

Team 512: RE-RASSOR Shoulder Phase II

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Objective

To create a 3D printed, motorized, scaled down version of NASA's RASSOR shoulder, to help introduce STEM concepts in middle and high schools.

Project Goals

- Enhance Phase I
- Lift 25 Pounds
- Simple Assembly
- Low Reproduction Cost

Testing



Successfully able to lift 10 pounds.

NASA's RASSOR



Research and Education -
Regolith Advanced Surface Systems Robot

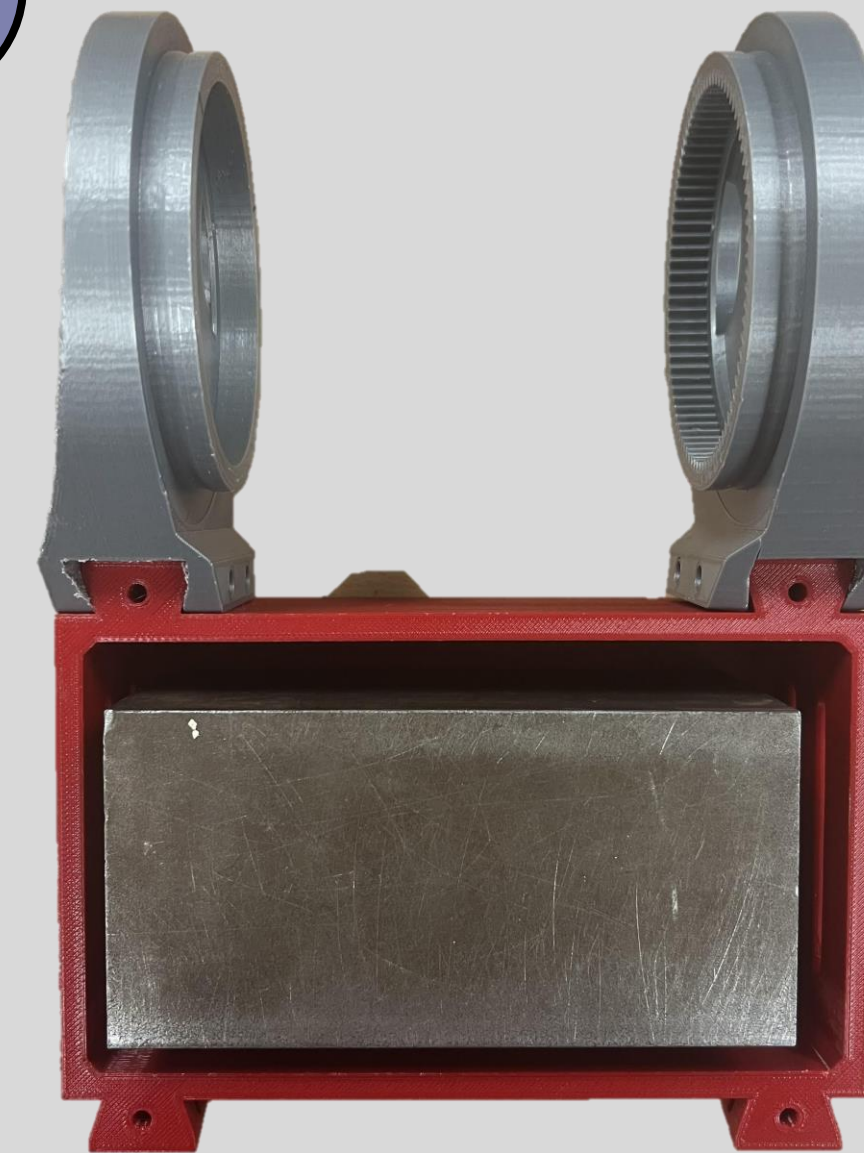
1



Boom (Arm)

