

### **Team Meeting #12 Agenda, 11/17/20**

- Discuss Portfolio Review Form
  - Deliverables in DVP?
  - Short write-ups on project learning topics
    - 2 or 3 short ones per member by the end of the semester
  - Project schedule detail
  - Good agendas and meeting details
  - Wiki draft Hiller details
  - Design Solution -> better representation and CAD files
  - Track user manuals for prototyping components
- Overall areas of improvement
  - Project Learning
  - Design Solution
  - References
- Continue prototyping
  - Discuss solenoid pulling power and implementation
  - Handle fabrication
  - Component incorporation

### **Team Meeting #12 Minutes, 11/17/20**

- Project Learning Write-ups
  - Summarize what we have learned in research, screenshots are good with explanations as well
- Project Schedule updates for portfolio
  - Increase focus on deliverables, testing; break large goals and deadlines into smaller, trackable goals
    - These could include: Part assembly
    - Part purchase
    - Go beyond showing up to meetings
    - Add detail in 1-month chunks
  - Get everyone involved in attaining the goals
- Wiki-page details for portfolio
  - The Wiki page has plenty of detail right now
  - We should run a few questions by Dr. Hiller regarding use of his name and details on patient outcomes during our next client meeting
  - We should keep a few markers for future expansion
  - Keep polished, but in progress
- Design Solution for portfolio
  - Incorporate better CAD files into the final design, be sure to tie components into the larger picture
  - Polish our schematics before uploading
  - Write up specifics regarding specifications and design goals
  - Add more than PPT presentations
- References for portfolio
  - Add manuals and spec sheets for the parts we are prototyping with
- **Next Client Meeting -> 11/19/20**
  - Update Dr. Hiller on progress
  - Ask Wiki page questions

- Prototyping
  - Solenoid is underpowered on 3.3V circuit
    - Discussed moving to 5V circuit on Arduino, as well as wiring in parallel with motor control off of 11.1V power supply and controlling via MOSFET semiconductor with Arduino
    - Multiple solenoids would likely work with this solution as well
  - Details from testing/prototyping
    - Old motor testbed worked for empirically determining force needed to actuate motor output shaft forward and backward with square drive interface
      - ~60g at low power, scaling to ~100g at full power
      - Our solenoid is rated for 250g, and should work well
    - A device limitation was discovered
      - All shaft actuation components need to be in alignment with motor for effective testing
      - The key mechanism places a moment on the output shaft, causing vibration
      - To solve this, we proposed creating a shaft that uses two solenoids on each side of the shaft to pull the actuator backwards simultaneously and create a net zero moment
    - Scaled 3D parts needed to be sanded to fit together, reducing alignment of shaft
    - Test of mechanism was successful, next steps will include incorporating multiple solenoids into actuation mechanism and ensuring enough power exists to run simultaneously
- Action Items
  - Jett will work on incorporating the MOSFET solenoid control into our motor circuit for total circuit control
  - Lucas will make necessary budget adjustments
  - Maclean will work on finding the most powerful solenoids he can with a small footprint, and ensure that they have output shafts that are locked to the solenoid body
  - Ryan will begin preparing the CAD handle for 3D printing, as well as testbed modifications for solenoids, motor, and potentiometer