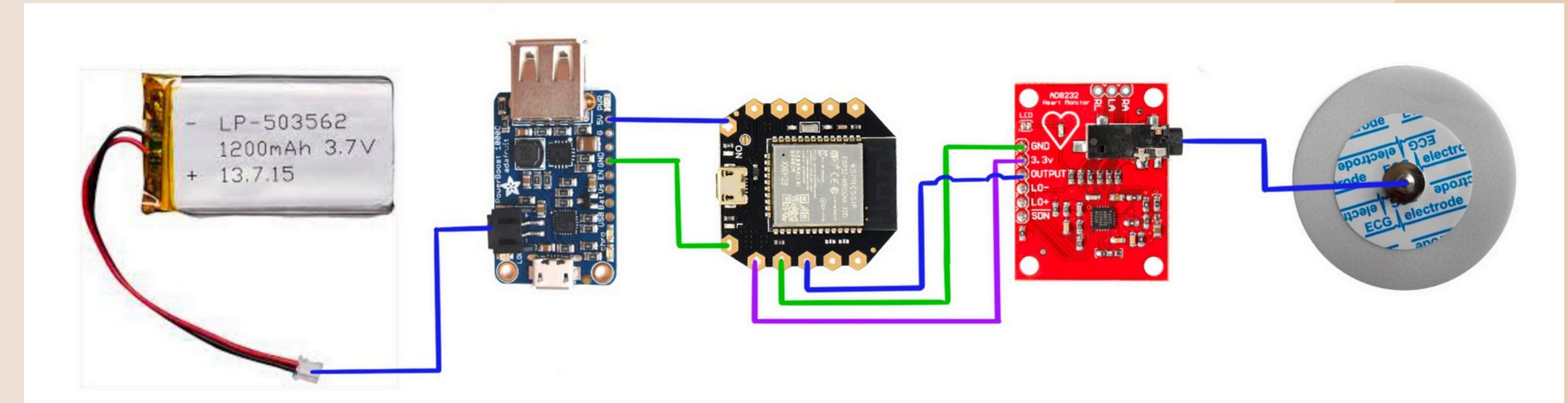
Variant 1:

- Arduino Nano
- Bluetooth Transmitter
- AD8242 Chip



Variant 2:

