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# Laser Target Hit Sensor

## Introduction

Using an existing product that indicates when a metal target is hit by a bullet, we are tasked with creating a device that can function with the use of a laser instead of a live fire round.

## Overview

- Determine a way to sense the light supplied by the client
- Find cheap materials that can process the light and trigger the flag module
- Solder the photodiodes and processing unit to a PCB board
- Make a full target that customers can easily use
- Keep the price of the target under $100

## Methodology
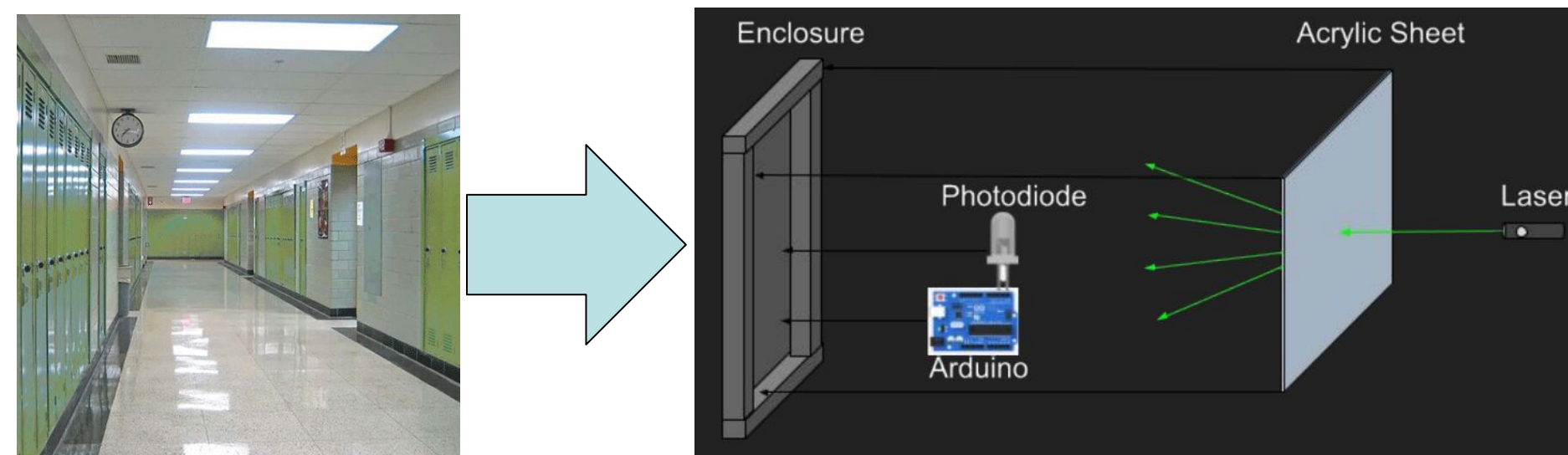


Our research process stems from how light is diffused in an ordinary building. We researched how certain materials could alter or bend light so that we could use fewer materials to sense it. Once we found a cheap and easy-to-use material, we looked for a small processing unit to power the device and run our code.

