



## JWST Mirror Actuators

**BT** polyfractal

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### Summary

A true-to-scale replica of JWST's mirror actuators

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This is a replica of JWST's mirror actuators. Six of these actuators are paired into a hexapod / stewart platform arrangement and used to control 6 degrees of freedom of each mirror segment (tip, tilt, roll, x, y, z translation).

Video explanation here:

Frame, base and flexures were printed in PLA. Gears and shafts were printed on a resin printer. If your printer is better tuned than mine you can probably print the gears in PLA as well. Some grease lubricant helps considerably.

Shafts were printed because I was lazy, but sourcing some real 5mm metal shafts would be considerably better. Only exception is the cam shaft which is easiest printed.

Warning! Nothing was toleranced to work straight off the printer, I had to do a lot of filing/sanding/glueing. The design could definitely use some improvements to make it more friendly!

You will also need:

- 1x 28byj-48 stepper motor
- 9x 625-2rs or 625-zz bearings
- 1x 20-30mm m8 screw with a hex head
- 1x m8 nut
- 4x m3 heat-set threaded inserts
- 4x m3x10 screws

## Model Files (.stl, .3mf, .obj, .amf)

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### Coupler.stl

updated 4. 2. 2022

58.0 KB



### Base.stl

updated 4. 2. 2022

52.4 KB



### Coupler Shaft.stl

updated 4. 2. 2022

82.5 KB



### Flexure.stl

updated 4. 2. 2022

199.4 KB



### 8T Spur Gear.stl

updated 4. 2. 2022

272.5 KB





### **Torsional Stabilizer.stl**

updated 4. 2. 2022

74.8 KB



### **18T Spur Gear.stl**

updated 4. 2. 2022

304.6 KB



### **Cam Shaft - not bev.stl**

updated 4. 2. 2022

114.1 KB



### **Frame.stl**

updated 4. 2. 2022

237.7 KB



### **Motor Shaft.stl**

updated 4. 2. 2022

82.5 KB



### **6T Spur Gear.stl**

updated 4. 2. 2022

238.8 KB



### **Lower Ballscrew mount.stl**

updated 4. 2. 2022

130.4 KB



### **64T Spur Gear.stl**

updated 4. 2. 2022

830.0 KB





### Frame - Resin.stl

updated 4. 2. 2022

288.9 KB



### Upper Ballscrew mount.stl

updated 4. 2. 2022

155.9 KB



### Cam Shaft.stl

updated 4. 2. 2022

483.3 KB



### Bevel.stl

updated 4. 2. 2022

2.5 MB



### jwst.step

updated 4. 2. 2022

3.5 MB



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