Mounting Bluetooth Switches for Easy Access in Hospital Beds

Overview
Our sponsor, David McNaughton, provided our team with a unique challenge with the project he assigned to us. This challenge was to develop a 3D printed base that could be modified based on the size of a particular Bluetooth switch. This base had to be easily affixed to a pillow or bed sheet. The ultimate goal of this project was to create an augmentative and alternative communication (AAC) system for persons who experience difficulty in using speech.

Objectives
Our team had a few objectives for our project this semester. Our objectives were to send a distress text message through Bluetooth or Wi-Fi, and to use CAD software to create a modifiable base to attach to pillows or bed sheets.

Approach
- Customer needs and requirements for device was discussed with sponsor
- A Needs-Metric’s Matrix was then created for customer needs
- Jessica Gormley, an expert in AAC, and Anthony Arnold, a patient with cerebral palsy, provided specific customer needs
- An extensive patent search was conducted after establishing key customer needs
- A concept selection chart was built to find the best device to move forward with the project, which included the Amazon button and the Huzzah button
- The Huzzah button was chosen based on its features and capabilities, along with using Wi-Fi instead of Bluetooth
- Multiple CAD models were designed for the modifiable base
- Calculations were made to find optimum battery length and spring constants
- Our results were achieved through trial and error, for the computer software team and the 3D printing team
- A final design was generated through trial and error and troubleshooting

Outcomes
The following list is a list of outcomes for this project and their implications:
- Depending on the device being compared to our Wi-Fi switch, the sponsor will save approximately $100.00 as a result of this project
- Manufacturing time is reduced substantially since our device is 3D printed. It only takes a few hours to produce compared to days with other devices
- Our team made the device wireless and portable, only allowing the device to be dependent on Wi-Fi signal