Report (Hand Model)

ABSTRACT:

I modeled a hand prototype on SOLIDWORKS 2023 using the research that was provided to me. I followed the steps of the videos on the research, and was able to replicate Automation Engineer's work and completely model a robotic hand. As I followed the steps, I learned how to blend in SOLIDWORKS, as well as how to program different parts in an assembly to move around using SOLIDWORKS Motion. I did make some mistakes and decided to deviate from their instructions at times, but I will fix it and improve upon what I was able to model, as well as request any specific modifications to the design to best fit the overall project.

INTRODUCTION:

I was asked by the Electronic Arm team to help design a hand mold for them. Upon inspecting their research, I found a set of YouTube videos that were a step-by-step manual on how to model a hand from scratch. I followed these instructions and was able to learn many aspects of CAD, produce a working prototype, and understand new tricks that the author of the videos used to replicate his own work and shorten time and increase efficiency.

I learned that, using a couple of parts for one finger, I could model the same component for other fingers if I just adjust the dimensions for the new component and save the part as another part. Images (1) and (2) demonstrate the same component for different fingers. As shown, they seem identical, and yet, when measured, they are not the same height, thus proving how useful it is to modify already existing parts and copy them into a new and different part for something else.

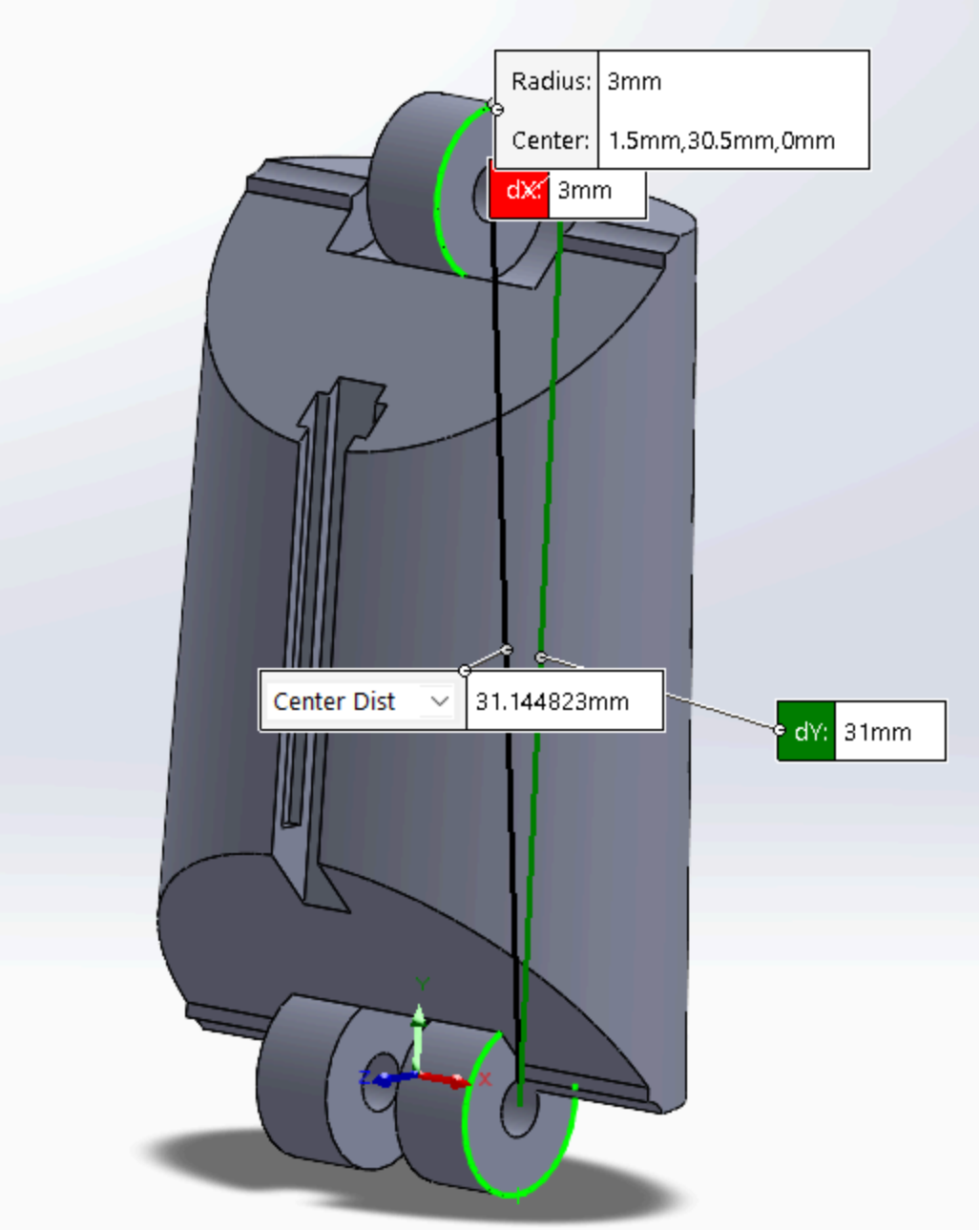

Image (1): Part 1 of Middle Finger

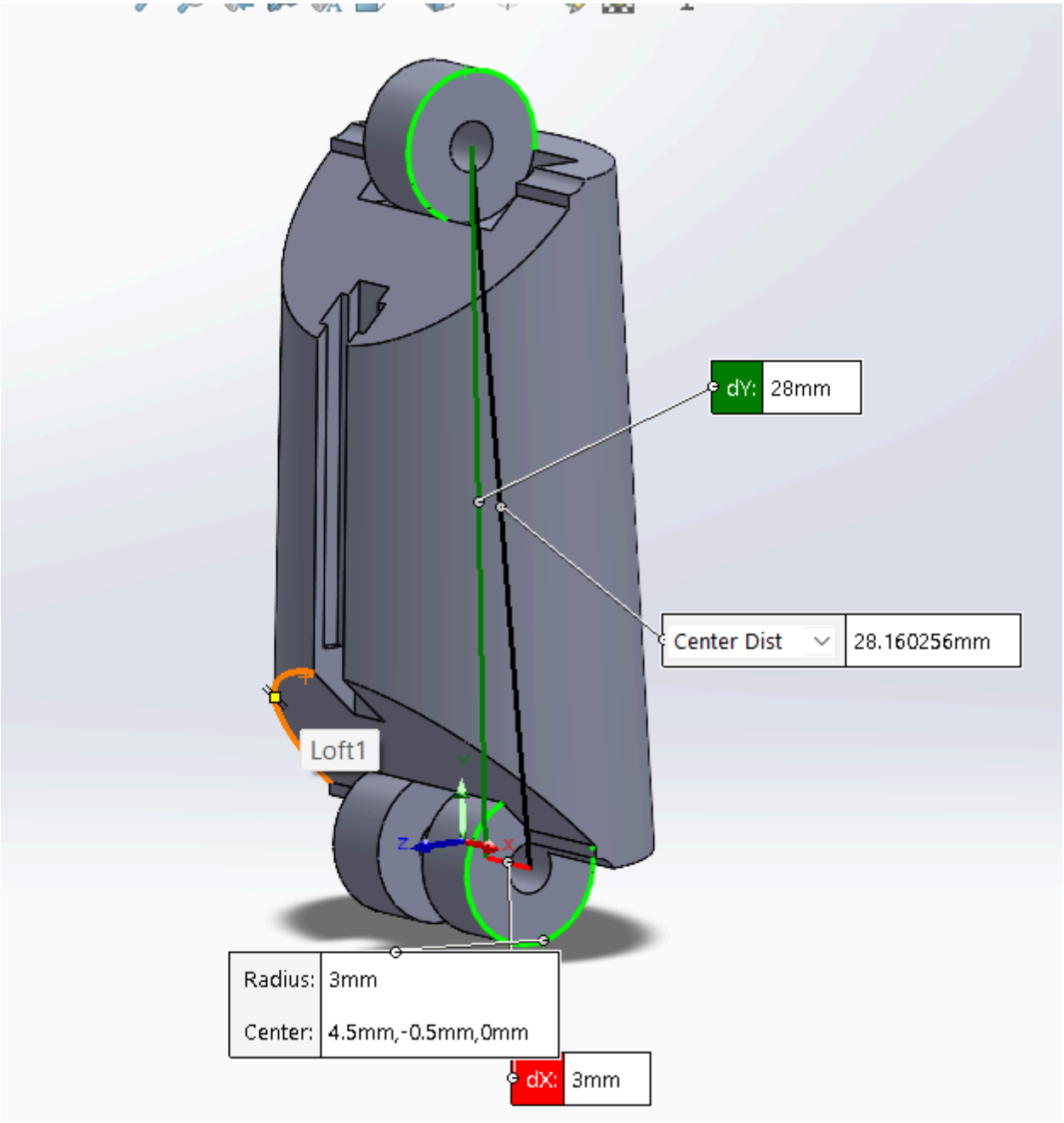

Image (2): Part 1 of Pinky Finger

Although I decided to not use the SOLIDWORKS Motion software (3), I nevertheless found it new and useful for future projects.