## Implementation

❑ **Technologies/Platforms**

- Integrated Flag and Central Module supplied by Client
- Used Raspberry Pi Pico as the main processing unit
- Created the main algorithm in Arduino and translated it into micro-Python
- Utilized Github to keep track of code updates
- The housing unit was 3D printed by the Client
- PCB board, photodiodes, and copper wire were soldered
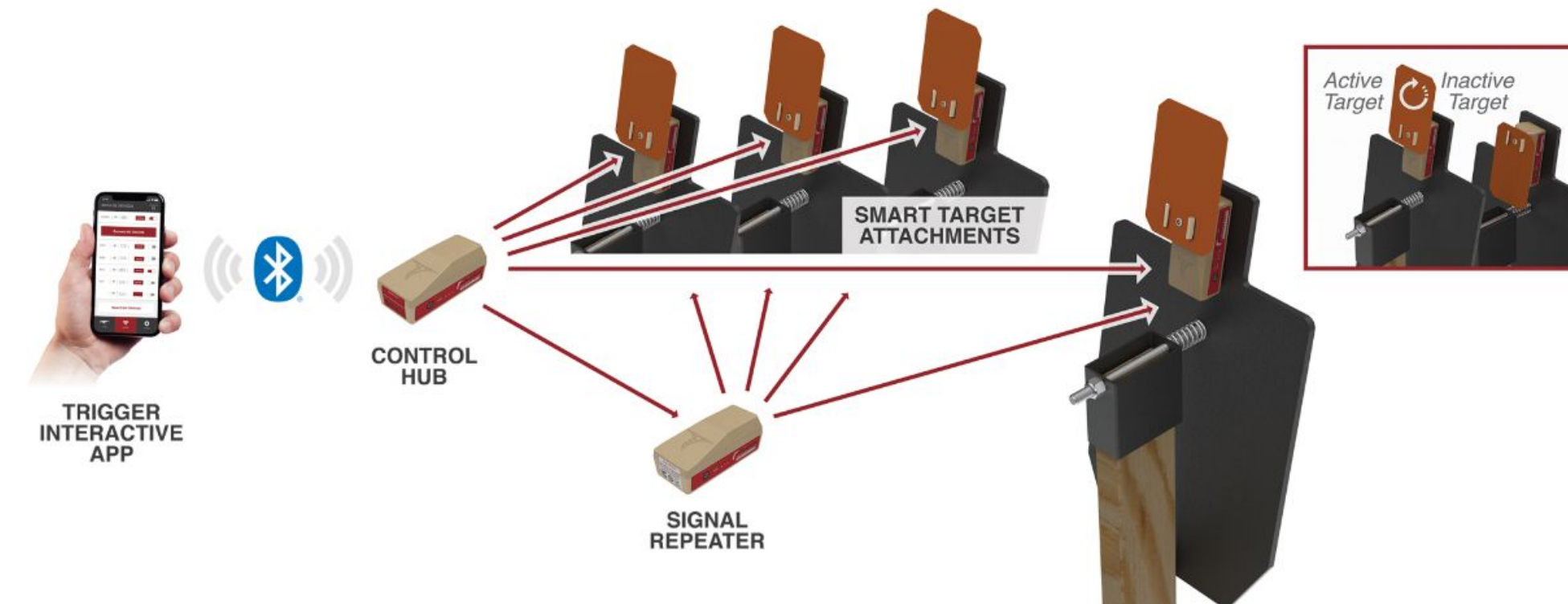


❑ **Challenges**

- Pico Power output was lower than anticipated
- Light sensor dead zones appeared in the first prototype
- Power On LED used lots of available voltage

❑ **Solutions**

- Prioritized one strong vibrating motor rather than three or more weak motors
- Reconfigured photodiode layout to cover more of the board
- Removed LED to save on power output