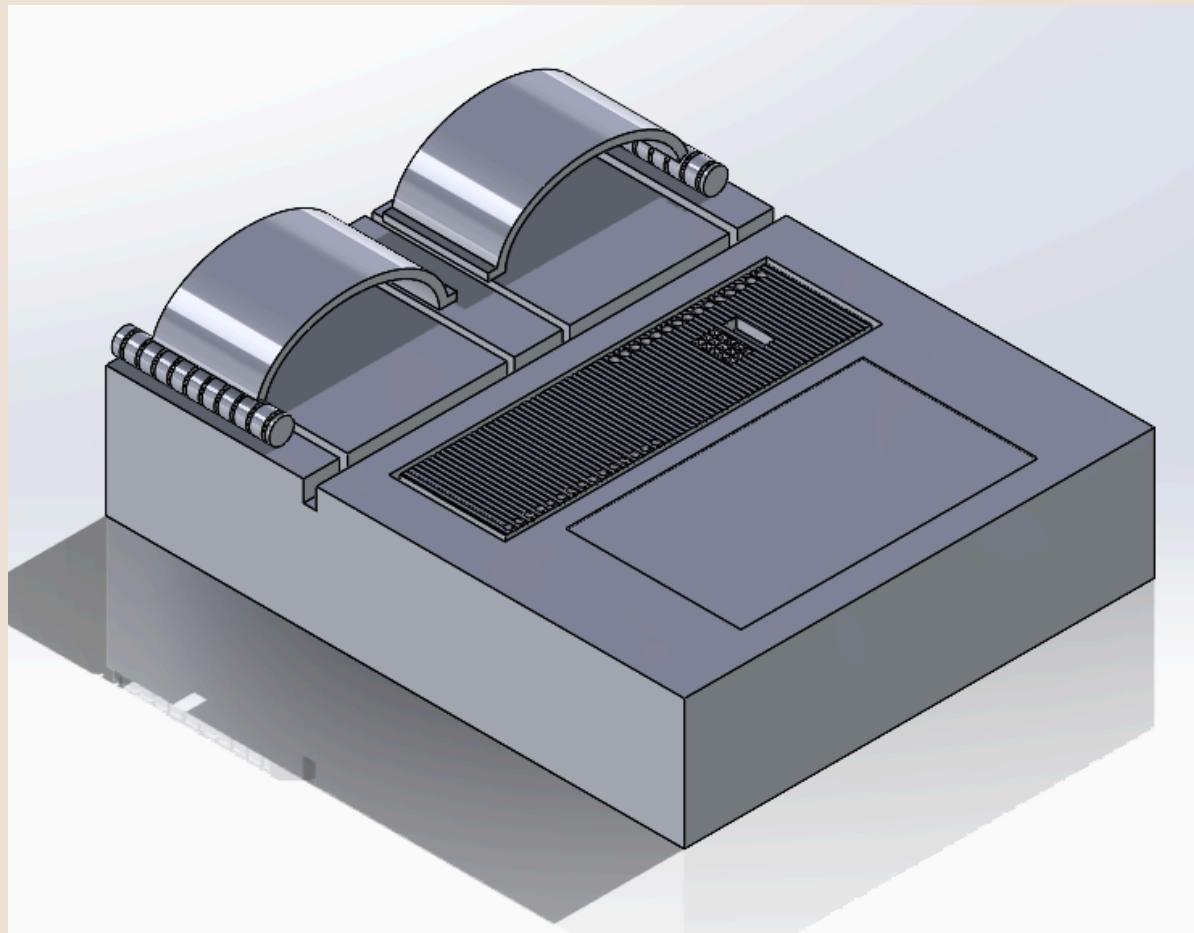
- 3.2V 1200mAh Battery
- Adafruit Power Boost 1000c
- ESP32 Beetle
- AD8242 Chip



