



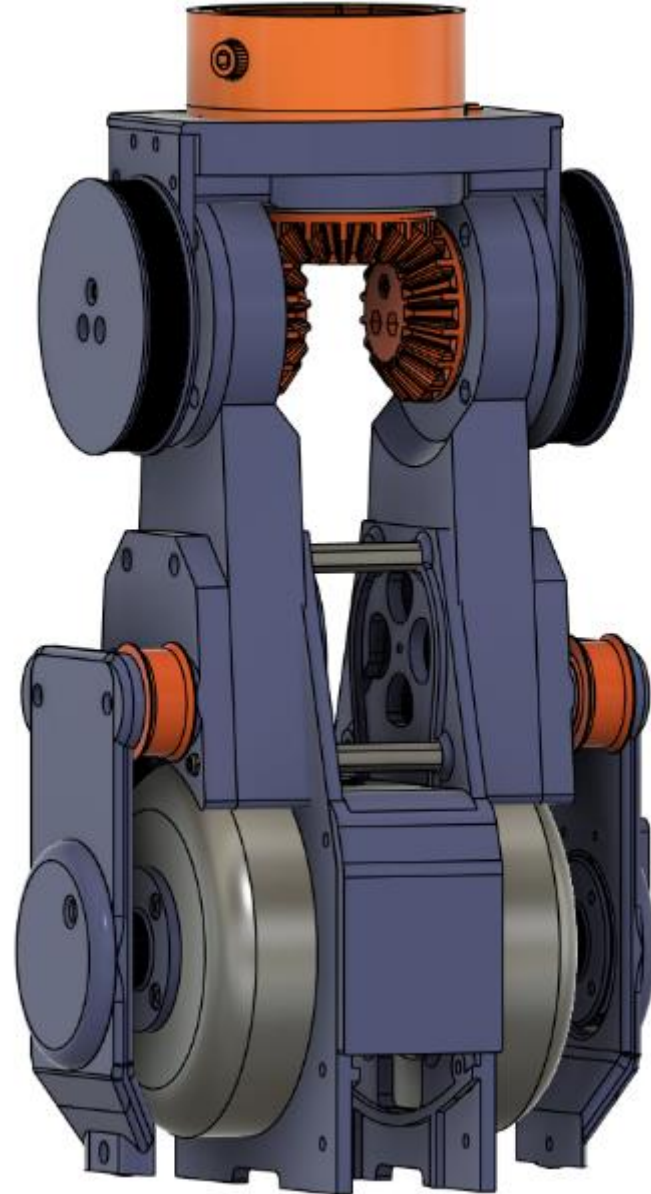
Theo Kersjes
David Fossholm

T400 Arm Assembly



Arm Creation – Wrist to Base

ARM HARDWARE		
Item	QTY	
Bearing 62mm x 50mm x 6mm	1	
Bearing 44mm x 35mm x 5mm	9	
Bearing 21mm x 15mm x 4mm	4	
M2 x 10mm Socket Screws	4	
M2 Nuts	4	
M2.5 x 40mm Socket Screws	5	
M2.5 Nuts	5	
M3 x 8mm Socket Screws	8	
M3 x 14mm Socket Screws	6	
M3 x 16mm Socket Screws	8	
M3 x 18mm Socket Screws	4	
M3 x 18mm Flat Head Screws	8	
M3 x 30mm Spacer	4	
M3 x 40mm Socket Screws	8	
M3 x 45mm Socket Screws	8	
M3 Nuts	33	Get Extra
M3 Locknuts	2	
M4 x 10mm Pan Head Screws	4	
MJBots Moteus R4	2	
EaglePower 160KV BLDC Motor	2	
Belt 450mm length 6mm width	2	
Magnet 1/4" x 1/8"	2	
12V 40mm x 10mm Fan	2	



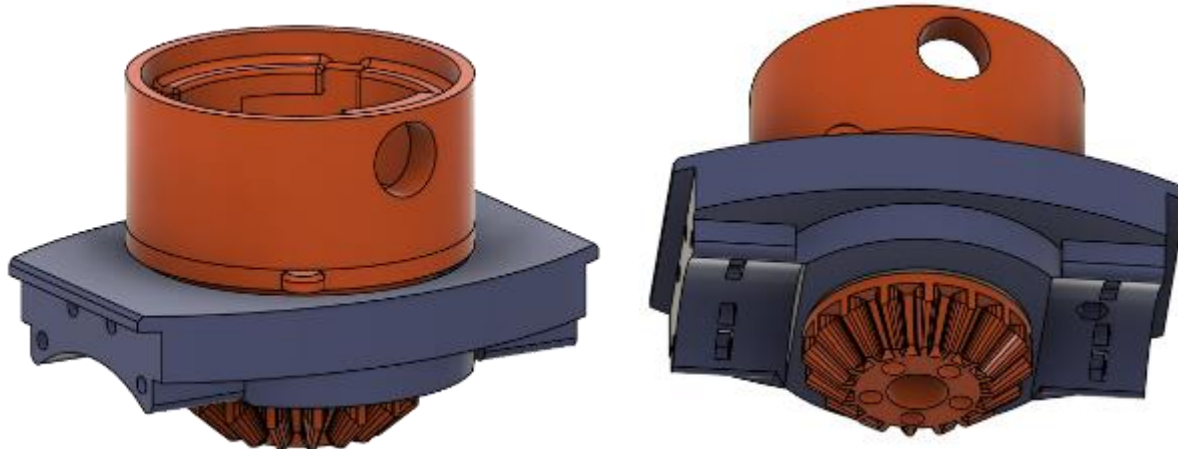
Top Rotation – Wrist

3-D Printed Parts

- Top Center Gear
- Outer Top Ring
- Hand ¼-turn Bayonet

Hardware

- Bearing 62mm x 50mm x 6mm
- Bearing 44mm x 35mm x 5mm
- (5x) M2.5 x 40mm Socket Screws
- (5x) M2.5 Nuts



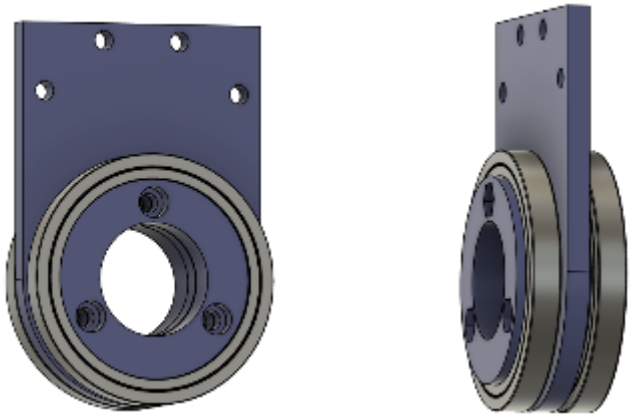
Side Gear Hub – Inner Rotation (x2)

3-D Printed Parts

- Output Plate
- Bearing Spacer Small
- Bearing Spacer Large

Hardware

- (2x) Bearing 44mm x 35mm x 5mm
- (3x) M3 x 14mm Socket Screws
- (3x) M3 Nuts



Fan Tower and Outer Ring (x2)

