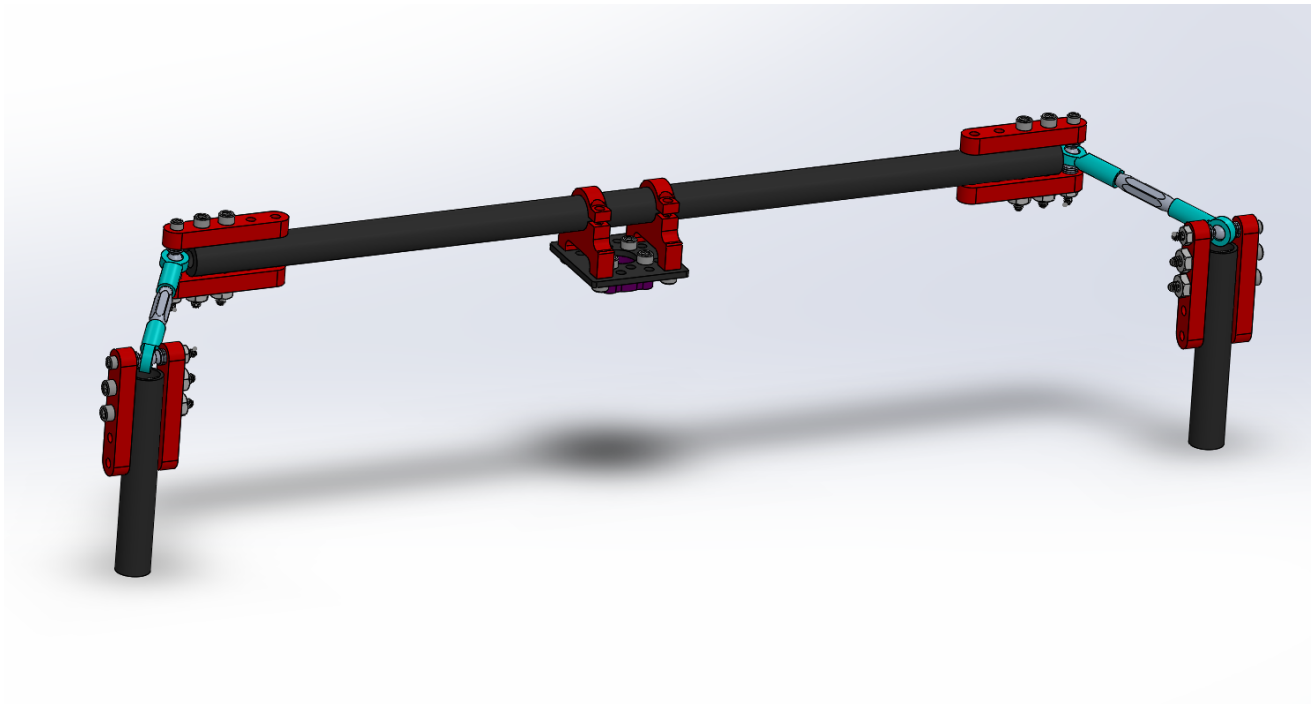

Open Source Rover

Body Assembly Instructions

Jet Propulsion Laboratory
California Institute of Technology

Contents

1 Maching/Fabrication

1.1 Aluminum Rods Cutting

Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
3Ft x 0.5 inch aluminum tube	S16	1		Metal Hacksaw or Bandsaw	N/A	N/A	 
0.5 x 4 inch aluminum tube	S18	4		Vice Clamp or C clamps	N/A	N/A	 

Take the 3Ft piece of 0.5 Inch Aluminum Rod **S16** and cut it into one 15 inch piece and one 13.5 inch piece. These are now the parts **S16A** and **S16B** respectively. In addition take two of the 4 inch aluminum rods **S18** and cut them down to 3 inchs in length as well.