## Results
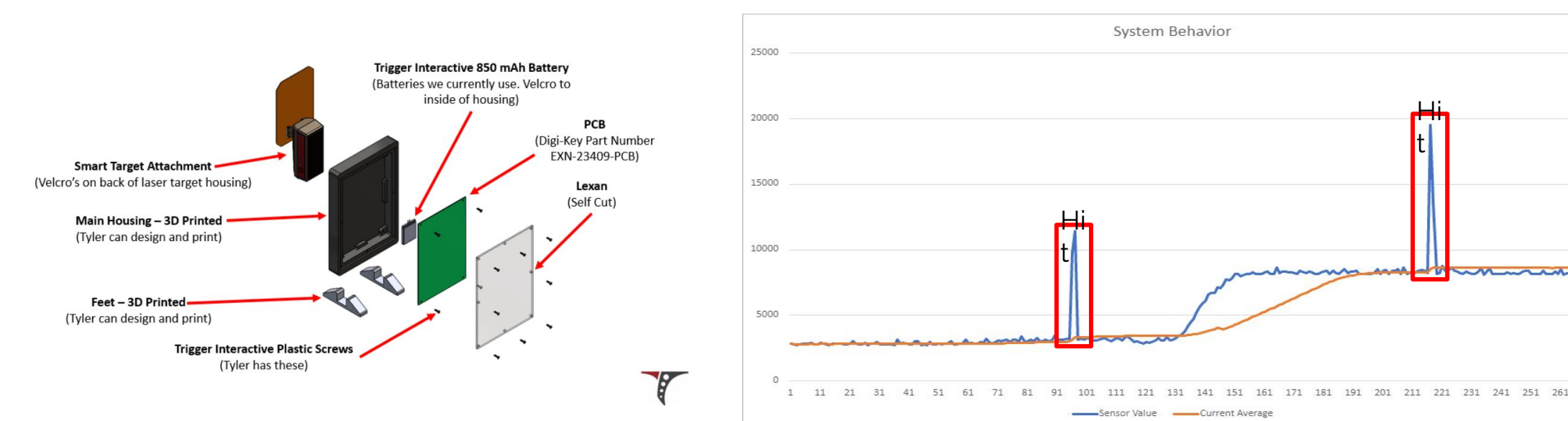


These visuals show a successfully assembled product that works as we wanted. The product can take a laser reading from any point on the face of the target and register a hit to the flag module with no problem. The device also has charging capabilities which would be very convenient for users.
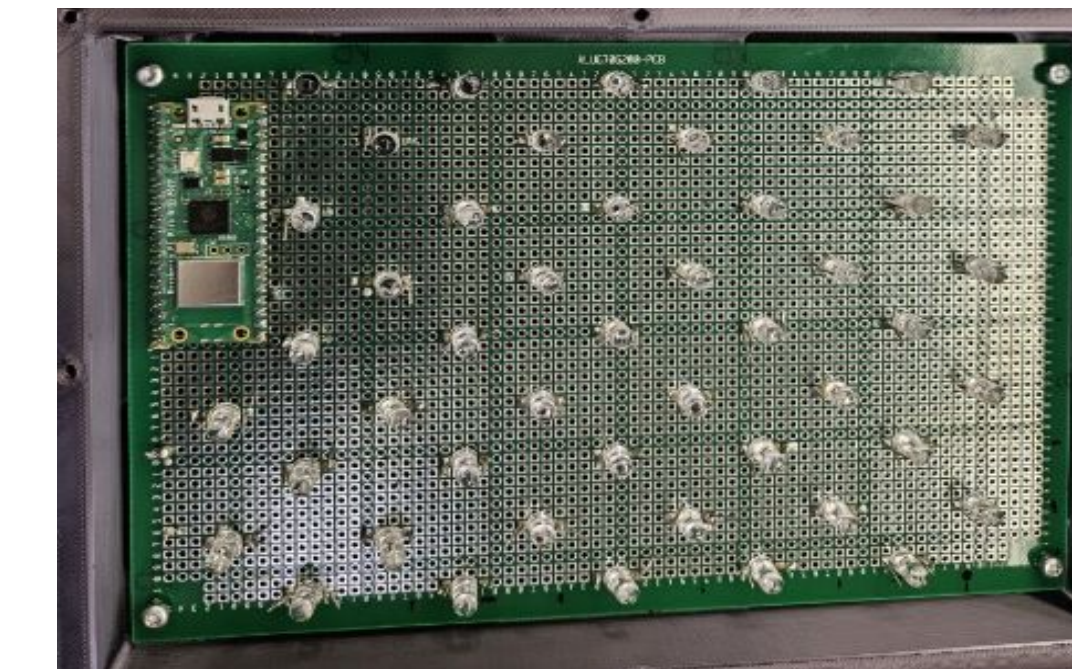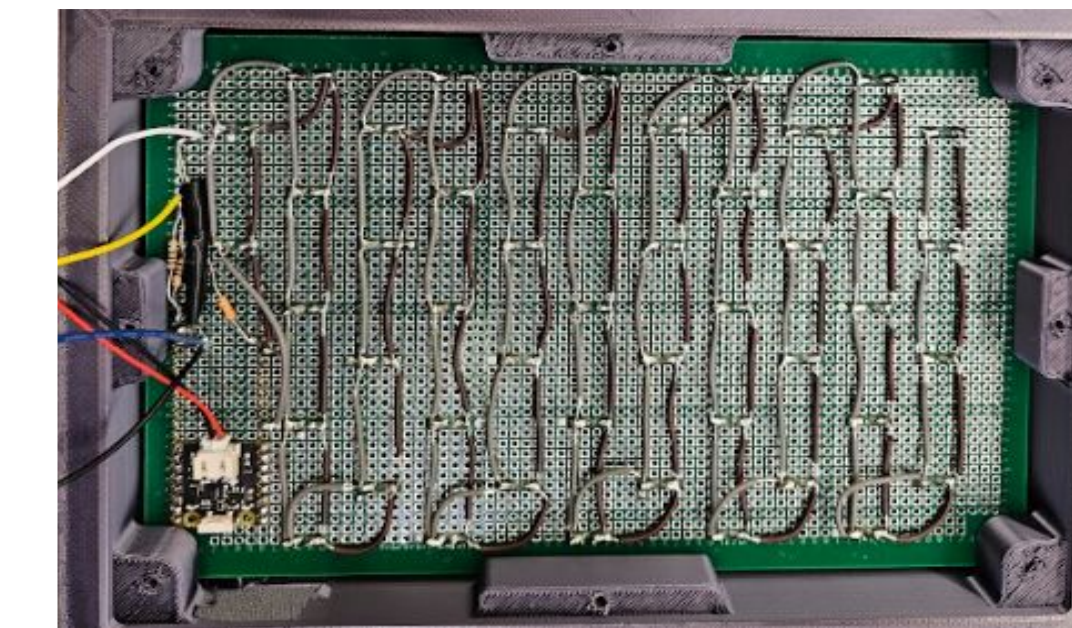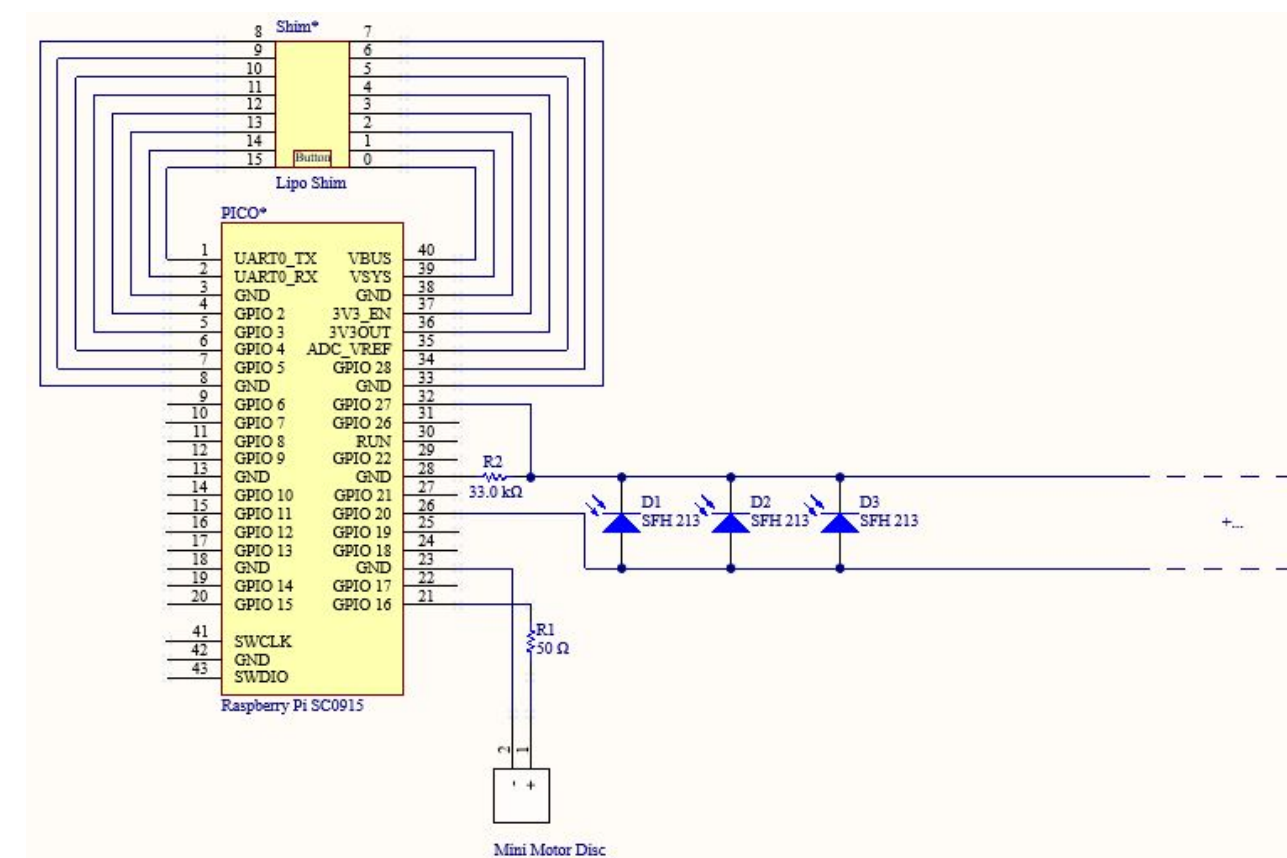




## Impact

- Users can safely practice the use of a gun wherever they choose
- Money is saved due to a bullet-free, battery powered system
- A new demographic of customers will be reached

## Conclusion

Overall, this project instructed us about product development in the industrial world. We also learned the importance of planning and teamwork when designing complex modules such as this laser receiver. Our main takeaway was learning to combine different skill sets and backgrounds and growing as a team to complete a common goal.

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