3-D Printed Parts

- Fan Tower
- Outer Bearing Ring

Hardware

- (4x) M3 x 16mm Socket Screws
- (4x) M3 Nuts



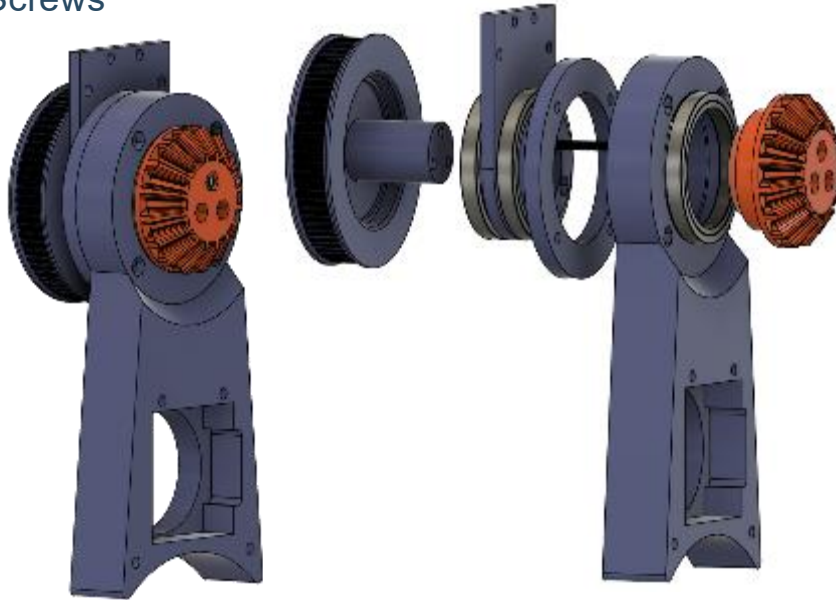
Side Gear and Belt Drive (x2)

3-D Printed Parts

- Outer Belt Drive Pulley
- Inner Side Gear
- Assembled Side Gear Hub (Step 2)

Hardware

- (1x) Bearing 44mm x 35mm x 5mm
- (3x) M3 x 45mm Socket Screws
- (3x) M3 Nuts



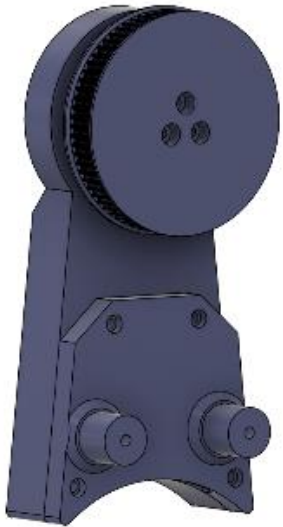
Fan Housing Belt Guide(x2)

3-D Printed Parts

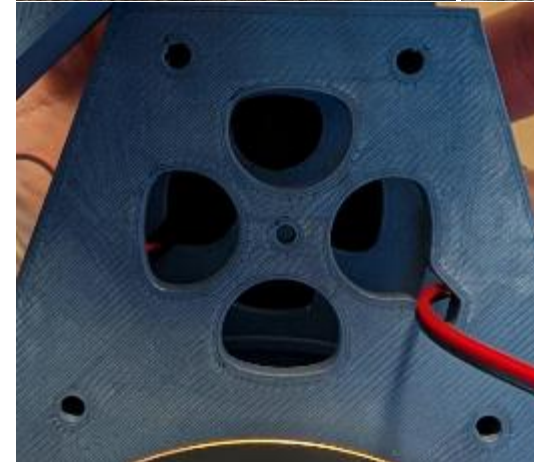
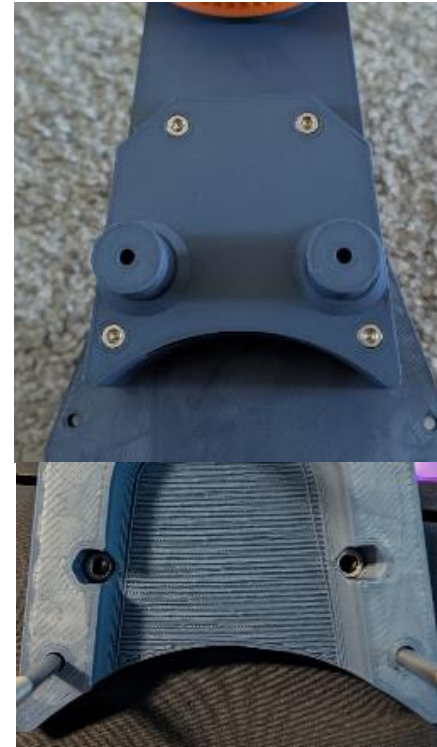
- Fan Housing

Hardware

- (4x) M3 x 40mm Socket Screws
- (4x) M3 x 30mm Standoff Spacer
- (2x) M3 Nut (pressed inside Fan Housing)
- (1x) 12V 40x10mm Fan



Note: Place fan cord as shown with wire fitting in groove of fan tower



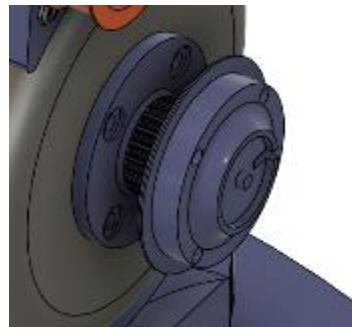
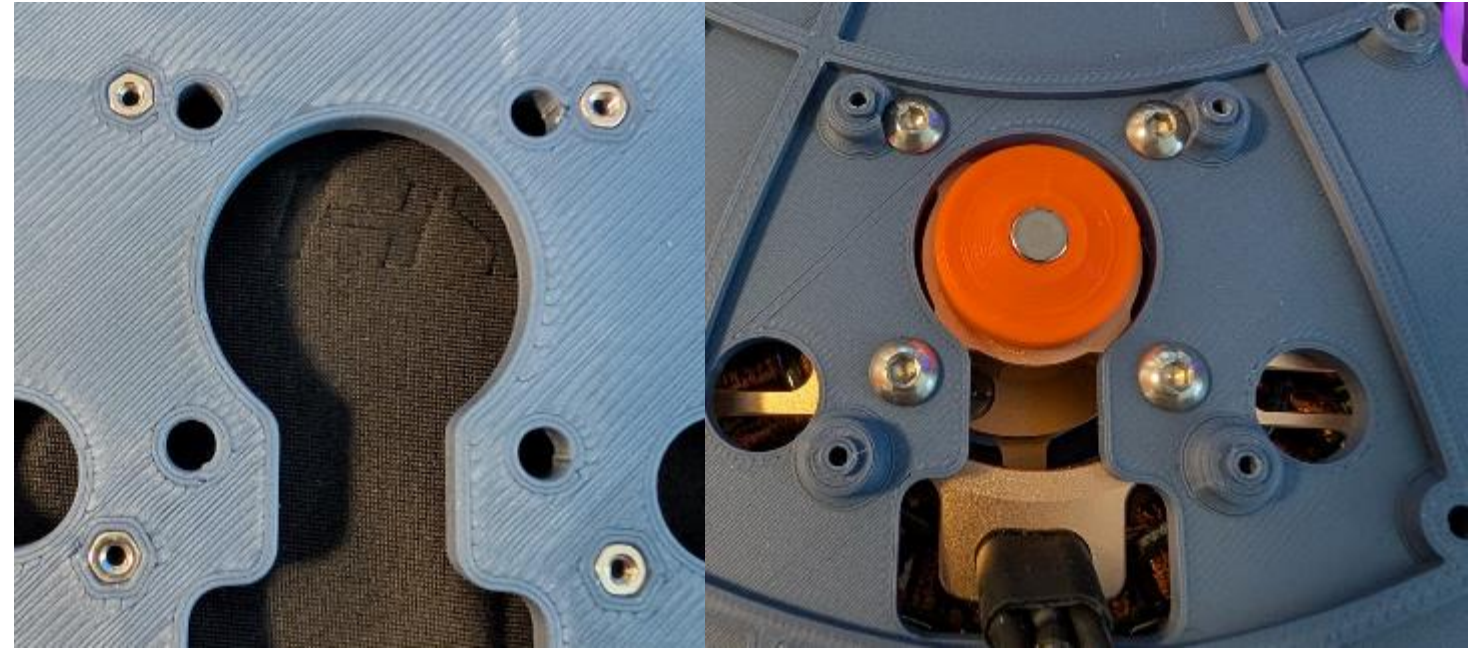
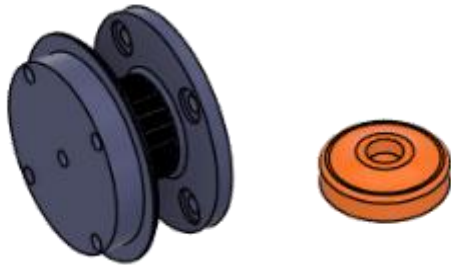
Motor(x2)