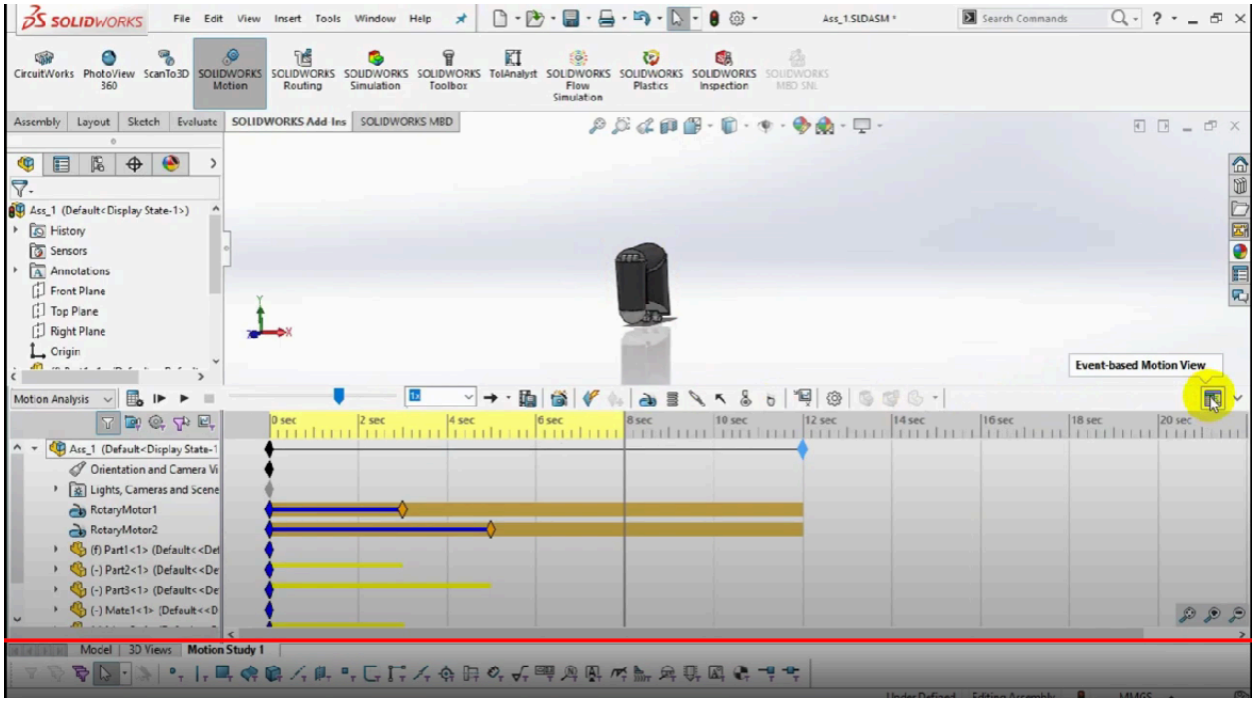

Image (3): Screenshot of the SOLIDWORKS Motion software being used by Automation Engineer

RESEARCH:

- Automation Engineer: https://www.youtube.com/watch?v=eOz5WrfFSvI&list=PLPE6SxiX3tFlu7DIgrNp9rpRh4uXIouPx

CONCLUSION:

I was able to model all 5 fingers, the metal bars necessary to connect the joints, and the hand that connects to the fingers (4). I did notice that I made a mistake in the thumb, which is extruding into the inside of the palm (5). There were many situations where his older version caused him issues for his CAD, and many of the sketches weren't completely constrained/dimensioned (6), but still made the parts work. I decided to follow suit and it worked fine. I hope that there isn't a huge issue when it comes to printing the 1st prototype.

