	Project Name			Northrop Grumman Handling Arm						
	Team			Team 18F10: Keven Benavente, Rayne Dobson, Savannah Hillebrand, David McNealy, Sami Scarcello, Tyler Schafer						
	Vendor	Part #	Part Name	Vendor Part #	Qty	Description	Material	Dimensions	Cost per unit (\$)	Total Cost (\$)
	Metals Depot	17, 18, 22	Joints	SQ 42	1	Joints to link arms	304 Stainless Steel	2" x 2" x 12"	\$197.00	\$197.00
		5,7	Sleeve, Ring	SQ 44	1	Sleeve and rings for vertical tube	304 Stainless Steel	4" x 4" x 12"	\$788.68	\$788.68
		16, 21	Links	SQ 43	2	2 vertical links	304 Stainless Steel	3" x 3" x 24"	\$479.45	\$958.90
		23	Bolt Pattern Plate	P514	1	Bolt pattern head attachment	304 Stainless Steel	13.75" x 7" x .25"	\$40.38	\$40.38
		4	Vertical Tube	T411410	1	Tube to attach to links	304 Stainless Steel	1.25" x .109" x 24"	\$25.20	\$50.40
		2	Clamp Disk	P514	2	Disks that clamp onto table	304 Stainless Steel	0.25" x 1.5" x 3"	\$9.96	\$19.92
		9, 11, 12	Worm Gear, Sleeve Clamp Screw, Sleeve Clamp Crank	SQ 412	1	Worm Gear for Rack and Pinon	304 Stainless Steel	2" x 2" x 5"	\$11.28	\$6.45
		10	Sleeve Crank	F5344	1	Crank to move rack and pinion	304 Stainless Steel	.625" x 4" x 6"	\$96.50	\$58.25
Parts									Total (\$)	\$2,119.98
	Morton	7	Rack and Pinion Screw	MH-307	1	Screw to clamp R&P closes	Zinc Die Cast/Steel	3/8" x 2"	\$8.90	\$8.90
	Machine Works								Total (\$)	\$8.90
	Granger	13,14,15,19,20	Compression Damper	6GTU7	2	Shocks for arm assistance	Steel	8.27" x 0.87"	\$160.00	\$320.00
		Total (\$)							\$320.00	
	TW Metals	1	Clamp	44453 CHIC	1	Material to make clamp	304 Stainless Steel	6" x 4" x "3/8 x 1'	\$280.02	\$280.02
										\$280.02
l .									Total (\$)	
	Zoro	2	Clamp Screw	G1709373	2	Screws to attach to clamp disks	-	-	\$33.35	\$66.70
	Zoro		·		2	·	-	-	\$33.35 Total (\$)	\$66.70 \$66.70
	Zoro	6,8	Clamp Screw Rack and Pinion Set	G1709373 N/A	2	Screws to attach to clamp disks Rack and pinion for vertical adjustment	- C45 Steel	-	\$33.35 Total (\$) \$80.00	\$66.70 \$66.70 \$80.00
			Rack and Pinion Set	N/A	1	Rack and pinion for vertical adjustment		-	\$33.35 Total (\$) \$80.00 Total (\$)	\$66.70 \$66.70 \$80.00 \$80.00
			·		1	·	- C45 Steel Aluminum	-	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75	\$66.70 \$66.70 \$80.00 \$80.00 \$267.75
	eBay Amazon	6,8	Rack and Pinion Set Titan Arm	N/A	1	Rack and pinion for vertical adjustment	Aluminum	-	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$)	\$66.70 \$66.70 \$80.00 \$80.00 \$267.75 \$267.75
ion	еВау		Rack and Pinion Set Titan Arm Part Name	N/A	1 Hours	Rack and pinion for vertical adjustment Arm to model locking joints	Aluminum Description		\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$)	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 Total Cost (\$)
ication	eBay Amazon Vendor	6,8	Rack and Pinion Set Titan Arm Part Name Welding	N/A	1 Hours	Rack and pinion for vertical adjustment Arm to model locking joints Weld the vertical p	Aluminum Description post to the clamp, and the	pall joints	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$) \$80.00	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 Total Cost (\$) \$80.00
abrication	eBay Amazon	6,8	Rack and Pinion Set Titan Arm Part Name	N/A	1 Hours	Rack and pinion for vertical adjustment Arm to model locking joints Weld the vertical p	Aluminum Description	pall joints	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$) \$80.00	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 Total Cost (\$) \$80.00 \$1,200.00
Fabrication	eBay Amazon Vendor Jemelco	6,8 Part #	Rack and Pinion Set Titan Arm Part Name Welding Machining	N/A	1 1 Hours 1 1 15	Rack and pinion for vertical adjustment Arm to model locking joints Weld the vertical p	Aluminum Description cost to the clamp, and the line joints, sleeve, links, ring	pall joints	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$) \$80.00 \$80.00 Total (\$)	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 Total Cost (\$) \$80.00 \$1,200.00 \$1,280.00
-	eBay Amazon Vendor	6,8	Rack and Pinion Set Titan Arm Part Name Welding Machining Part Name	N/A	Hours 1 15 Trips	Arm to model locking joints Weld the vertical p Machine th	Aluminum Description cost to the clamp, and the line joints, sleeve, links, ring Description	pall joints	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$) \$80.00 Total (\$) Cost per unit (\$)	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 \$267.75 \$80.00 \$1,200.00 \$1,280.00 Total Cost (\$)
-	eBay Amazon Vendor Jemelco	6,8 Part #	Rack and Pinion Set Titan Arm Part Name Welding Machining	N/A	1 1 Hours 1 1 15	Arm to model locking joints Weld the vertical p Machine th	Aluminum Description cost to the clamp, and the line joints, sleeve, links, ring	pall joints	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$) \$80.00 Total (\$) Cost per unit (\$) \$64.00	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 Total Cost (\$) \$80.00 \$1,200.00 \$1,280.00 Total Cost (\$)
Travel Fabrication	eBay Amazon Vendor Jemelco Vendor	6,8 Part #	Rack and Pinion Set Titan Arm Part Name Welding Machining Part Name	N/A	Hours 1 15 Trips	Arm to model locking joints Weld the vertical p Machine th	Description oost to the clamp, and the late joints, sleeve, links, ring Description trips to and from Phoenix	pall joints s	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$) \$80.00 Total (\$) Cost per unit (\$) \$64.00 Total (\$)	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 \$267.75 \$267.75 \$80.00 \$1,200.00 \$1,200.00 Total Cost (\$) \$256.00
-	eBay Amazon Vendor Jemelco Vendor	6,8 Part #	Rack and Pinion Set Titan Arm Part Name Welding Machining Part Name	N/A	Hours 1 15 Trips	Arm to model locking joints Weld the vertical p Machine th	Description oost to the clamp, and the late joints, sleeve, links, ring Description trips to and from Phoenix	pall joints	\$33.35 Total (\$) \$80.00 Total (\$) \$267.75 Total (\$) Cost per unit (\$) \$80.00 Total (\$) Cost per unit (\$) \$64.00 Total (\$)	\$66.70 \$80.00 \$80.00 \$267.75 \$267.75 Total Cost (\$) \$80.00 \$1,200.00 \$1,280.00 Total Cost (\$)