3-D Printed Parts

- Motor-Belt Gear
 - Optional Motor-Belt Gear with Rotational Sensor
- Magnet Holder
 - Recommend superglue to hold to motor

Hardware

- (4x) M4 x 10mm Panhead Screws
- (4x) M3 x 8mm Socket Screws
- (1x) 1/4" x 1/8" Magnet
- (4x) M2 Nuts (pressed into 3D print under motor)
- EaglePower 160KV BLDC Motor



Motor Control Board – MJBots (x2)

3-D Printed Parts

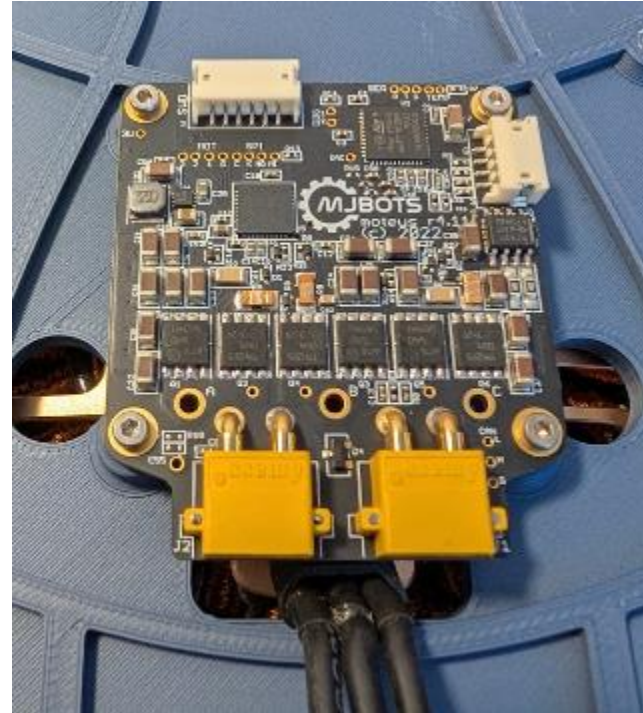
- None

Hardware

- (4x) M2 x 10mm Socket Screws
- MJBots Moteus R4

Actions

- Cut and solder Motor windings to MJBots



Add picture of
soldering wires

Put Arm Sides Together

3-D Printed Parts

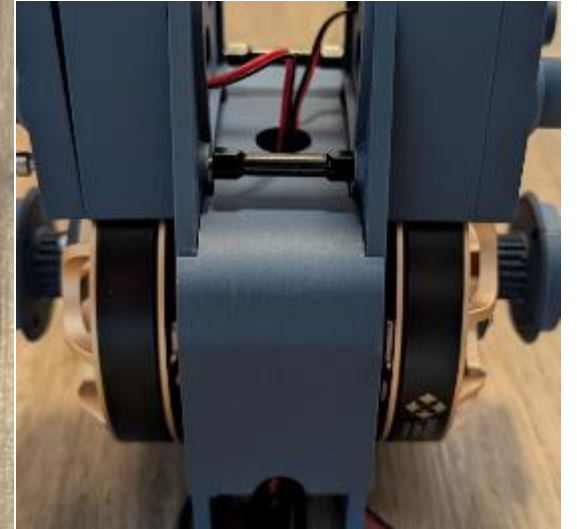
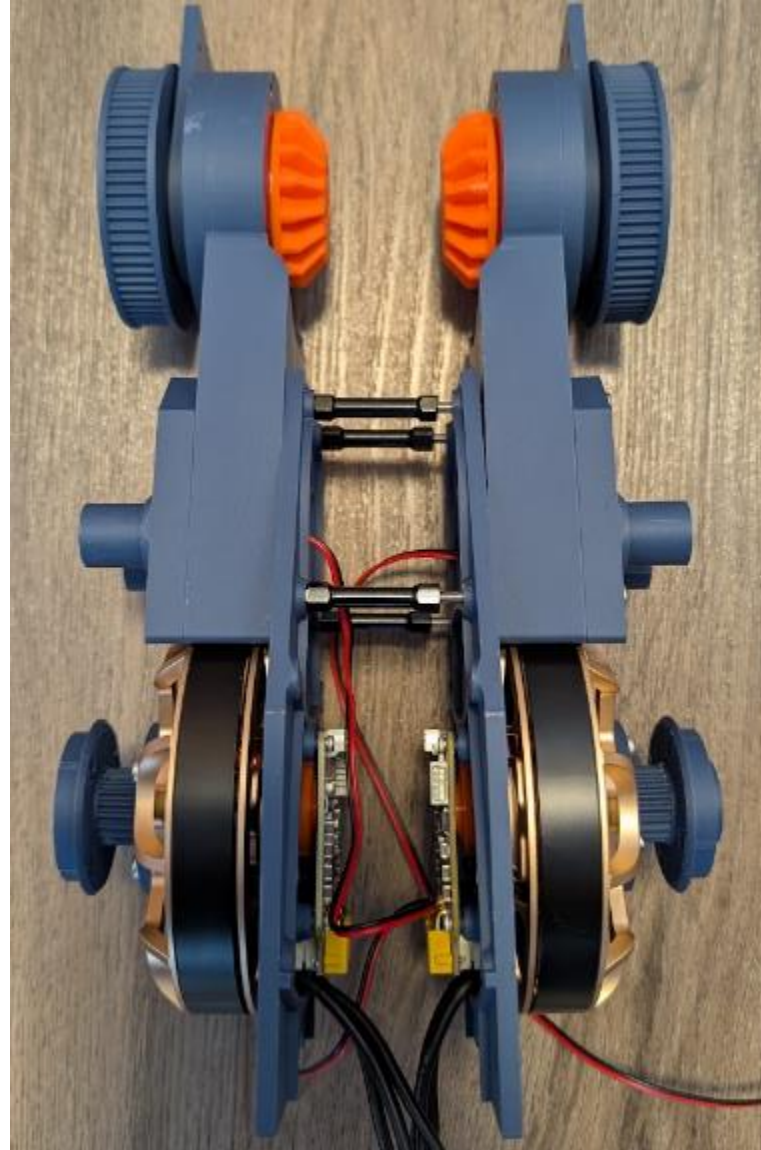
- (1x) Wire Cover L
- (1x) Wire Cover R