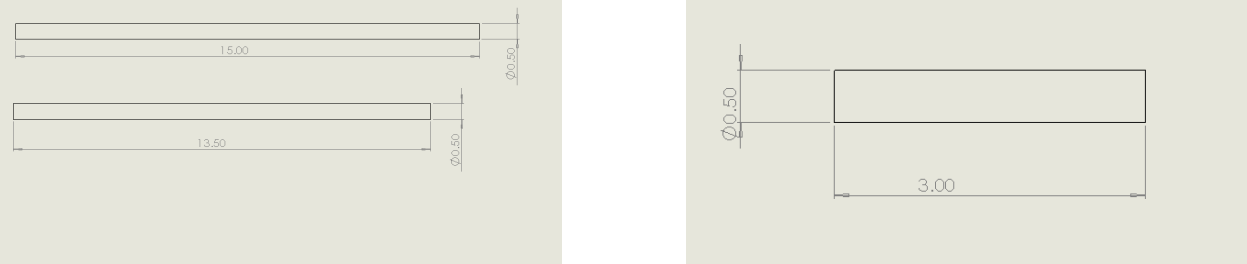

Figure 1: Aluminum Rod cutting

1.2 Aluminum Rods Drilling

Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
0.5 x 14 Inch Aluminum Rod	S16	1		Center/Starter Drill			
0.5 x 3 Inch Aluminum Rod	S18	2		Drills #23			
Hand Drill/Drill Press				Vice or V-Clamp			

The turnbuckles must be attached to the differential pivot and rocker-bogie arm, which will be attached with the 5 hole aluminum beam. The rods must be modified to make this connection.

Using the vice or clamp grab firmly onto the 0.5 x 13.5 inch rod **S16B** with the end extending out around 2 inches from the edge of the vice/clamp. Mark the dimensions as shown in 8, and carefully use the center drill to start the center hole for these. It is important that the center hole is as centered as possible to prevent the bit from walking/slipping during drilling, which could result in the bit breaking. Then use drill # 25 and drill all the way through both sides of the rod. This makes the **S16B'** part.

Figure 2: Drilling the Differential pivot rod

Test the cut by taking the 5 Hole Aluminum Beam **S21** and screws **B7** and making

sure screws go all the way through as shown in 3. If they do not you can file/drill the hole out until they do pass through [1].

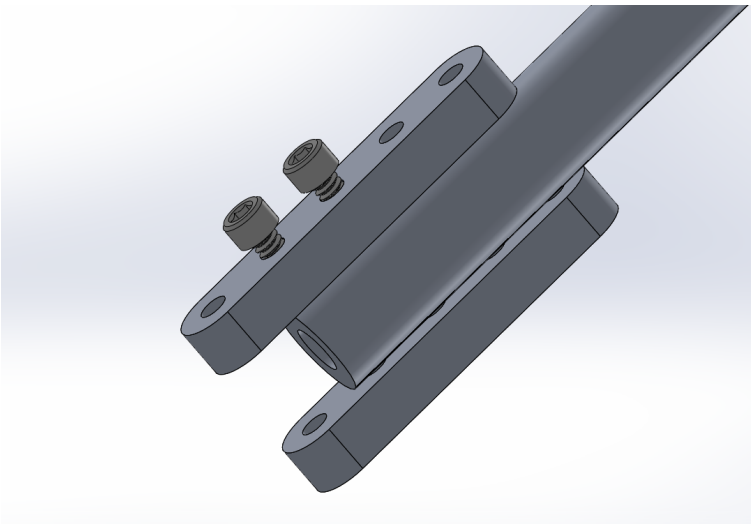

Figure 3: Testing the differential pivot holes

Flip the rod around and repeat the steps for the other side, making sure to align the hole's axes as much as possible such that the holes are all parallel to the previous set.

Now take quantity (2) of the 0.5 x 3 inch hallow rods **S18** and perform the same holes drilled following Figure 4 the holes drilled on just one end of each of them, see drawing below. Test each of the sets individually to make sure the beam will attach to each of them. This makes the **S18B** parts

[1]The hole size on the Aluminum Beam **S21** is halfway between a # 4 and # 6 screw, we used the # 6 screws and just used an allen key to drive the screw through the holes in beam, effectively tapping them as well.

