

GEORGIA INSTITUTE OF TECHNOLOGY

PROJECT REPORT

GT Pioneer

Author:
Vishakh KUMAR

Instructor:
Dr. Raghuram PUCHA

*A report submitted in fulfillment of the requirements
for the team project of ME 1770*

in the

Group X
George W Woodruff School of Mechanical Engineering

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Chapter 1

Manufacturing Working Drawing

Insert spiel about ManufacturingWorkingDrawing.

- **1.1 Working Drawings**

A product cannot be counted as finished unless there are plans to manufacture that product. While the plans for our product is definitely beyond the ability of a student run organization (or small countries), we've added working drawings to highlight important features and dimensions of our work.

- **1.2 Assembly Instruction Manual**

While our product is unlikely to ever reach the manufacturing line, it's prudent to think about how products are manufactured and assembled in order to create functional products. In that spirit, we've created assembly instructions for an intrepid student to follow should s/he ever attempt building a Mars Rover.

- **1.3 Exploded View**

- **1.4 Part List**

1.1 Working Drawings

1.1.1 Joystick

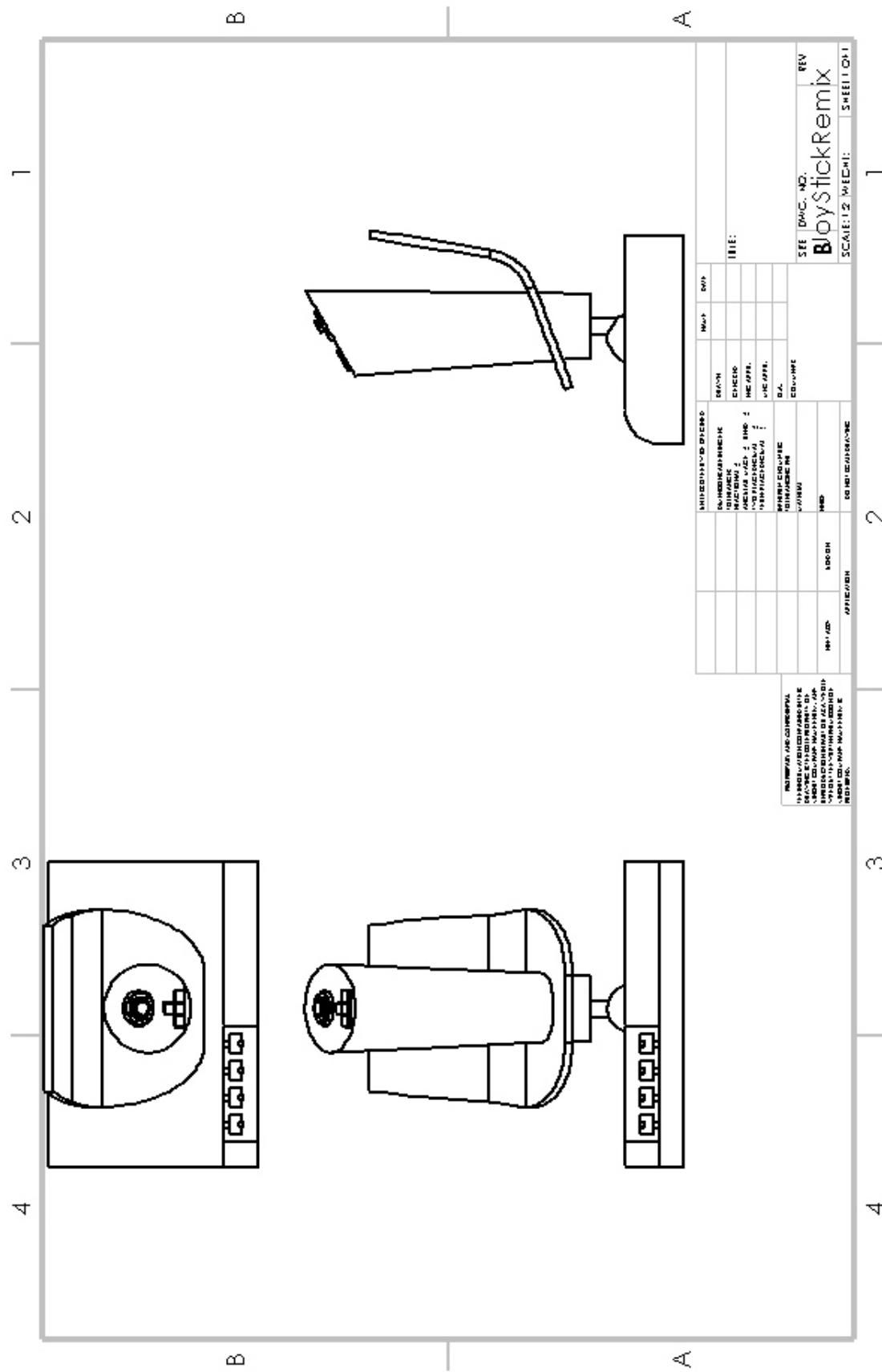


FIGURE 1.1: Kumar, Vishakh: JoyStick Full Assembly

1.1.2 Emergency Switch

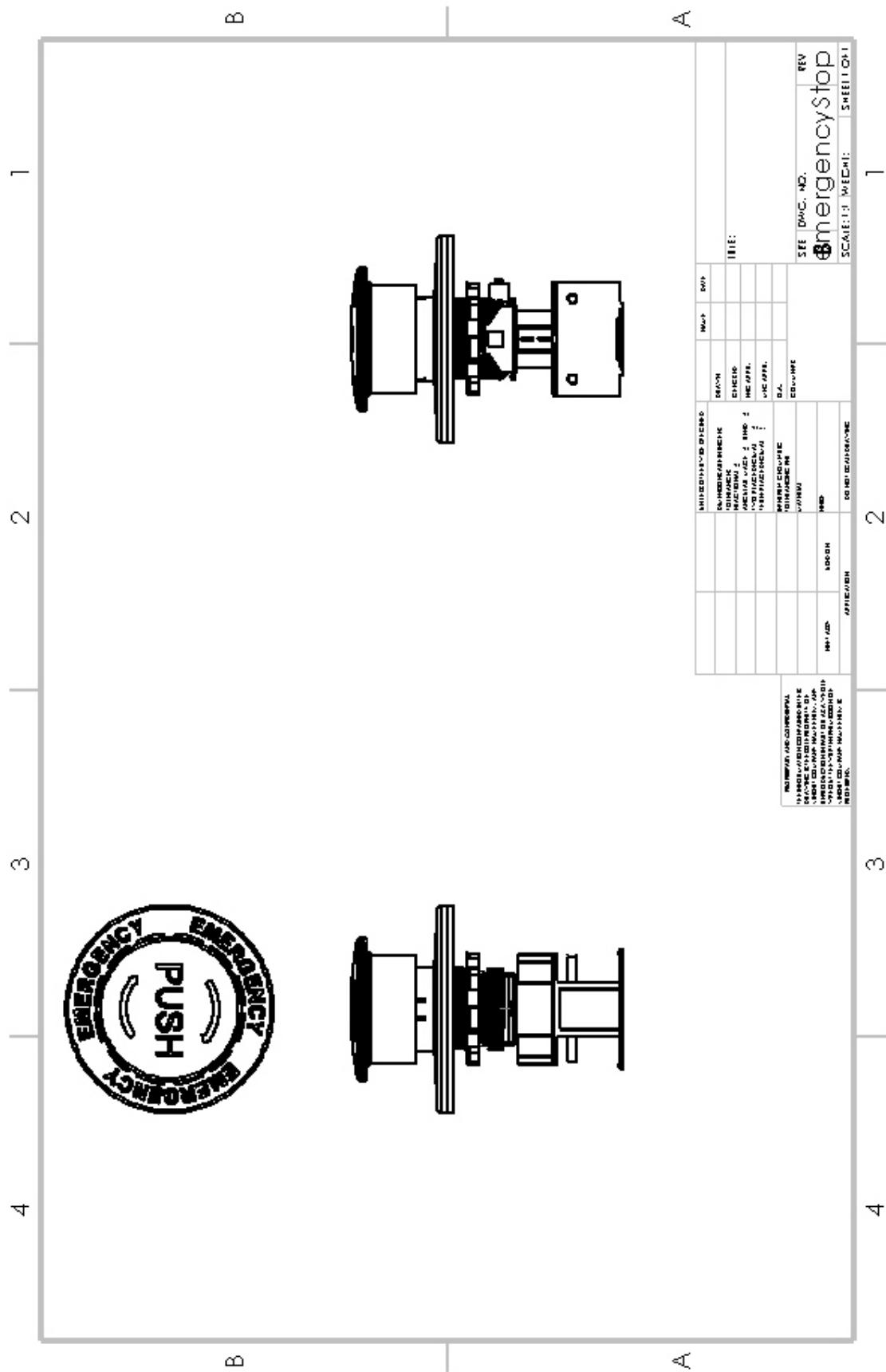


FIGURE 1.2: Kumar, Vishakh: Emergency Switch

1.1.3 Seat

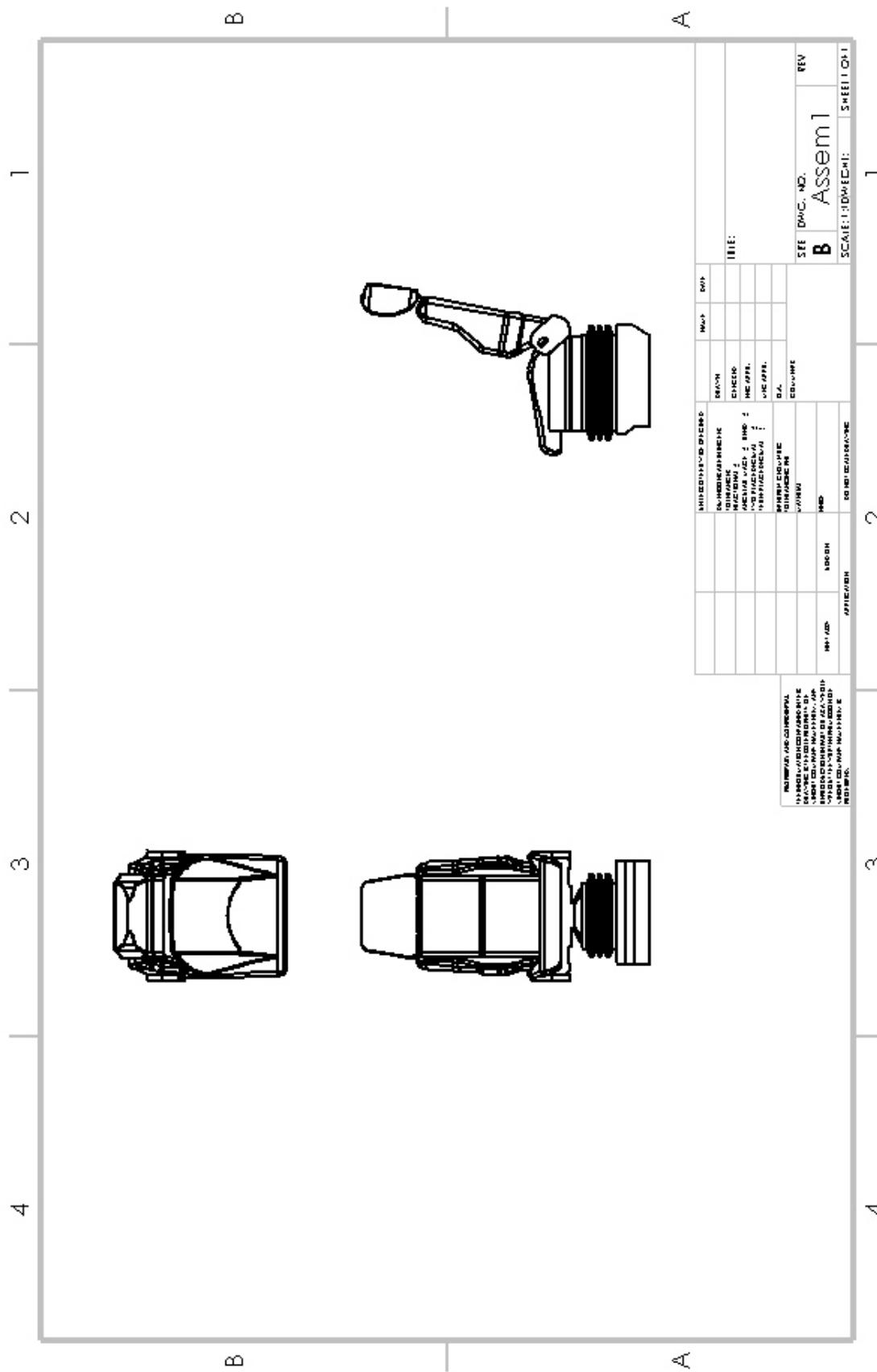


FIGURE 1.3: Kumar, Vishakh: Seat Full Assembly

1.1.4 Antenna

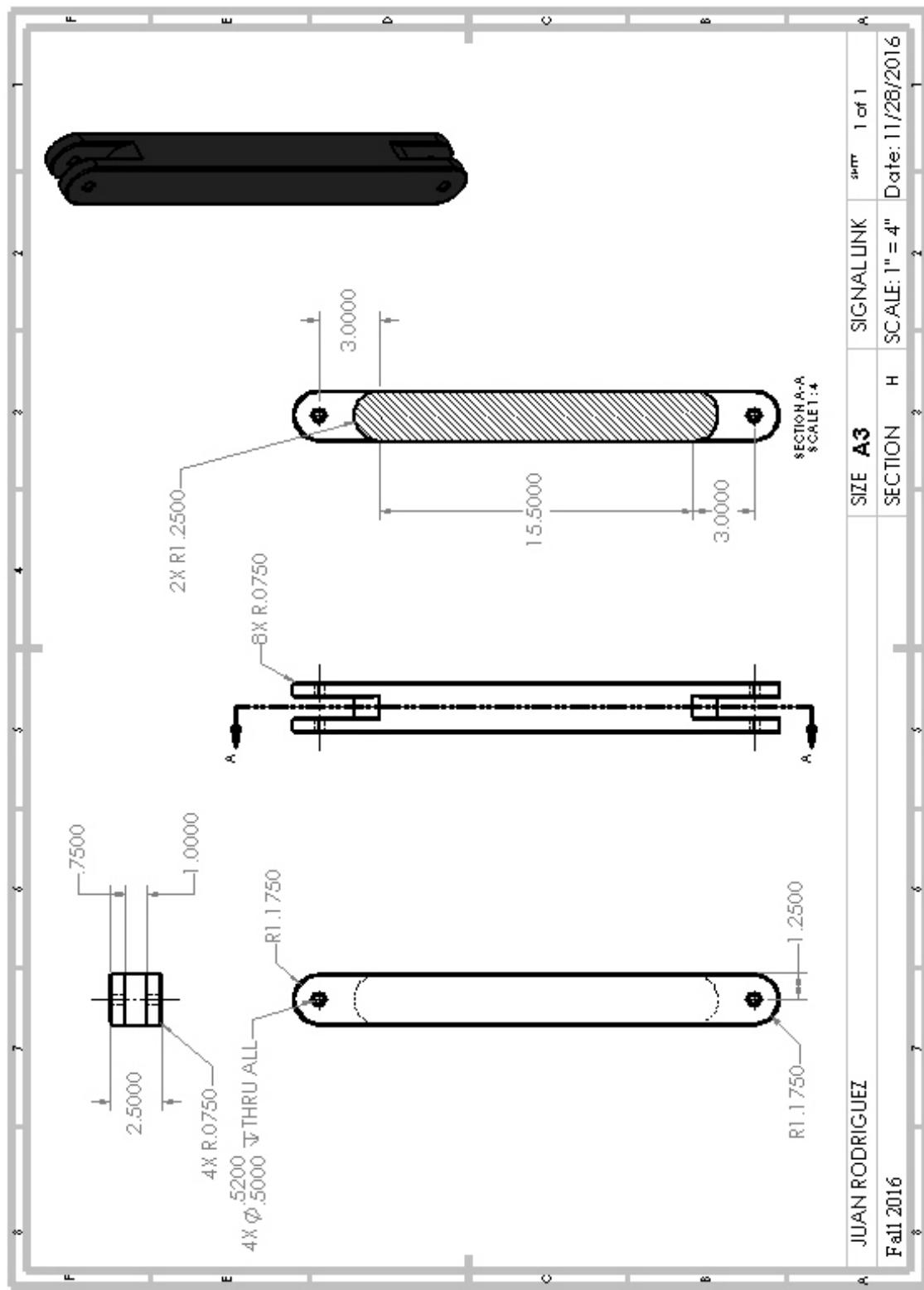


FIGURE 1.4: Signal Bar

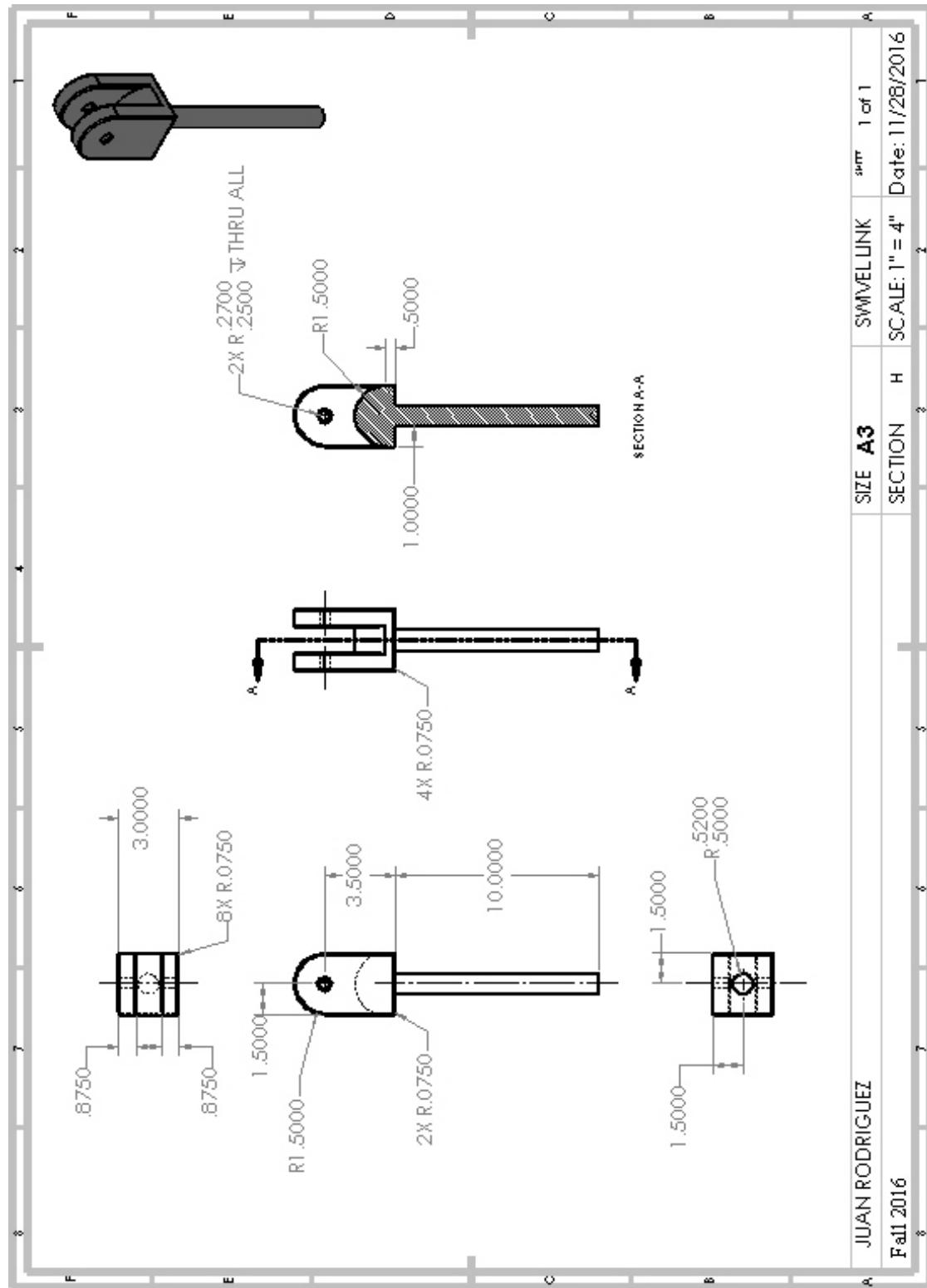


FIGURE 1.5: Swivel Link

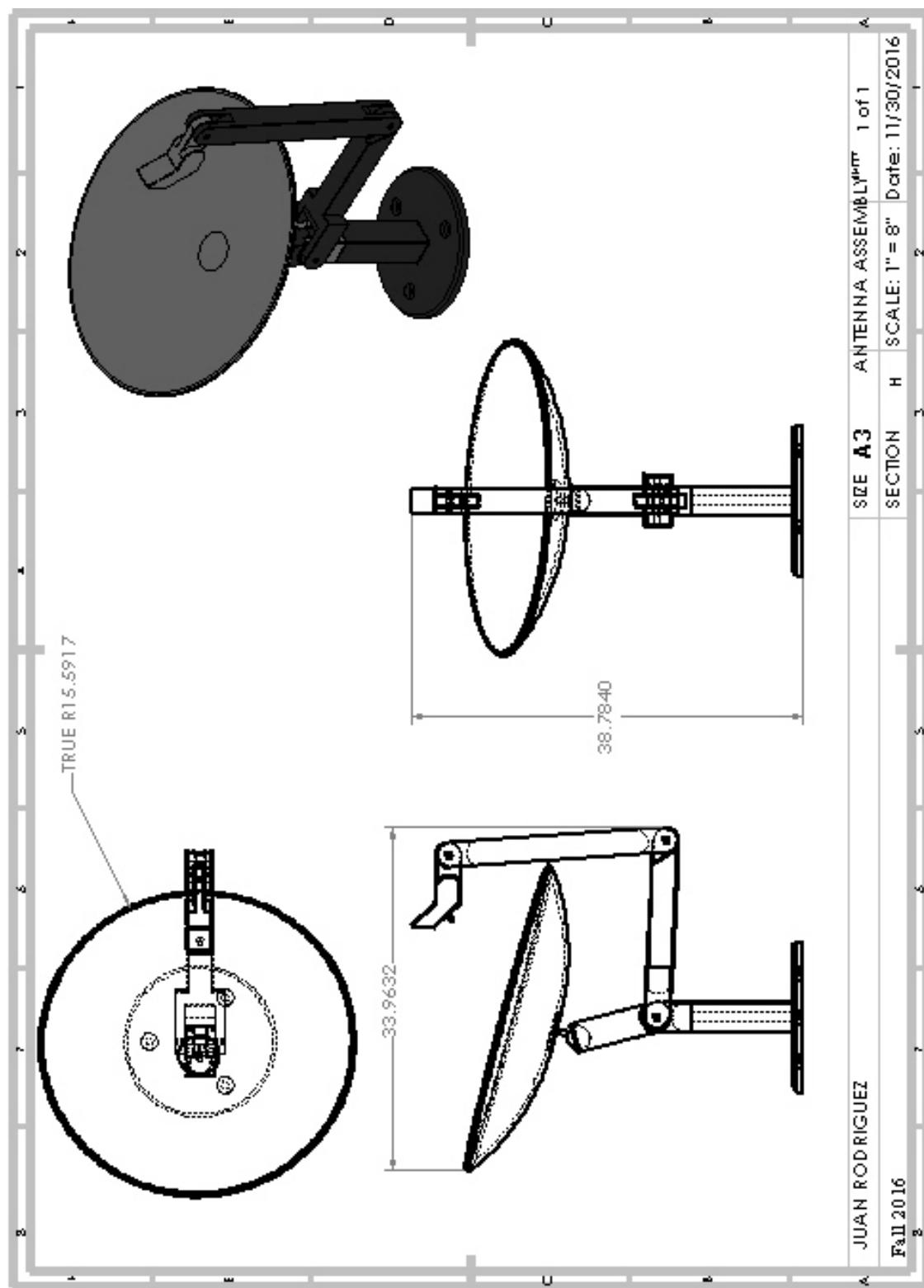


FIGURE 1.6: Antenna Assembly

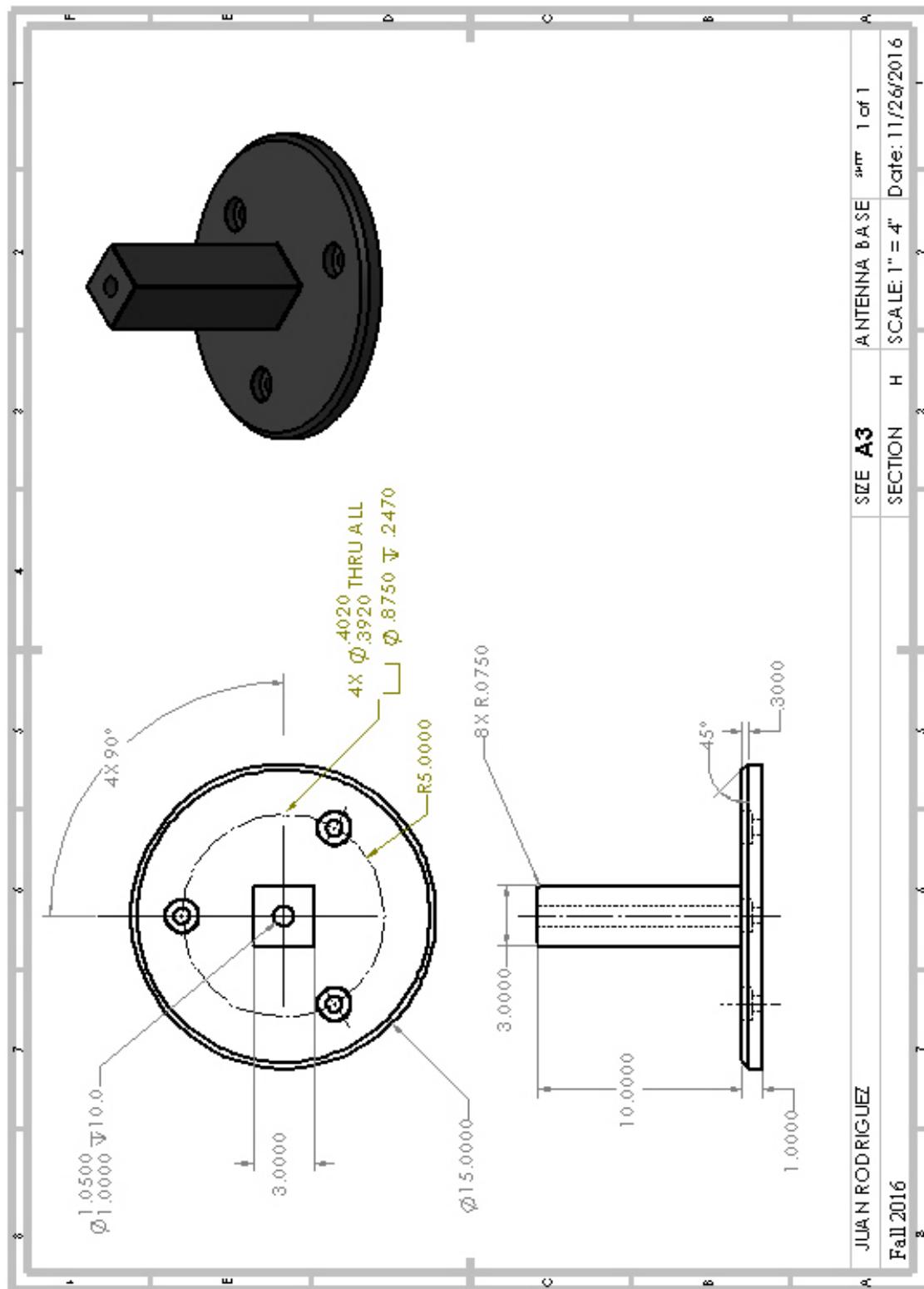


FIGURE 1.7: Antenna Base

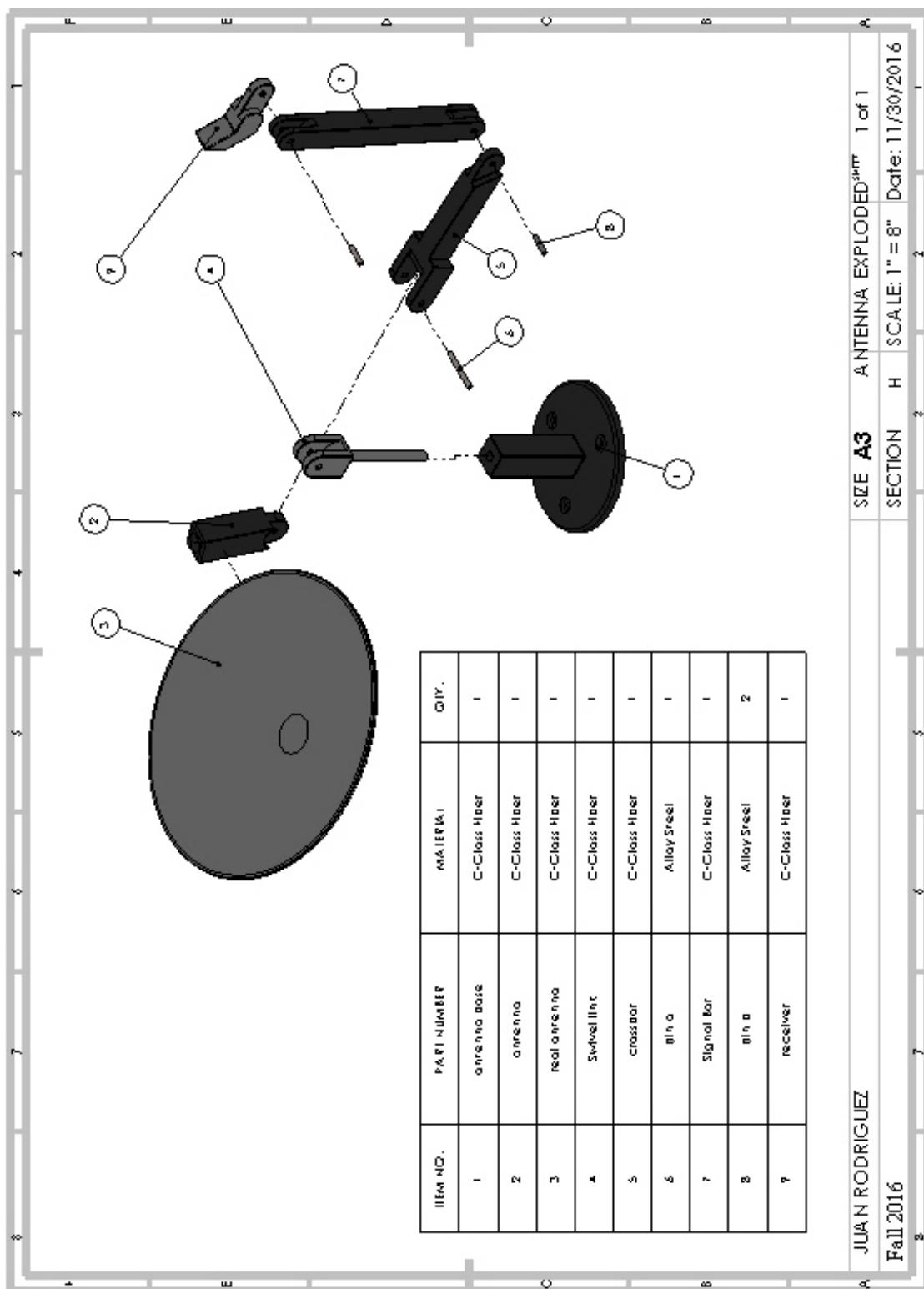


FIGURE 1.8: Antenna Exploded

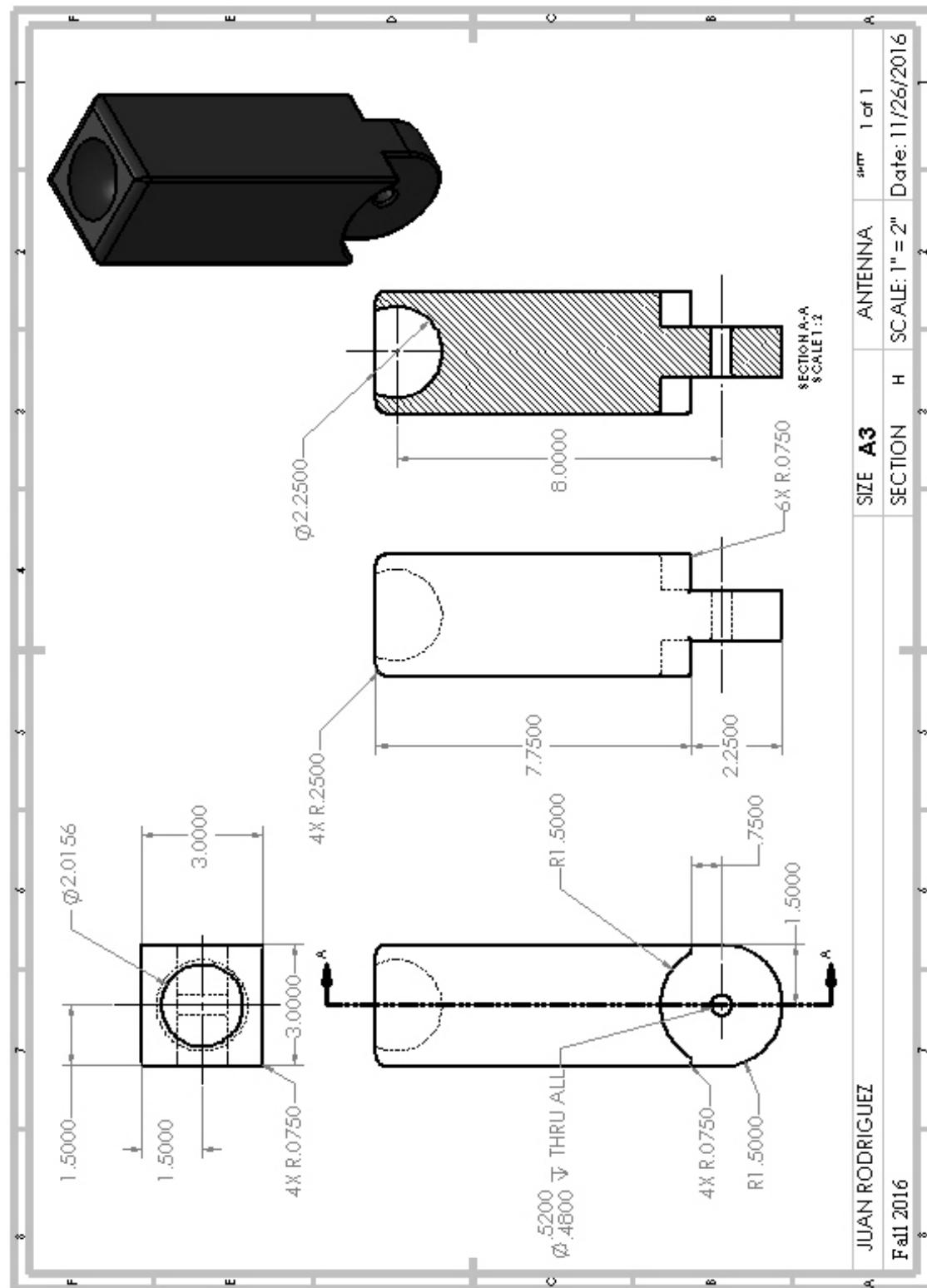


FIGURE 1.9: Antenna Support

