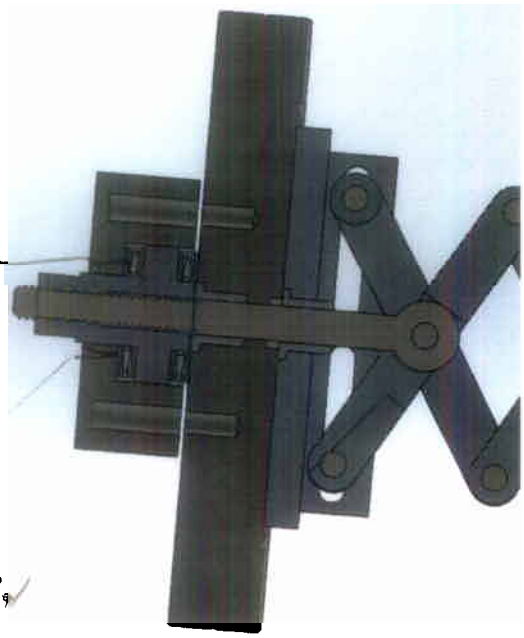
1. **After having had the chance to ruminate on your design for a week, make any changes needed to update the FRDPARRC table, Error Budget, solid model and drawings.**

   See updated Solidworks model ("Gould_Scissor_Actuator.SLDASM") and renderings below.



looks good

2. **Create a Bill of Materials, and make sure you have all you need to build. (1 pt)**

   See ("Gould_PUPS_8_BoM.xlsx") for the Bill of Materials.

3. **Make the parts and measure and compare to the drawings. Did you achieve the desired tolerances? (4 pts)**

   For the most part, I've hit all my tolerance goals. The three reamed holes in each of the scissor segments are very close to one another, but not 100% consistent. Some occasional hand reaming was necessary during assembly.

4. **Assemble the axis, and comment on did it go together the way you expected? (1 pt)**

   Somewhat. The actual external force has changed from just a linear sliding motion to a screw motion to both gain extra force and for better control of the extension length.

5. **Measure performance and compare to that predicted (e.g., attach a laser pointed taped to "on" to the carriage and measure motion of the spot far down the hall...) (4 pts)**

   a. **Accuracy**
   ★ b. **Repeatability**
   c. **Resolution**

looks solid

PUPS 8

Bill of Materials

How many are we making? 1

#	Item	Source	Part Number	URL	Quantity Needed	Pack Size	Packs Needed	Unit Price	Extended Price	Notes
1	CF4.5" Flange	KJLC	F0450X000N	http://www.lesker.com/newweb/fl	1	1	1	$ 40.70	$ 40.70	
2	3/16"D x 1.5"L 18-8 SS Dowel Pins	McMaster	90145A514	http://www.mcmaster.com/#90145	18	20	1	$ 12.51	$ 12.51	
3	3/16"D x 1.75"L 416 SS Dowel Pins	McMaster	98380A516	http://www.mcmaster.com/#98380	2	5	1	$ 10.59	$ 10.59	
4	3/16" External Retaining Rings	McMaster	98408A126	http://www.mcmaster.com/#98408	40	25	2	$ 5.26	$ 10.52	
5	Springs	McMaster	9435K35	http://www.mcmaster.com/#9435K	18	5	4	$ 5.29	$ 21.16	
6	4-40 x 1/4" Socket Cap Screw	McMaster	92196A106	http://www.mcmaster.com/#92196	2	100	1	$ 3.92	$ 3.92	
7	8-32 x 3/4" Flat Head Slotted Screw	McMaster	91781A197	http://www.mcmaster.com/#91781	8	100	1	$ 6.28	$ 6.28	
8	10-32 x 1" Flat Head Slotted Screw	McMaster	91781A833	http://www.mcmaster.com/#91781	8	50	1	$ 6.09	$ 6.09	
9	1/4"-20 x 3"L SS Rod End	McMaster	6251K31	http://www.mcmaster.com/#6251K	1	1	1	$ 13.83	$ 13.83	
10	1/2" ID, 15/16" OD Needle Roller Thrust Bea	McMaster	5909K31	http://www.mcmaster.com/#5909K	2	1	2	$ 3.11	$ 6.22	
11	Washers for Needle Roller Thrust Bearing	McMaster	5909K44	http://www.mcmaster.com/#5909K	4	1	4	$ 1.02	$ 4.08	
12	1/4" ID Flanged Sleeve Bearing	McMaster	2706T13	http://www.mcmaster.com/#2706T	2	1	2	$ 4.17	$ 8.34	
13	4"W x 18"L x 3/8"T 6061 Al Sheet	McMaster			1	1	1		$ -	To make 17 scissor segments (3/8" x 3/8" x 2.625")
14	3"D x 1"L 6061 Al Rod	McMaster			1	1	1		$ -	To make flange attachment plate
15	2"D x 1"L 304 SS Rod	McMaster			1	1	1		$ -	To make thrust bearing clamp
16	1"D x 1.5"L 6061 Al Rod	McMaster			1	1	1		$ -	To make flanged nut
17	0.75"W x 2"L x 0.125"H 6061 Al Sheet	McMaster			1	1	1		$ -	To make alignment fork
18	1" x 2.5" x 0.625" 6061 Al Sheet	McMaster			1	1	1		$ -	To make wafer attachment block
19	3/8"D x 6"L 6061 Al Rod	McMaster			1	1	1		$ -	To make 6 segment spacer cylinders

Price Per Device	$	144.24
Total Price	$	144.24