• Hardware

- (2x) M3 x 45mm Socket Screws
- (2x) M3 Lock Nuts

• Procedure

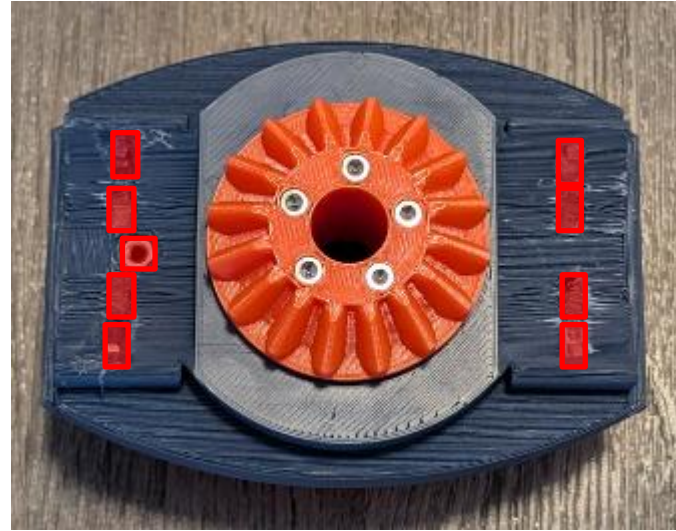
- Loosely Attach Sides
- Place Wire Cover inside
- Tighten Screws
- Add M3x45mm through wire cover holes



Attach Wrist

3-D Printed Parts

- None
- **Hardware**
- (8x) M3 x 18mm Flat Head Screws
- (9x) M3 Nuts
- **Procedure**
- Place M3 Nuts in wrist locations (x9)
- Attach via 8x Flat Head Screws



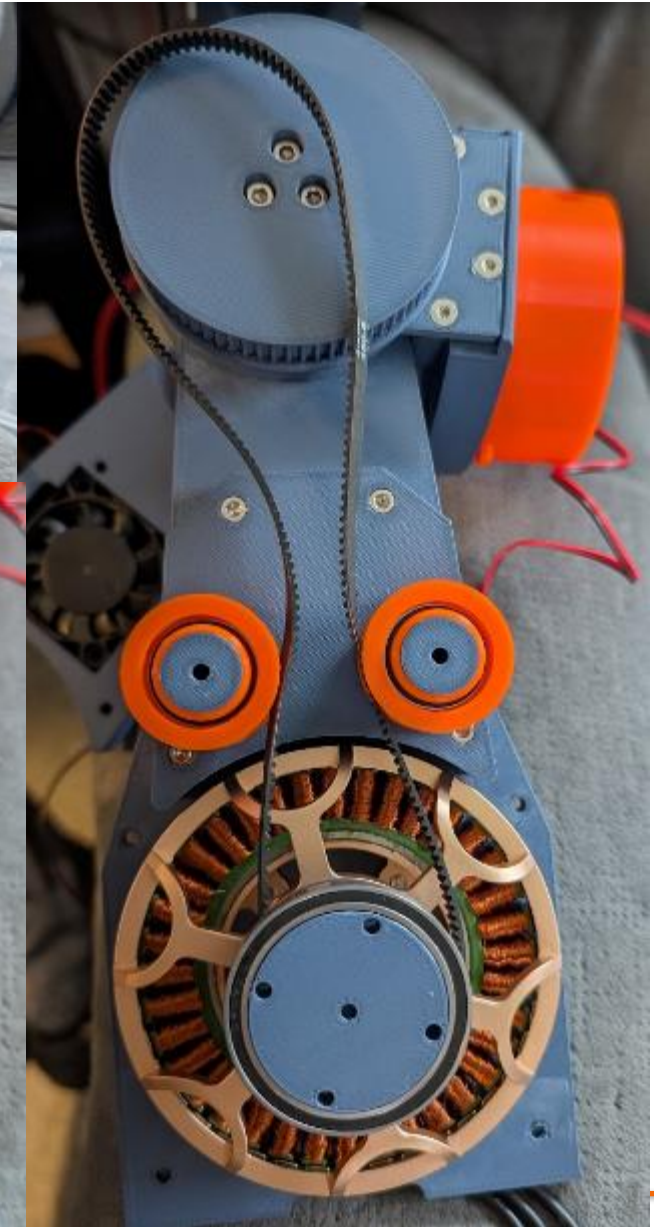
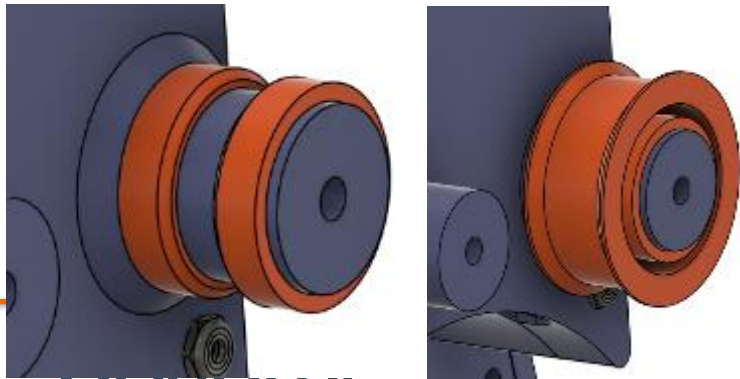
Outer Arm Brace(x2)

3-D Printed Parts

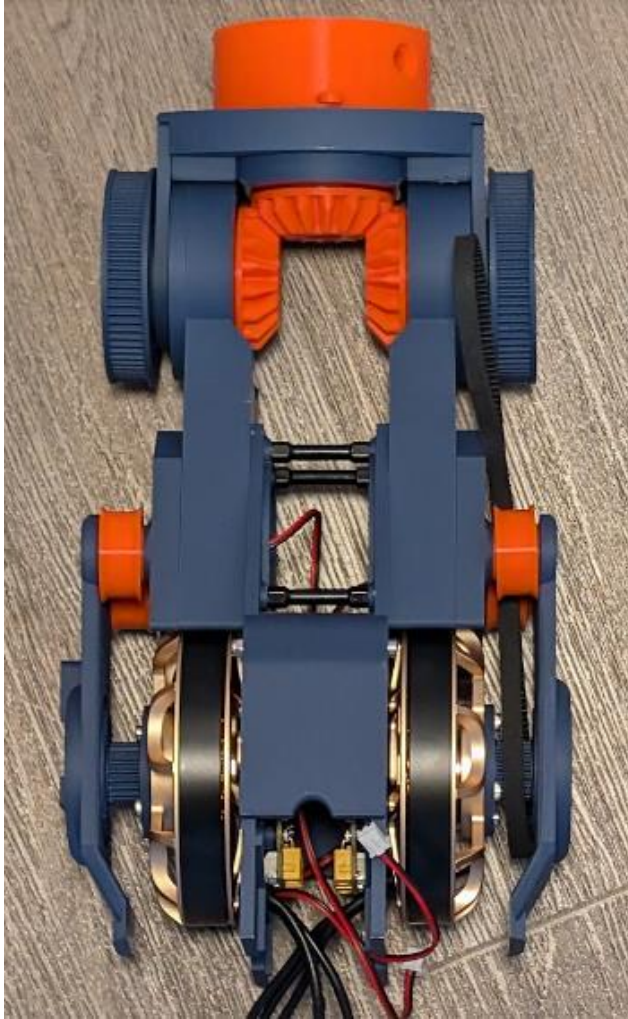
- (1x) Arm Brace Belt Holder
 - Optional Arm Brace with Rotational Sensor
- (4x) Tensioner Bearing Spacer
- (2x) Tensioner

Hardware

- (2x) M3 x 18mm Socket Screws
- (2x) 21mm x 15mm x 4mm Bearing
- (1x) 44mm x 35mm x 5mm Bearing
- (1x) 450-6 Drive Belt
 - Place loosely in position