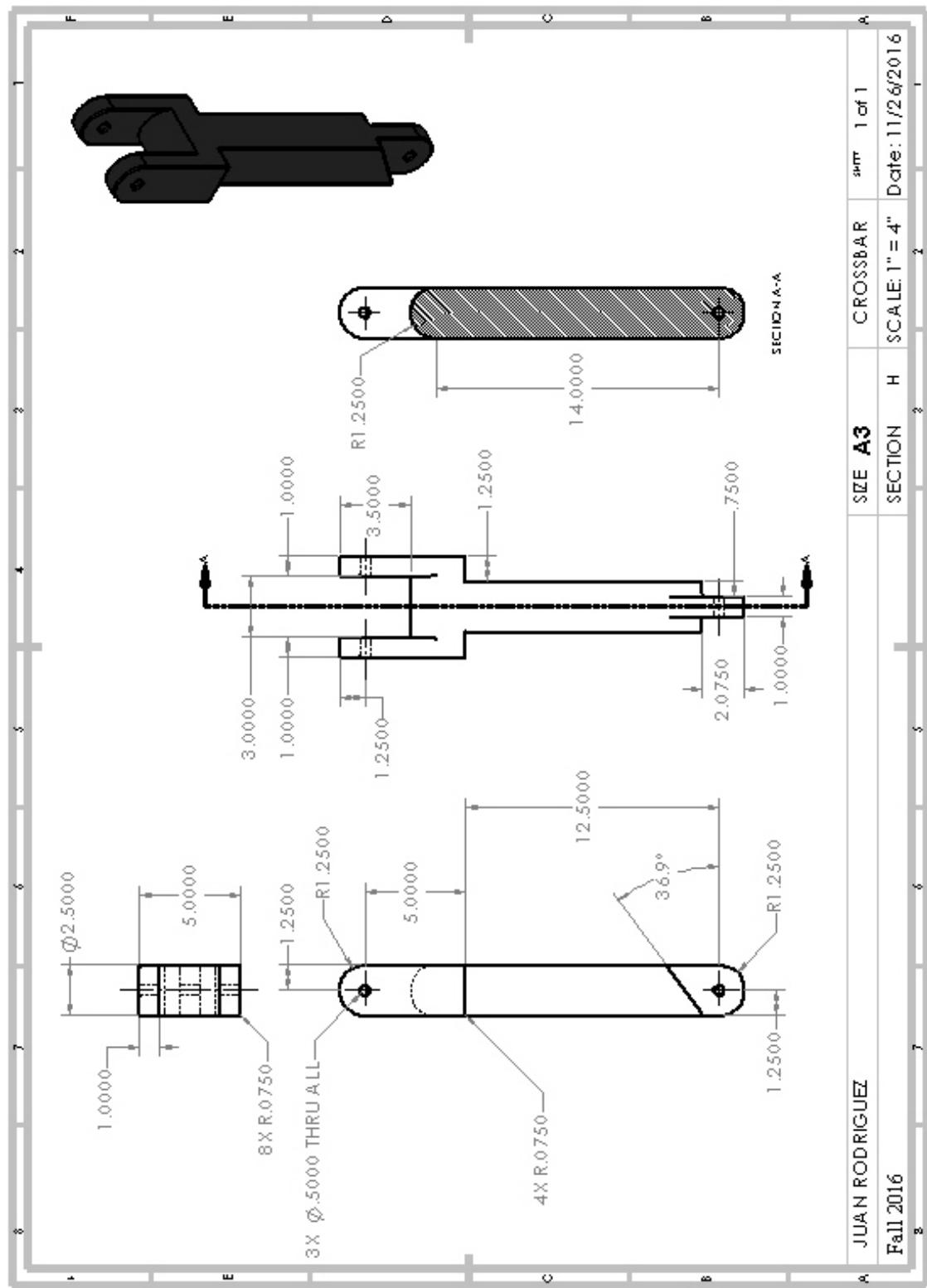


FIGURE 1.10: Crossbar

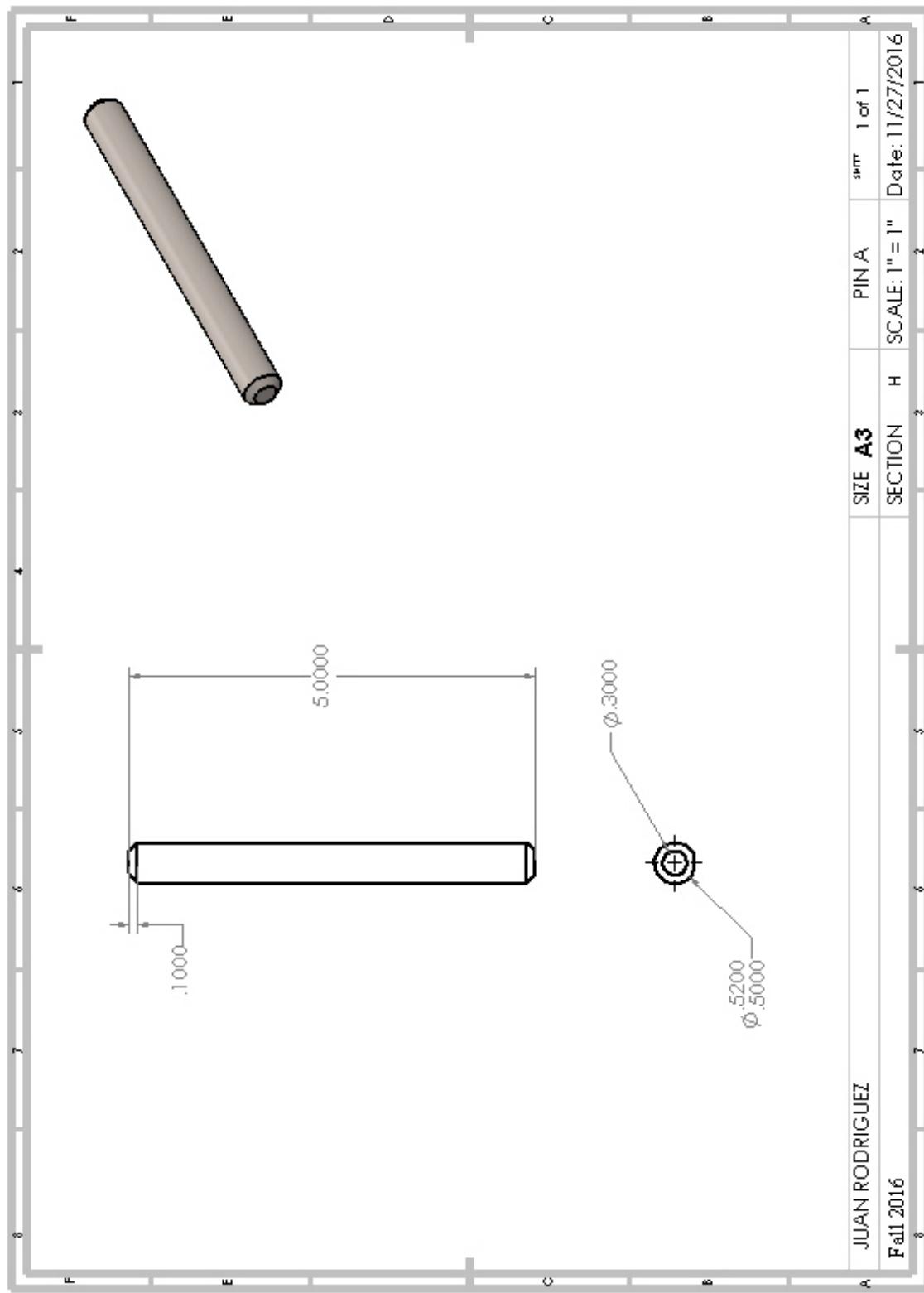


FIGURE 1.11: Pin A

1.1.5 Chassis

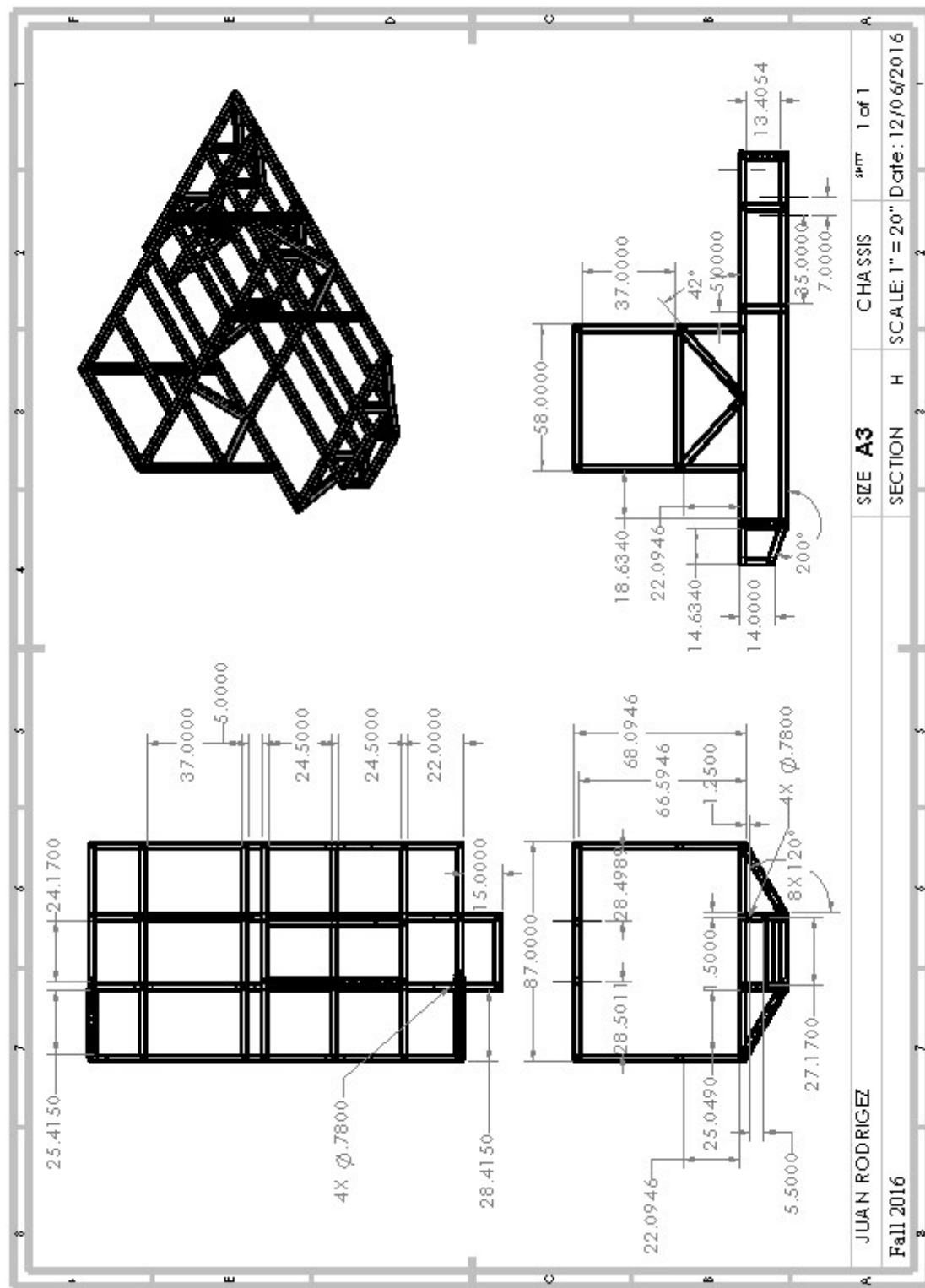


FIGURE 1.12: Rodriguez, Juan: Chassis

1.1.6 Cabinet Drawer

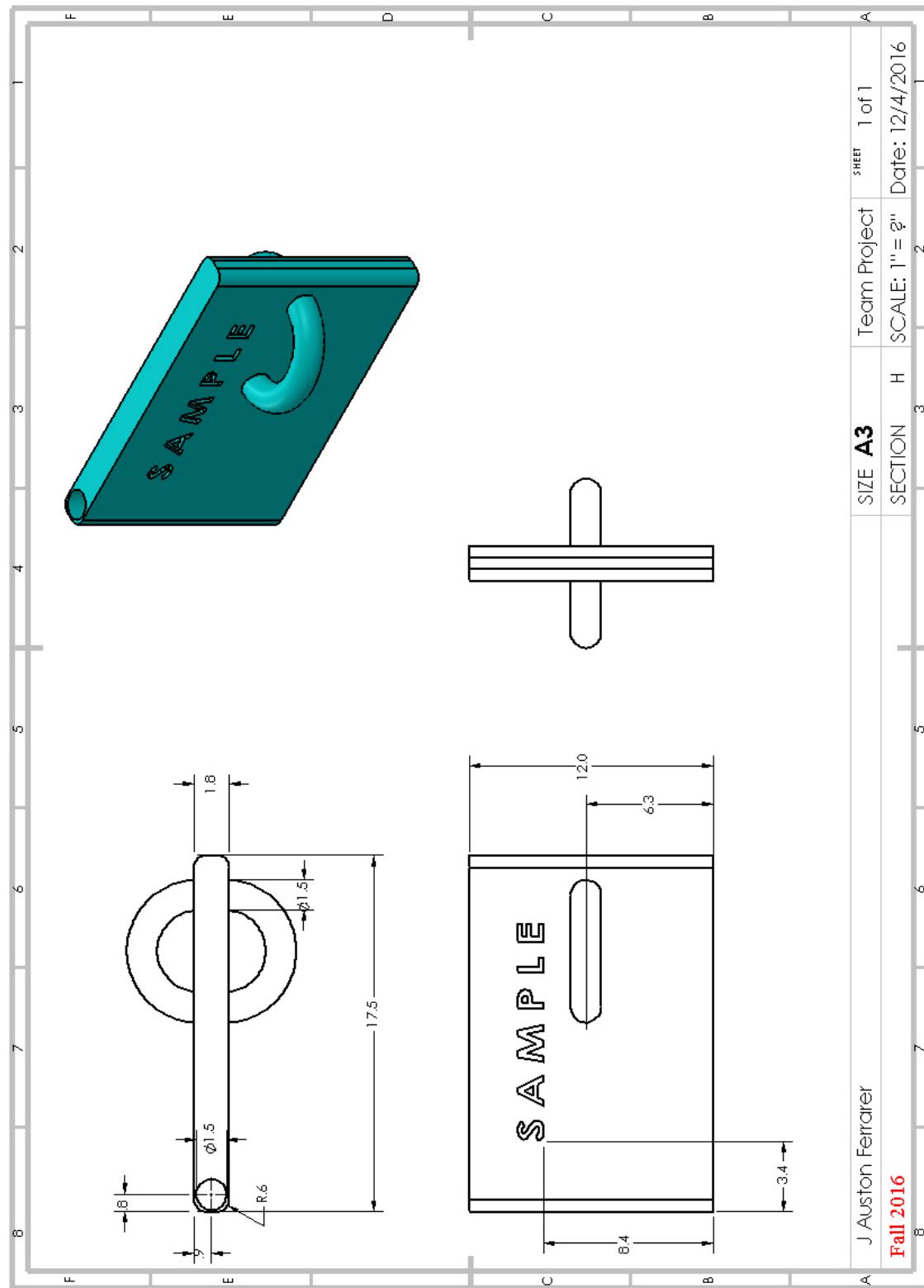


FIGURE 1.13: Rodriguez, Juan: Cabinet Drawer

1.1.7 Door and Hinge

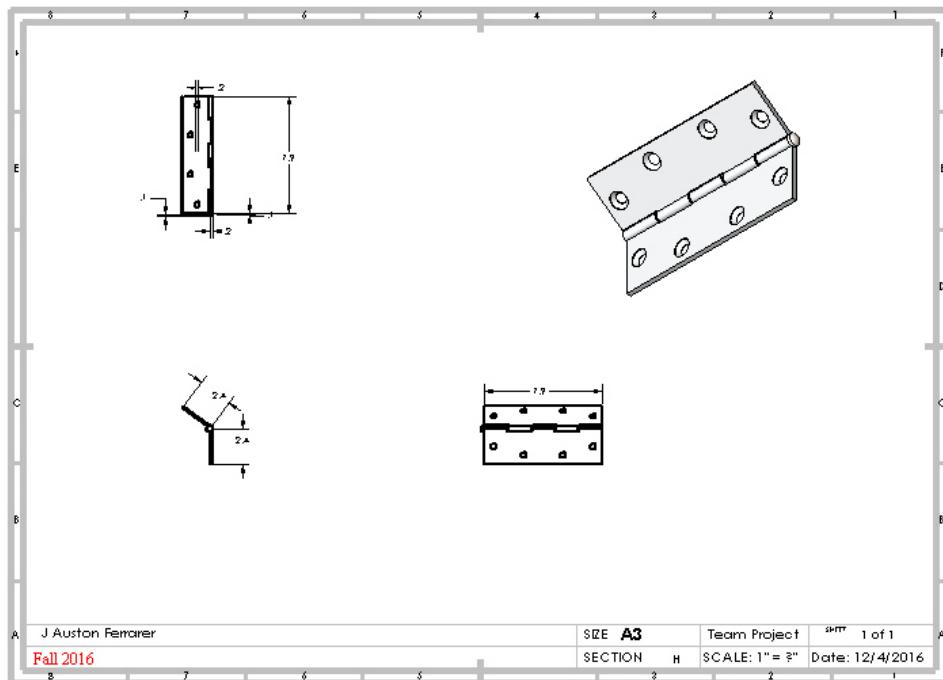


FIGURE 1.14: Ferrarer, Auston: Complete Hinge

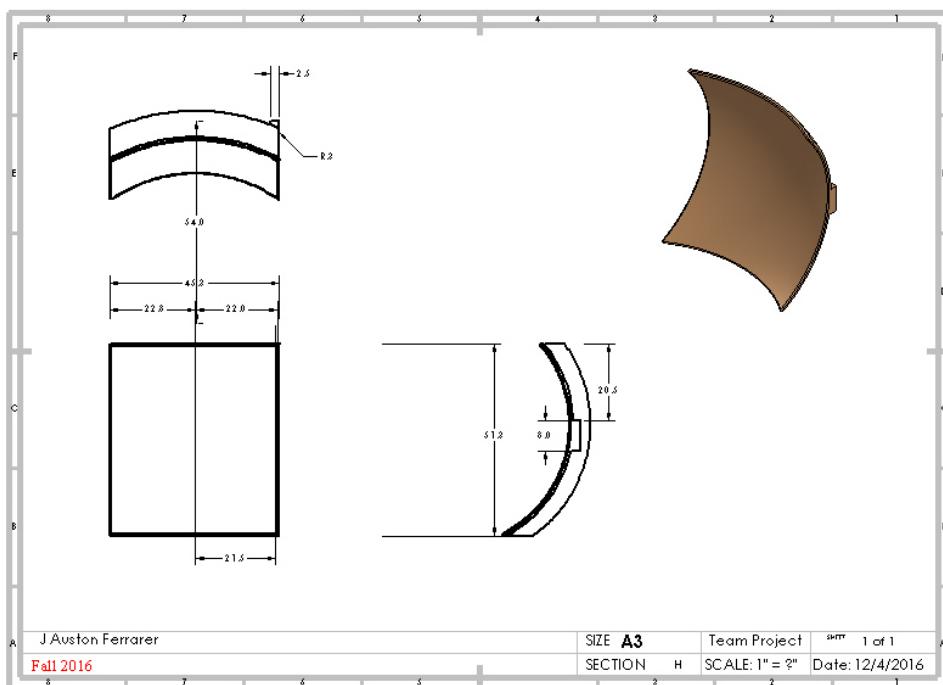


FIGURE 1.15: Ferrarer, Auston: Exterior Door

1.1.8 Exterior Shell

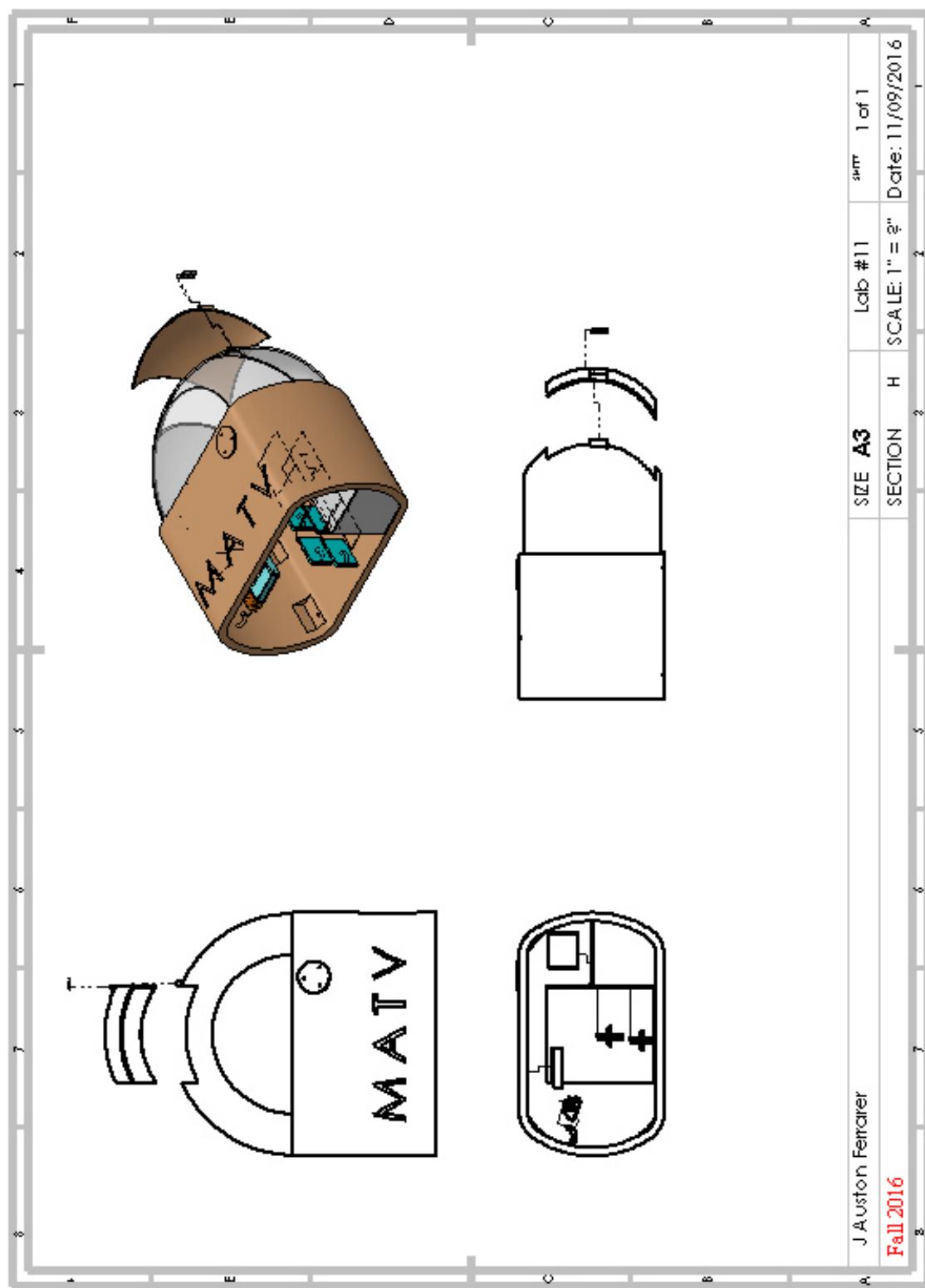


FIGURE 1.16: Ferrarer, Auston: Assembly

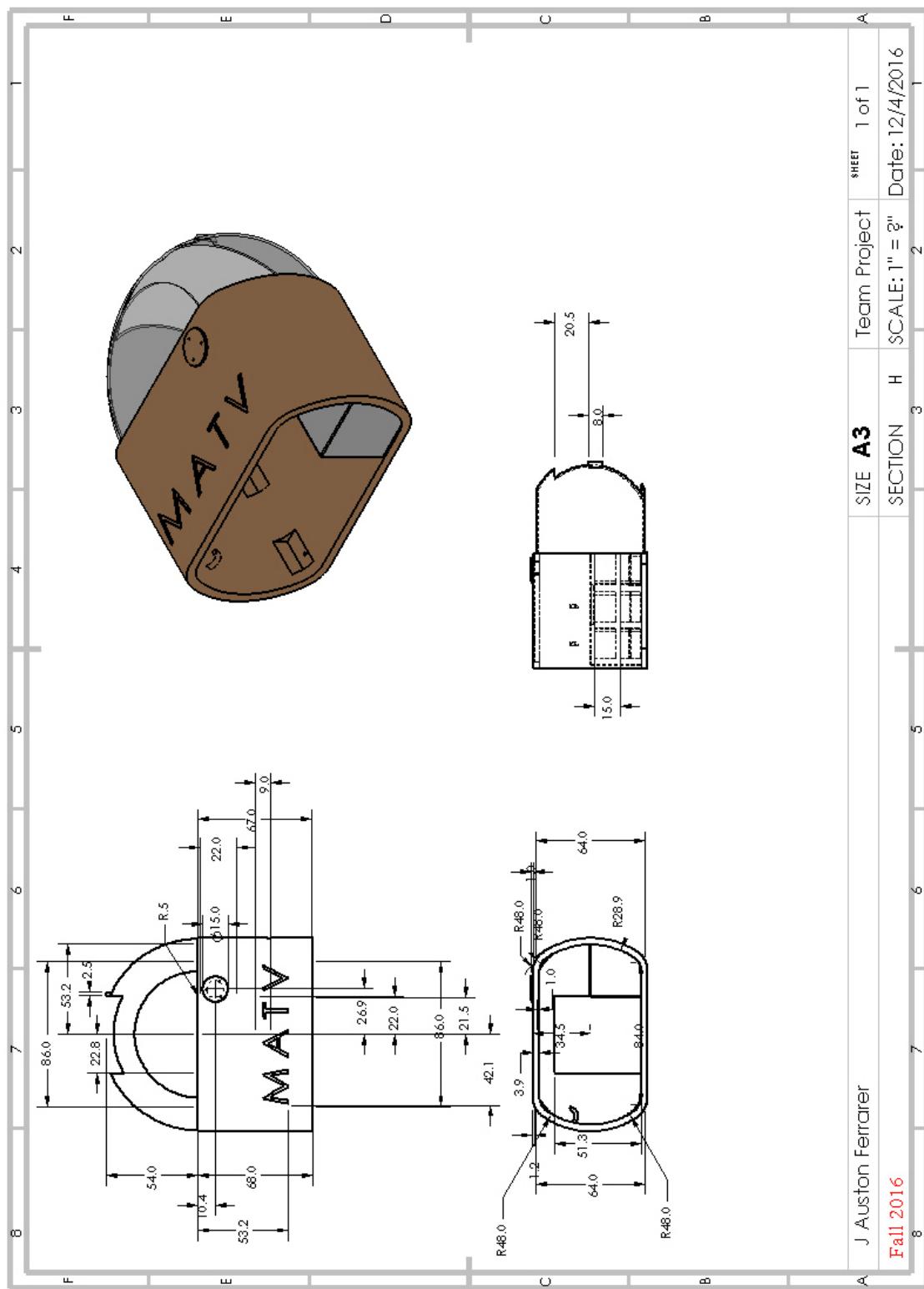


FIGURE 1.17: Ferrarer, Auston: Full Shell

1.1.9 Helmet

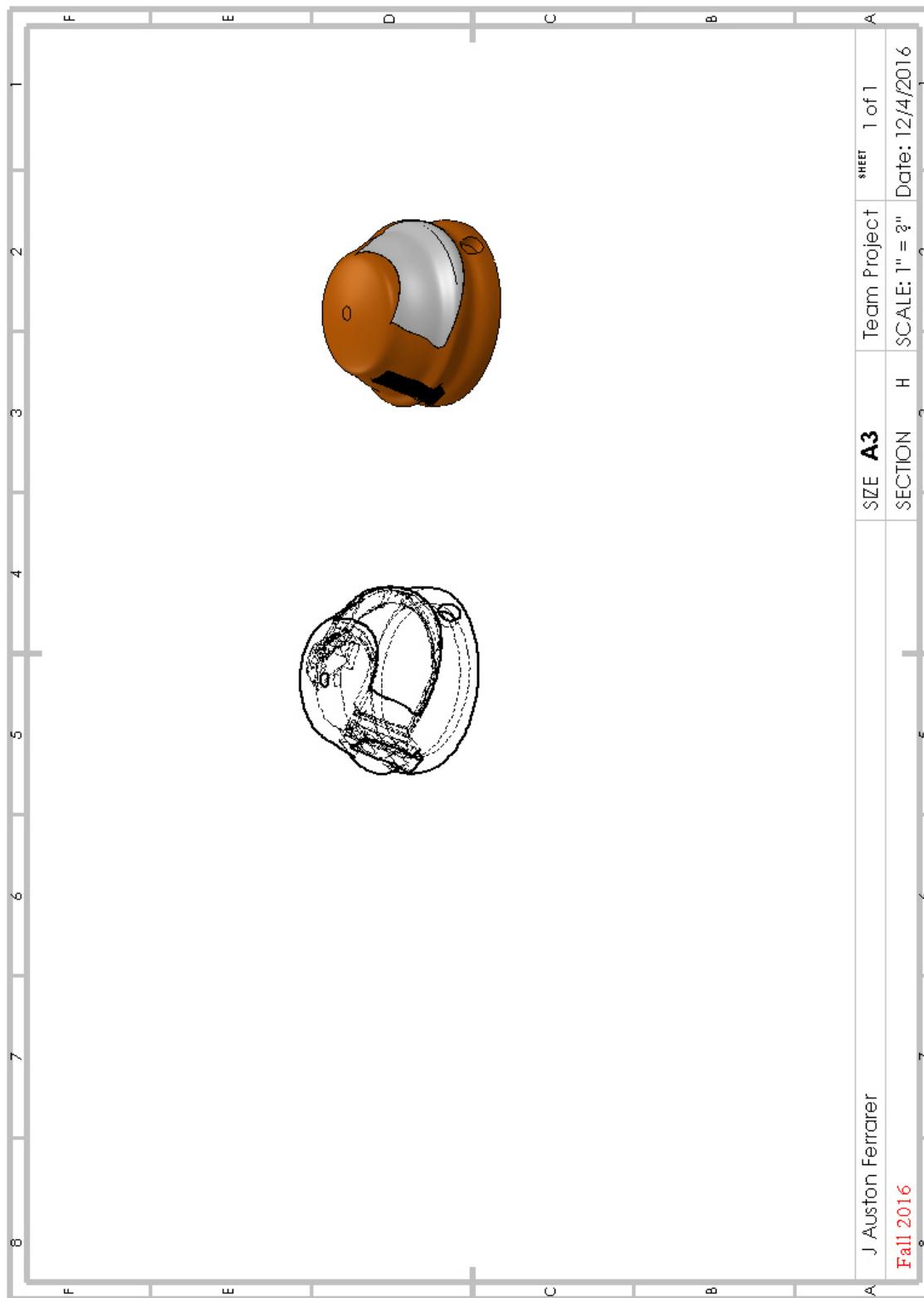


FIGURE 1.18: Ferrarer, Auston: Helmet Full Assembly

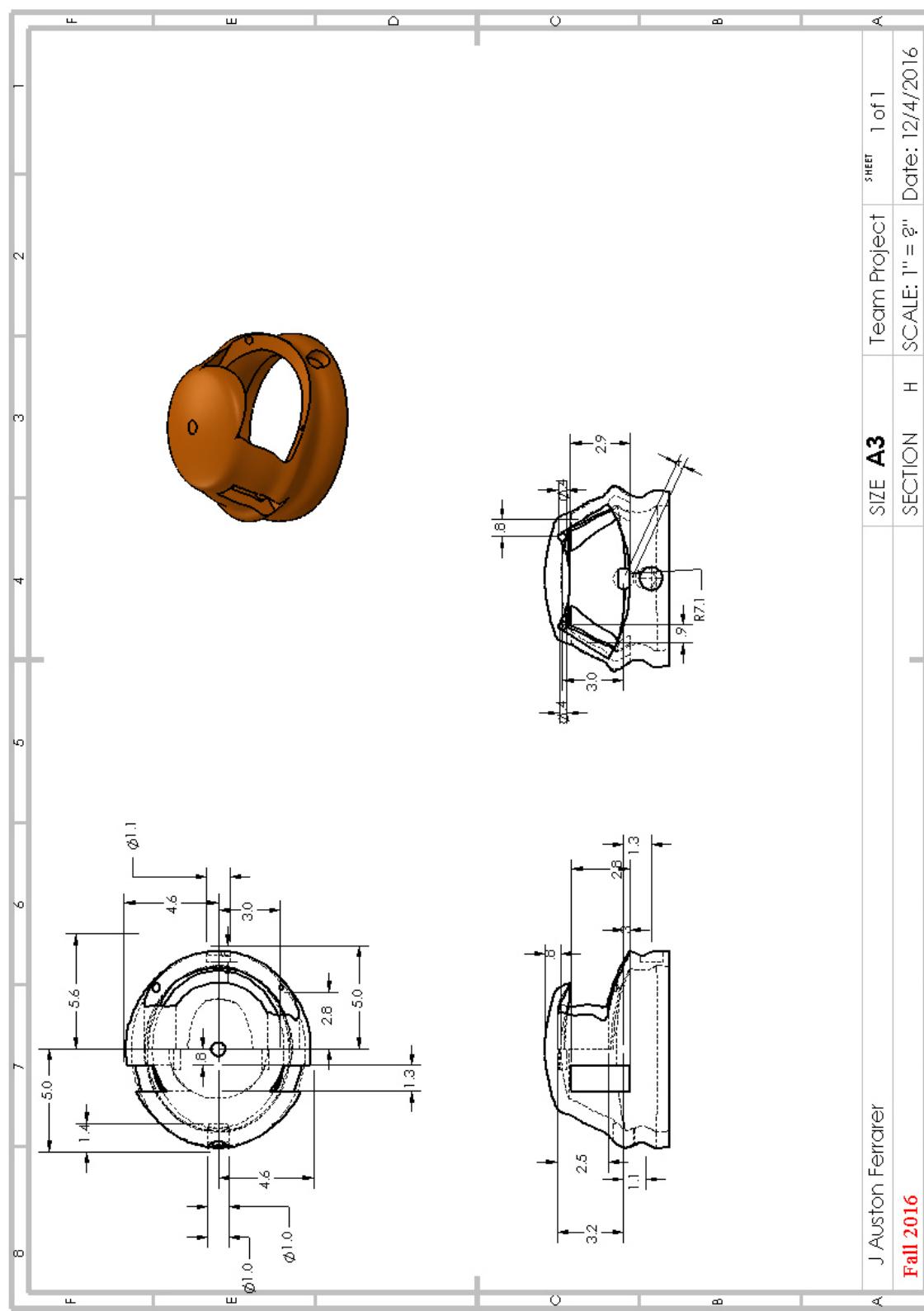


FIGURE 1.19: Ferrarer, Auston: Helmet Shell

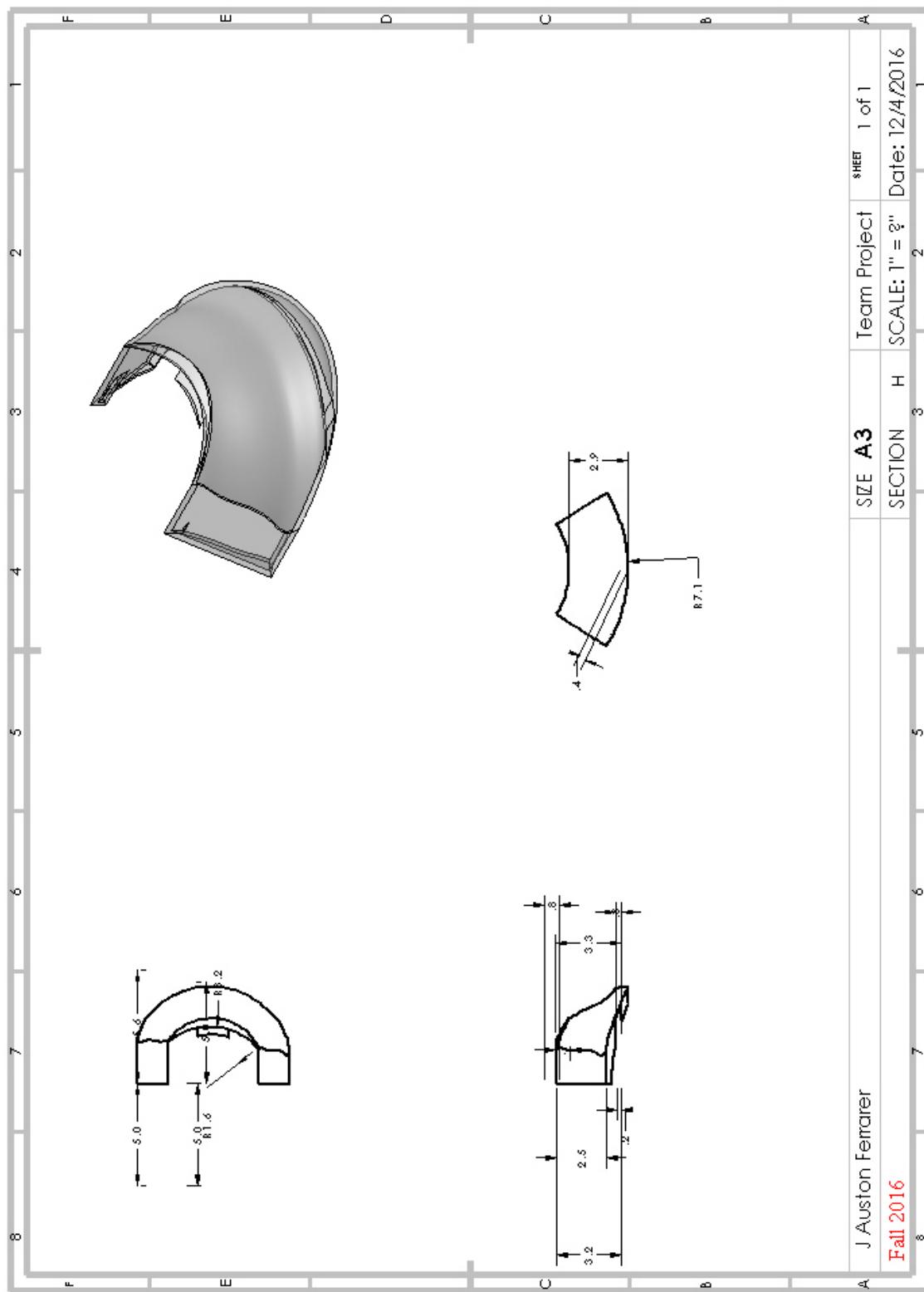