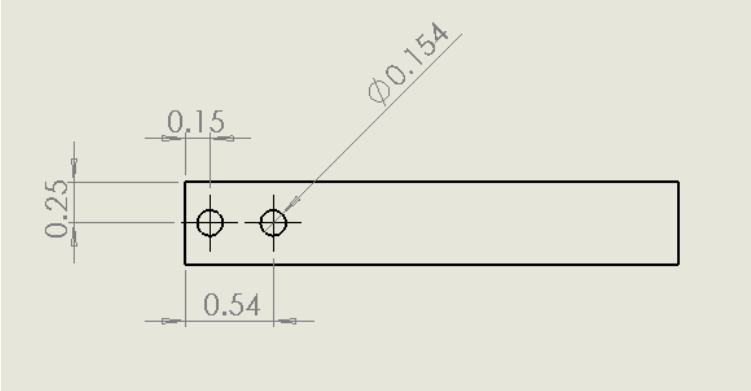

Figure 4: Testing the differential pivot holes

2 Mechanical Assembly

Parts/Tools Necessary

Item	Ref	Qty	Image	Item	Ref	Qty	Image
0.5 Circular Clamping Hub	S13	1		6-32 x 1.25 Button head Screw	B7	8	
0.5 Inch Bottom Bore Clamp	S20	2		4-40 x 1.25 Button head Screw	B9	4	
0.5 x 14 Inch Aluminum Rod	S16B	1		#6-32 Locking Nut	B11	8	
0.5 x 3 Inch Aluminum Rod	S18B	2		#4-40 Locking Nut	B12	4	
5 Hole Aluminum Beam	S21	8		#4-40 Washer	W2	24	
RC Turnbuckles	S32	2		Allen Key set	N/A	1	
6-32 x 1/4 Button head Screw	B1	8		Wrench Set	N/A	1	

1. **Attach Clamping Hubs** Use Screws **B1** to attach the bottom tapped clamping hub **S20** to the single pattern bracket **S8**. Then use screws **B1** to attach the 0.5 inch clamping hub **S20** to the bottom of the pattern bracket.

