

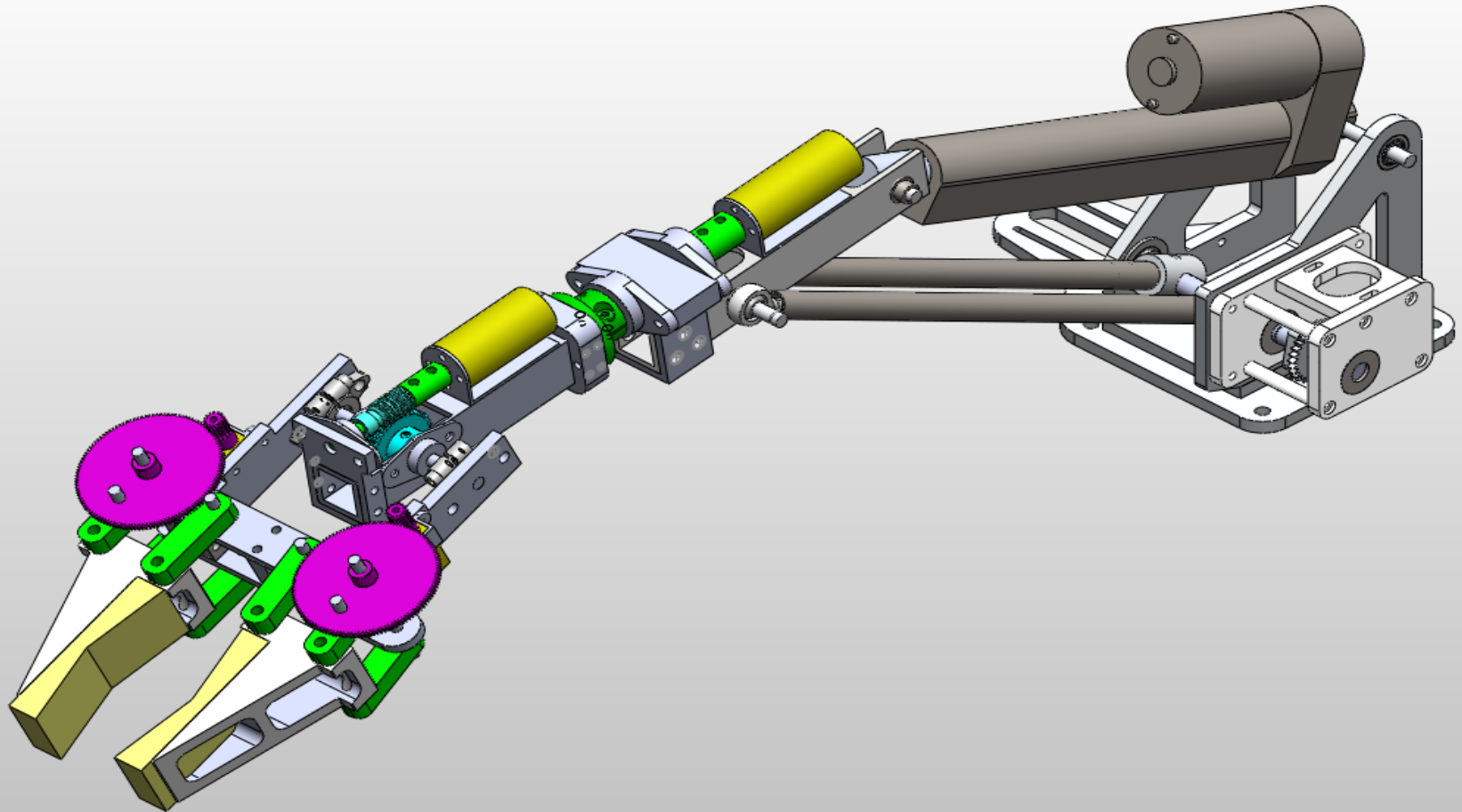


ROVER
MICHIGAN MARS ROVER TEAM