FIGURE 1.20: Ferrarer, Auston: Helmet Visor

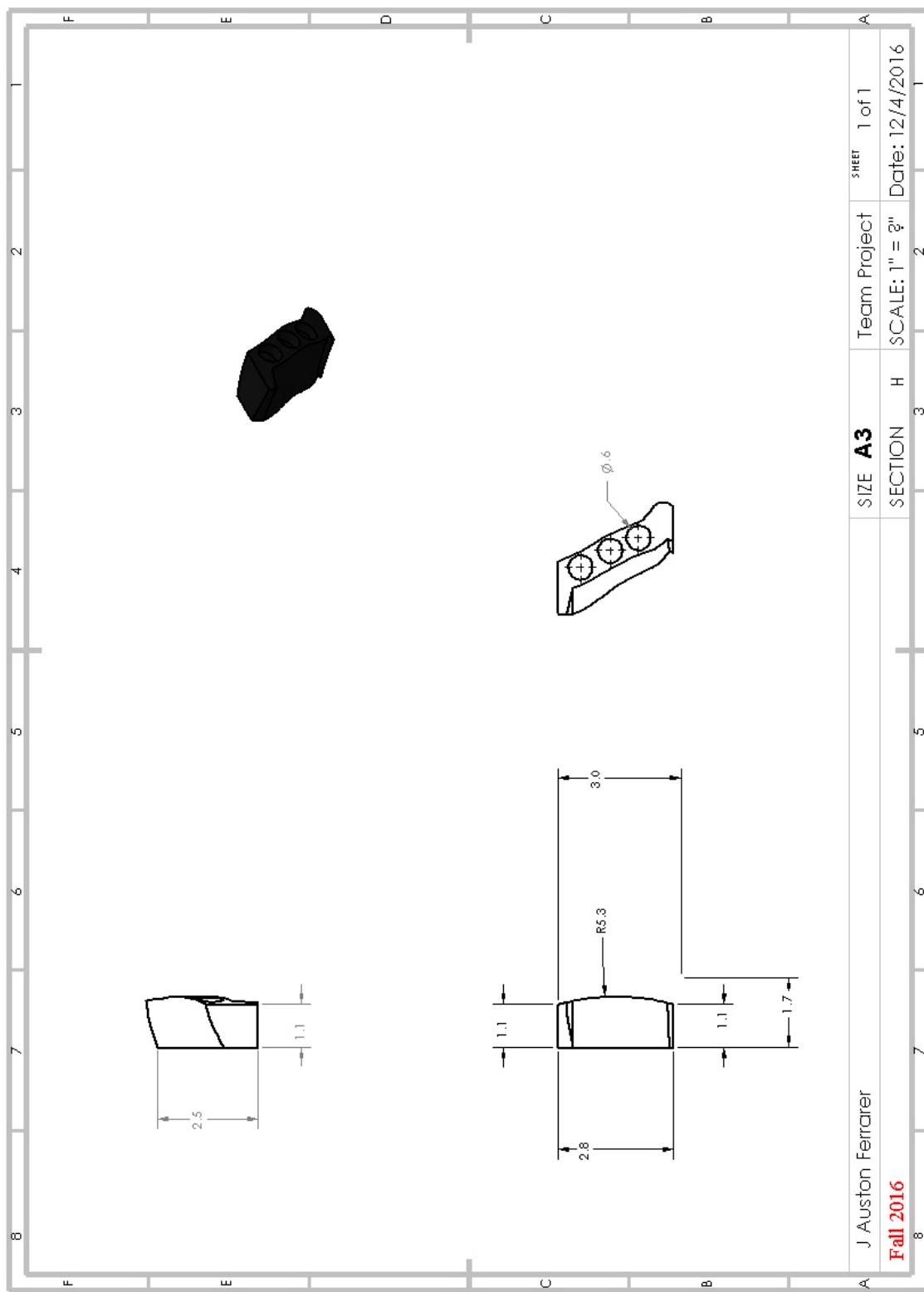


FIGURE 1.21: Ferrarer, Auston: Side Lights

1.1.10 Grabber

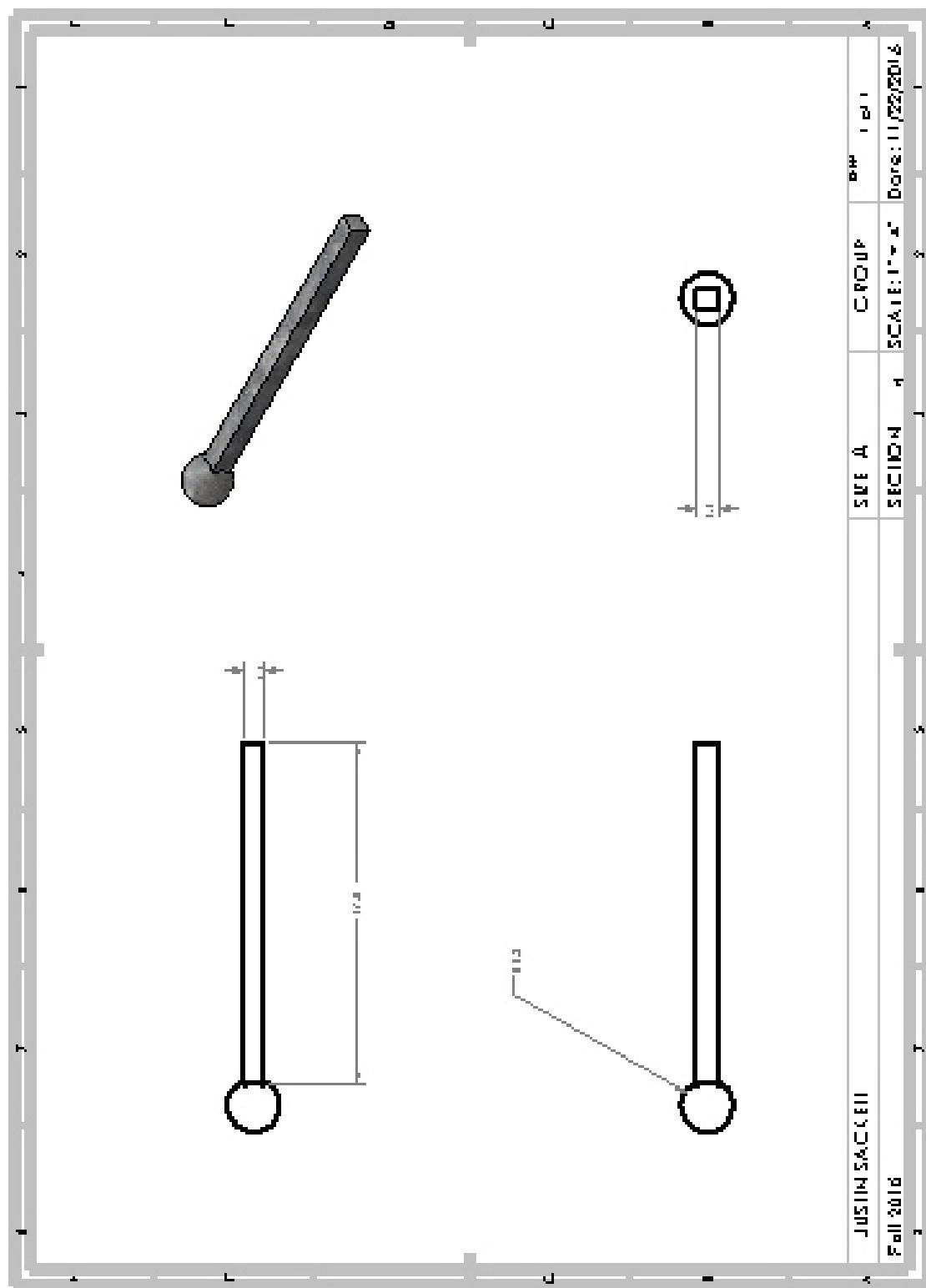


FIGURE 1.22: Sackett, Justin: Ball Rod

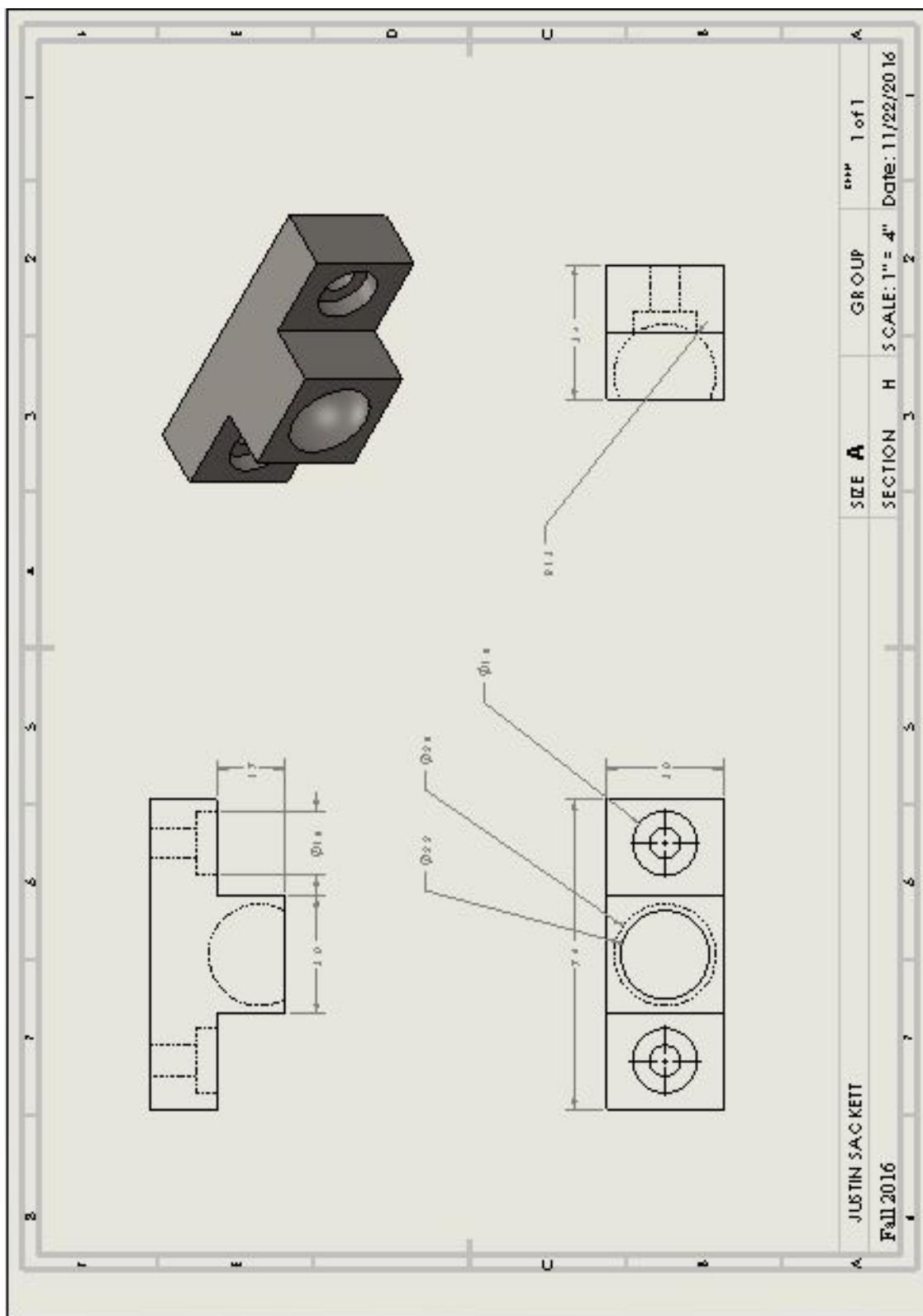


FIGURE 1.23: Sackett, Justin: Ball Socket

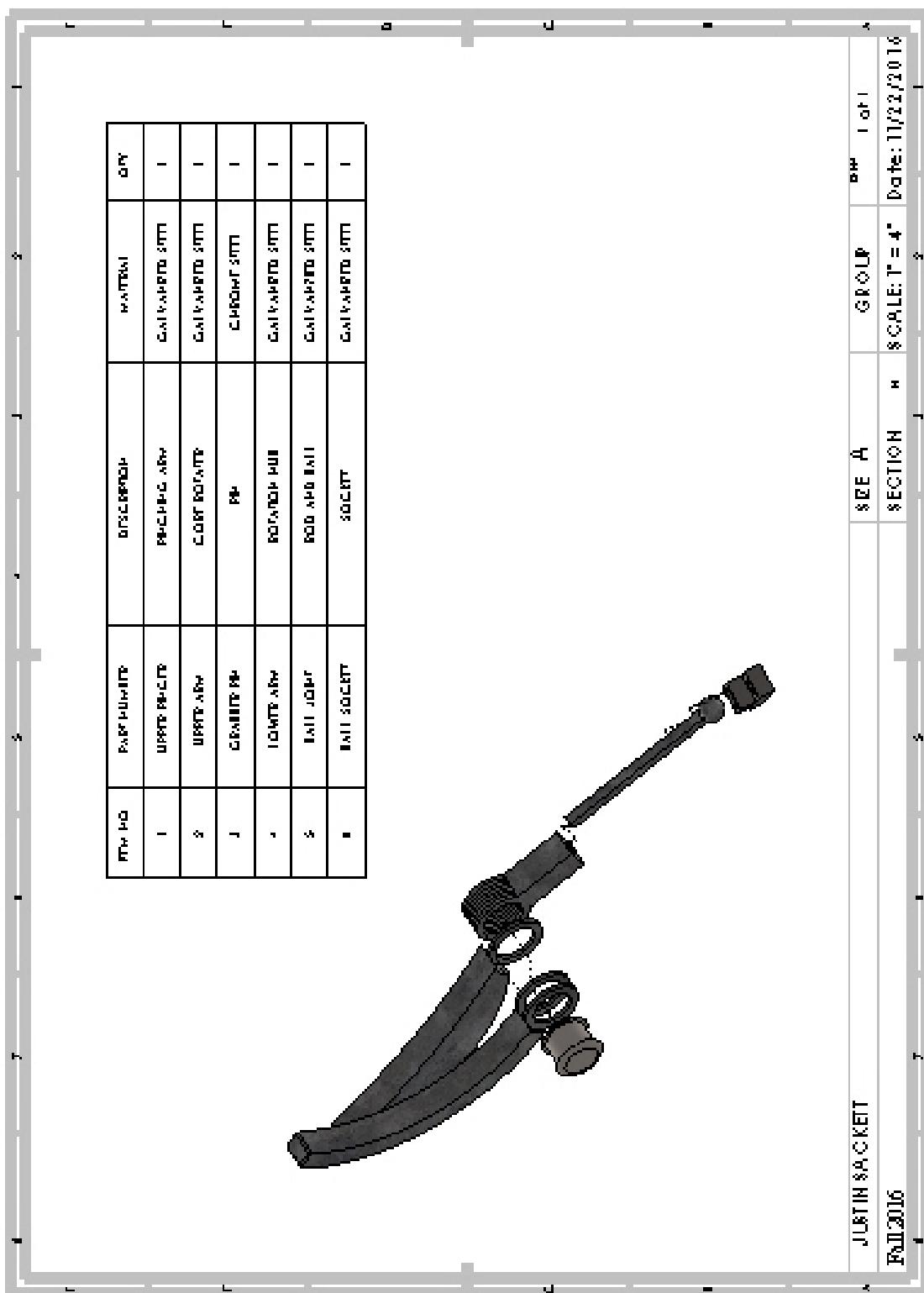


FIGURE 1.24: Sackett, Justin: Grabber Exploded

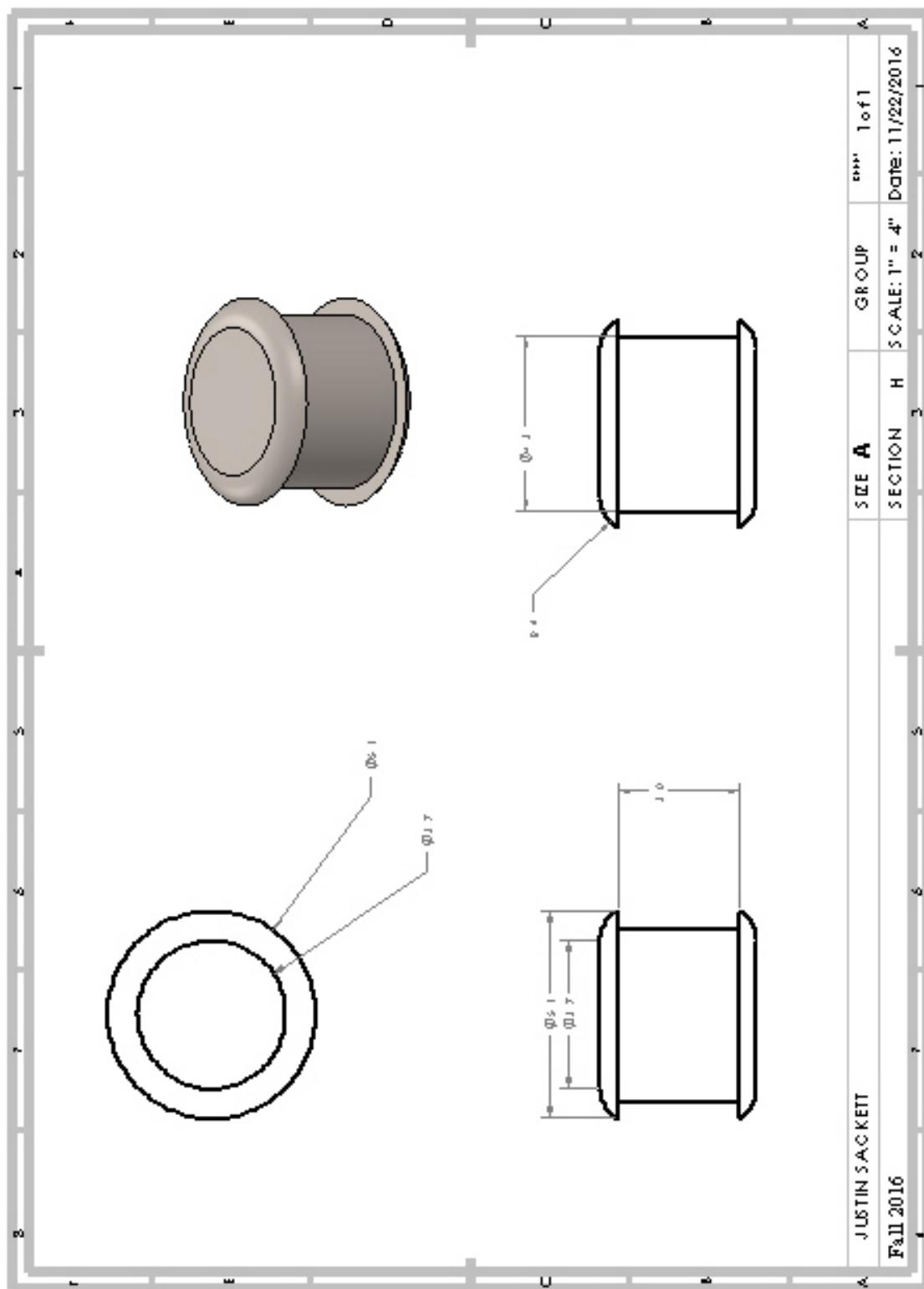


FIGURE 1.25: Sackett, Justin: Grabber Pin

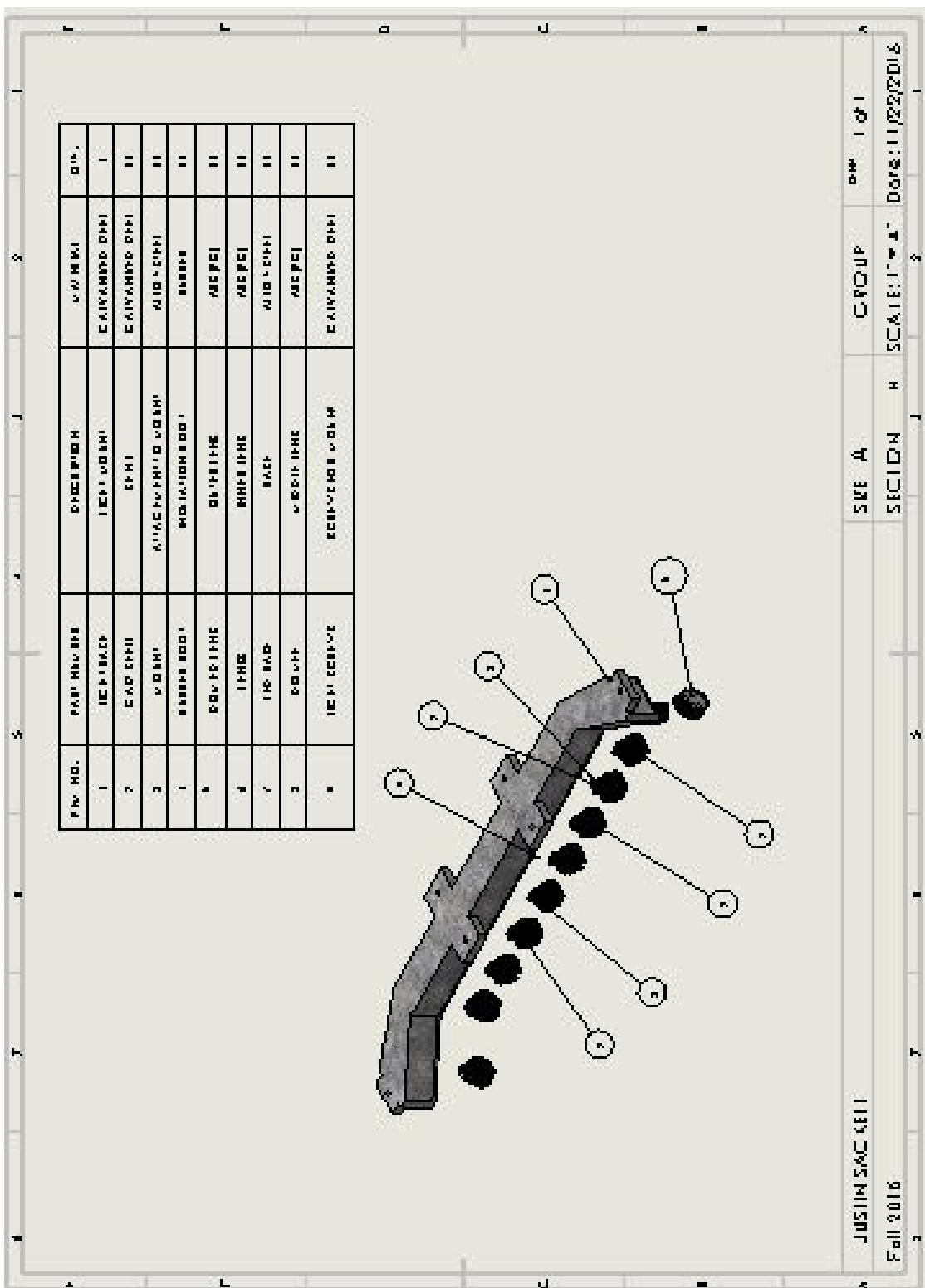


FIGURE 1.26: Sackett, Justin: Lights Exploded Part List

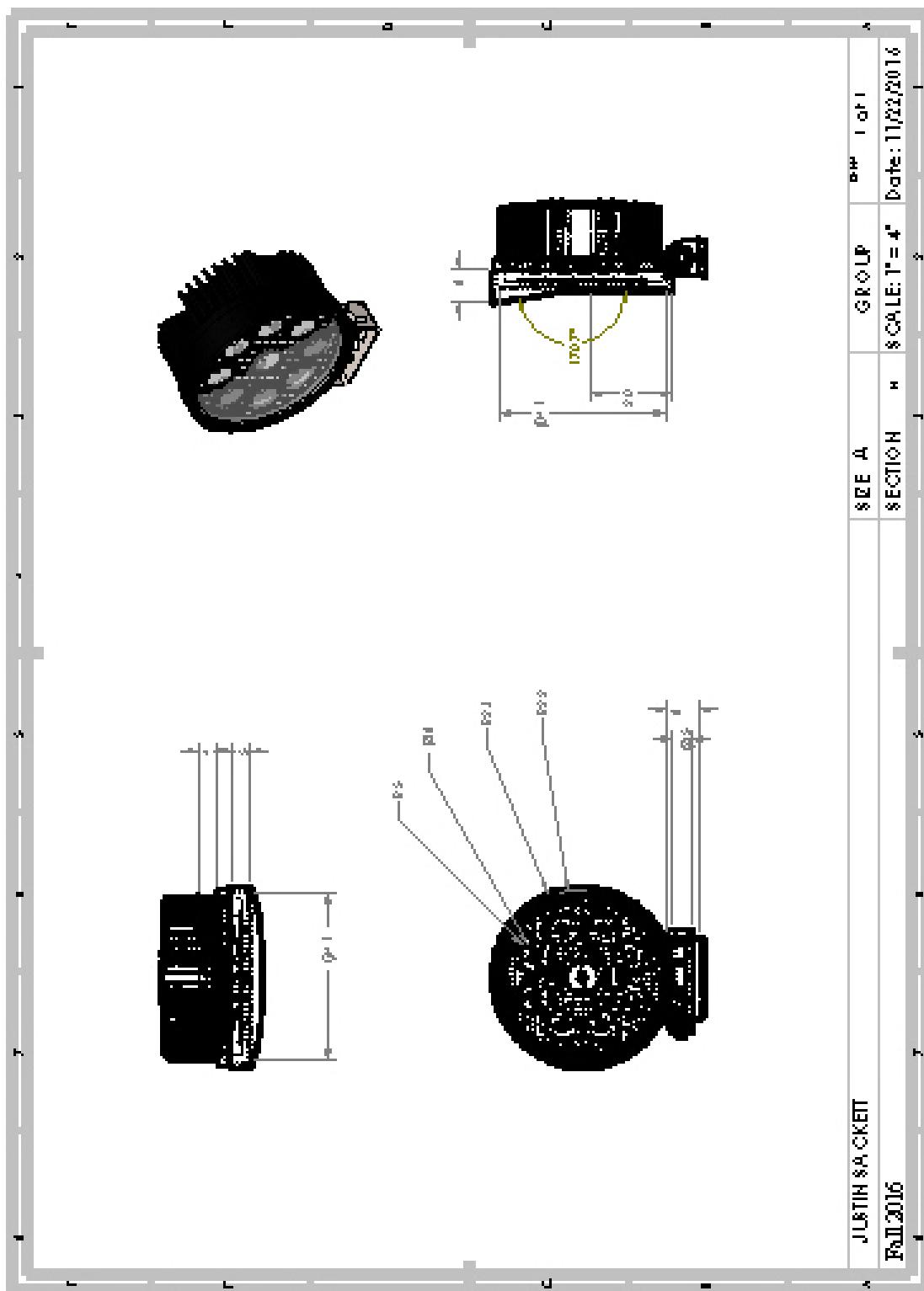


FIGURE 1.27: Sackett, Justin: Light

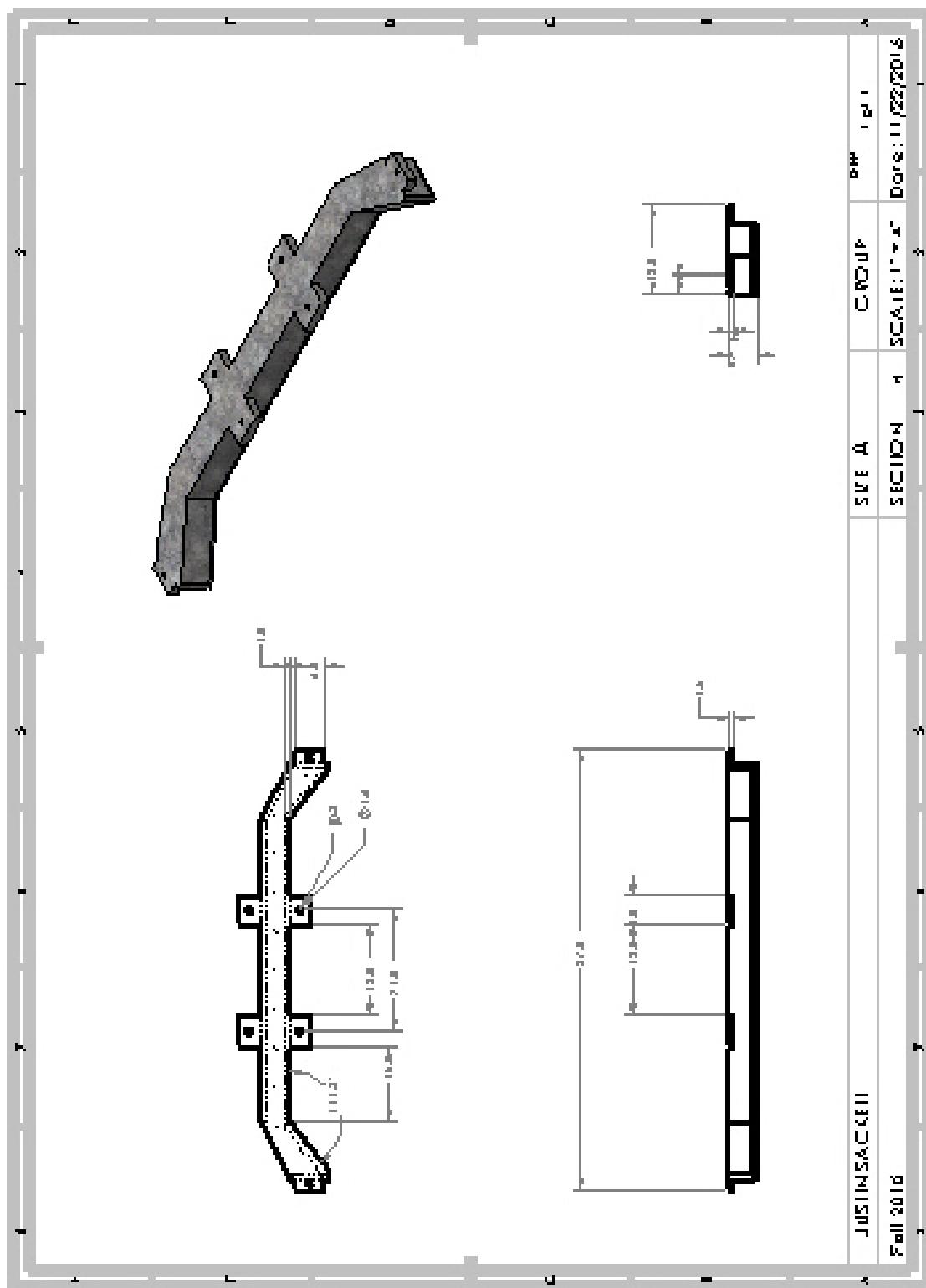


FIGURE 1.28: Sackett, Justin: Light Base

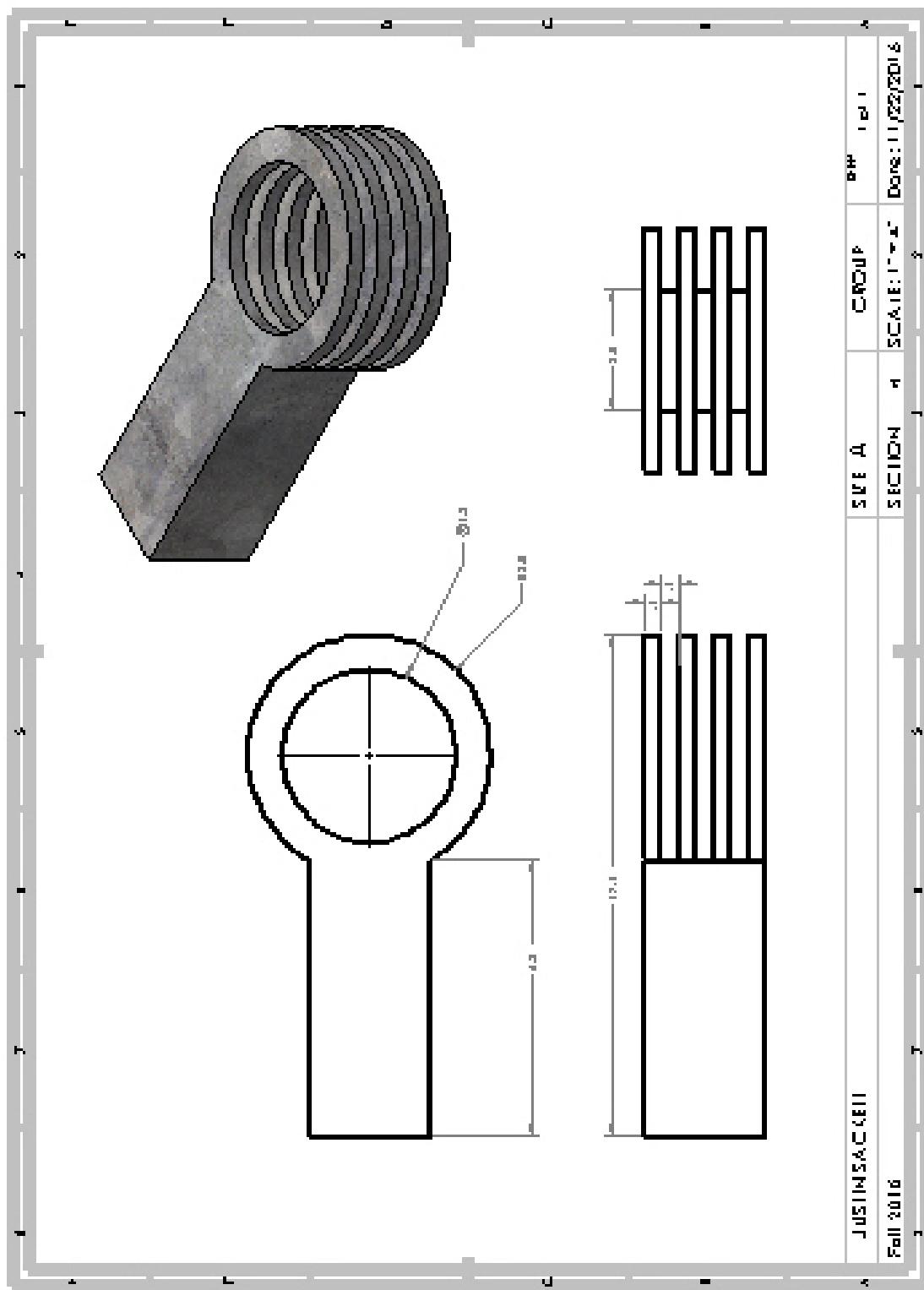


FIGURE 1.29: Sackett, Justin: Lower Arm

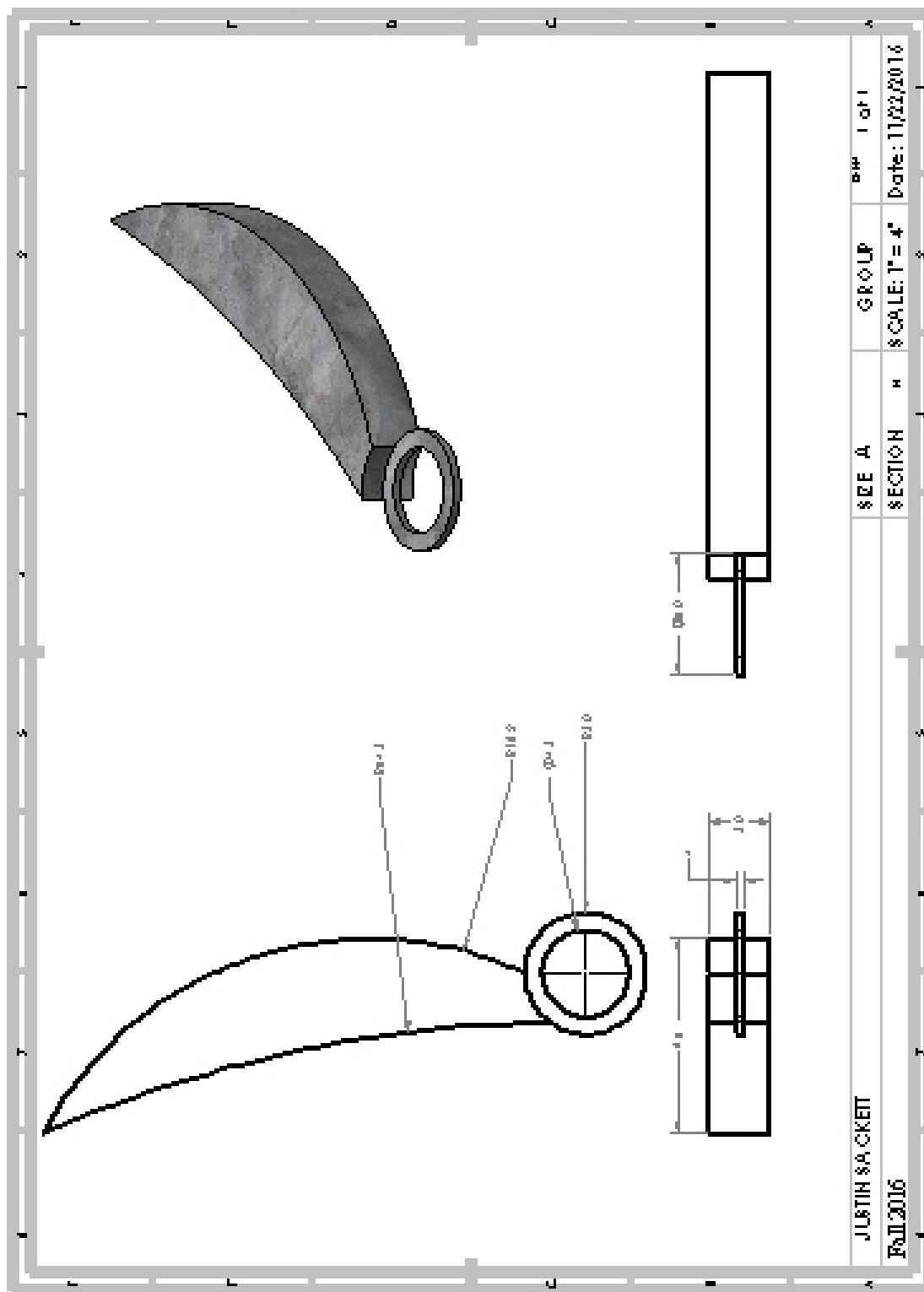


FIGURE 1.30: Sackett, Justin: Upper Pincer

1.1.11 Suspension

