

CURRENT HARDWARE BUILD

PI I: Robotic Arm Exoskeleton

Colin Cipolla

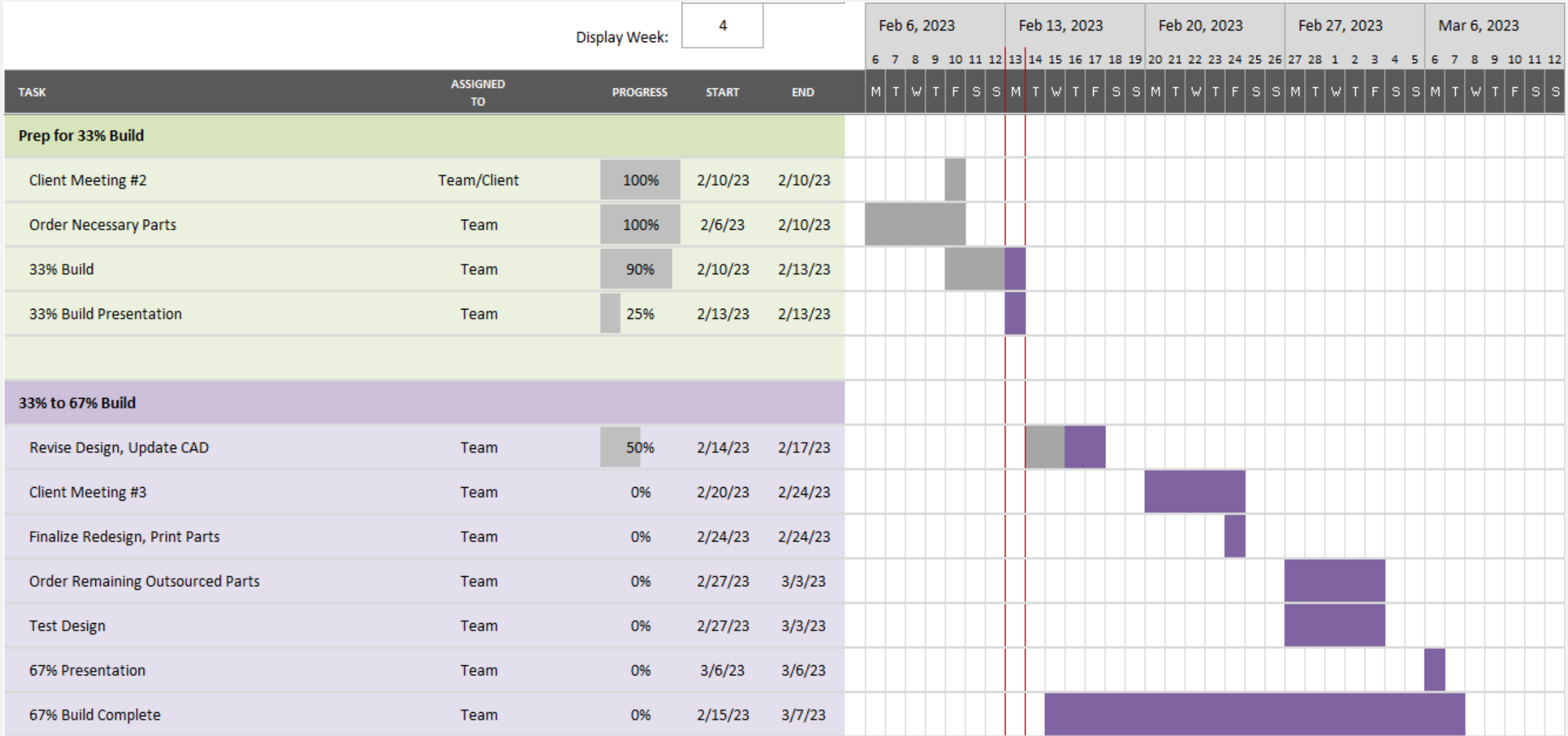
Jordan Finger

Dylan Kurz

Michael Marchica

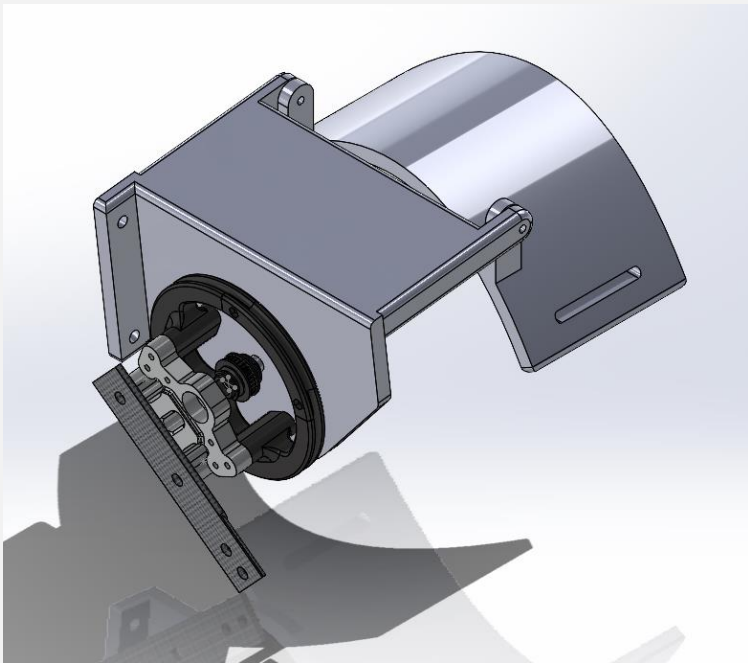
Michael George

GANTT CHART UPDATE

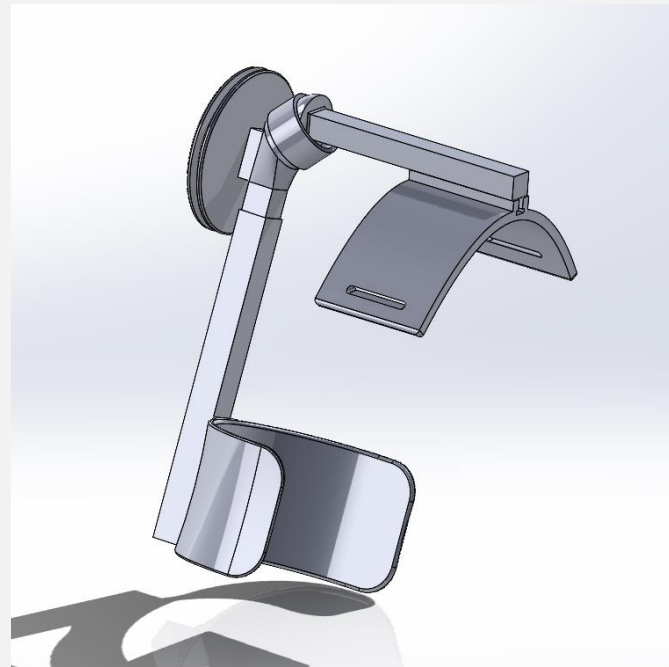


DESIGN PROGRESSION

Fall 2022 Prototype



First Ball and Socket Design