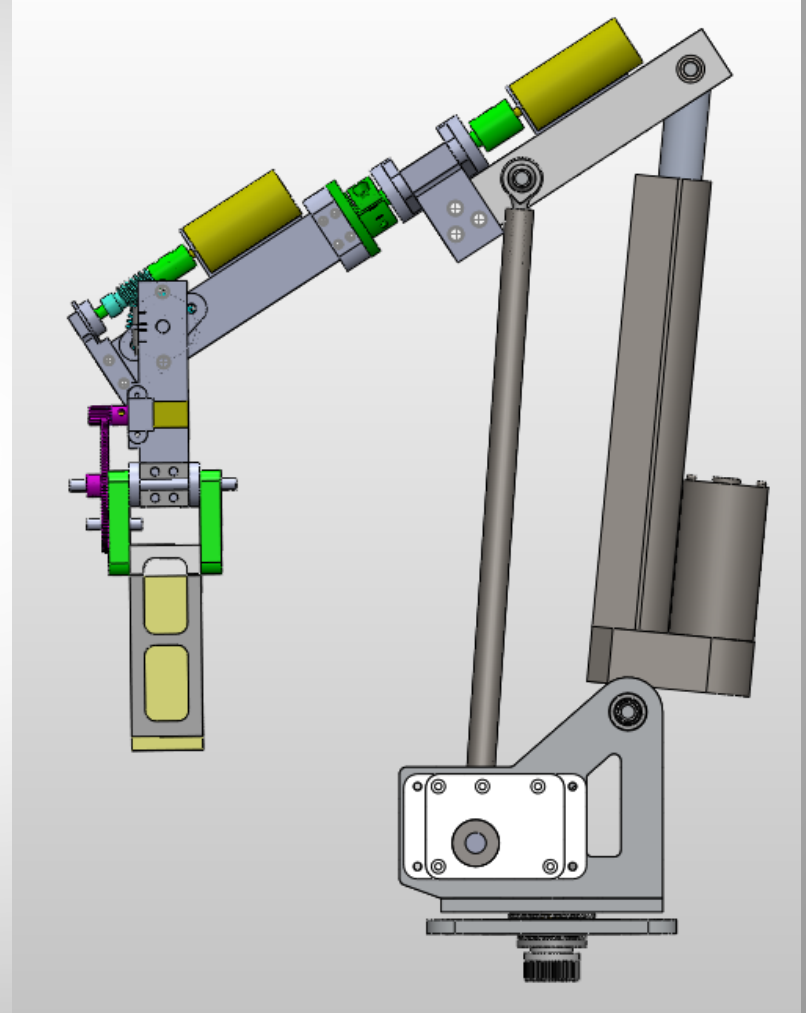
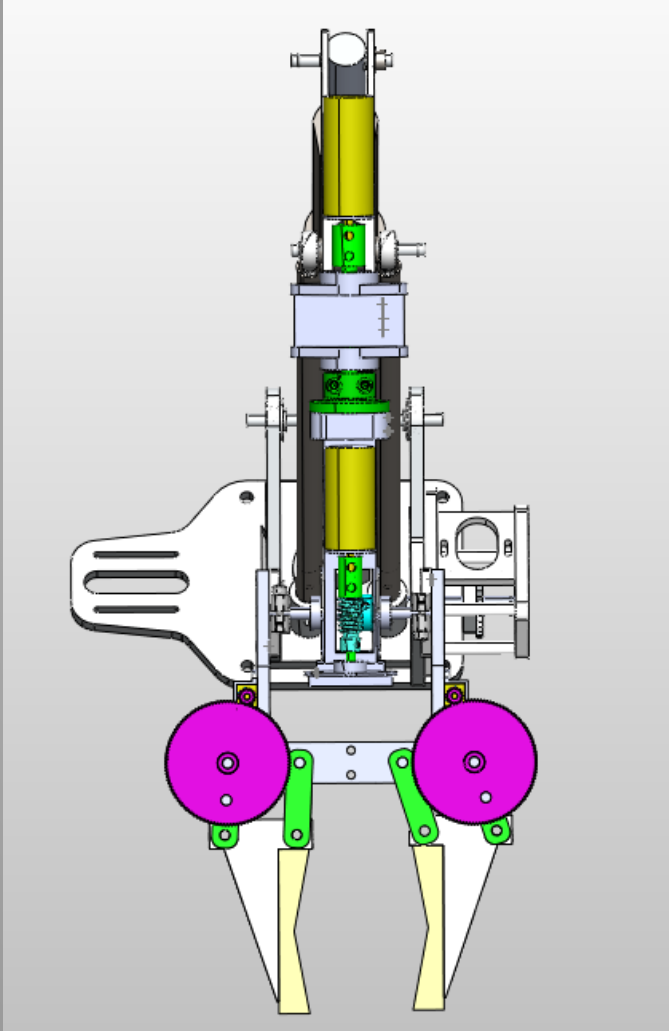
ROBOTIC ARM