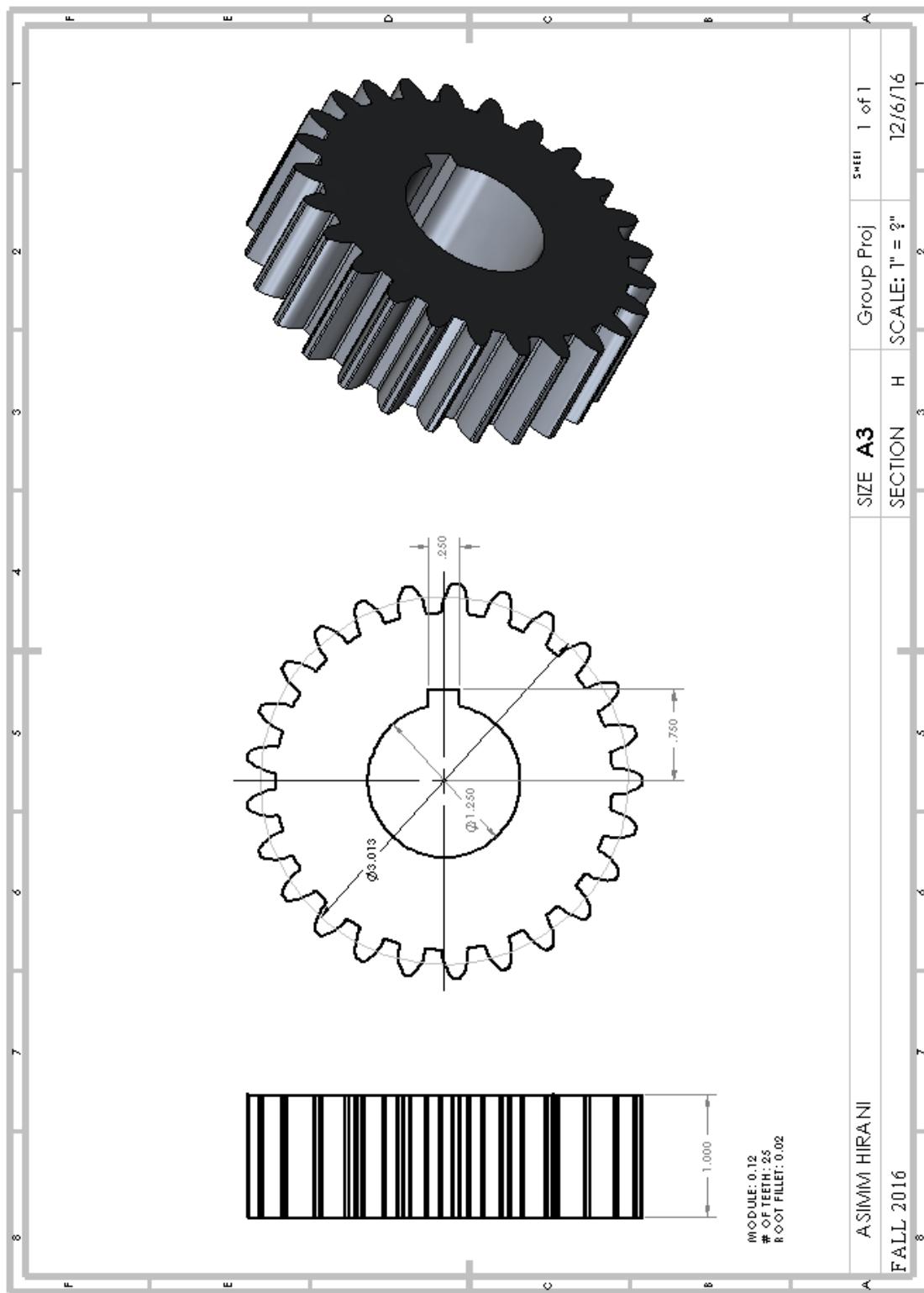


FIGURE 1.31: Hirani, Asimm: 25 Tooth Gear

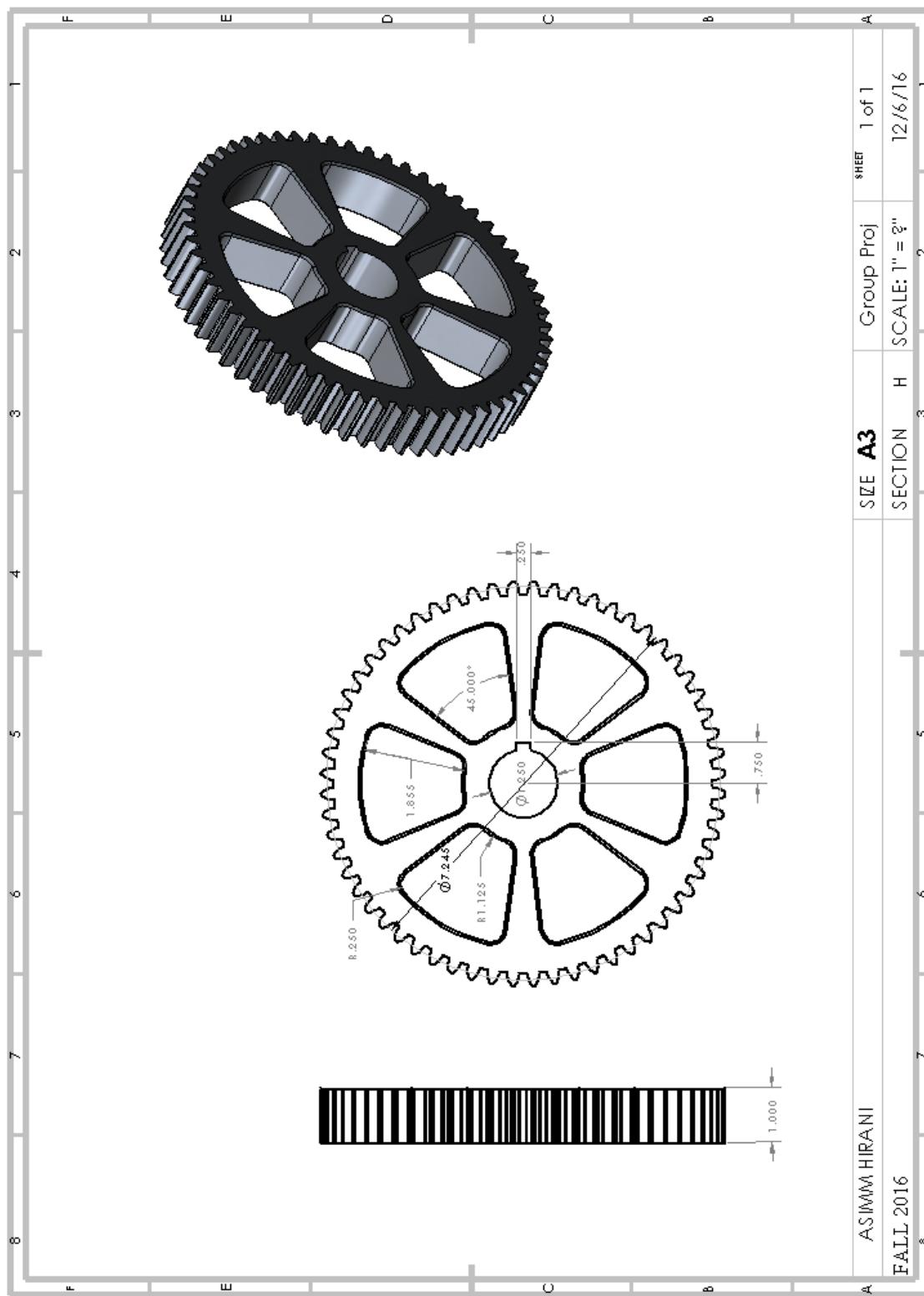


FIGURE 1.32: Hirani, Asimm: 60 Tooth Gear

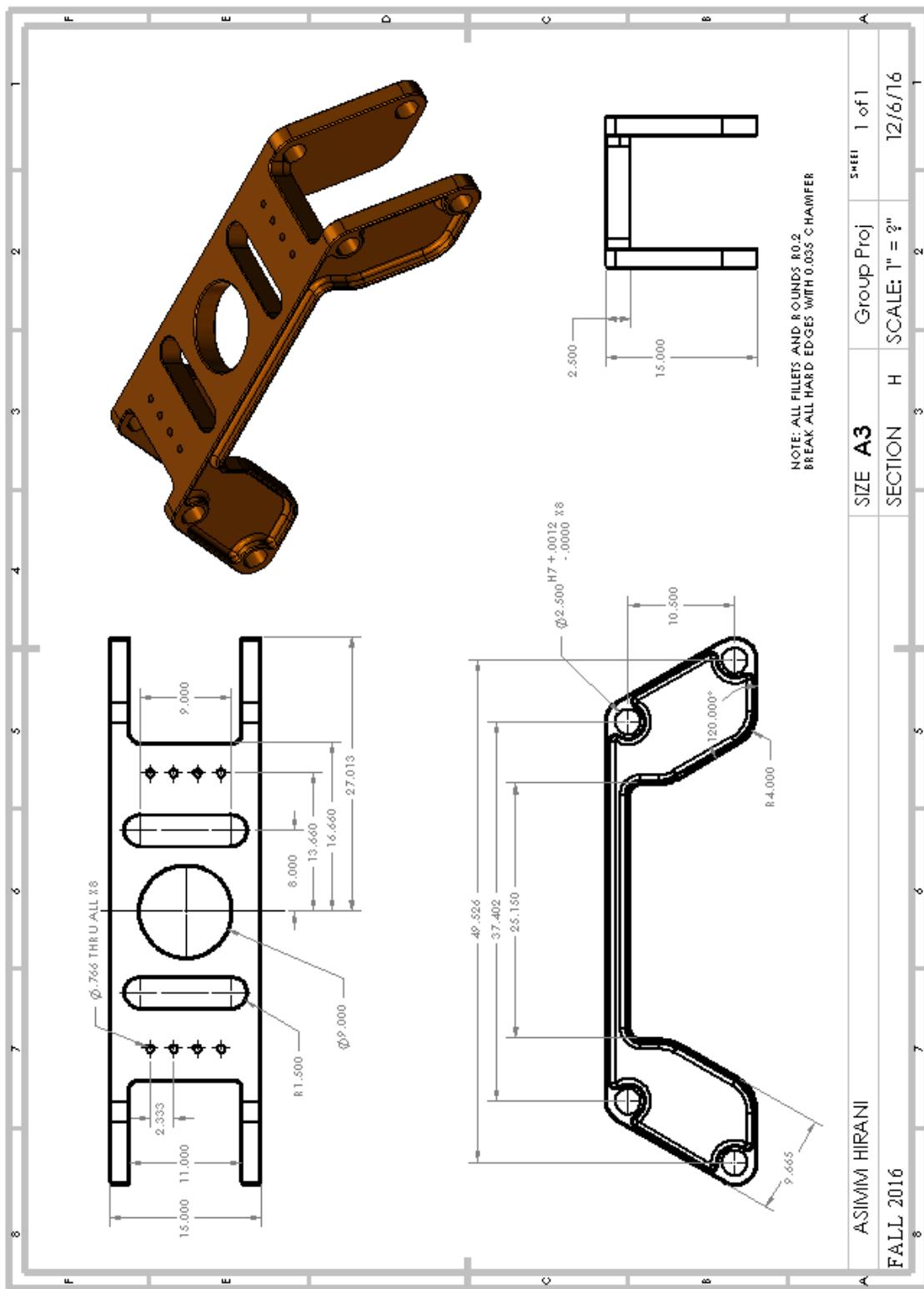


FIGURE 1.33: Hirani, Asimm: Center Frame

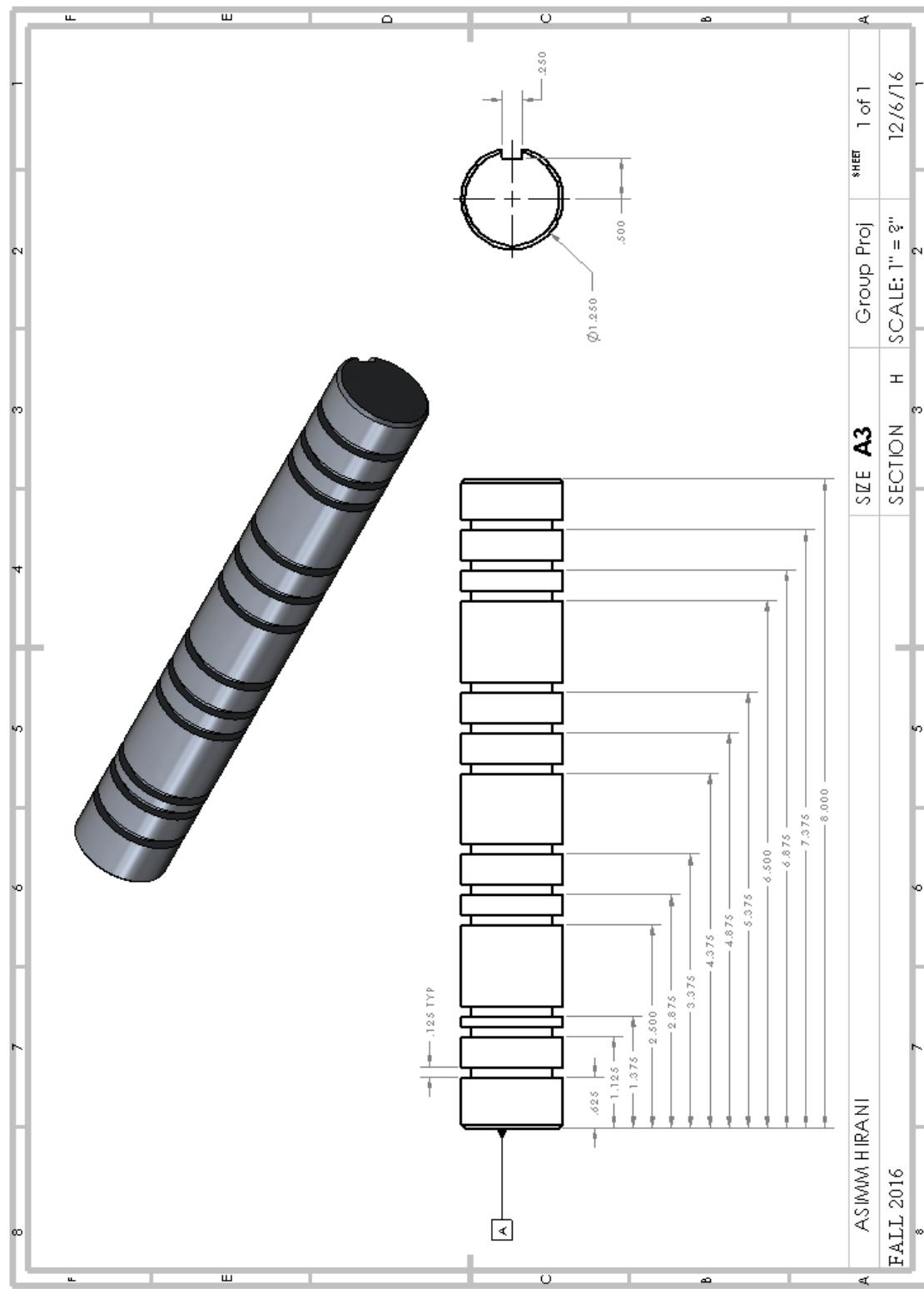


FIGURE 1.34: Hirani, Asimm: Gearbox Idler Shaft

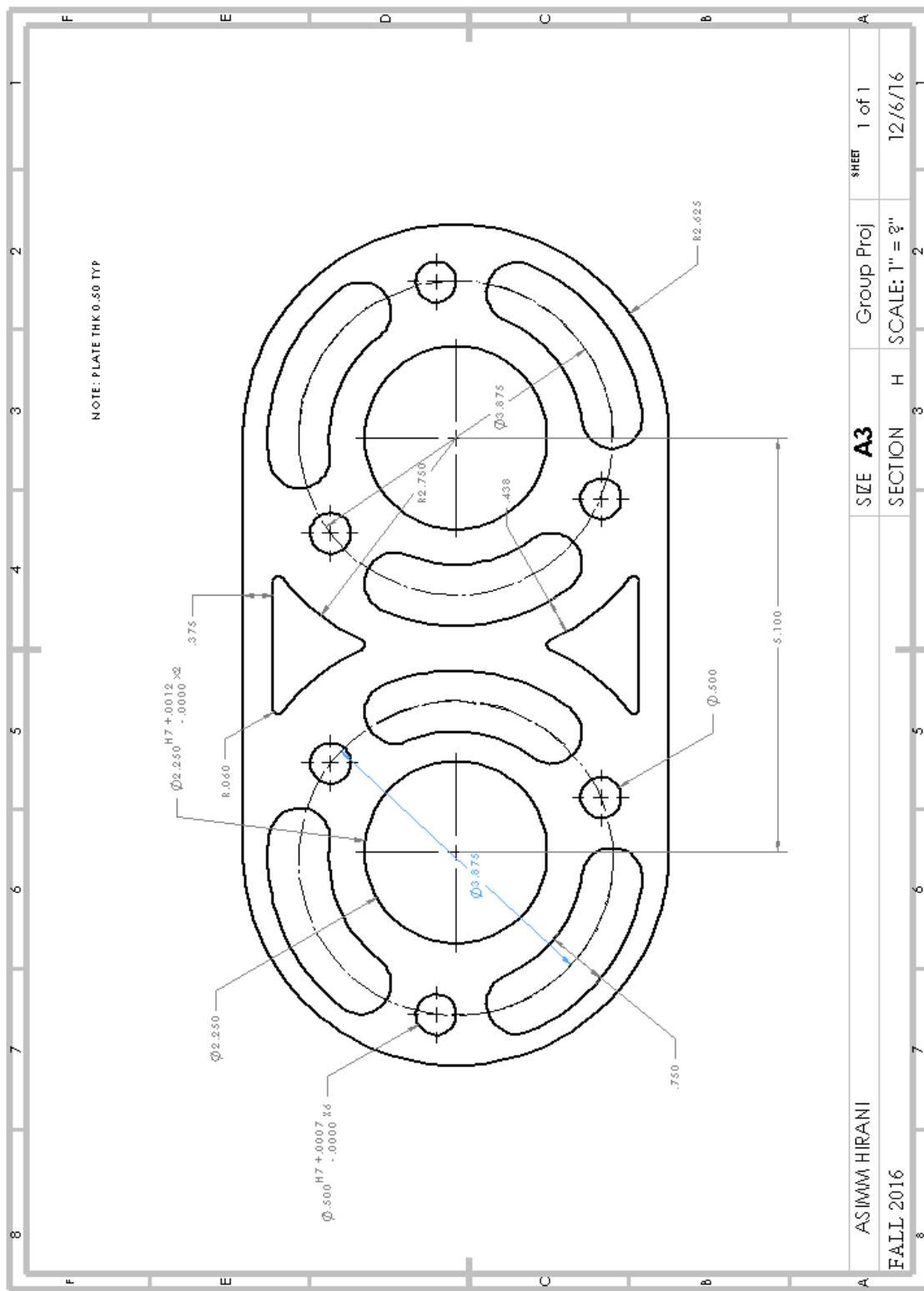


FIGURE 1.35: Hirani, Asimm: Gearbox Plate

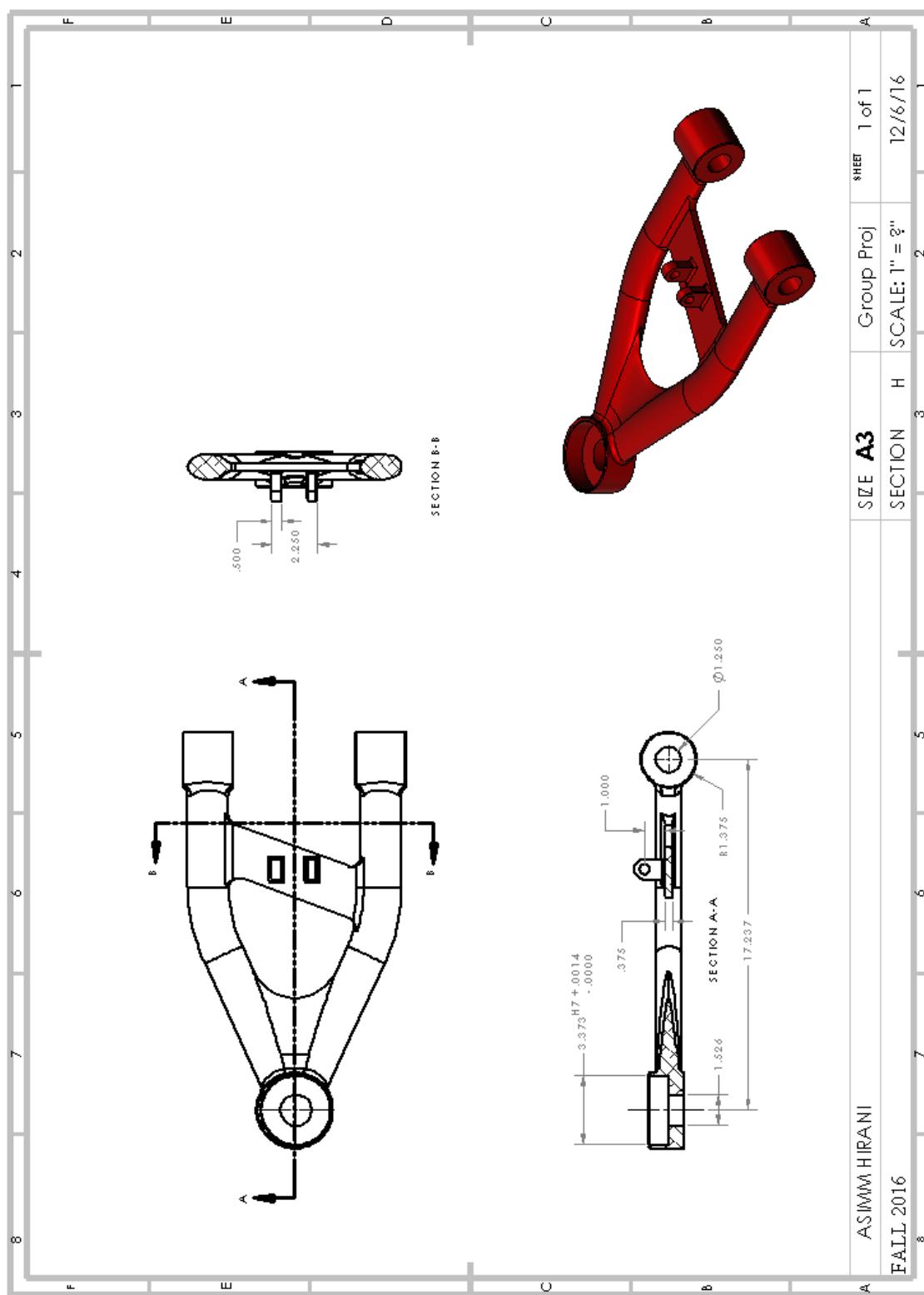


FIGURE 1.36: Hirani, Asimm: LCA

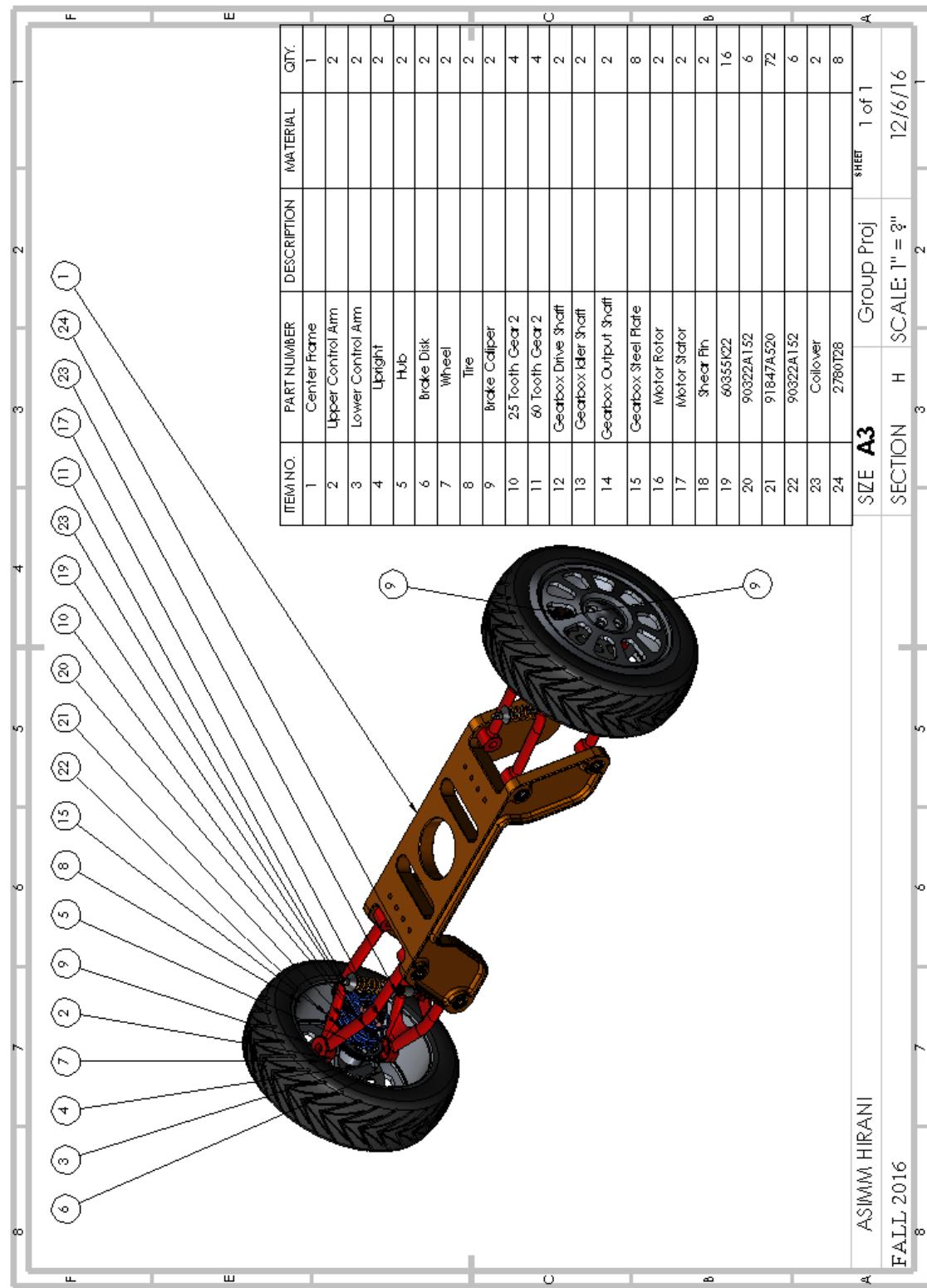


FIGURE 1.37: Hirani, Asimm: Suspension Assembly

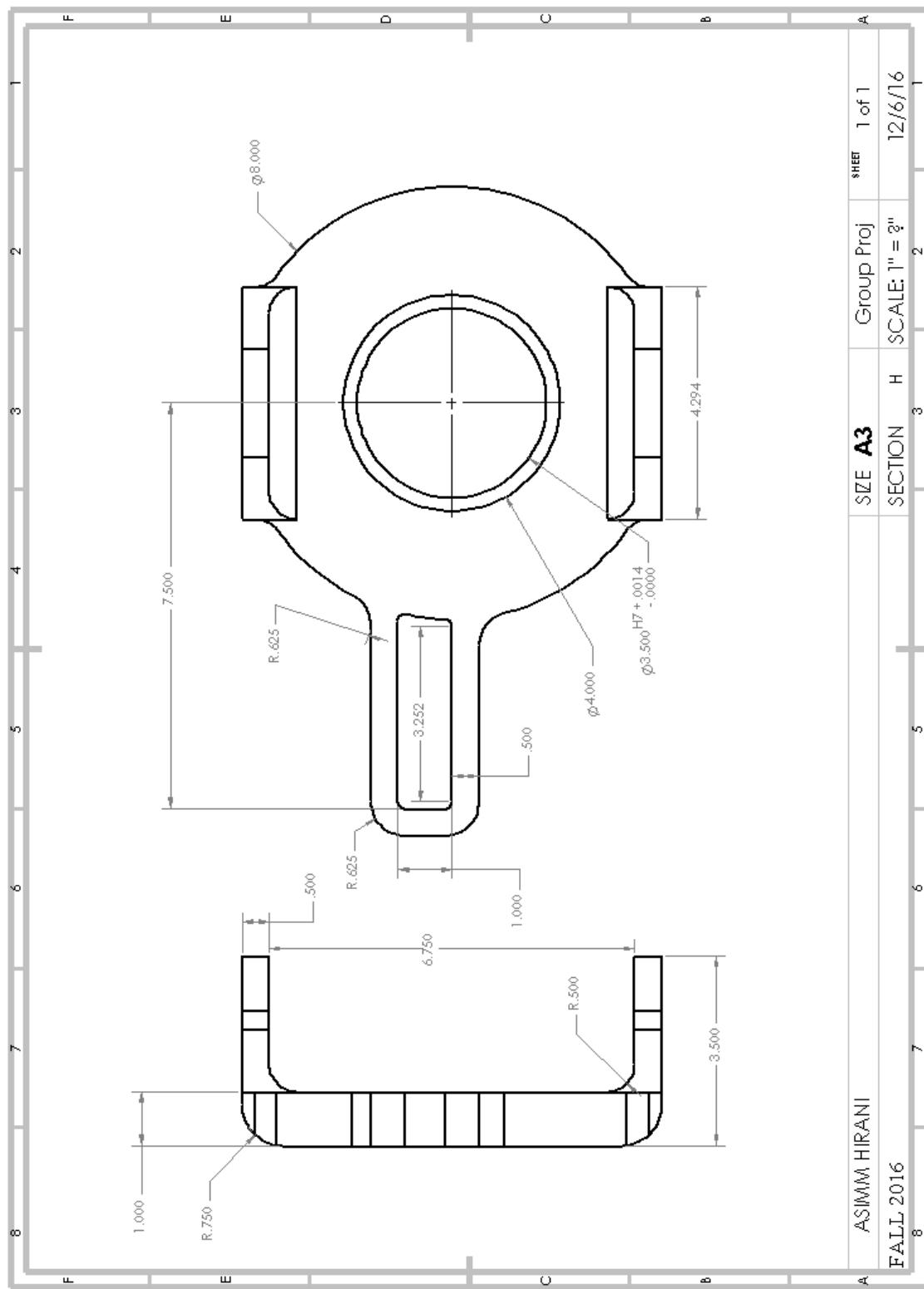


FIGURE 1.38: Hirani, Asimm: Upright

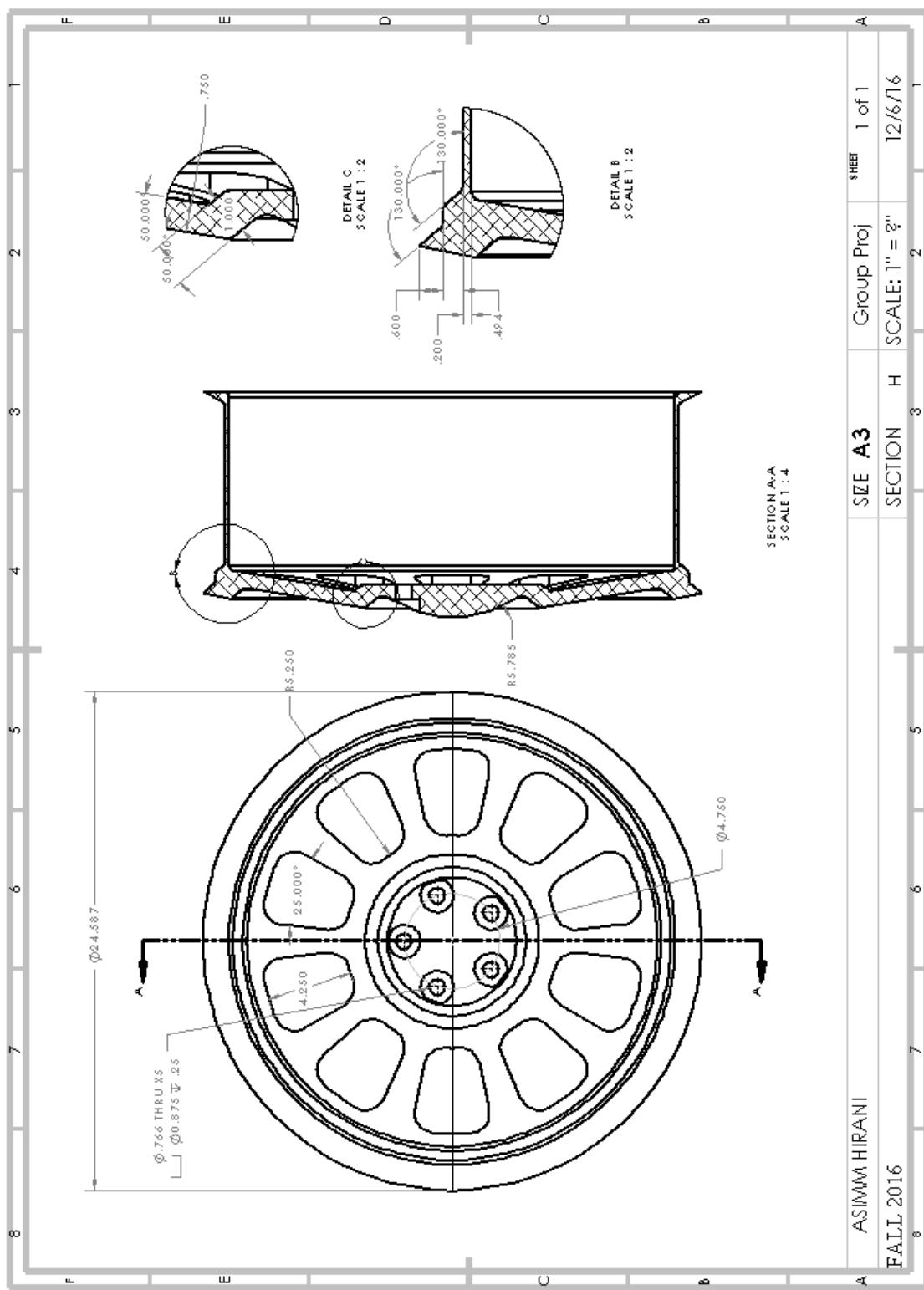


FIGURE 1.39: Hirani, Asimm: Wheel

1.1.12 3D Printer

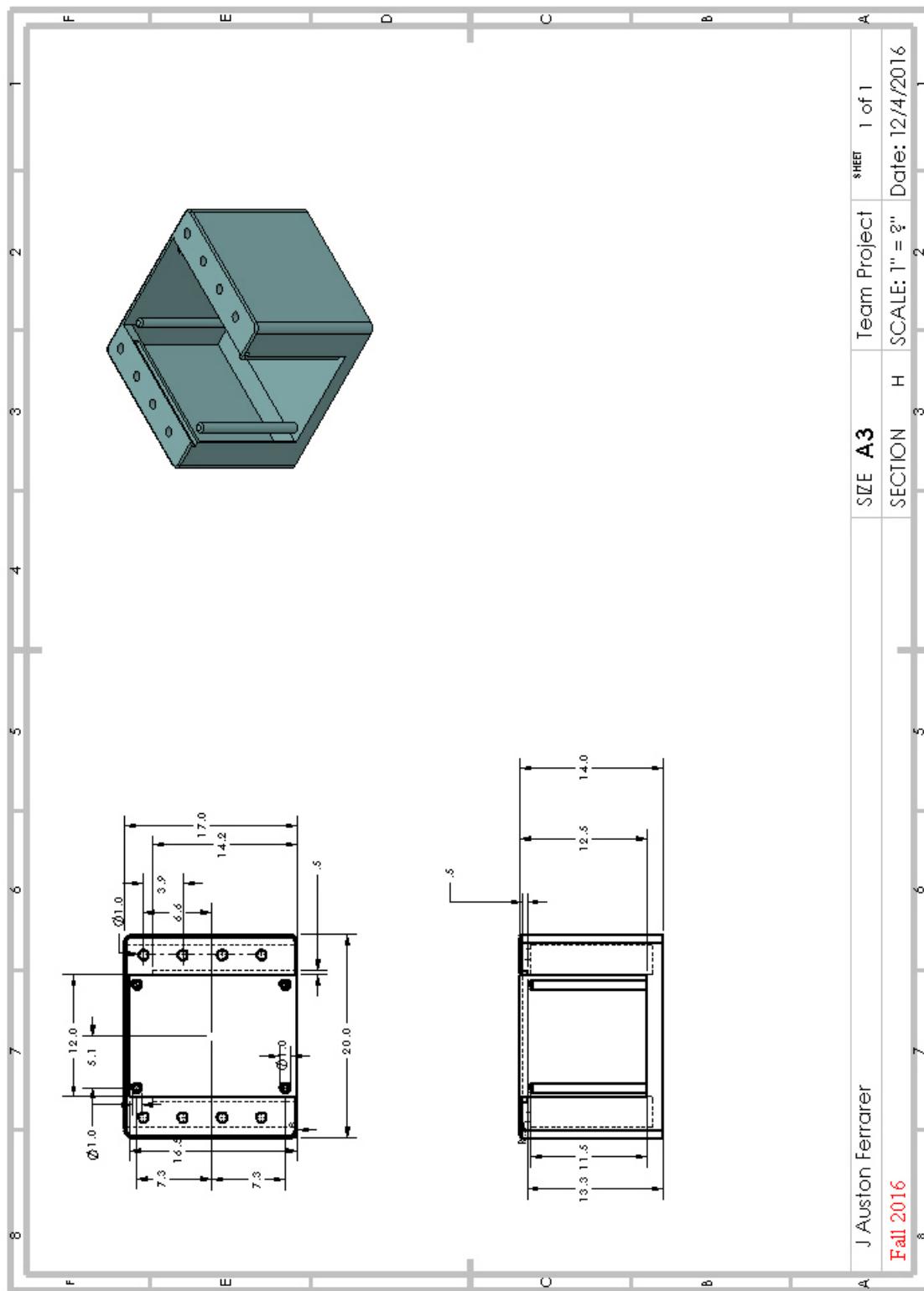


FIGURE 1.40: Ferrarer, Auston: Base Extrusion

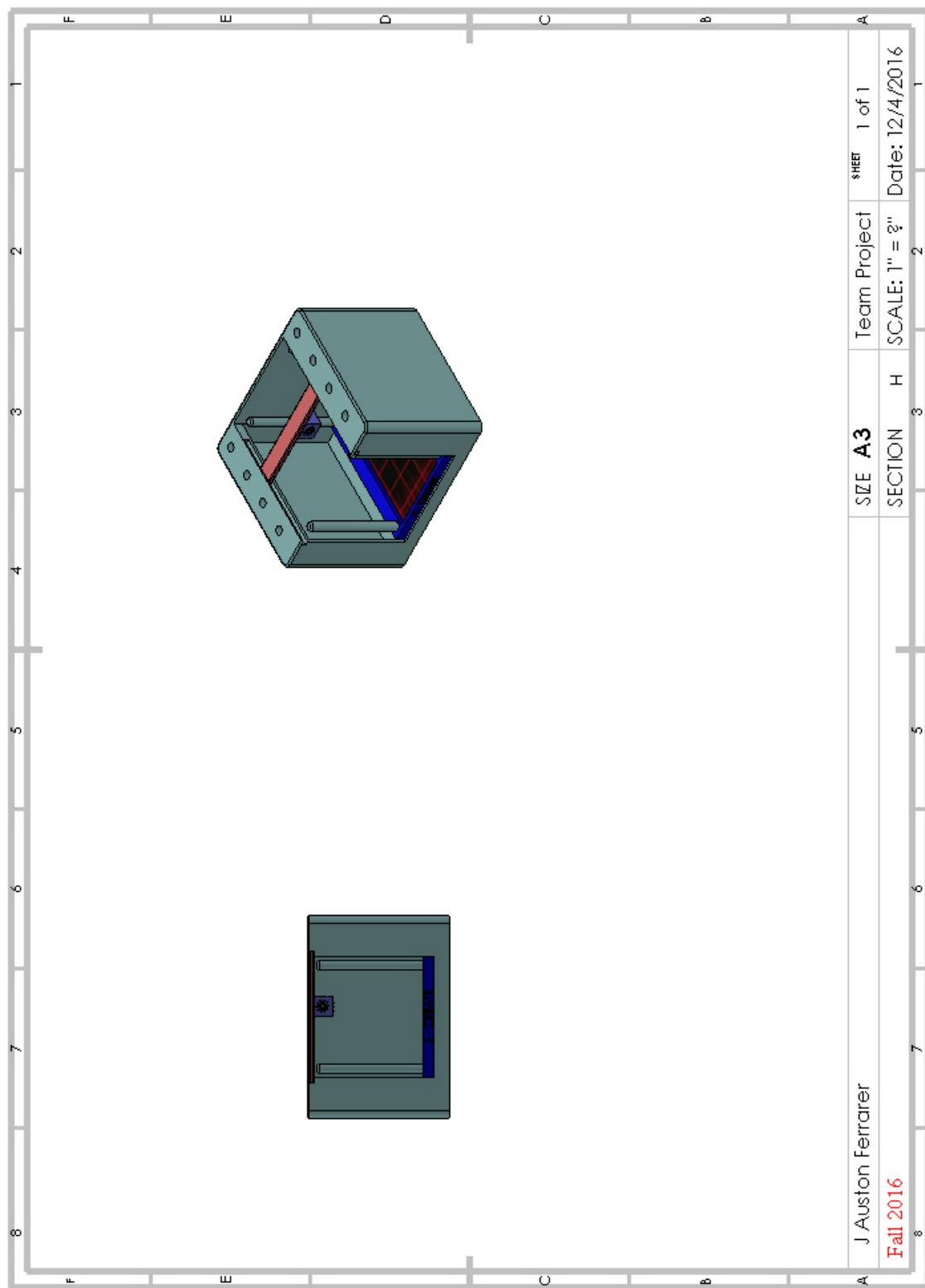


FIGURE 1.41: Ferrarer, Auston: Full 3D Printer

