

## Meeting Minutes 9/20/17

Need to.....

- Get access to the ME capstone room
- Ask Dr. Lerner about the run time of the device
- Everyone put research in annotated bibliography form on the drive so we can all access research.

### System Level Systems

Since our device is not in existence use systems that represent it as closely as possible.

Use the following three main systems to compare to:

- Exoskeleton
  - Existing ankle exoskeleton devices
- Orthotics
  - Existing supports and braces used for similar applications as our device
- Electronics
  - Electronic systems of exoskeletons etc..

### Subsystems

- Electronics/controls:
  - Sensors
  - Microcontroller
  - Power
  - Etc
- Exoskeleton:
  - Propulsion methods (moving the foot off the ground)
  - Motor/drive system (where mechanical energy is coming from)
  - Bowden cable system ( how the cables are utilized)
- Orthotics:
  - Support of the foot
  - Attachment (of mechanical parts )
  - Comfort/interaction with the body

Customer Requirements:

- Bowden cable system
- Attachment to calf
- Interface with the foot

- Scalable for foot sizes
- Adjustable for different severity levels
- Easy on/off
- Uses a torque sensor
- Uniform weight distribution on bottom of foot
- Soft interaction between the foot and the floor
- Light weight
- Sense force
- Works on children ages 5-12
- Works on mild cases of quiniens gate in CP patients
- Safe
- Reasonable run time

### Engineering Requirements

- Actuated ankle motion of 25-30 degrees
- Static ankle adjustment 0-30 degrees
- Light weight (entire system 0.5kg)
- Easy on/off (only one mode of securing. i.e. Velcro, zipper, laces...)
- 10-15N of propulsion provided from the device to the ground
- Sensor accuracy 10-20%
- Run time 2 hours
- Motor/actuator force provided through cables ....(needs to eventually give 10-15N of propulsion)
- Power supply (to be determined)
- For foot sizes (age range 5-12 years old)

Black box model – see scanned document.

### To Do by Monday:

- Project description, schedule, and budget section write up (Hannah)
- Research of orthotics systems and subsystems(Hannah)
- Functional Decomposition diagram draft and section write up (Azalea)
- Customer and engineering requirements, and draft of QFD (Brandon)
- Research section write up (Ethan)
- Exoskeleton and electronics systems and subsystems research and write up (Robert)
- Whole group review functional diagram
- Whole group fill out QFD