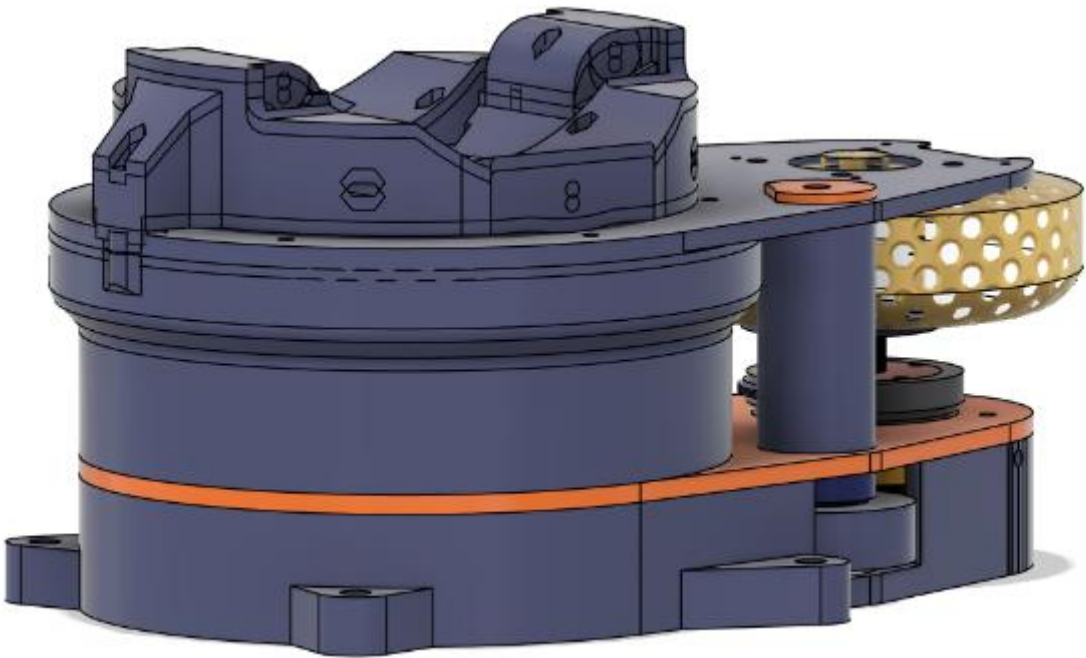
Arm is now complete minus baseplate



On to: Rotational Base

Base Creation – Table Base with Arm Attach

BASE HARDWARE		
Item	QTY	
Bearing 100mm x 80mm x 10mm	1	
Bearing 44mm x 35mm x 5mm	9	
Bearing 21mm x 15mm x 4mm	10	
M2.5 x 6mm Thermoplastic Screws	4	
M2.5 x 6 or 8mm Socket Screws	4	
M3 x 10mm Socket Screws	12	
M3 x 12mm Socket Screws	4	
M3 x 20mm Socket Screws	3	
M3 x 25mm Socket Screws	1	
M3 x 30mm Socket Screws	4	
M3 x 40mm Flat Head Screws	7	
M3 x 50mm Spacer	6	
M3 x 55mm Socket Screws	4	
M3 Nuts	37	Get Extra
M4 x 10mm Pan Head Screws	4	
Magnet 1/4" x 1/8"	1	
Eagle Power 160KV BLDC Motor	1	
MJBots Moteus R4	1	
Belt 480mm length 6mm width	1	
Waveshare Servo Board	1	



Planetary Gearset

3-D Printed Parts

- (1x) Sun gear
- (4x) Planetary Gears
- (1x) Planetary Gear Holder A
- (1x) Planetary Gear Holder B

Hardware

- (8x) 21mm x 15mm x 4mm Bearing
- (4x) M3 x 30mm Socket Screws
- (7x) M3 Nuts
 - hot glue to hold the 3x nuts in the sun gear



Place M3x30 through planetary gear holes

Planetary Gearset Holder

3-D Printed Parts

- (1x) Planetary Gear Shroud
- (1x) Top Plate
- (1x) Gear Spacer

Hardware

- (1x) 100mm x 80mm x 10mm Bearing
- (6x) M3 x 40mm Socket Screws
- (12x) M3 Nuts
 - 6x placed on each side of Gear Shroud



Recommend Lubricating Gear with Synthetic Grease



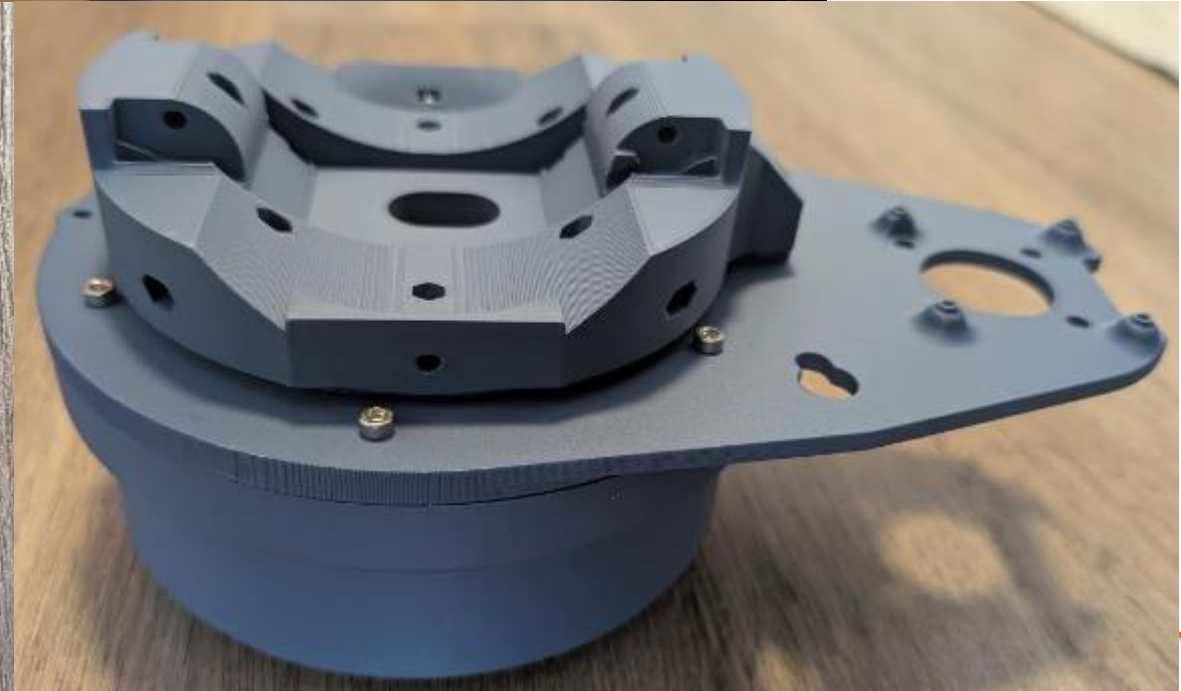
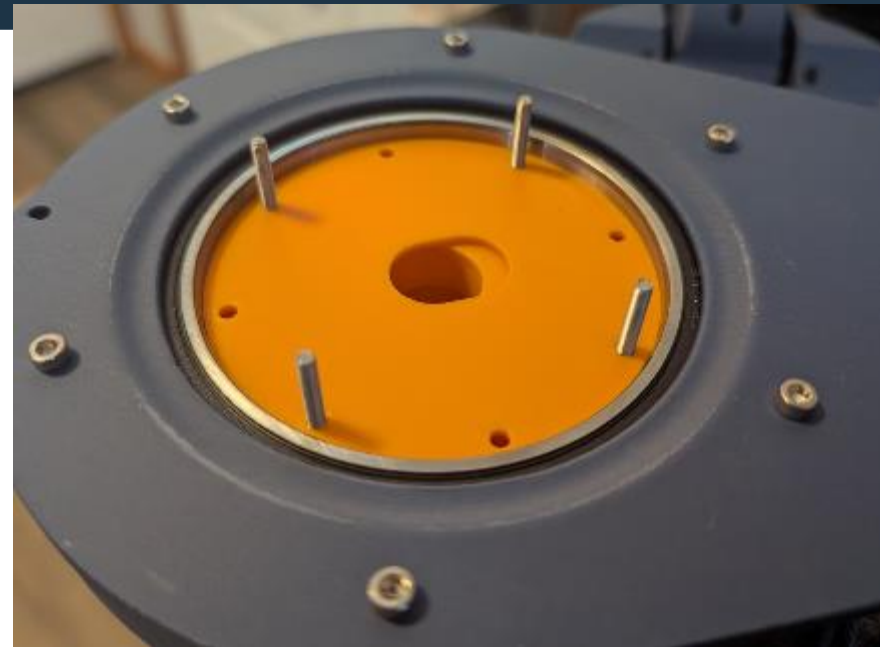
Arm Base Attachment