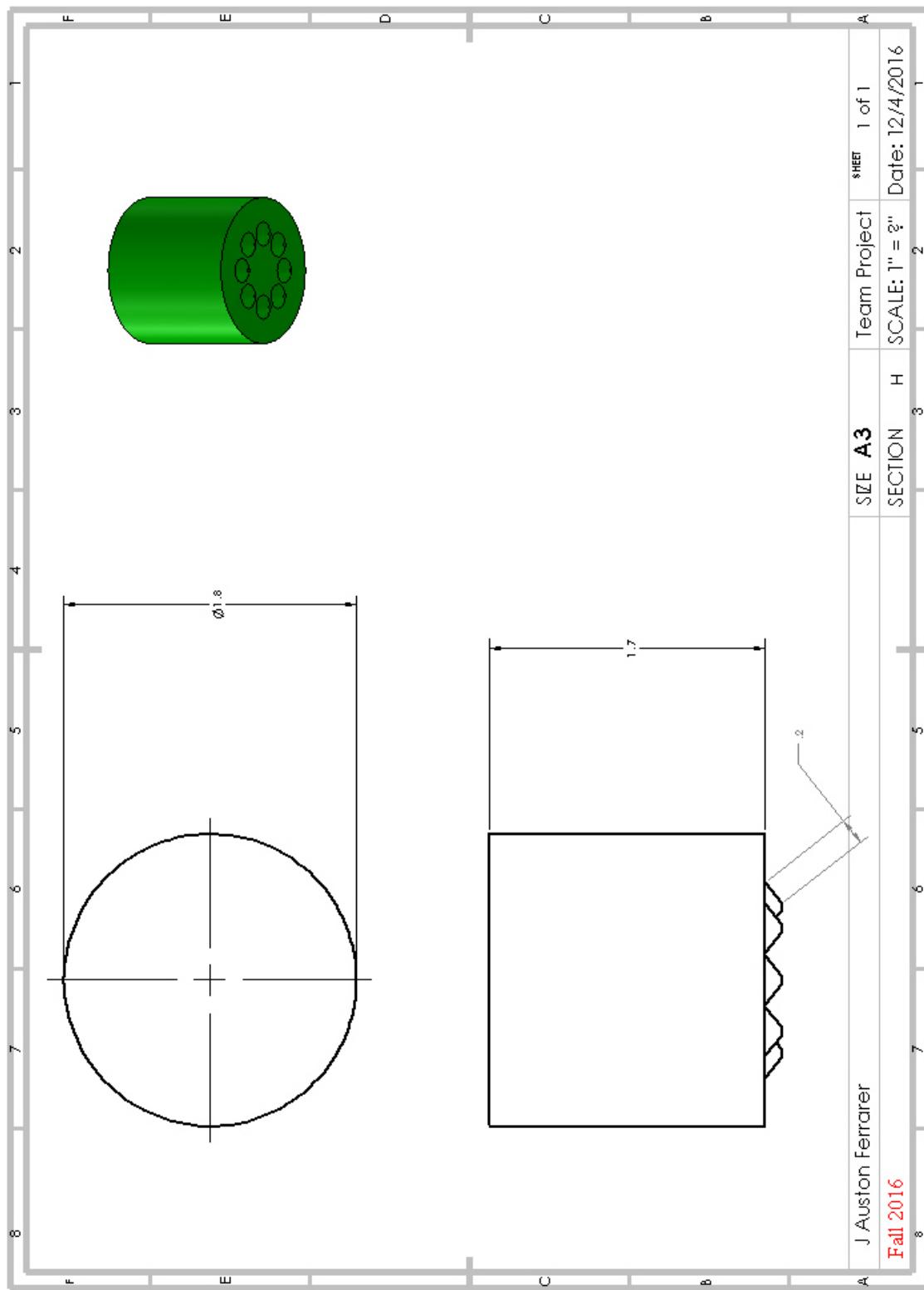


FIGURE 1.42: Ferrarer, Auston: Printing Nozel

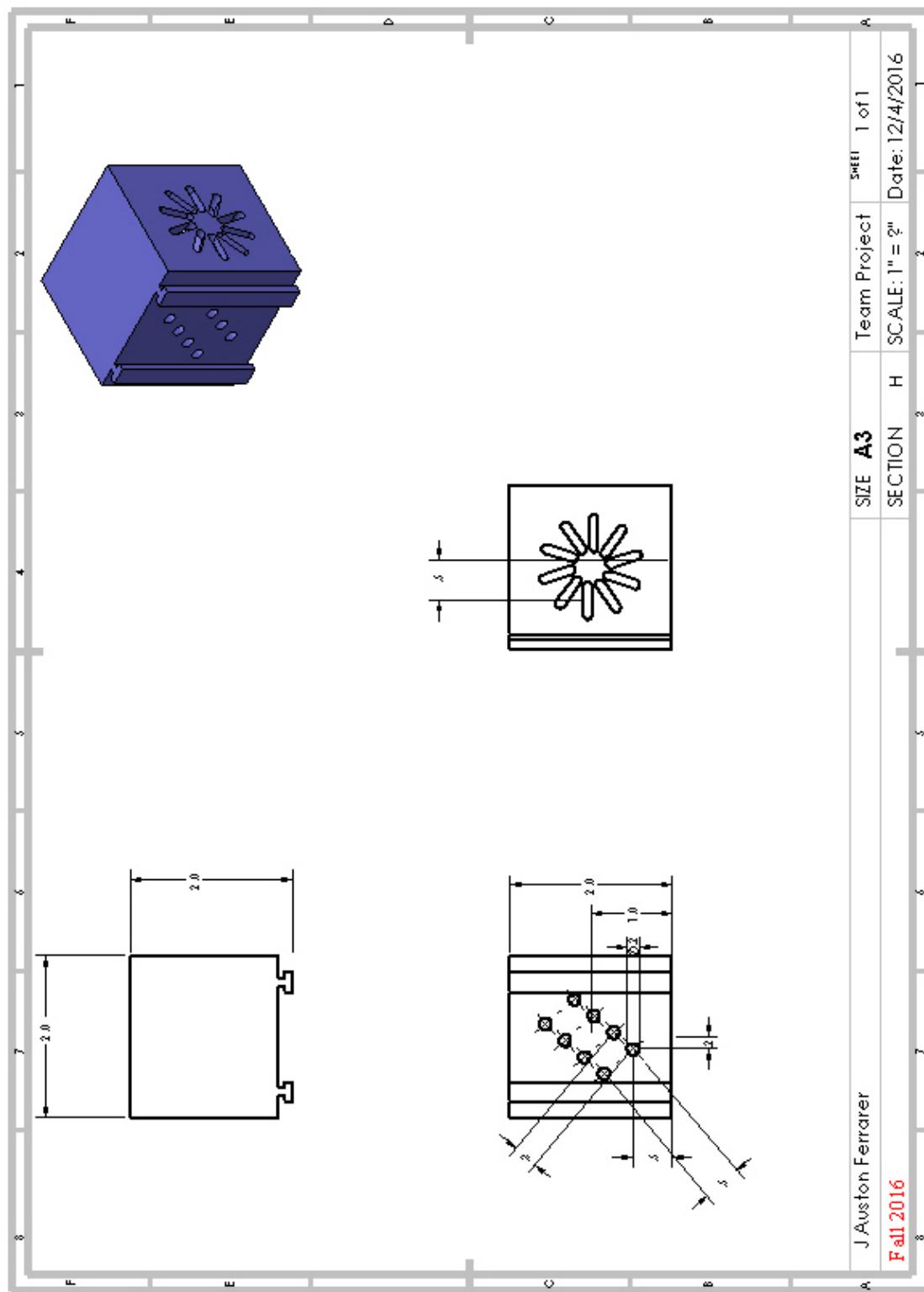


FIGURE 1.43: Ferrarer, Auston: Printing Nozel Casing

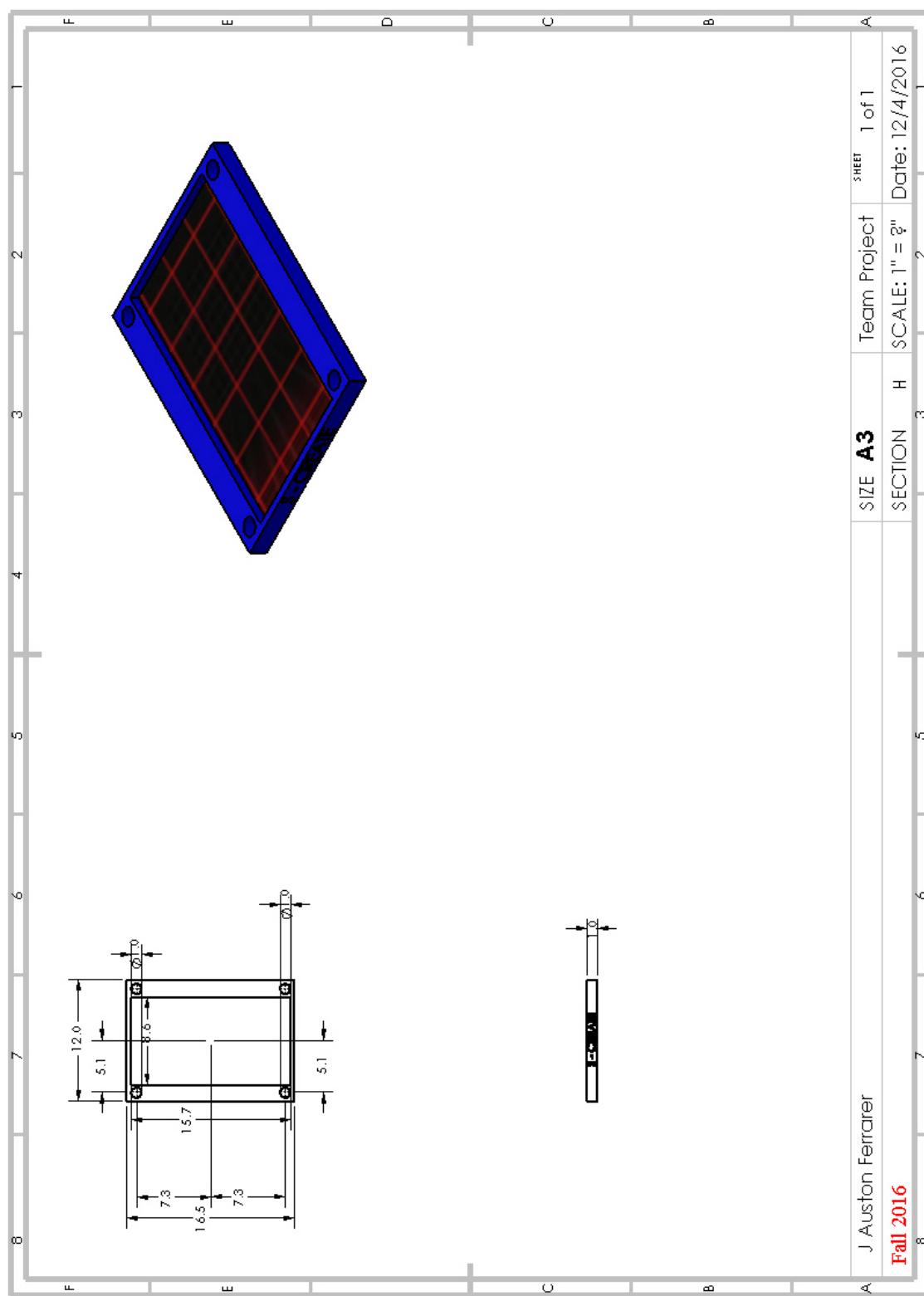


FIGURE 1.44: Ferrarer, Auston: Printing Pad

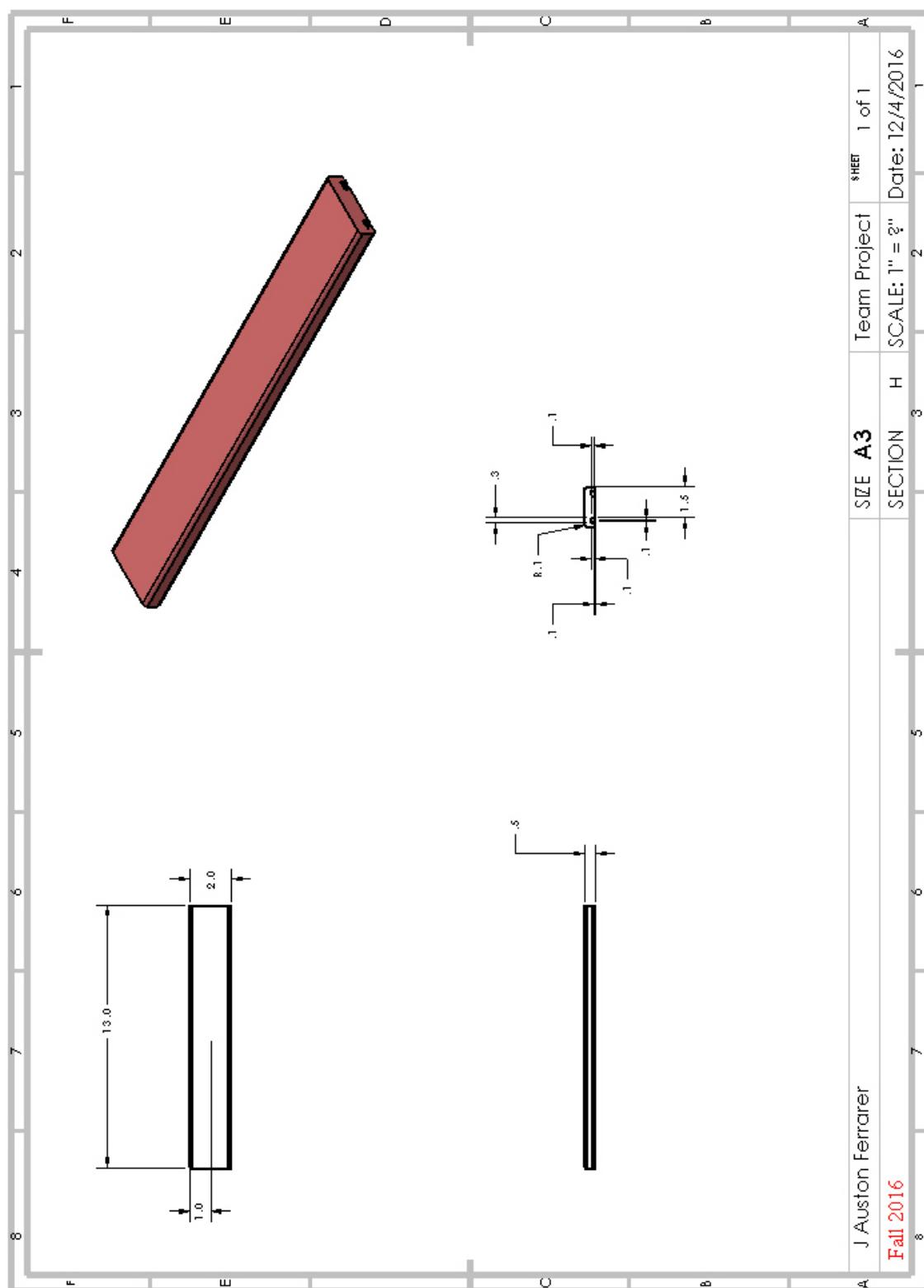


FIGURE 1.45: Ferrarer, Auston: Sidebar for Nozel

1.1.13 Bed

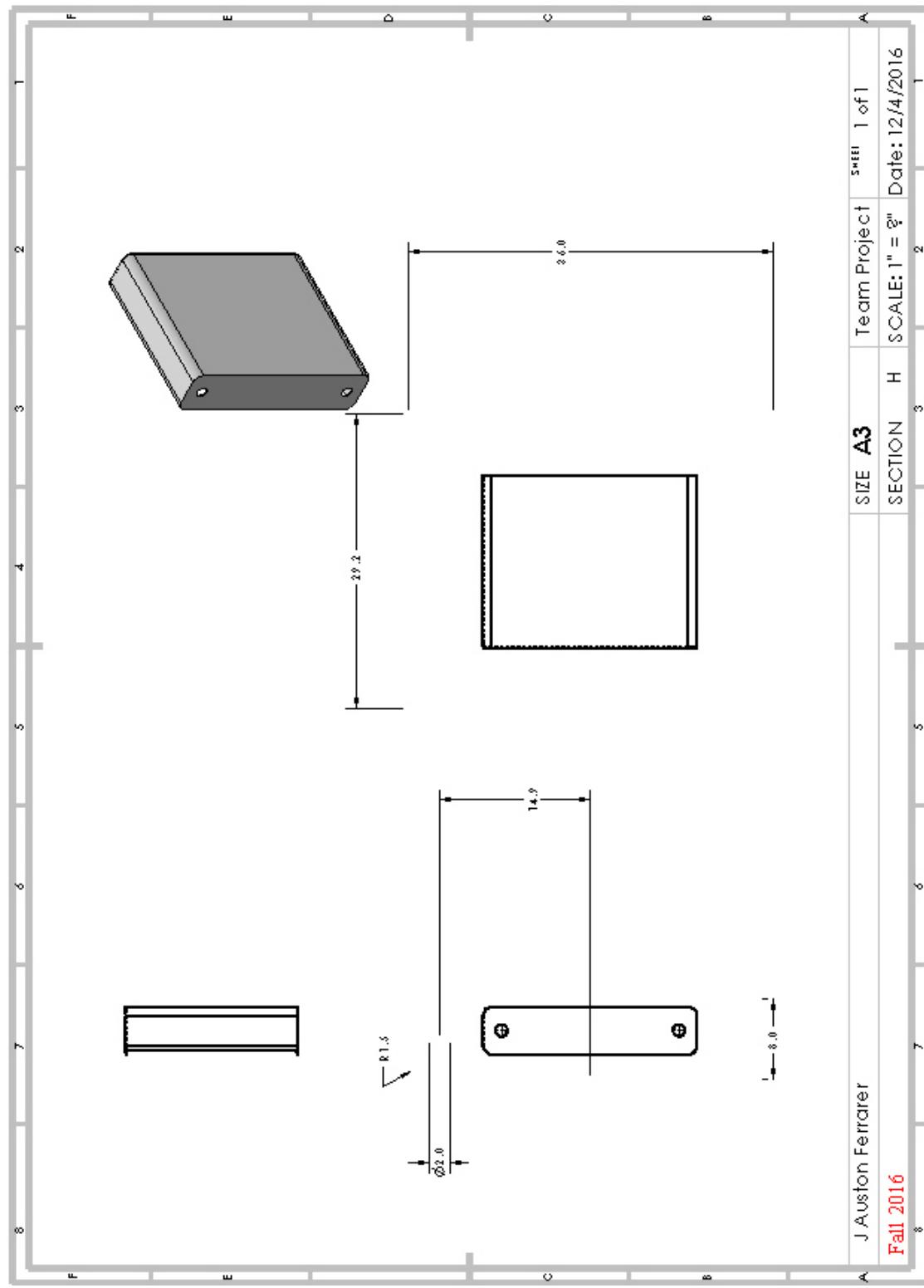


FIGURE 1.46: Ferrarer, Auston: Connecting Side Bracket

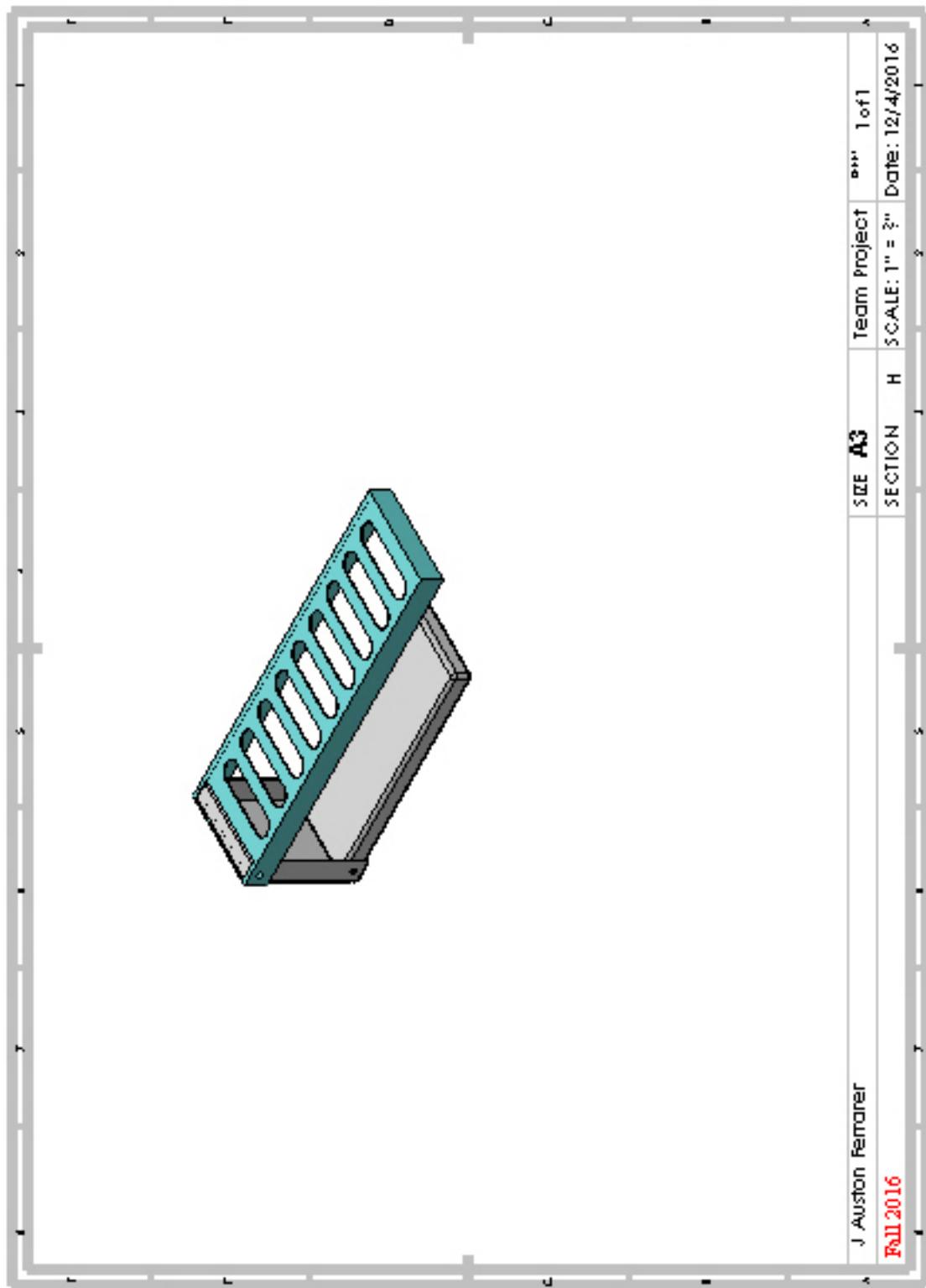


FIGURE 1.47: Ferrarer, Auston: Full Bed

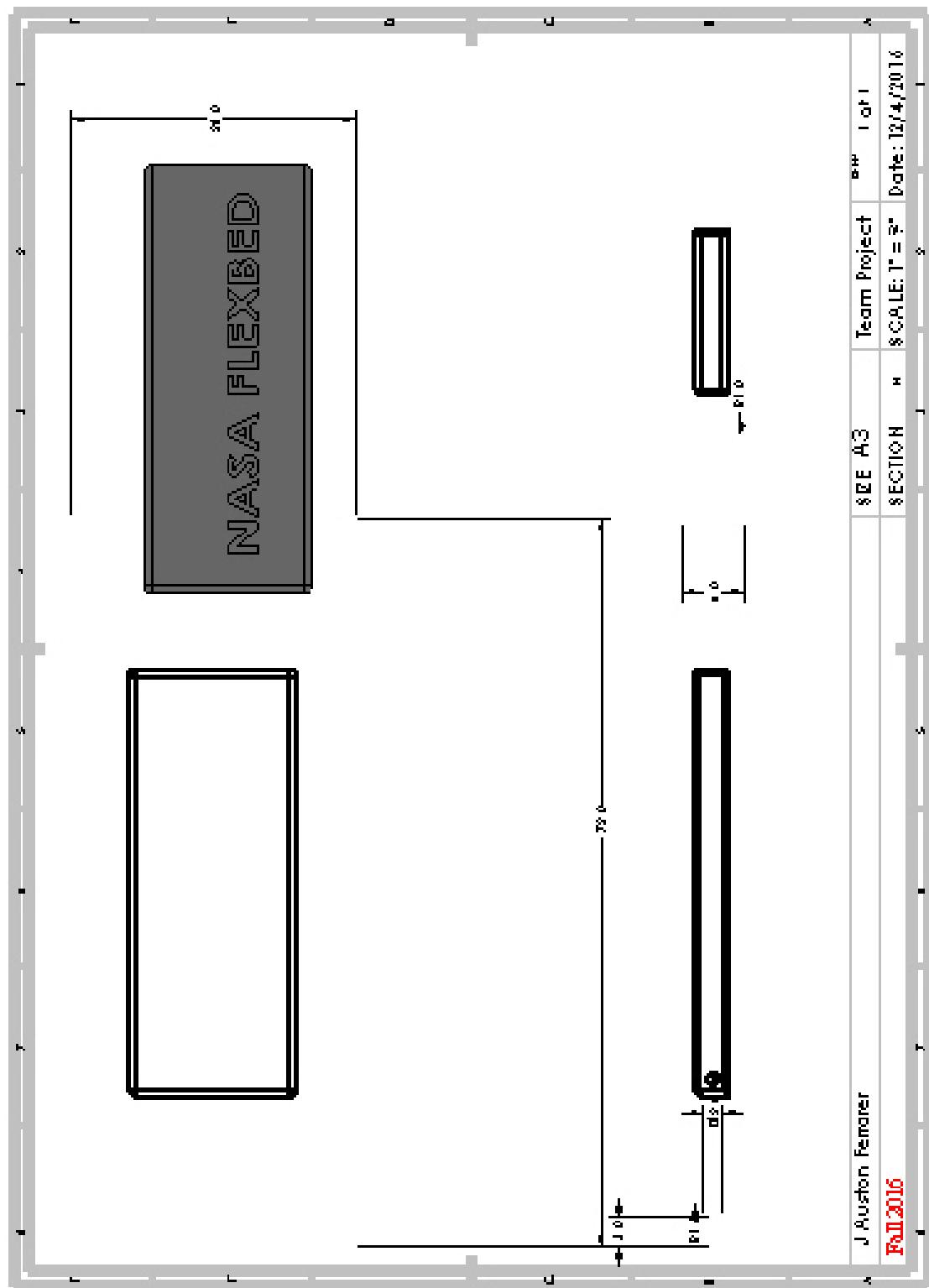


FIGURE 1.48: Ferrarer, Auston: Mattress

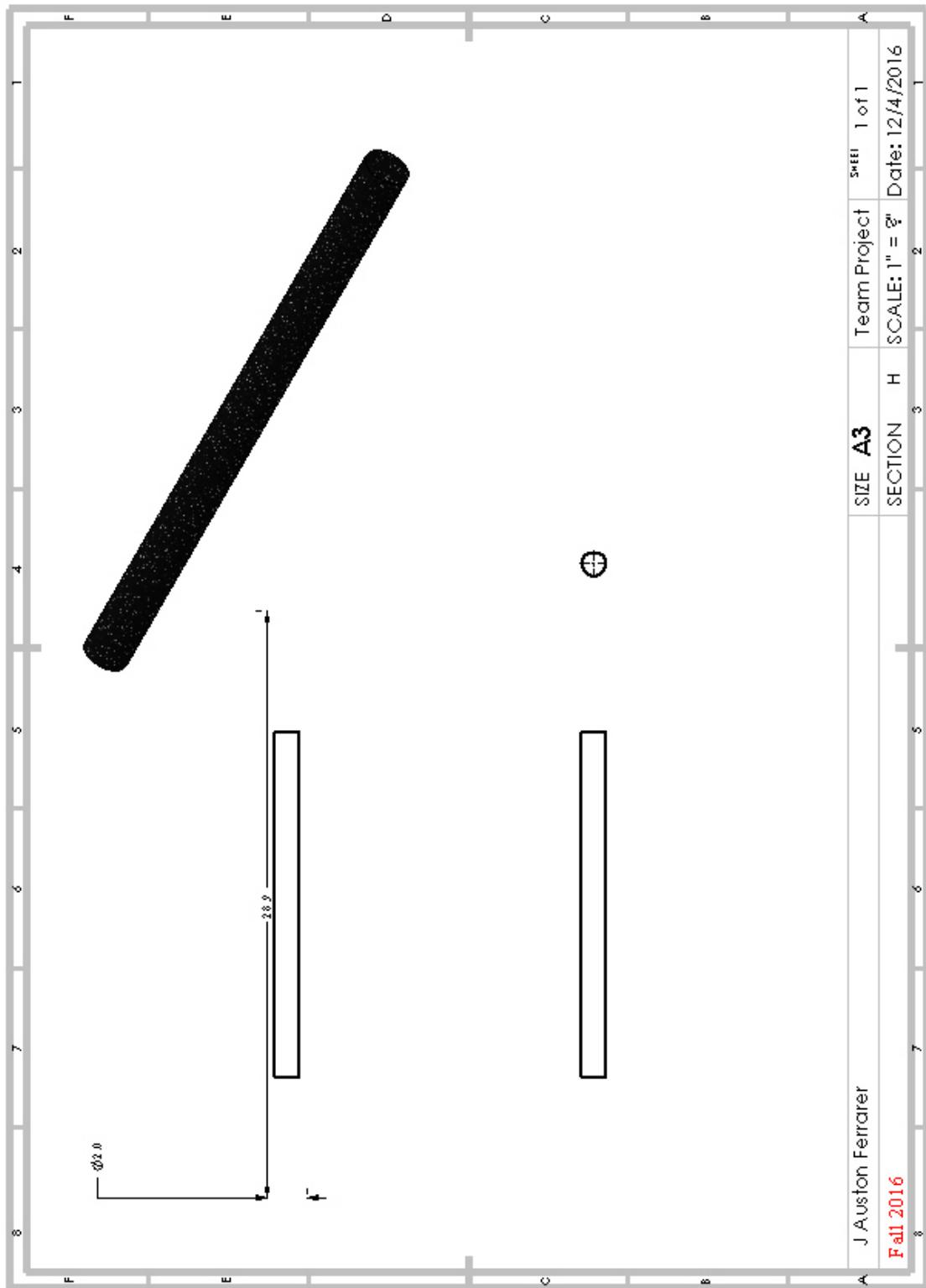


FIGURE 1.49: Ferrarer, Auston: Slide Bolt For Brackets

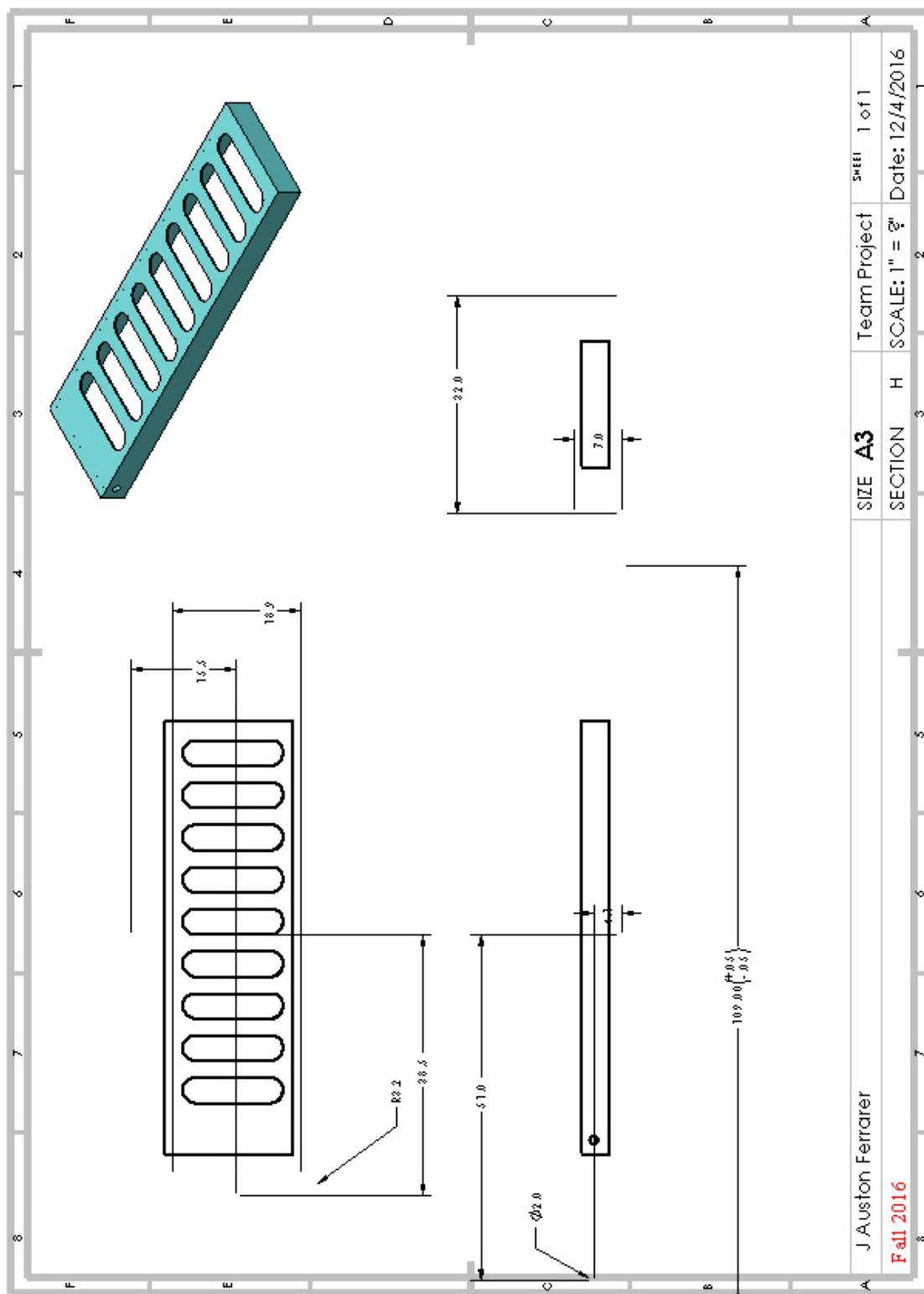


FIGURE 1.50: Ferrarer, Auston: Top Brackets

1.2 Assembly Instruction Manual

1.2.1 Antenna

Step 1

Insert the Swivel Link into the antenna base and check for tight fit.