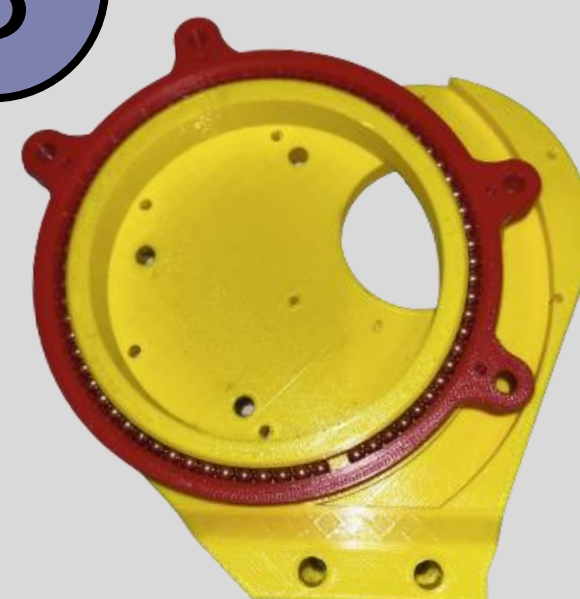
Material added to arm at potential failure points, able to hold 32.5+ pounds.

2

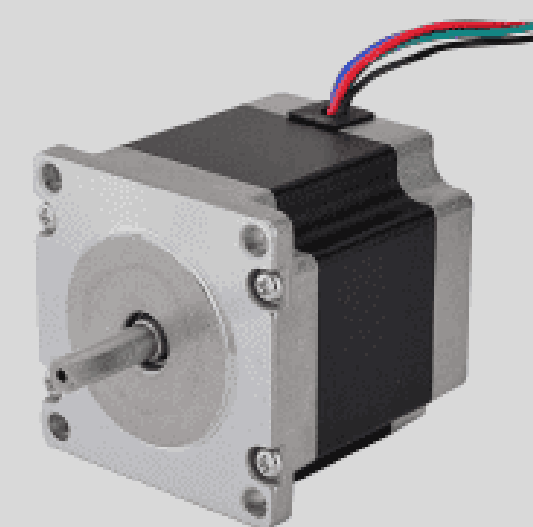


Chassis
Given by FSI, clamped down with weight inside. Shoulder blades attach.

3



Left Shoulder Blade Assembly
3D printed BB ball bearing attached.



NEMA 23 Motor
High torque output.



Motor Housing
Cases NEMA 23 Motor.



Gear Assembly
Planetary Carrier (black)
Planetary Gears (red)
Sun Gear (blue)

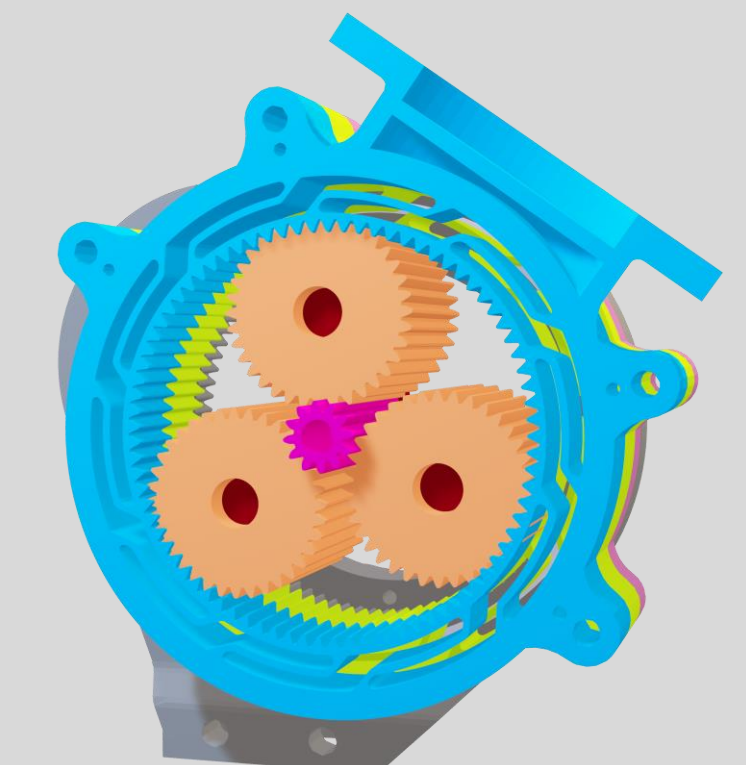


Dual Direction Harmonic Gear
Offset splines in opposing directions.



Right Shoulder Blade Assembly
Ring gear meshes with planetary gears.

Planetary Harmonic Gearbox



Number of Gear Teeth:
Sun = 12
Planetary = 36
Ring = 84
Torque Ratio: 160:1
Module: 1
Pressure Angle: 25 degrees

Future Work