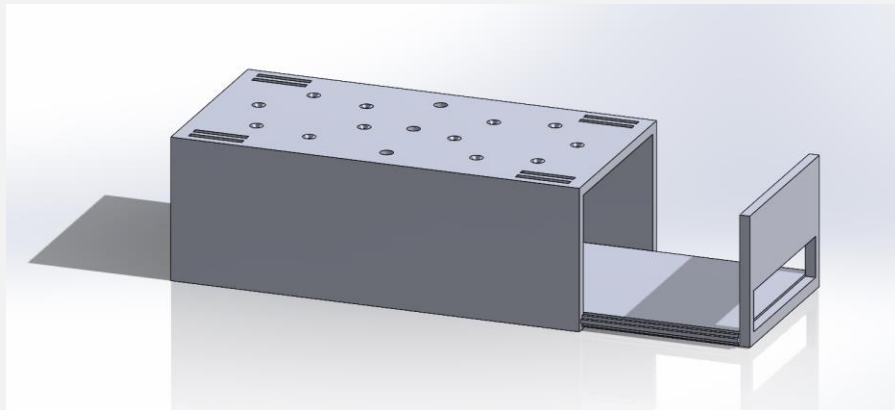


Current Ball and Socket

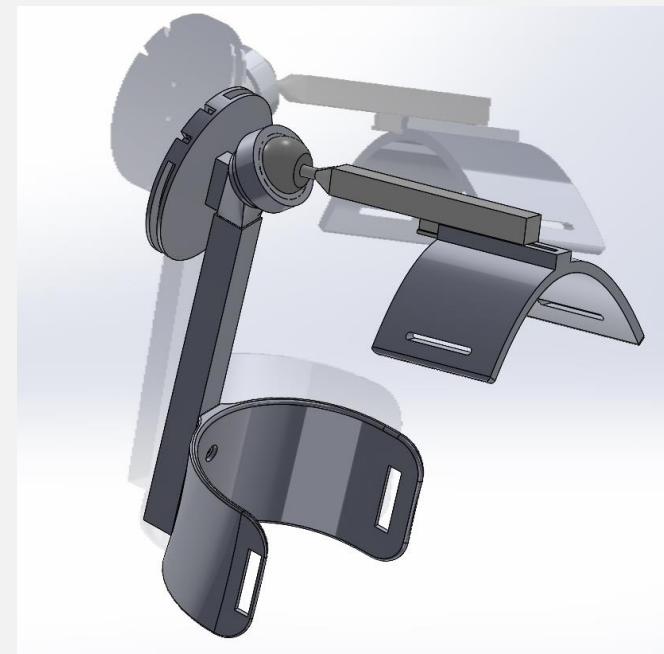


CURRENT CAD MODELS

Motor Mount

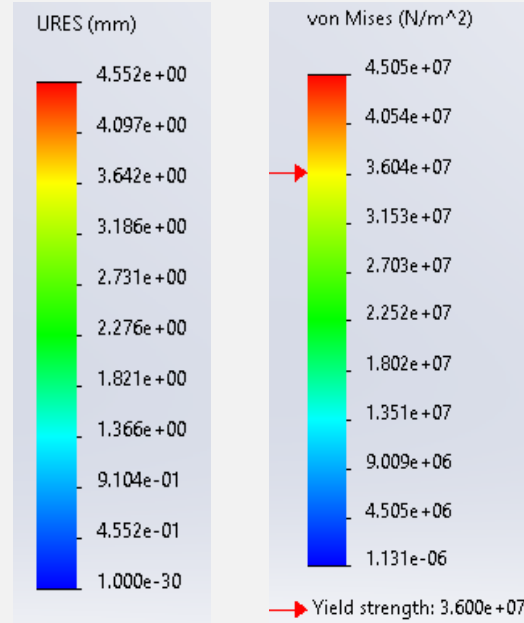


Ball & Socket Assembly

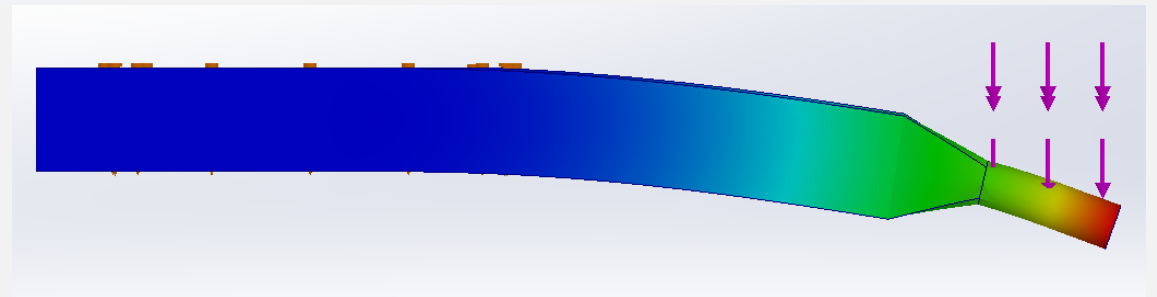


FEA

- Most vulnerable component is the shoulder bar.
- Assuming all 120N of force from the motor is transferred into the part which gives an over-estimation.
- As expected the critical point will not withstand the forces



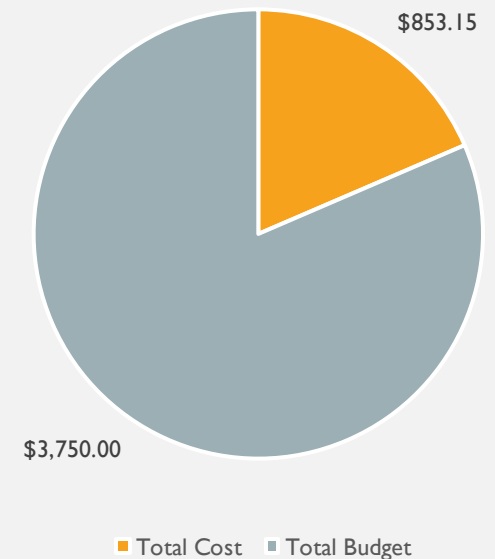
Property	Value	Units
Elastic Modulus	2400000000	N/m ²
Poisson's Ratio	0.35	N/A
Shear Modulus	318900000	N/m ²
Mass Density	1200	kg/m ³
Tensile Strength		N/m ²
Compressive Strength		N/m ²
Yield Strength	36000000	N/m ²