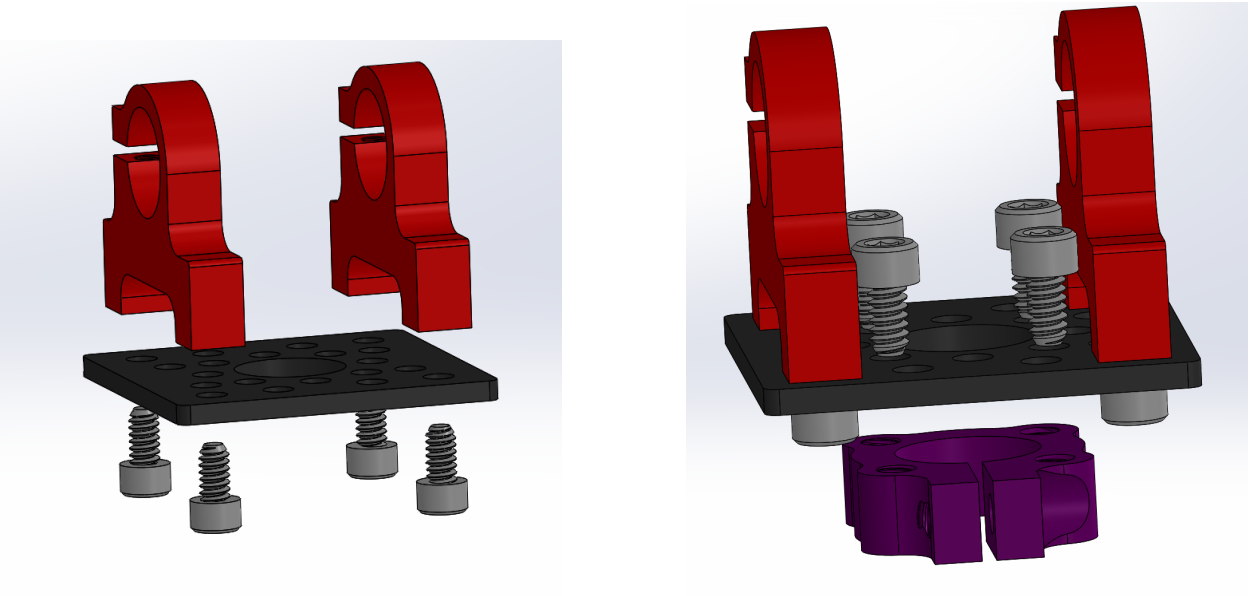

Figure 5: Attaching clamping hub

2. **Differential Pivot:** Using modified 3inch aluminum rod **S18A**, aluminum beams **S21**, washers **W2**, screws **B7** and **B9**, hex nuts **B11** and **B12** attach the turnbuckle **S32** to the rod as shown. The outtermost screw is the #4 screw, the others are #6.

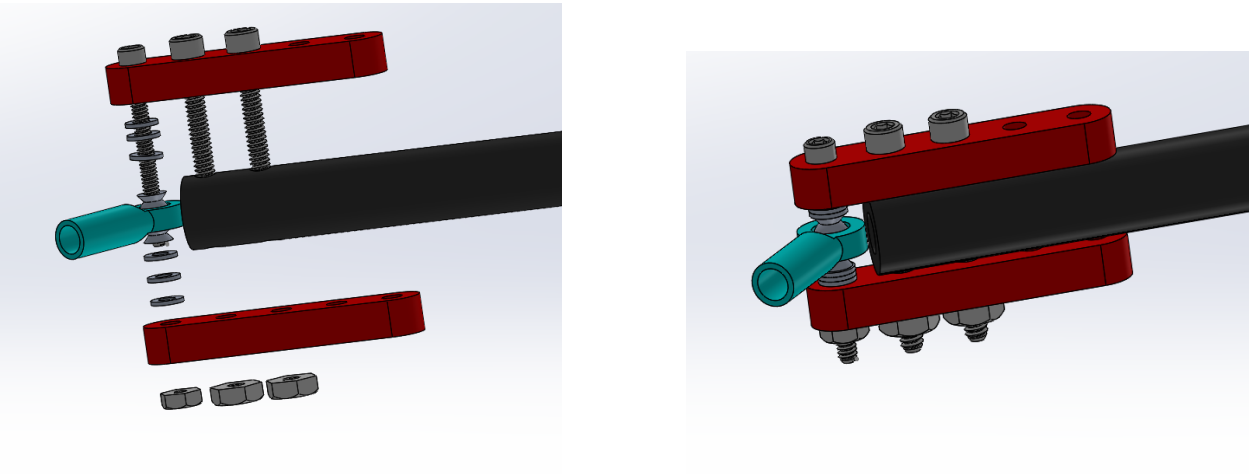

Figure 6: Attaching the turnbuckle

3. **Differential Pivot Cont:** Pass the 13.5inch rod through the clamping hubs on the differential pivot on the body assembly, making sure to center this as much as possible. Then repeat step 2 for the other side of the differential pivot. If necessary unscrew the

turnbuckles in the middle to insert the rods into place, then screw the turnbuckle back together.