3-D Printed Parts

- (1x) Arm Base
- (1x) Arm-Base Spacer
 - Place inside bearing as shown

Hardware

- (4x) M3 x 55mm Socket Screws
- (6x) M3 Nuts



Motor

3-D Printed Parts

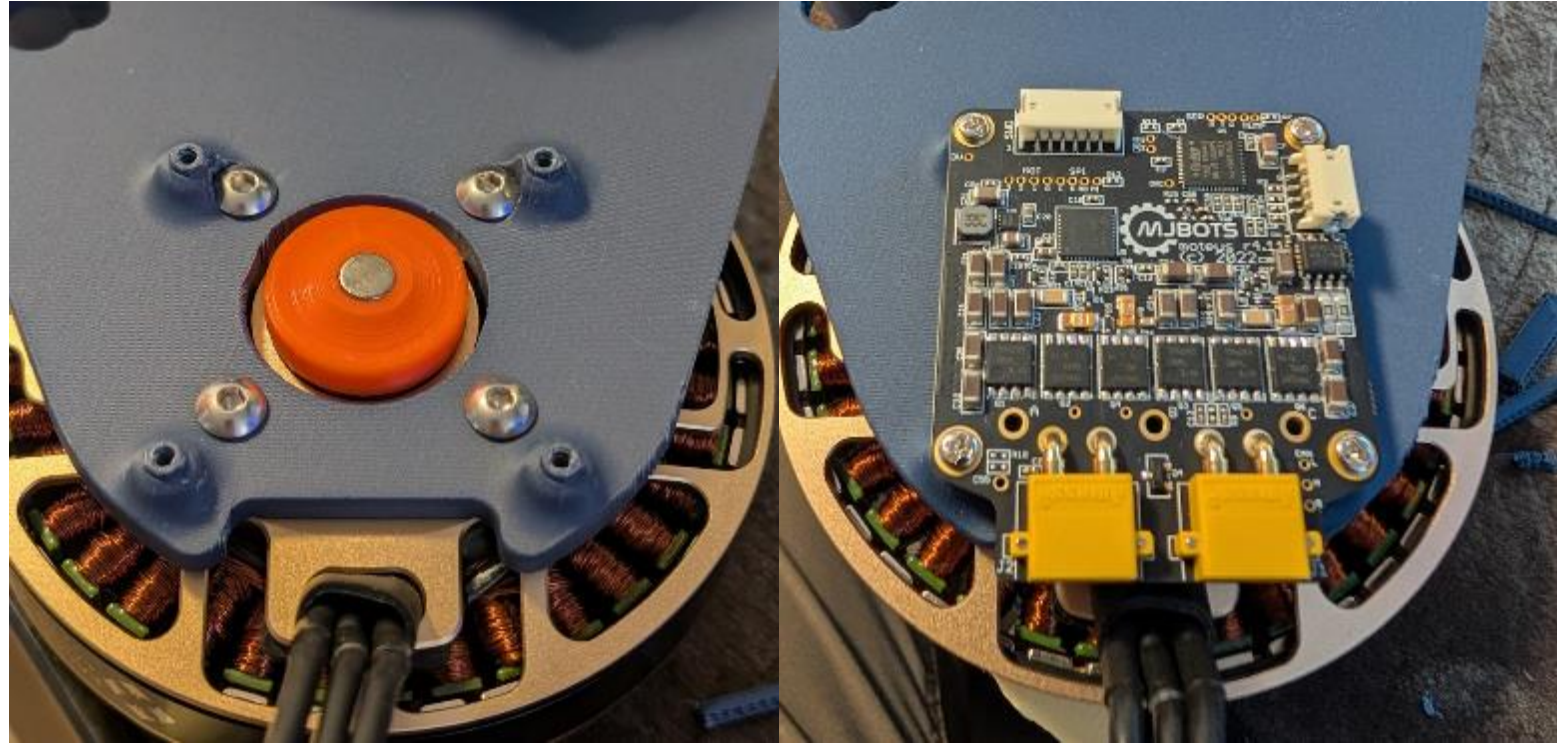
- Magnet Holder
 - Recommend superglue to hold to motor

Hardware

- (4x) M4x10mm Panhead screws
- (4x) M2.5x6mm Thermoplastic Screws
- (1x) 1/4" x 1/8" Magnet
- EaglePower 160KV BLDC Motor
- MJBots Moteus R4

Actions

- Cut and Solder BLDC wires to MJBots



Add picture of
soldering
wires

Midplate Bearing Holders

3-D Printed Parts

- (1x) Midplate
- (1x) Sungear Bearing Holder
- (1x) Belt Pulley Bearing Holder

Hardware

- (2x) 44mm x 35mm x 5mm Bearing
- (8x) M3 x 10mm Socket Screws
- (10x) M3 Nuts



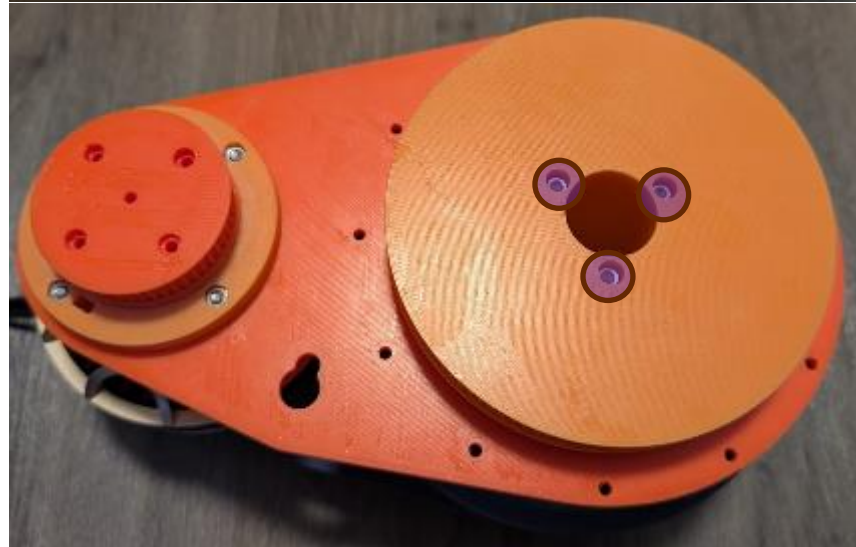
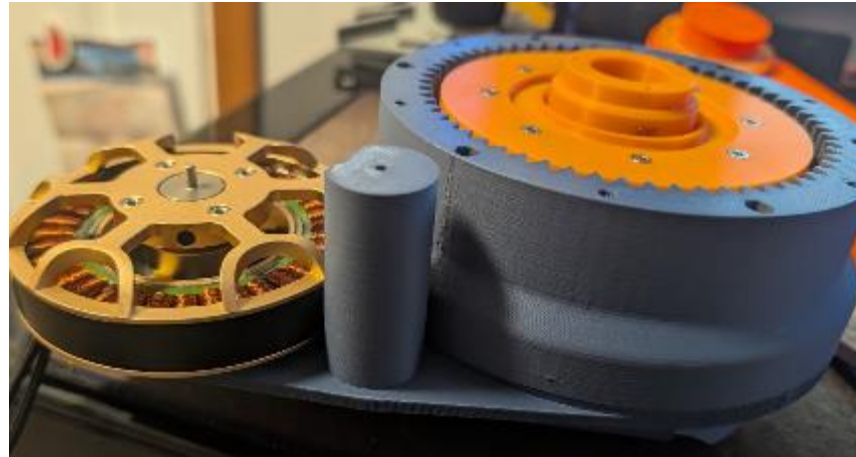
Midplate Attach with Pulleys