Alpha Prototype/Beta Design - Housing

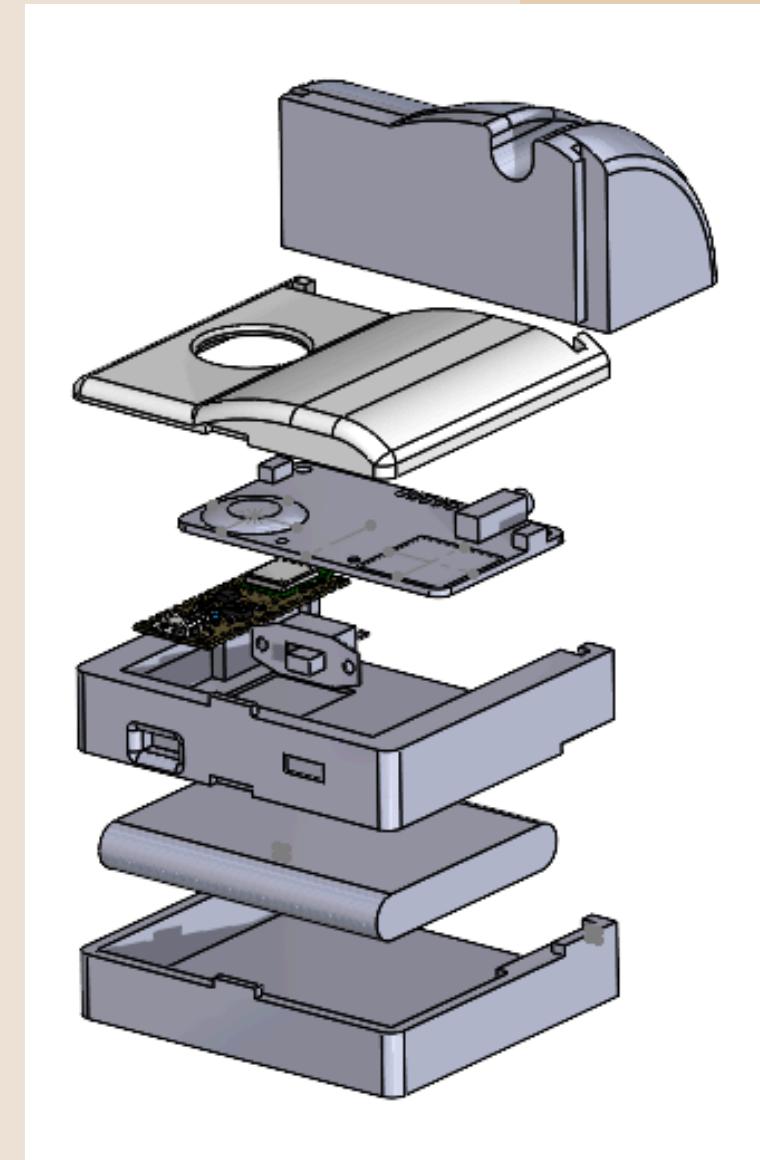
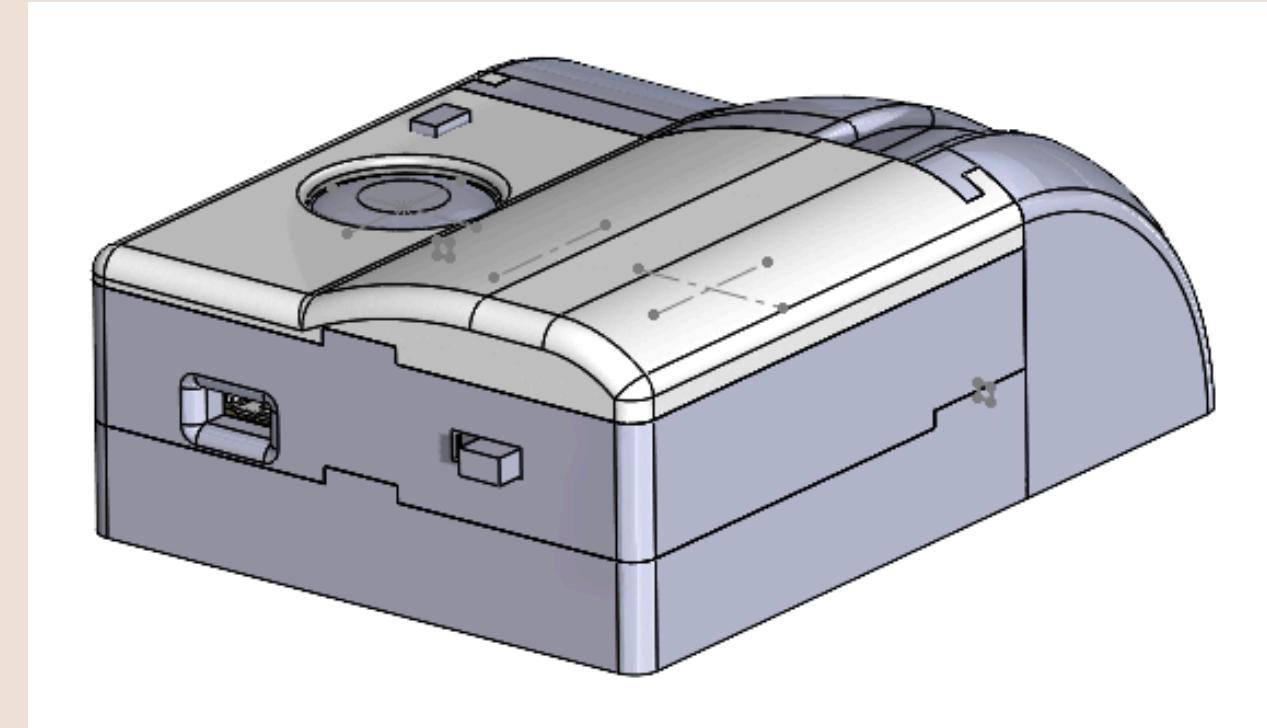
Alpha Prototype

- Dependent on reading ECG signal through fingertips through MAX86150 board
- Required both hands