Fangzhou Xia, Scott Briggs, Xingjian Lai

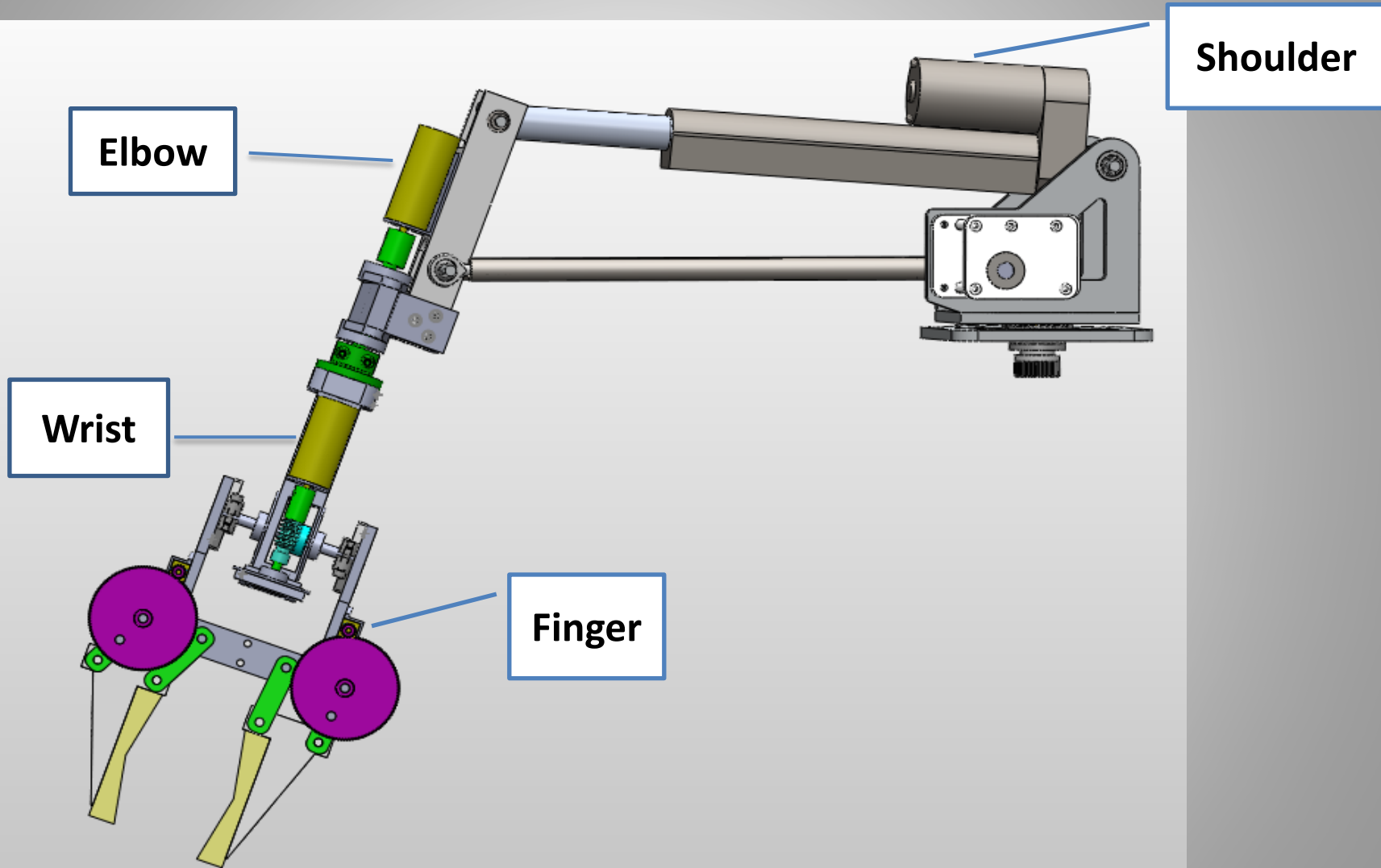
Design Overview



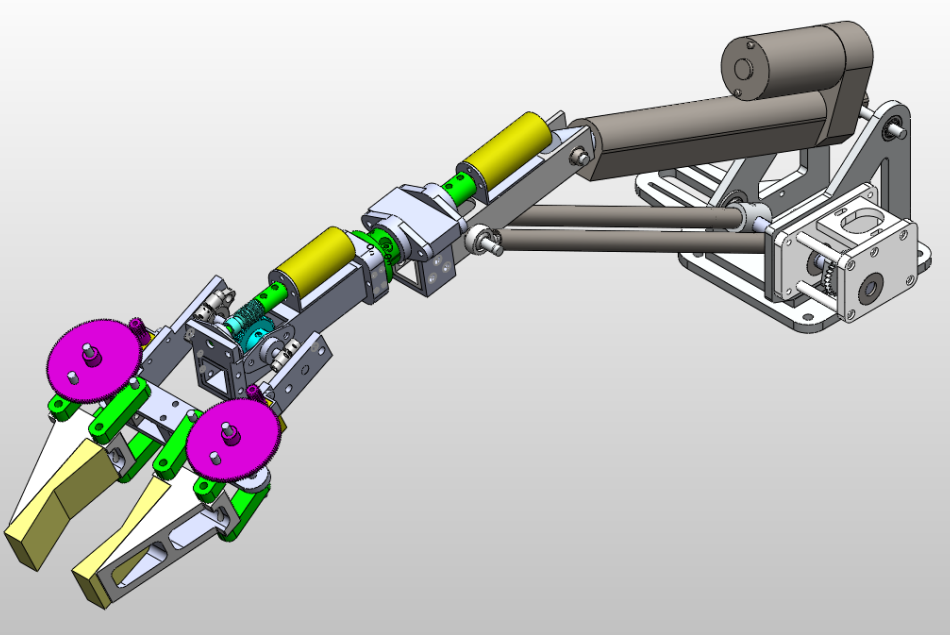
Front and Side View



Nomenclature



Loading Analysis



Expected Maximum Load:
 $5\text{kg} = 176.36981\text{ oz.}$

Structure Estimated Weight
 $3.285\text{ kg} = 115.87\text{ oz.}$

Loading Analysis

Parts	Gear Ratio	Stall Torque (oz-in.)	Estimated Torque (oz.-in.)
Finger	8:1 * 1000:1	1000	614
Wrist	30:1 * 34:1	1800	1068
Elbow	499:1	300	0 (normal use)
Shoulder	30:1 * 133:1	7500	4051

Cost Estimation

A	B	C	D	E	F	G
Parts	Module	Link	Price Floor	Price Ceiling	No	
Elbow Motor	1591-499:1	http://www.pololu.com/product/1591	19.95	19.95	1	19.95
Elbow and Wrist Motor Bracket	1569	http://www.pololu.com/product/1569	6.33	7.45	2	14.9
Wrist Motor	1591-34	http://www.pololu.com/product/1591	19.95	19.95	1	19.95
Finger Motor	1596-1000:1	http://www.pololu.com/product/1596	22.95	22.95	2	45.9
Finger Motor Bracket	989	http://www.pololu.com/product/989	4.99	4.99	2	9.98