3-D Printed Parts

- (1x) Axis1 Belt Pulley
- (1x) Axis1 Planetary Gear Pulley
- (1x) Plate Spacer

Hardware

- (4x) M3 x 10mm Socket Screws
- (3x) M3 x 20mm Socket Screws
- (2x) M3 Nuts



Axis 1 Belt Tensioner and Belt

3-D Printed Parts

- (1x) Belt Tensioner Wheel
- (1x) Belt Tensioner Bottom
- (1x) Belt Tensioner Key

Hardware

- (2x) 21mm x 15mm x 4mm Bearing
- (1x) M3x40mm Socket Screw
- (1x) 480-6 Belt



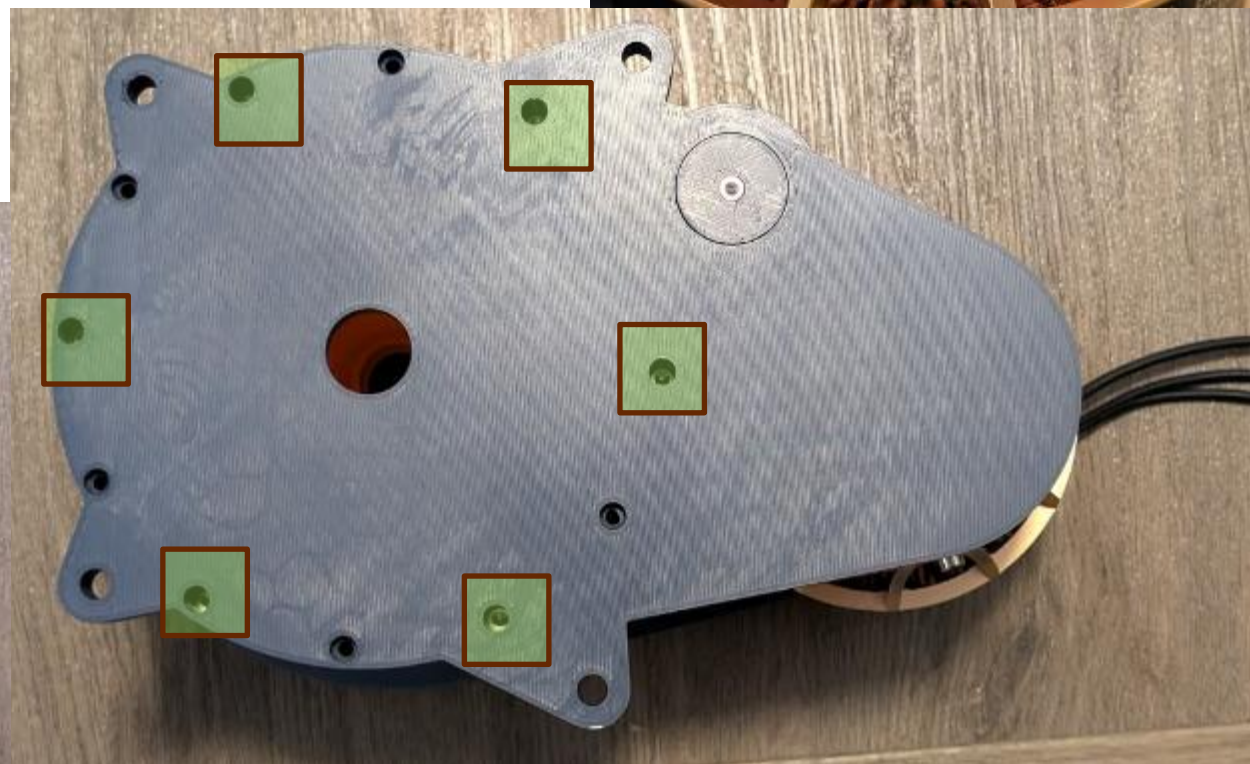
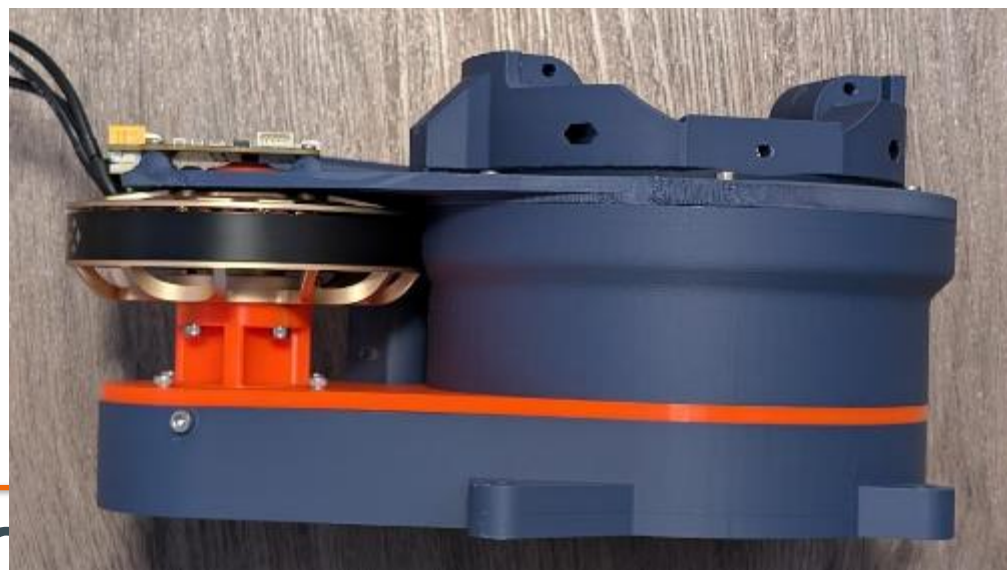
Axis 1 Bottom Cover