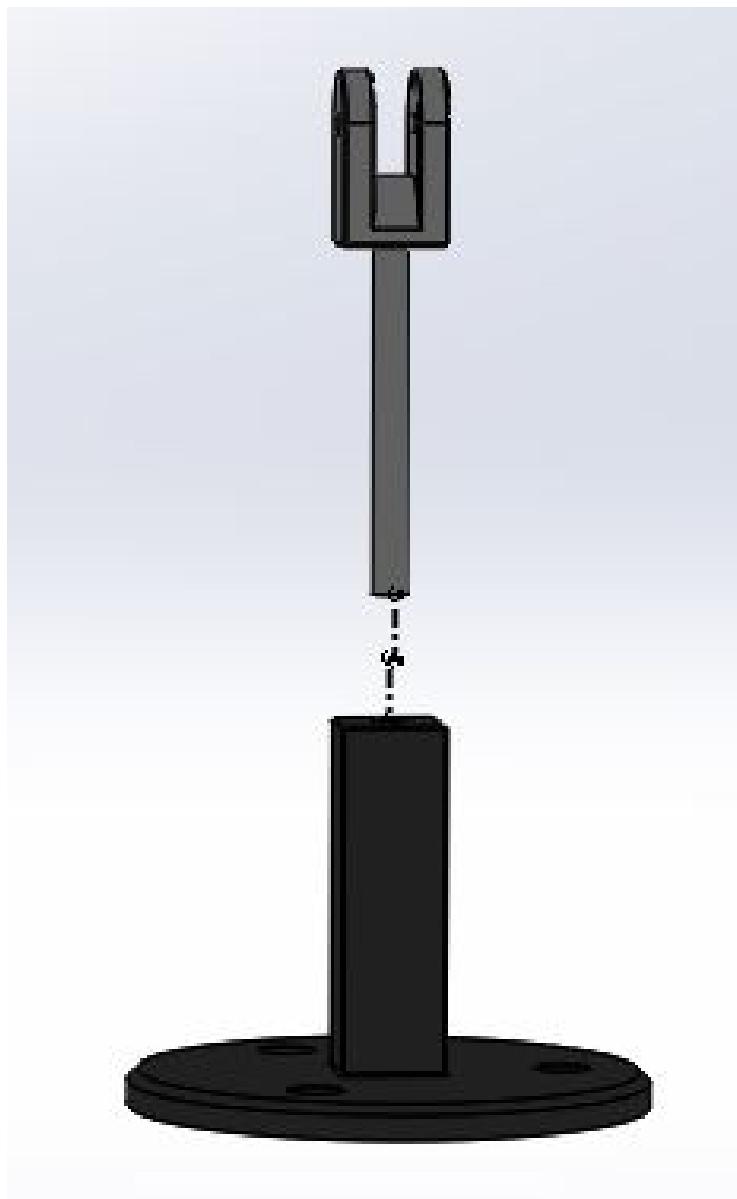


FIGURE 1.51: Rodriguez, Juan: Assembly Step 1

Step 2

Align the holes of the antenna support, the crossbar and then swivel link. Insert pin a.

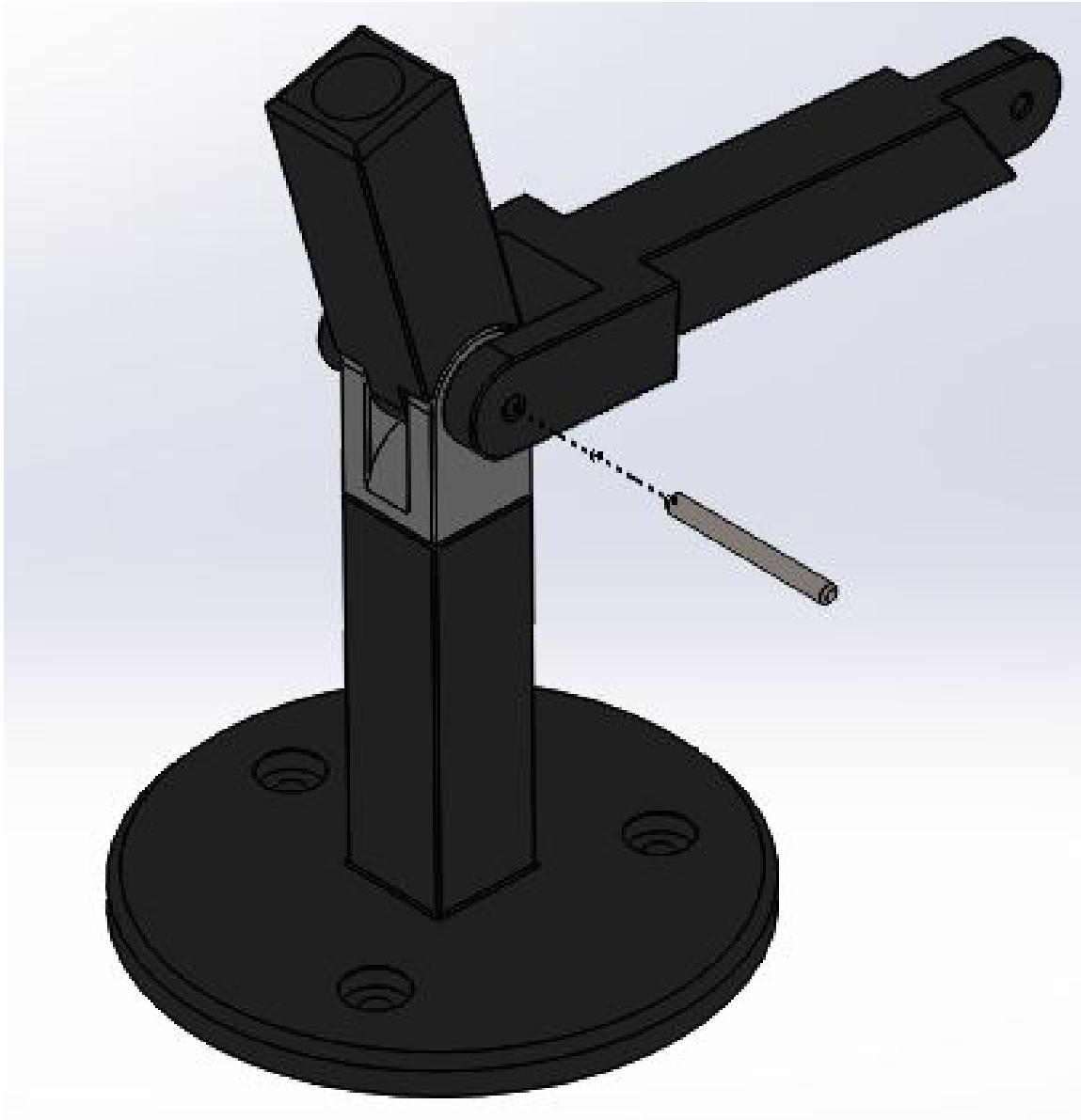


FIGURE 1.52: Rodriguez, Juan: Assembly Step 2

Step 3

Align the holes of the signal bar and the retriever. Insert the second pin b.

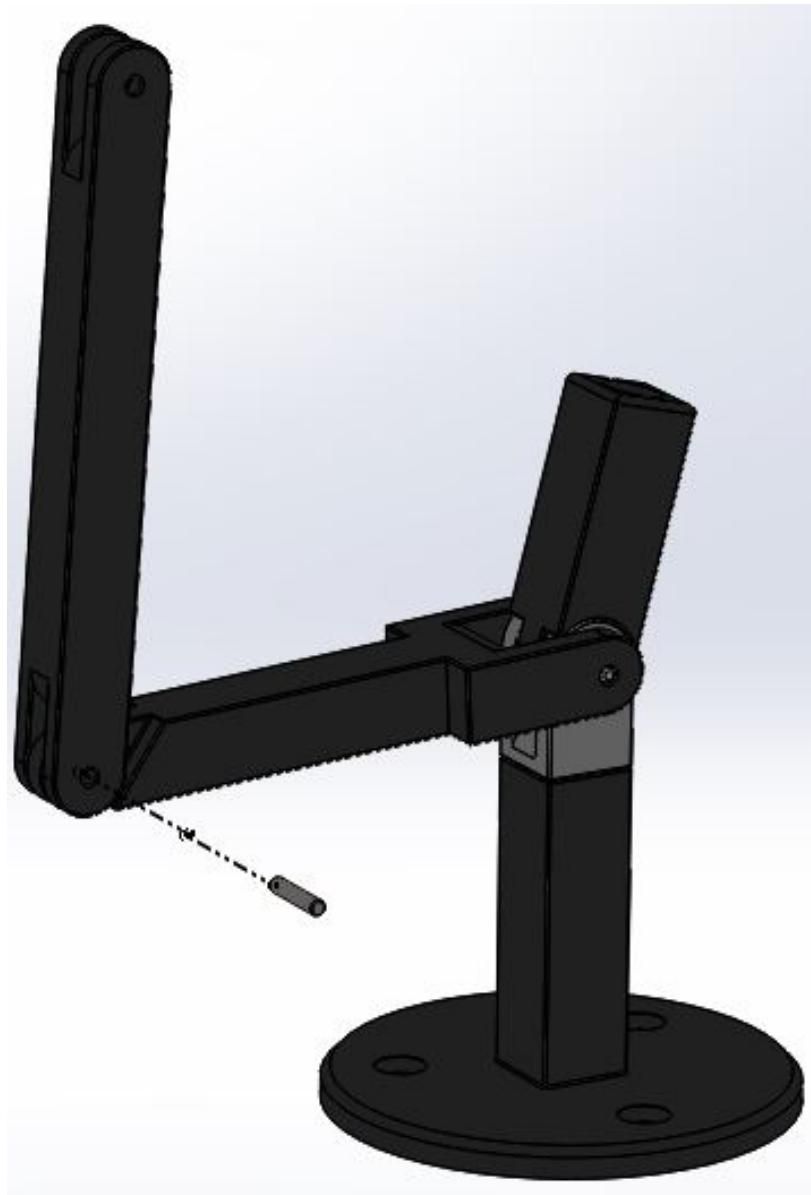


FIGURE 1.53: Rodriguez, Juan: Assembly Step 3

Step 4

Align the holes of the signal bar and the retriever. Insert the second pin b.

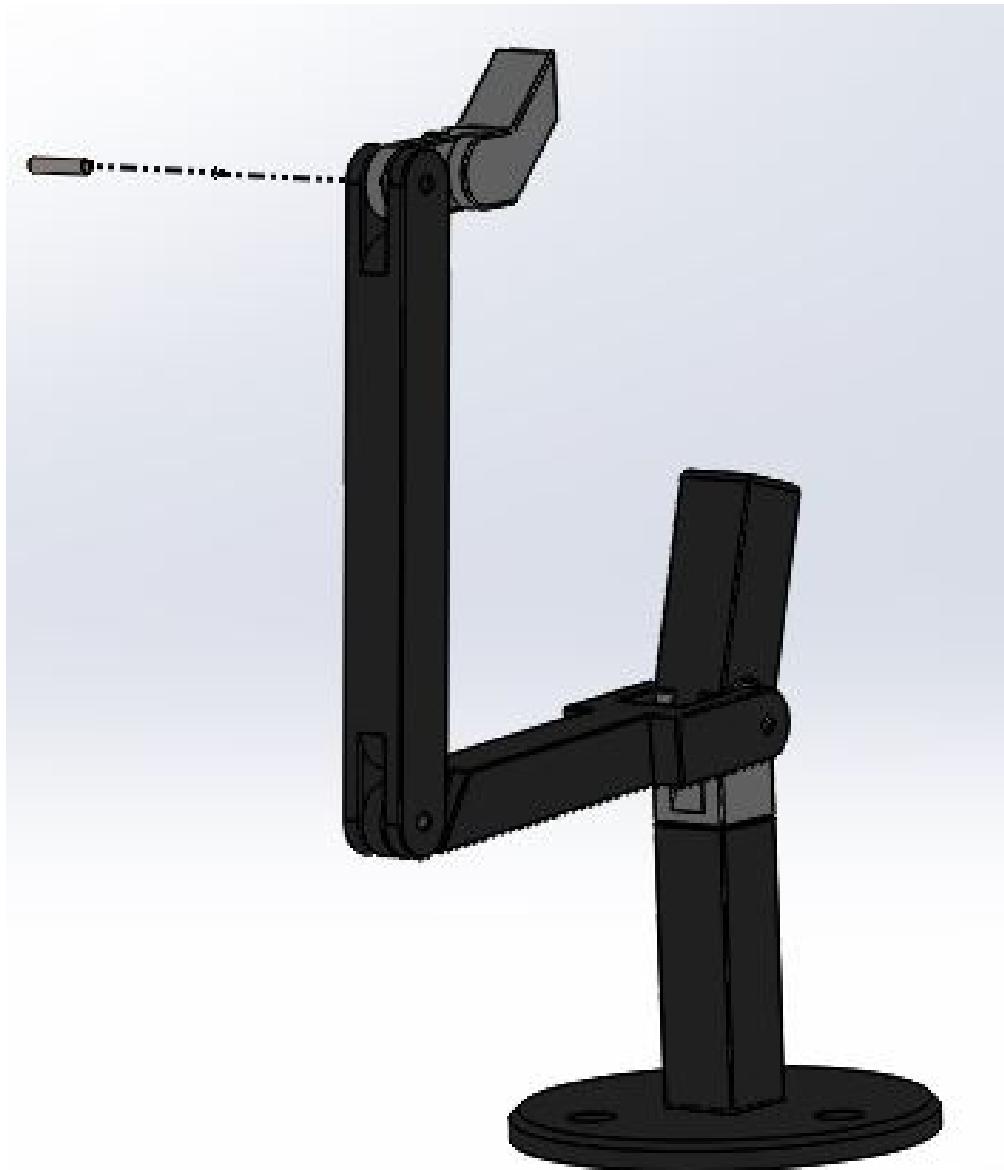


FIGURE 1.54: Rodriguez, Juan: Assembly Step 4

Step 5

Attach the ball and socket joint to existing assembly.

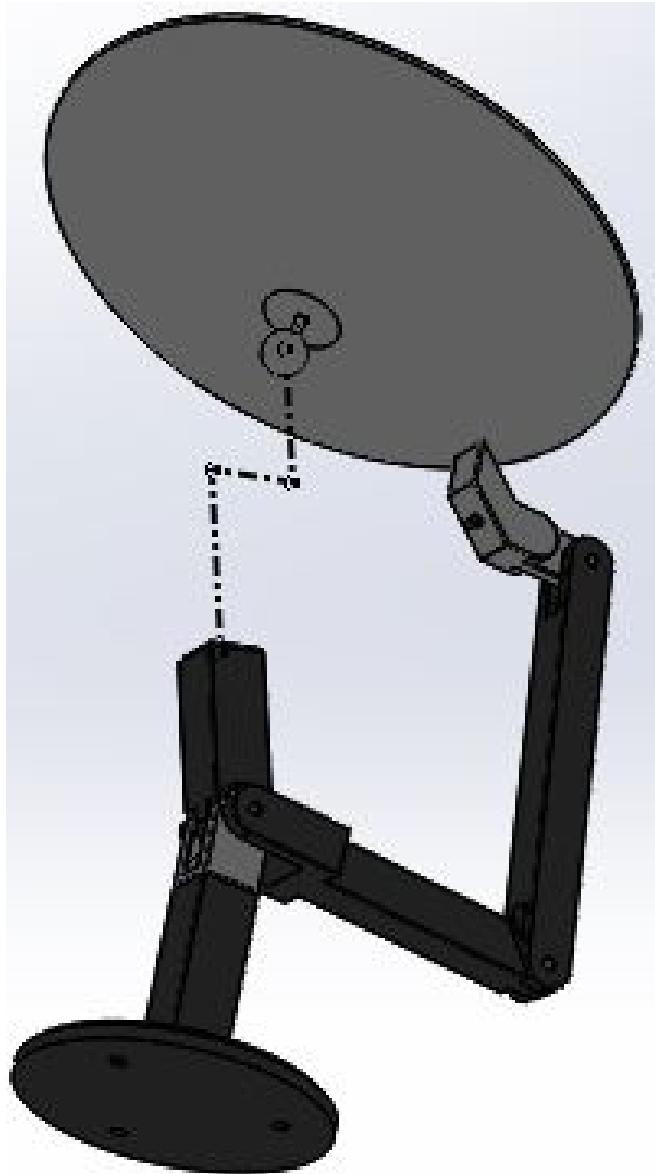


FIGURE 1.55: Rodriguez, Juan: Assembly Step 5

1.2.2 Grabber

Step 1

Ball and socket will be premanufactured using a cast.

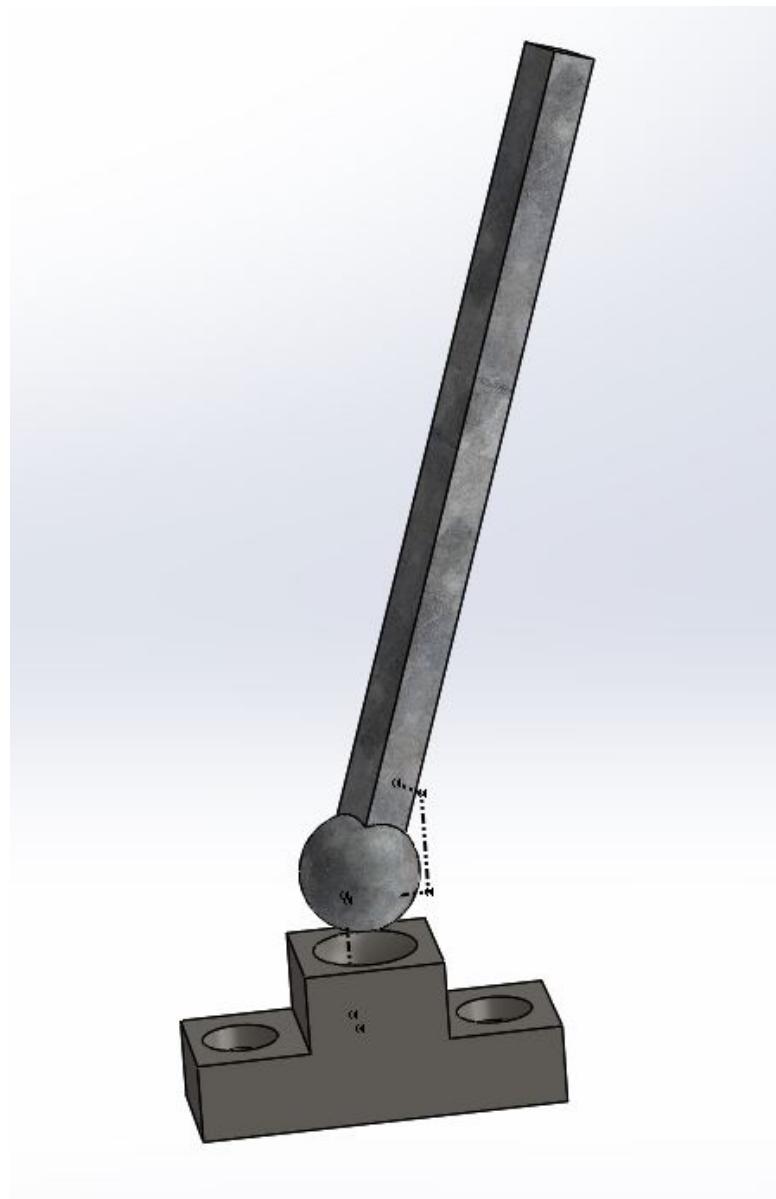


FIGURE 1.56: Sackett, Justin: Assembly Step 1

Step 2

Slide the Upper arm joint onto the hydraulic arm of the ball joint



FIGURE 1.57: Sackett, Justin: Assembly Step 2

Step 3

Slide the Upper arm and Upper pincer into the slots of the upper arm joint. The pincer should slide into the central slot. The upper arm should slide into the two slots on either side of the center.

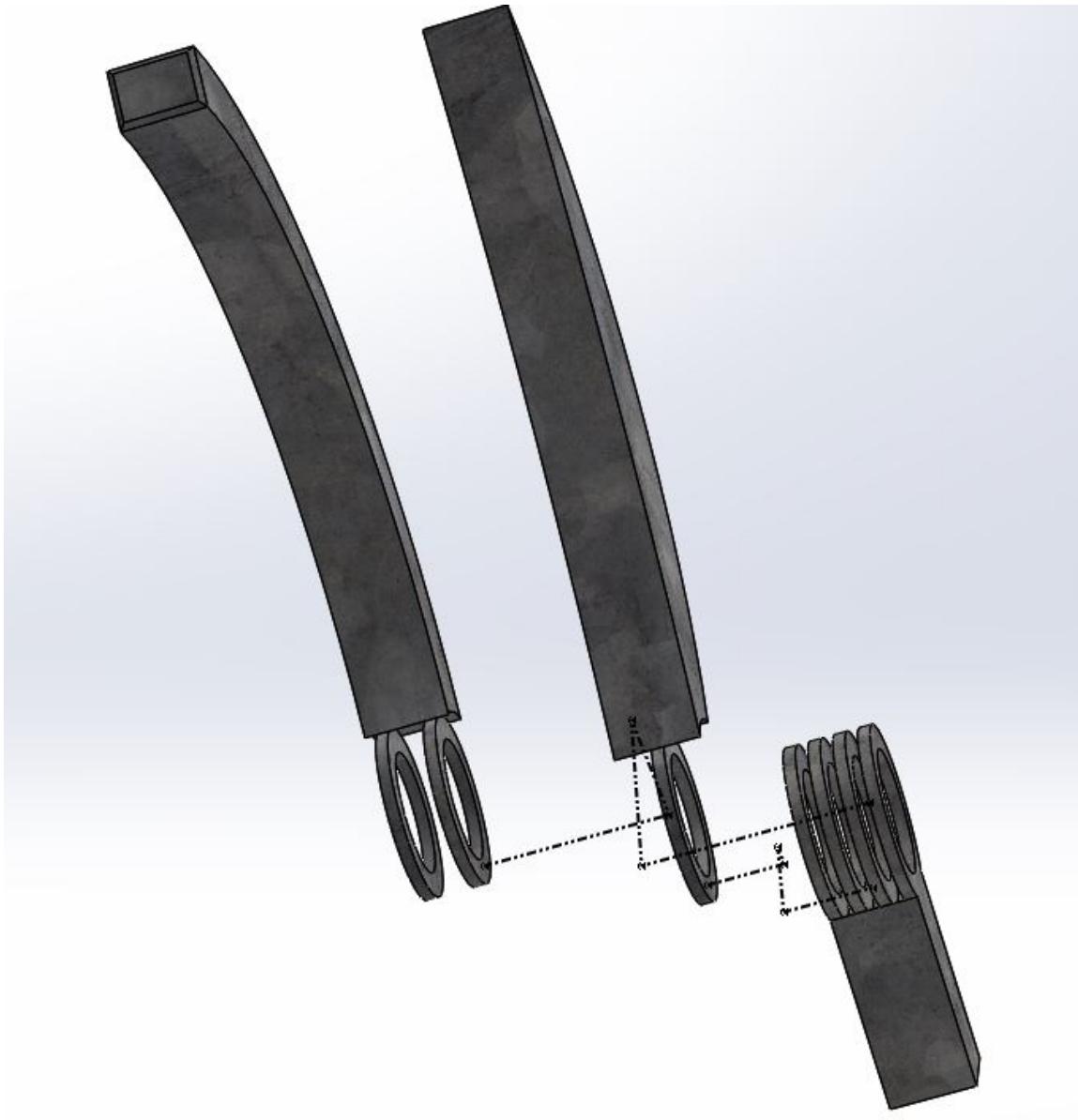


FIGURE 1.58: Sackett, Justin: Assembly Step 3

Step 4

Insert the Hinge pin into the central hole of the Upper arm, Upper pincer, and upper arm joint.

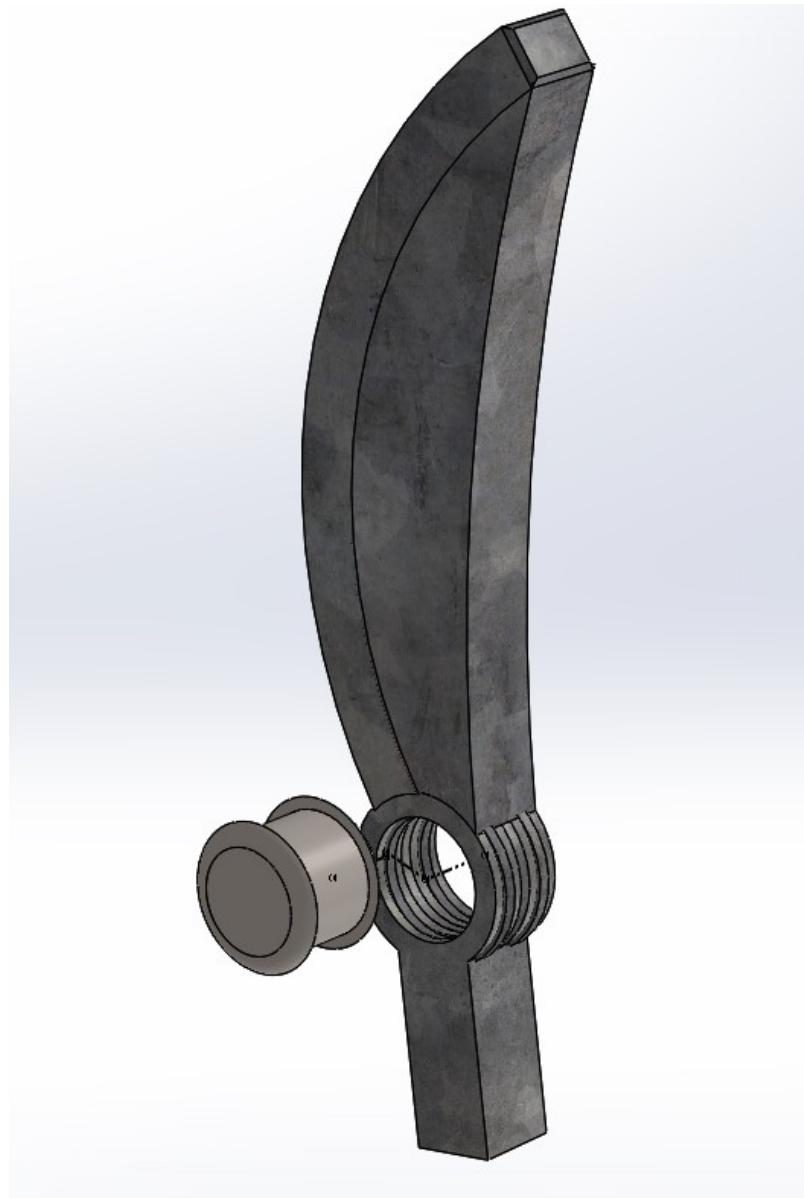


FIGURE 1.59: Sackett, Justin: Assembly Step 4

Step 5

Complete the assembly by sliding the upper joint assembly onto the ball joint arm.