Elbow Shaft Coupling	A 5X 9M0408	https://sdp-si.com/eStore/Catalog#	4.66	8.94	1	8.94
Elbow Bearing	A 7Z26MFB0811	https://sdp-si.com/eStore/Catalog#	8.78	11.91	2	23.82
Elbow Shaft Suupport	8mm	orySpec=00000028945%3A%3A8%0900000028946%	TBD	TBD	1	20
Worm Gear	A 1P 6MYK08R040	https://sdp-si.com/eStore/Catalog#	15.94	22.1	1	22.1
Worm	A 1Y 5MYK08RA	https://sdp-si.com/eStore/Catalog#	6.28	13.44	1	13.44
Worm Shaft Bearing	A 7Z58MBFM005L	https://sdp-si.com/eStore/Catalog#	5.54	7.52	1	7.52
Wrist Shaft Coupling	S51CBYM040050	https://sdp-si.com/eStore/Catalog#	7.1	9.63	1	9.63
Wrist Bearing	A 7Z58MBFM006L	https://sdp-si.com/eStore/Catalog#	5.54	7.52	2	15.04
Wrist Shaft Support	6mm	vona2/detail/110300013850/?Inch=0&CategorySpec=C	TBD	TBD	2	30
Wrist Motor Gear	A 1B 8MYK05015	https://sdp-si.com/eStore/Catalog#	6.66	9.24	2	18.48
Finger Gear	S10T05M120A0305	https://sdp-si.com/eStore/Catalog#	21.12	28	2	56
						335.65

Estimated Parts Cost Without Raw Aluminum and Controller: \$335.65

Q & A

THANK YOU!