3-D Printed Parts

- (1x) Bottom Cover

Hardware

- (6x) M3x50mm Socket Screw
- (2x) M3x12mm Socket Screw



Motor Board Cover

3-D Printed Parts

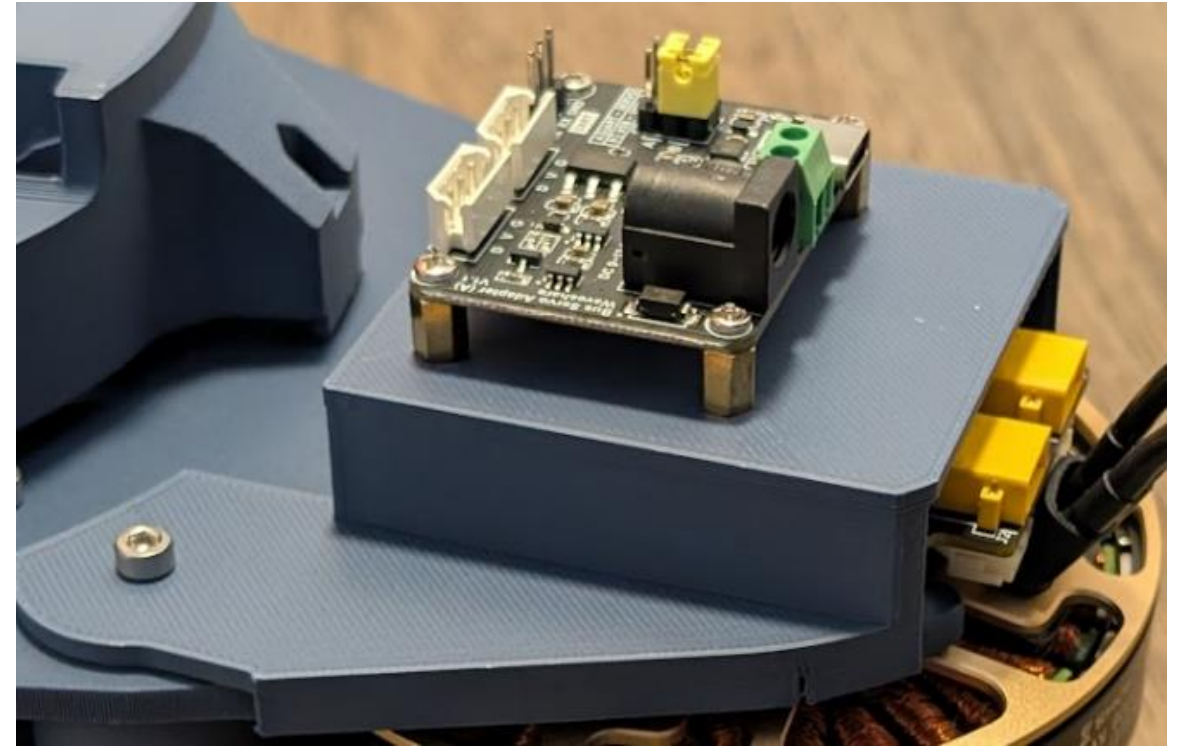
- (1x) Board Cover

Hardware

- (1x) M3x25mm Socket Screw
- (1x) M2.5x6 or 8mm Socket Screw
- (1x) Servo Board

Modifications

- Current design is made for thermoplastic screws but I cut off the plastic nubs and drilled out the holes to be 2.5mm and used the standoffs of the servo board.



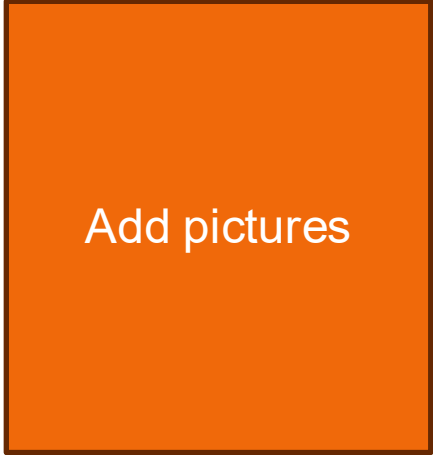
Attach Arm to Axis1 Base

3-D Printed Parts

- None

Hardware

- (2x) M3x12mm Socket Screw



Add pictures

Robotics cross solution demos



3 units end of February 2026 for:

- Arrow Bob Card
- AVNET Thomas
- EWC Theo



- ✓ **NCV75215** Integrated Ultrasonic AFE with ToF measurement for proximity application

- ✓ **NCV76124**
Humidity, rain (moisture)
frost (temperature)
Ambient light
(IR) sunlight intensity



- ✓ **NCS32100** Inductive Positioning with better than 50 Arcsec Accuracy

- ✓ **NCN26010 10BASE-T1S** Controller for multi-drop all ethernet connectivity over SPE (Single Pair Ethernet).

- ✓ **NCD83591** 3-phase BLDC Gate Driver (60V)

- ✓ **NTMFSOD9N04XM** 40V, T10, 0.9mΩ N-Channel MOSFETs

- ✓ **NCV7192** Pressure / Force interface for Wheatstone bridge



- ✓ **Hyperlux** Families ultra-low power (**LP**) and high dynamic range rolling shutter (**LH**), small optical global shutter image sensors (**SG**), and iToF (**ID**) for depth sensing **AF0130, AF0131**



Sensor Hand Technology demonstrator v2

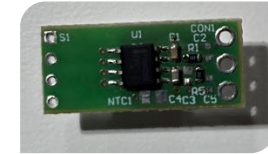
- ✓ **NCV75215** Integrated Ultrasonic AFE with ToF measurement for proximity application

- ✓ **NCV76124** Rain (moisture) and Light Sensor

- ✓ **NCS32100** Inductive Positioning with better than 50 Arcsec Accuracy



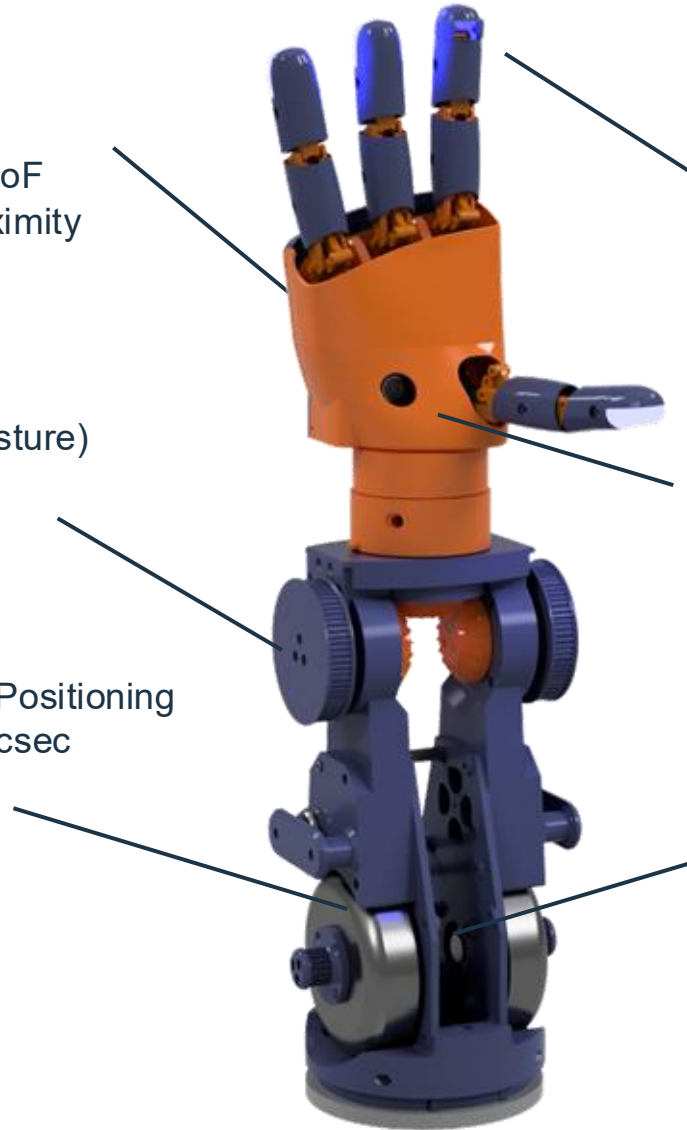
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- ✓ **NCN26010 10BASE-T1S** Controller for multi-drop all ethernet connectivity over SPE (Single Pair Ethernet).
- ✓ **NCD83591** 3-phase BLDC Gate Driver (60V)
- ✓ **NTMF50D9N04XM** 40V, T10, 0.9mΩ N-Channel MOSFETs



Digital Twin