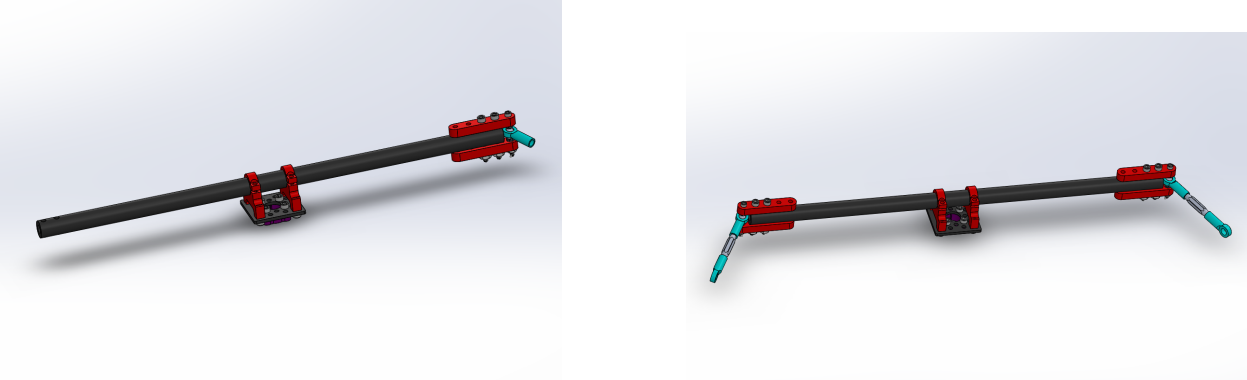

Figure 7: Attaching the top of the Differential Pivot

4. **Differential Pivot Vertical rods:** Perform Step 2 for the the 3 Inch Aluminum Rod **S18B**. Finally attach all the pieces of the turnbuckles together at the end if necessary.

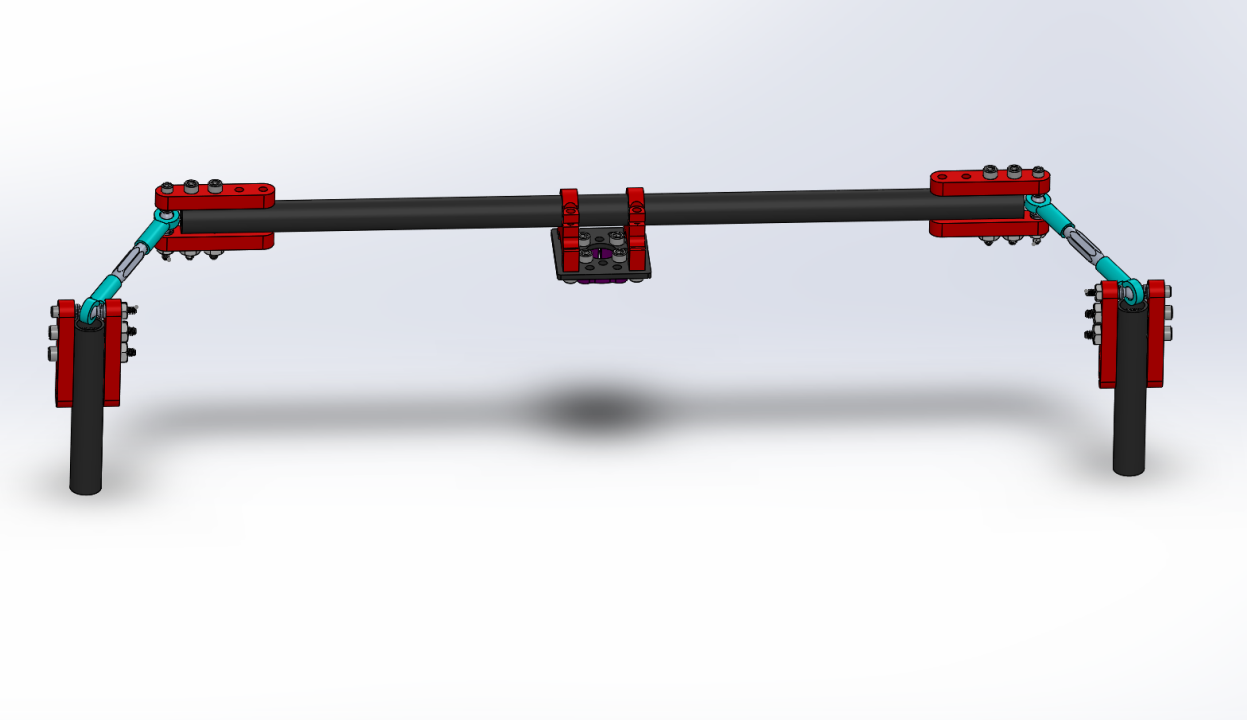

Figure 8: Final Differential Pivot Assembly