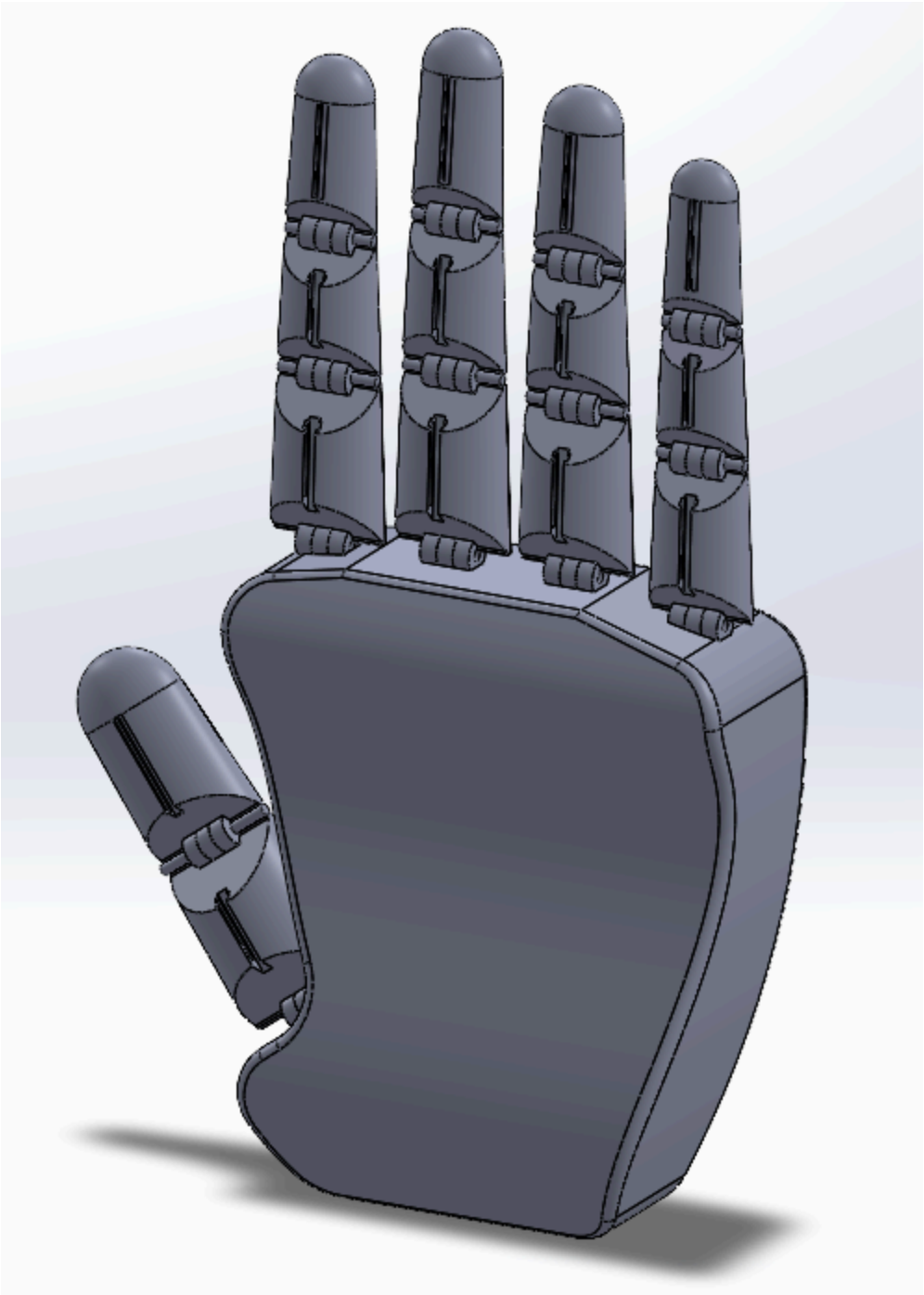

Image (4): Assembly of Fingers mated to the Hand part

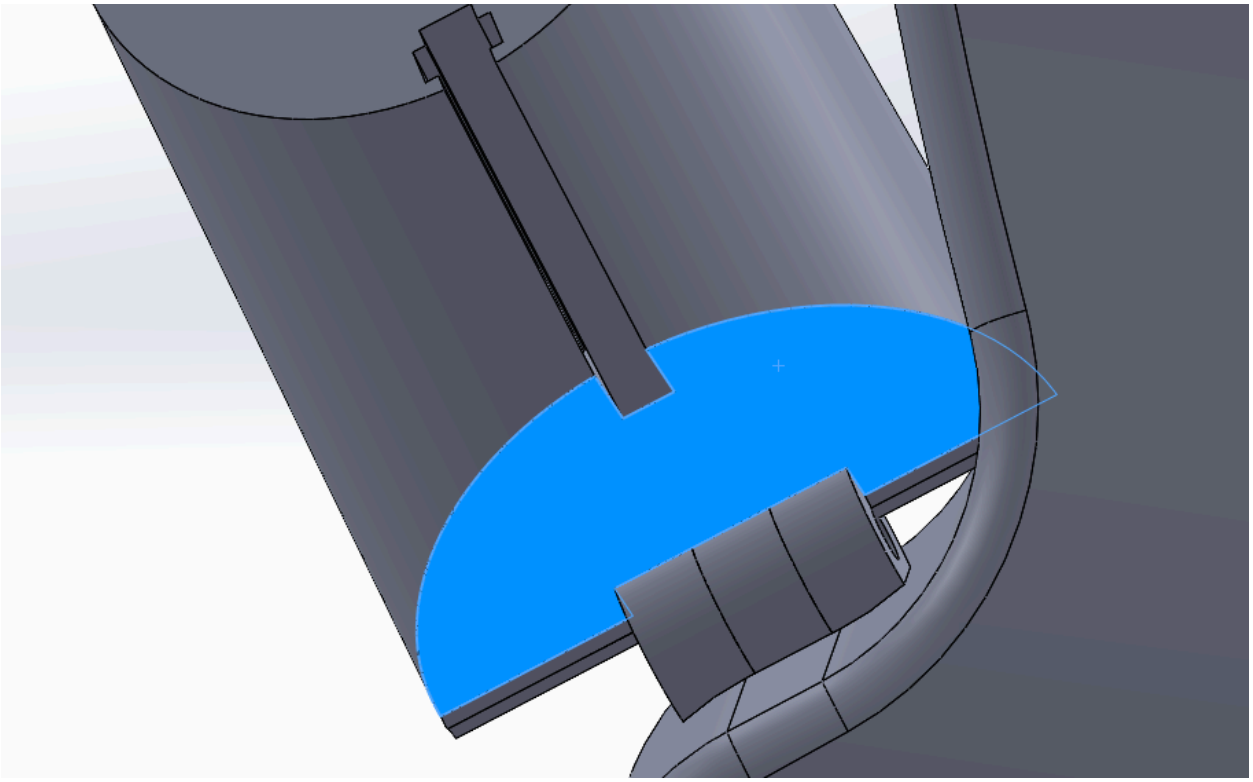

Image (5): Part of the Thumb assembly is extruding into the Hand part

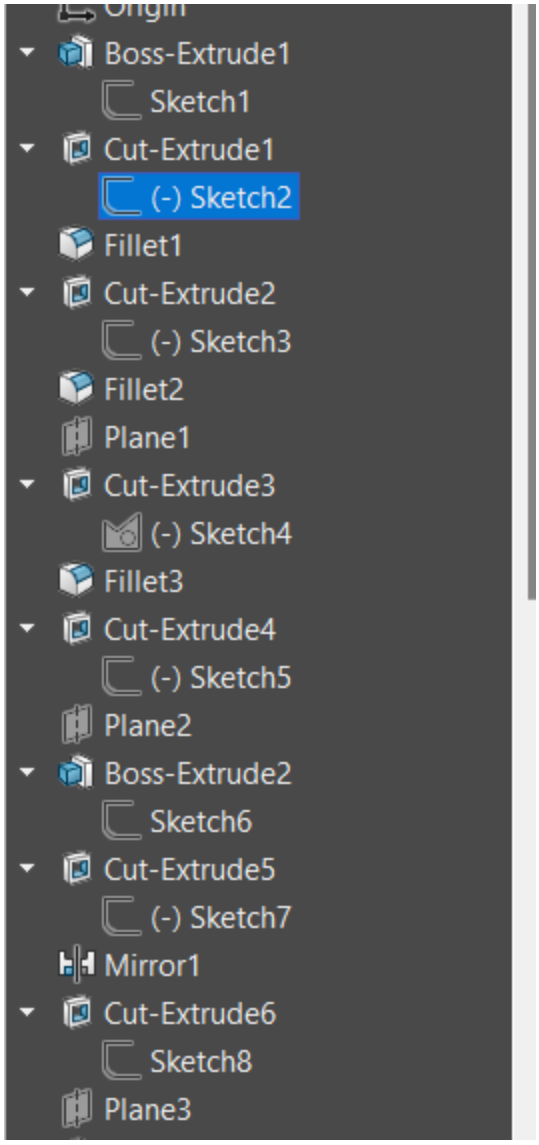

Image (6): Hand part Modeling Tree used as an example to indicate that many sketches aren't fully constrained/dimensioned

FUTURE WORK:

I plan to further my assistance to the Electronic Arm team by helping redesign the hand mold to fit the required standards for the rest of the prosthesis. I will also fix the minor mistake on the thumb by either cutting a small portion of the thumb or by remodeling the hand to fit the thumb in that place.