PURCHASING PLAN

Bill of Materials:	Quantity:	Vendor/Manufacturer:	Part Status:	Total Cost:
Shoulder Plate	1	Manufactured Team	Finalizing Design	\$2.25
Socket Joint	1	Manufactured BIO Mechatronics Lab	Finalizing Design	\$41.04
Large Pulley	1	Manufactured BIO Mechatronics Lab	Finalizing Design	\$8.00
Large Pulley Bridge	1	Manufactured BIO Mechatronics Lab	Finalizing Design	\$1.00
Ball Joint Bar	1	Manufactured BIO Mechatronics Lab	Redesigning	\$11.13
Ball Joint	1	Manufactured BIO Mechatronics Lab	Finalizing Design	\$1.34
Motot Mount Box Lid	1	Manufactured Team	Finalizing Design	\$2.31
Motor Mount Box	1	Manufactured Team	Completed	\$6.75
Bicep Cuff	1	Manufactured Team	Completed	\$1.83
Bicep Mount Upper	1	Manufactured BIO Mechatronics Lab	Waiting on BIO MECH	\$1.00
Bicep Mount Lower	1	Manufactured BIO Mechatronics Lab	Waiting on BIO MECH	\$1.00
Harness System	1	Modified Amazon	Delivered	\$34.00
Strapping 10 Yard	1	Modified Amazon	Delivered	\$12.16
Motors AK 60-6	2	Buy-Out T-Motor	Delivered	\$599.00
Bowden Cables 5'	4	Buy-Out Absolute Bikes	Delivered	\$43.00
6-32 x1in Bolts	8	Buy-Out The Home Depot	Delivered	\$1.38
6-32 Nut	8	Buy-Out The Home Depot	Delivered	\$1.38
#6 Washers	12	Buy-Out The Home Depot	Delivered	\$1.38
6-32 Nylock Nuts	4	Buy-Out The Home Depot	Delivered	\$1.38
4-1 1/2 Sheet Metal Screws	4	Buy-Out The Home Depot	Delivered	\$1.38
8-32 x 1 1/2 Bolts	8	Buy-Out The Home Depot	Delivered	\$1.38
8-32 x 1 Bolts	8	Buy-Out The Home Depot	Delivered	\$1.38
8-32 Nuts	4	Buy-Out The Home Depot	Delivered	\$1.38
8-32 Nylock	4	Buy-Out The Home Depot	Delivered	\$1.38
#8 Washers	12	Buy-Out The Home Depot	Delivered	\$1.38
Shoulder Tube	2	Buy-Out dragonplate.com	Unpurchased	\$73.54
Total Cost of Prototype:				\$853.15

Budget Utilization



MANUFACTURING PLAN

- Currently Manufactured -
 - Ball and socket shoulder joint
 - Sliding shoulder plate
 - Bicep cuff
 - Motor mount
 - Harness
- In Progress -
 - Bowden cable routing
 - Motor attachment
- Yet to be started -
 - Additional shoulder pivot joint
 - Battery location and housing

Shoulder Plate	1	Manufactured	Team
Socket Joint	1	Manufactured	BIO Mechatronics Lab
Large Pulley	1	Manufactured	BIO Mechatronics Lab
Large Pulley Bridge	1	Manufactured	BIO Mechatronics Lab
Ball Joint Bar	1	Manufactured	BIO Mechatronics Lab
Ball Joint	1	Manufactured	BIO Mechatronics Lab
Motor Mount Box Lid	1	Manufactured	Team
Motor Mount Box	1	Manufactured	Team
Bicep Cuff	1	Manufactured	Team
Bicep Mount Upper	1	Manufactured	BIO Mechatronics Lab
Bicep Mount Lower	1	Manufactured	BIO Mechatronics Lab

DEMONSTRATION