Beta Design

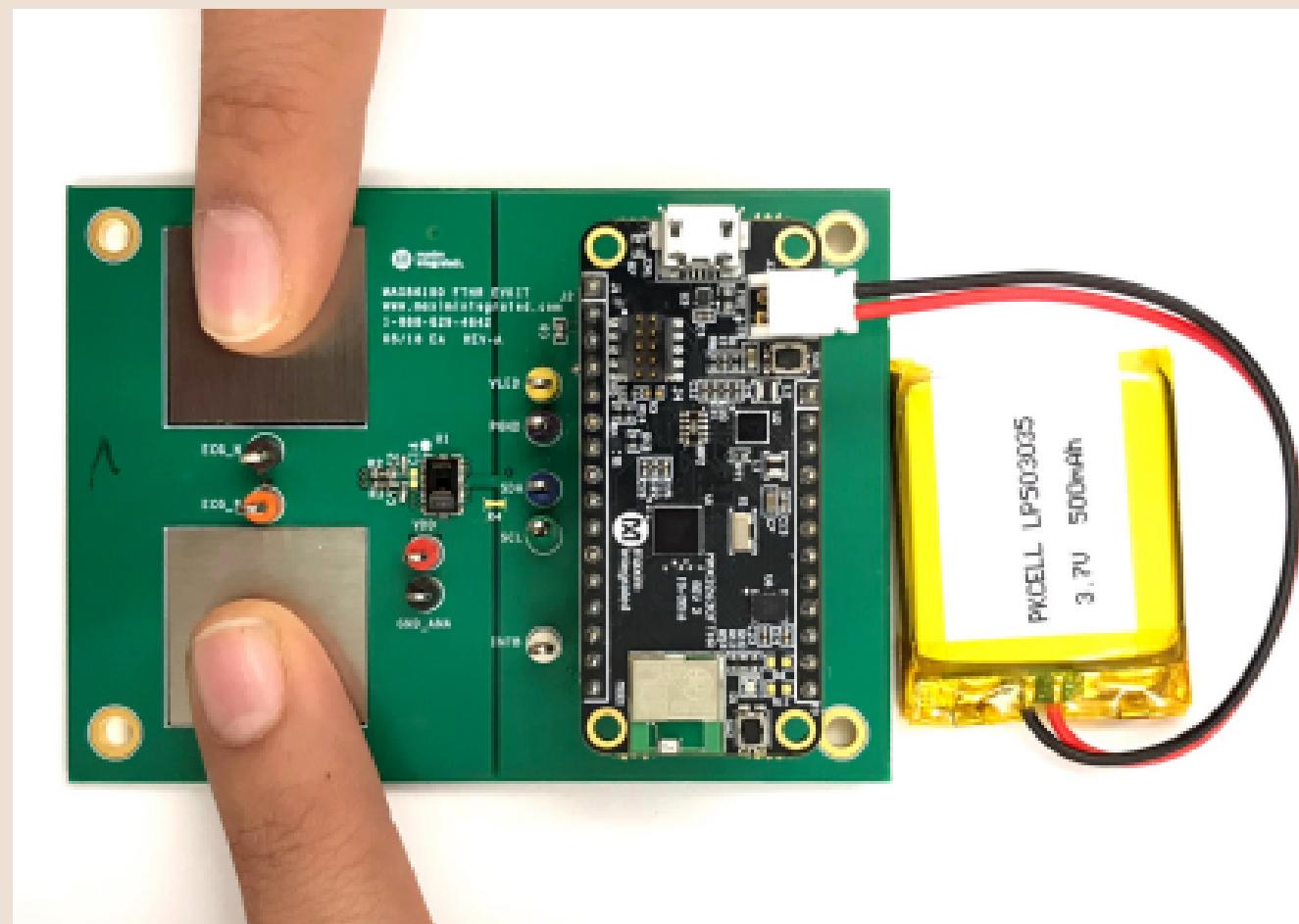
- Dependent on reading ECG through electrodes
- Only requires one hand
- Allows use of MAX86150 PPG and ECG functionality



Alpha Prototype/Beta Design - Electrical

Alpha Prototype

- MAX86150 Kit Sensor Board
- MAX32630FTHR Microcontroller Board
- 500mAh Lithium Polymer Batter
- Bluetooth receiver



Beta Design

- Arduino BLE 33
- MAX86150
- 5000mAh Li Ion Battery,