FIGURE 1.60: Sackett, Justin: Assembly Step 5

1.2.3 Lights

Step 1

Place all 11 light subassemblies on top of the 11 pre manufactured holes in the light base.



FIGURE 1.61: Sackett, Justin: Assembly Step 1

Step 2

Screw each of the 11 light screws into each of the 11 holes in order to secure the lights into the light base.



FIGURE 1.62: Sackett, Justin: Assembly Step 2

Step 3

Complete the assembly by securely fastening each screw.



FIGURE 1.63: Sackett, Justin: Assembly Step 3

1.2.4 Suspension

Step 1

Assemble Full Wheel by taking wheel and putting into Tire.



FIGURE 1.64: Hirani, Asimm: Assembly Step 1

Step 2

Insert Hub into Wheel



FIGURE 1.65: Hirani, Asimm: Assembly Step 2

Step 3

Mount Brake Disk and Brake Caliper onto Hub

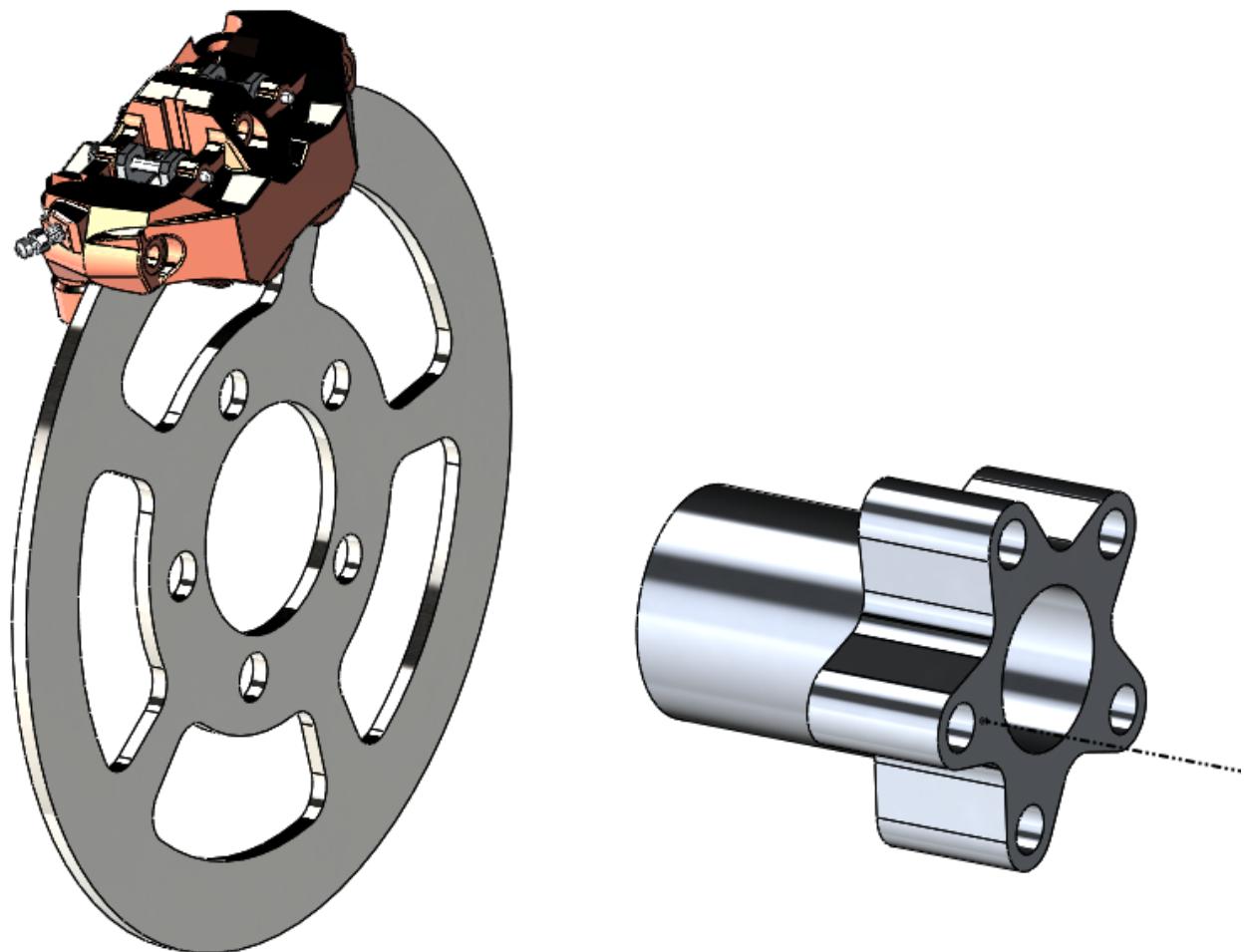


FIGURE 1.66: Hirani, Asimm: Assembly Step 3

Step 4

Mount hub and wheel assembly onto upright



FIGURE 1.67: Hirani, Asimm: Assembly Step 4

Step 5

Mount lower control arms and upper controls arms onto frame. Mount coilover onto LCA. Mount upright between control arms. Mirror assembly accross the frame.

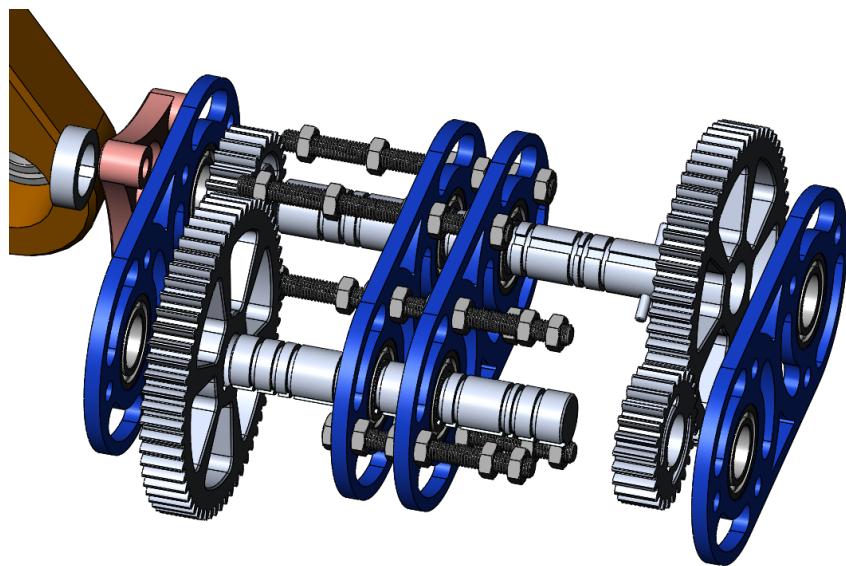


FIGURE 1.68: Hirani, Asimm: Assembly Step 5

1.2.5 3DPrinter

Step 1

Place titanium extrusion cylinder inside of blue vented housing.

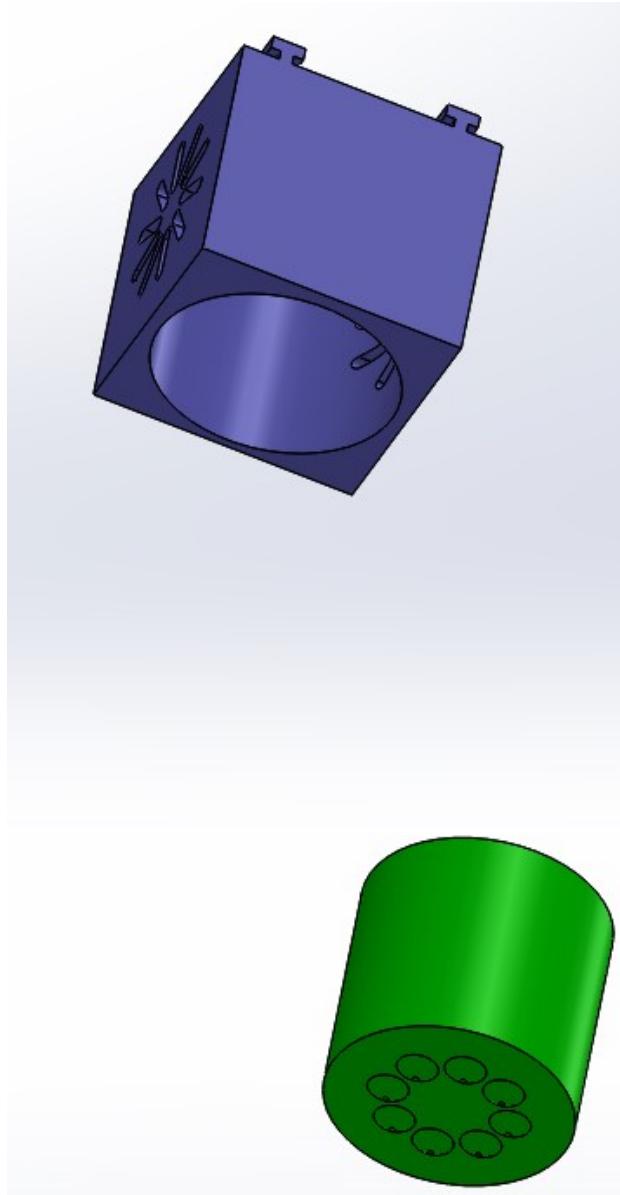


FIGURE 1.69: Ferrarer, Auston: Assembly Step 1

Step 2

Slide extrude cut ridges into red slide-bar. They should be allowed to move freely.

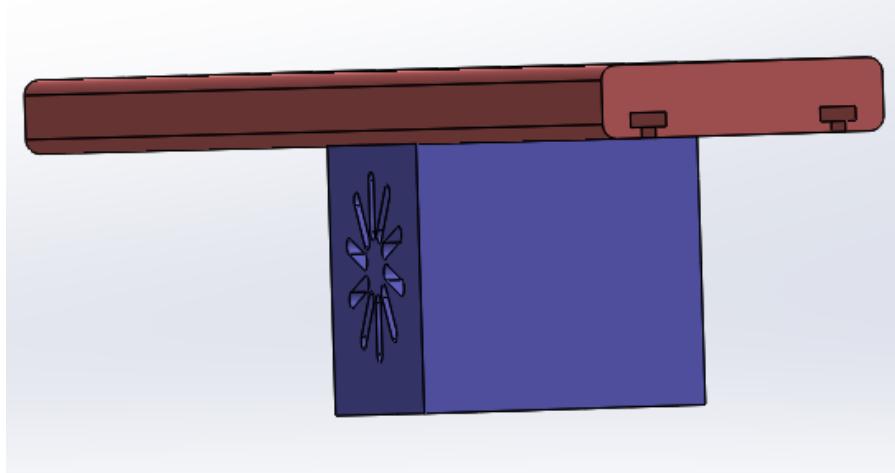


FIGURE 1.70: Ferrarer, Auston: Assembly Step 2

Step 3

Place royal blue 3D printing board into 3D printed shell by placing the four extrude cut holes on the plate into the four corresponding posts. Then slide the sidebar into the 3D printed shell.

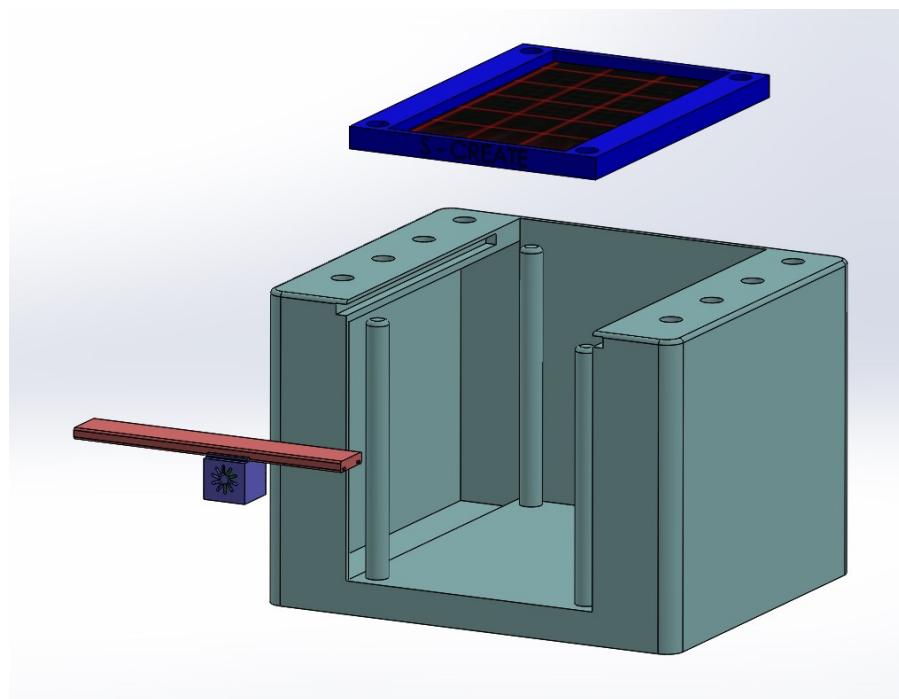


FIGURE 1.71: Ferrarer, Auston: Assembly Step 3

1.2.6 FlexBed

Step 1

Place the bottom mattress and top bracket into the side bracket of the assembly.

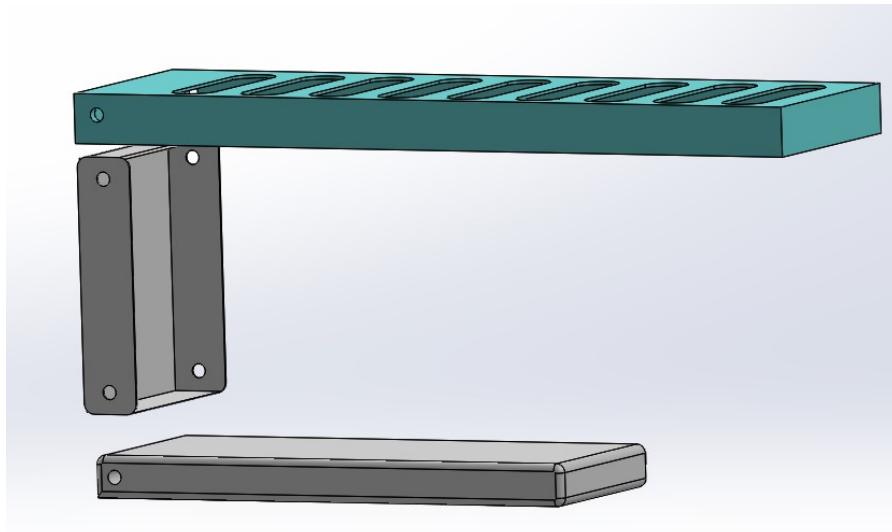


FIGURE 1.72: Ferrarer, Auston: Assembly Step 1

Step 2

Place two carbon fiber rotating rods into the holes shown to finish assembling the foldable flex bed.

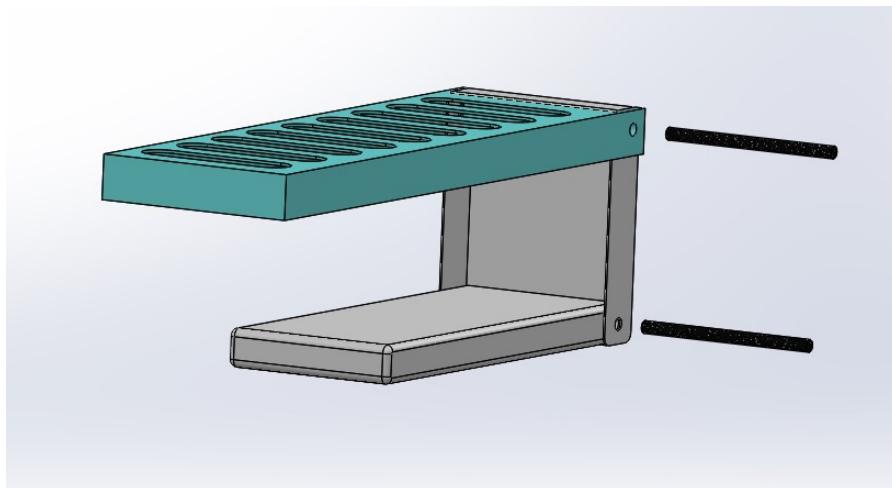


FIGURE 1.73: Ferrarer, Auston: Assembly Step 2

1.2.7 Helmet

Step 1

Press fit the acrylic visor into the shell of the Mars helmet.

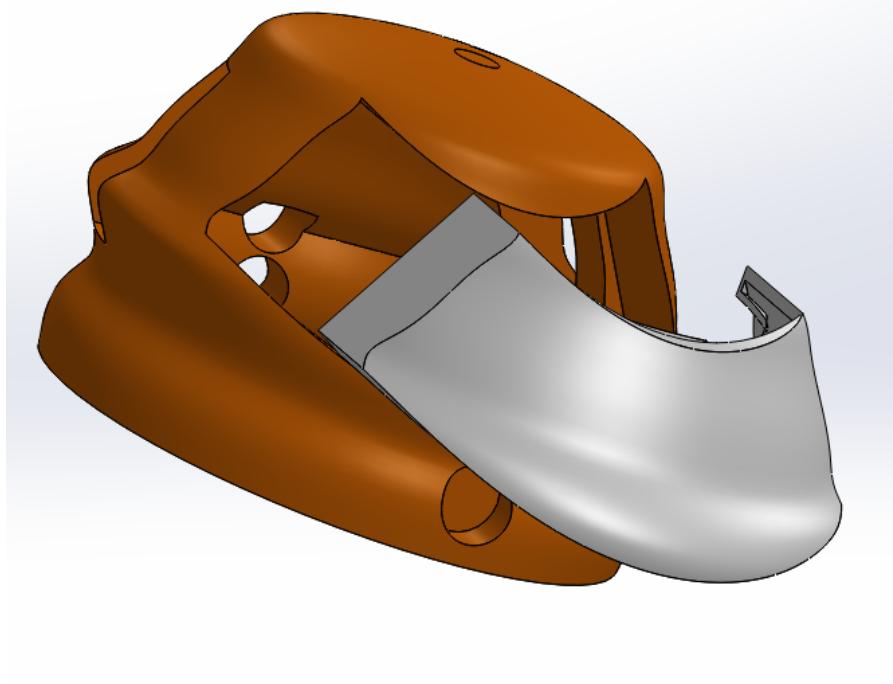


FIGURE 1.74: Ferrarer, Auston: Assembly Step 1

Step 2

Insert the black side lights into the press-fit whole in the side of the helmet.

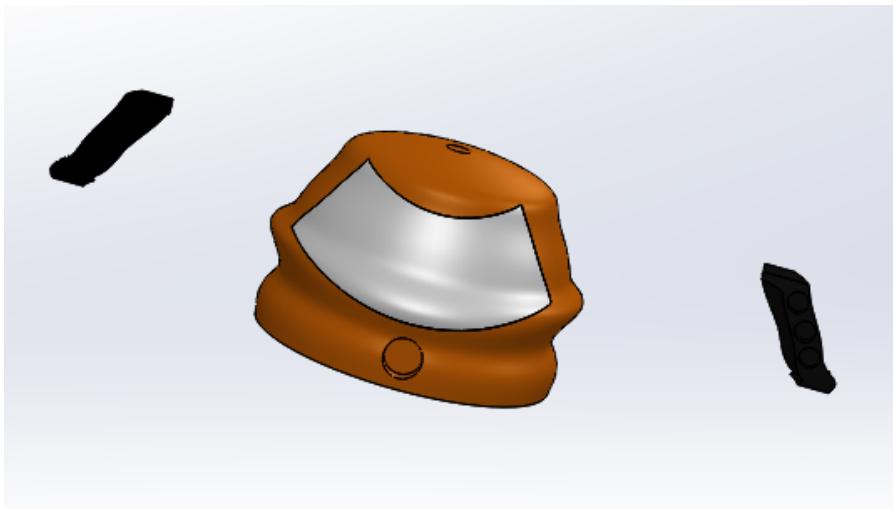


FIGURE 1.75: Ferrarer, Auston: Assembly Step 2

1.2.8 Hinge

Step 1

Insert the Swivel Link into the antenna base and check for tight fit.

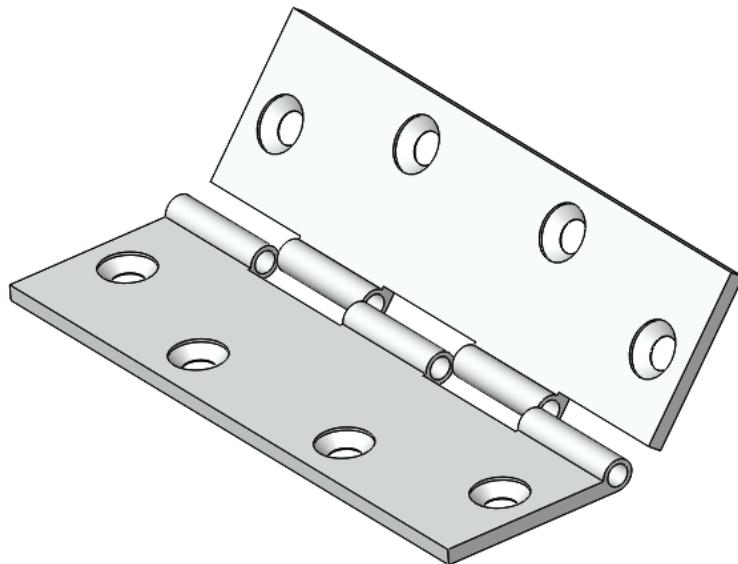


FIGURE 1.76: Ferrarer, Auston: Assembly Step 1

Step 2

Align the holes of the antenna support, the crossbar and then swivel link. Insert pin a.

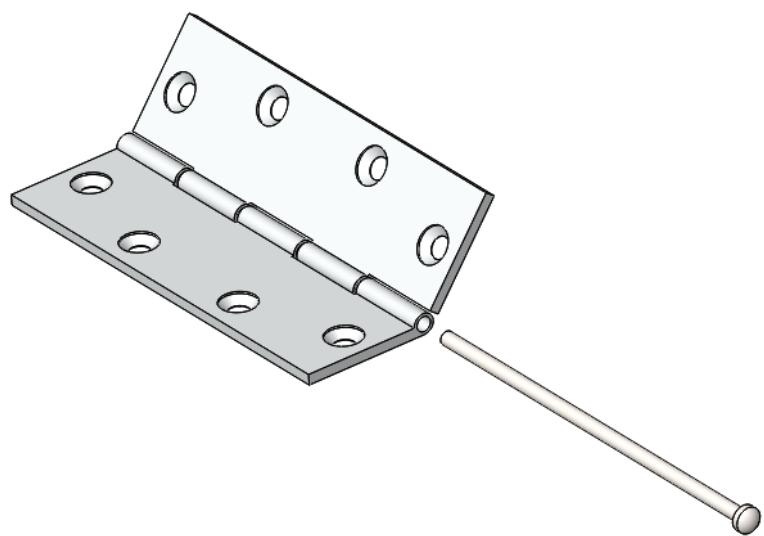


FIGURE 1.77: Ferrarer, Auston: Assembly Step 2

1.3 Exploded View

1.3.1 Antenna

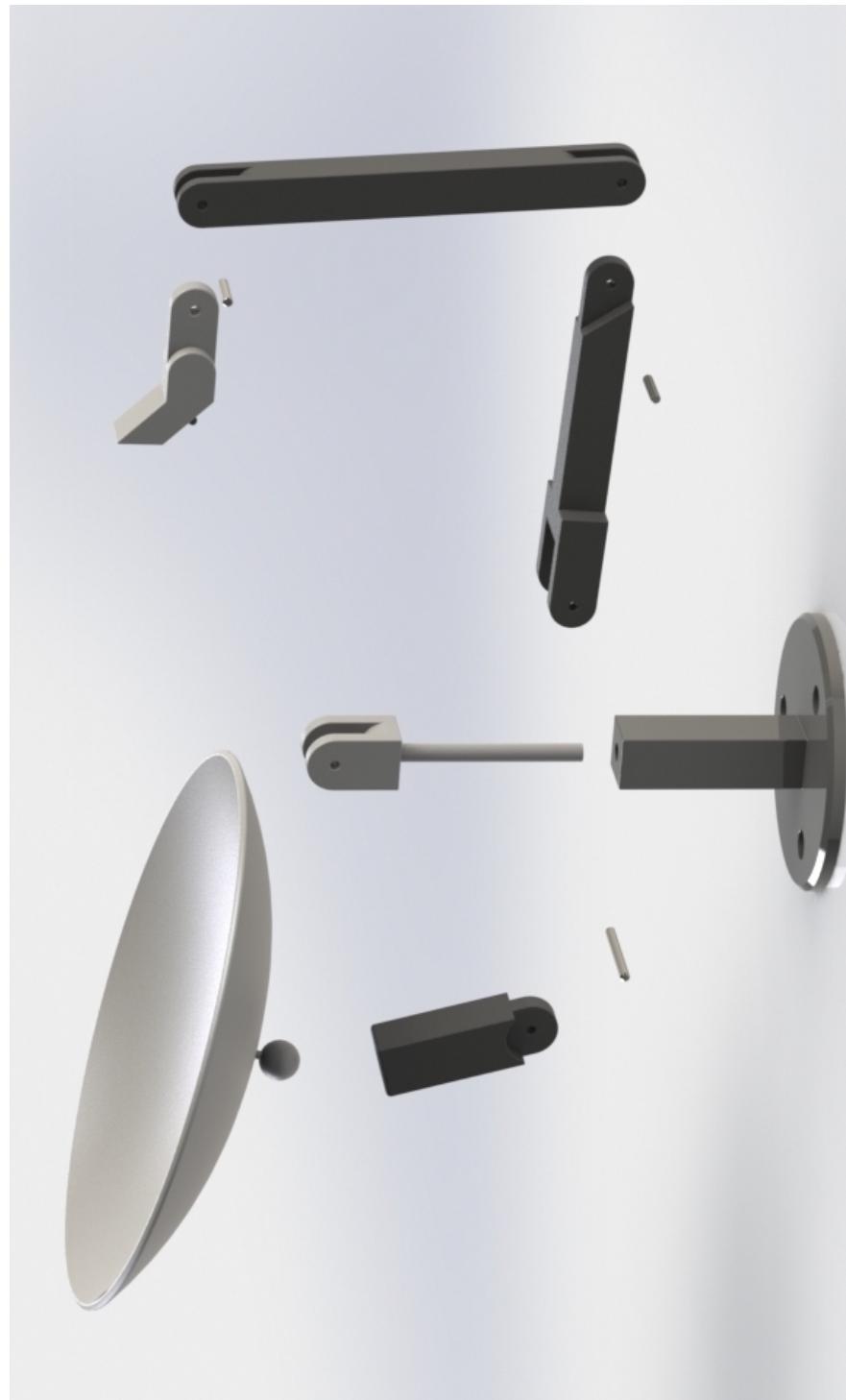


FIGURE 1.78: Rodriguez, Juan: Exploded View of Antenna Assembly

1.3.2 Grabber



FIGURE 1.79: Sackett, Justin: Exploded View of Grabber Assembly

1.3.3 Light

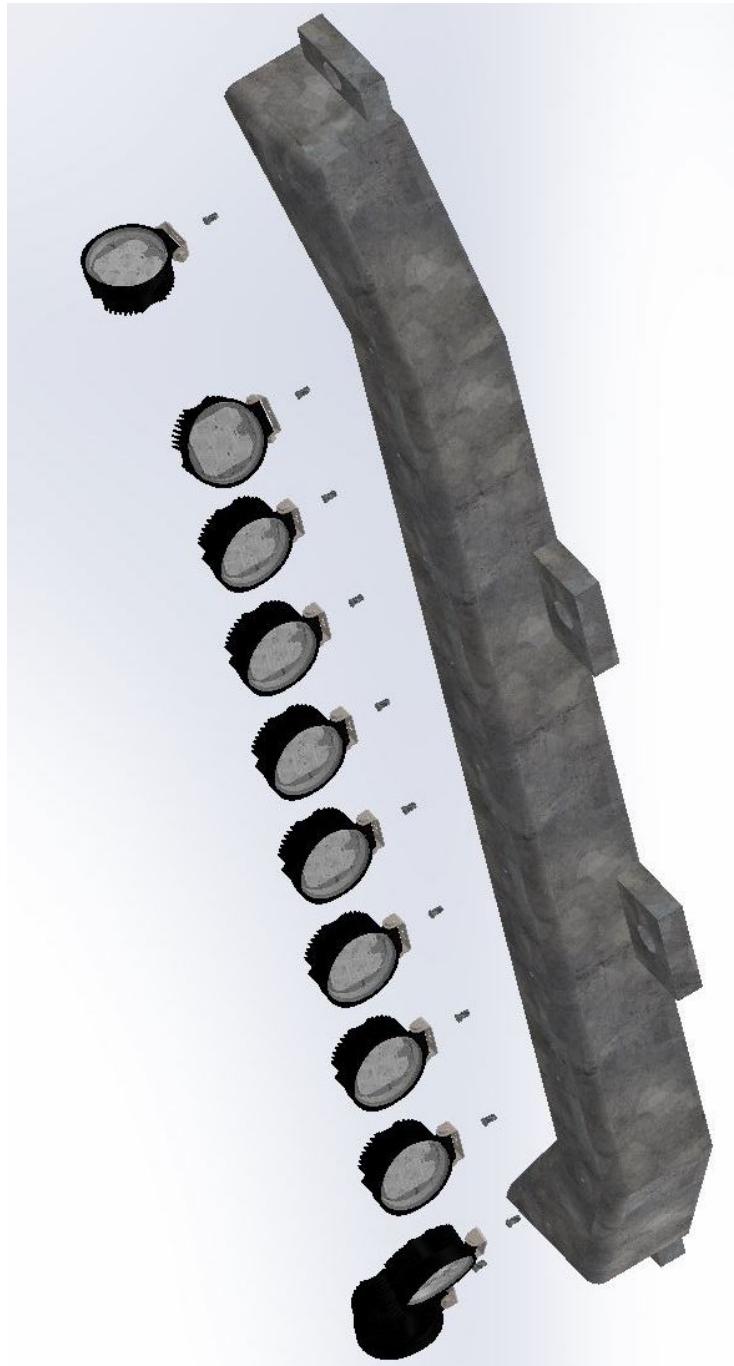


FIGURE 1.80: Sackett, Justin: Exploded View of Light Assembly

1.3.4 Suspension



FIGURE 1.81: Hirani, Asimm: Exploded View of Suspension Assembly

1.4 Part List