

Robotic Arm



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Project Description

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- Goal: develop a **waist-mounted robotic arm** that
 - Offers **active gravity compensation**
 - Remains **lightweight, low-profile, and energy efficient**
 - Enables the arm to rest naturally by the user's side.
- **Client:** Dr. Zach Lerner, Associate Professor of Mechanical Engineering, NAU.
- **Sponsorship:** W.L Gore

Purchase Plan

Type	Including	Percentage bought	Percentage on Hand
Fasteners	Screws, bolts, washers, heat set inserts, etc.	100	90
Printing Material	PLA, Onyx, and Carbon	100	100
Electronic Components	Batteries, Motor, control boards, etc.	80	80
Machined Parts	Commissioned Aluminum or other material	0	0
Overall		70	68

Manufacturing plan

Manufacturing Plan							
Completion	Part No.	Material	Manufacturing Hours / Part	Quantity	Total Time	Quantity Completed	Completed Time
	DET001-V1	Carbon Fiber	2	2	4	1	2
	DET002	ONYX	11	1	11	0	0
	DET003	ONYX	9	1	9	0	0
	DET004	ONYX	6	1	6	0	0
	DET005	Carbon Fiber	2	2	4	0	0
	DET006-V1	ONYX	7	2	14	0	0
	SUB03-DET001	ONYX / 6061-T6	5	1	5	0	0
	SUB03-DET002	ONYX / 6061-T6	5	1	5	0	0
	SUB03-DET003	ONYX	4	1	4	0	0
			Totals:	12	62	1	2
						Completed Manufacturing (%)	8.33%
						Manufacturing Time (%)	3.23%

Design Efforts (Spring Semester)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	R3-DET001-V1 (Link)		2
2	R3-DET002 (Mount 1)		1
3	R3-DET003 (Mount 1-2)		1
4	R3-DET004 (Mount 2)		1
5	R3-DET005 (Front)		2
6	R3-SUB01-DET001 (HingeBracket)		1
7	R3-SUB01-DET002 (HingeBlock)		1
8	R3-SUB01-DET003 (HingeCam)		1
9	92981A103	Alloy Steel Shoulder Screws	2
10	94645A102	High-Strength Steel Nylon-Insert Locknut	2
11	57155K588	Flanged Ball Bearing	4
12	R3-SUB02-DET001 (External)	CubeMars AK45-36	2
13	R3-SUB02-DET002 (Internal)		2
14	R3-SUB03-DET001 (CuffAttach)		1
15	R3-SUB03-DET002 (LinkAttach)		1
16	R3-SUB03-DET003 (Cuff)		1
17	94500A295_316 Stainless Steel Button Head Hex Drive Screws		4
18	91239A113	Button Head Hex Drive Screw	40
19	94777A102	316 Stainless Steel Flange Nut	2
20	R3-DET006-V1 (Front)		2

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DIMENSIONS ARE IN INCHES
 TOLERANCES:
 FRACTIONAL ±
 ANGULAR: ±0.004° BEND ±
 TWO PLACE DECIMAL ±
 THREE PLACE DECIMAL ±

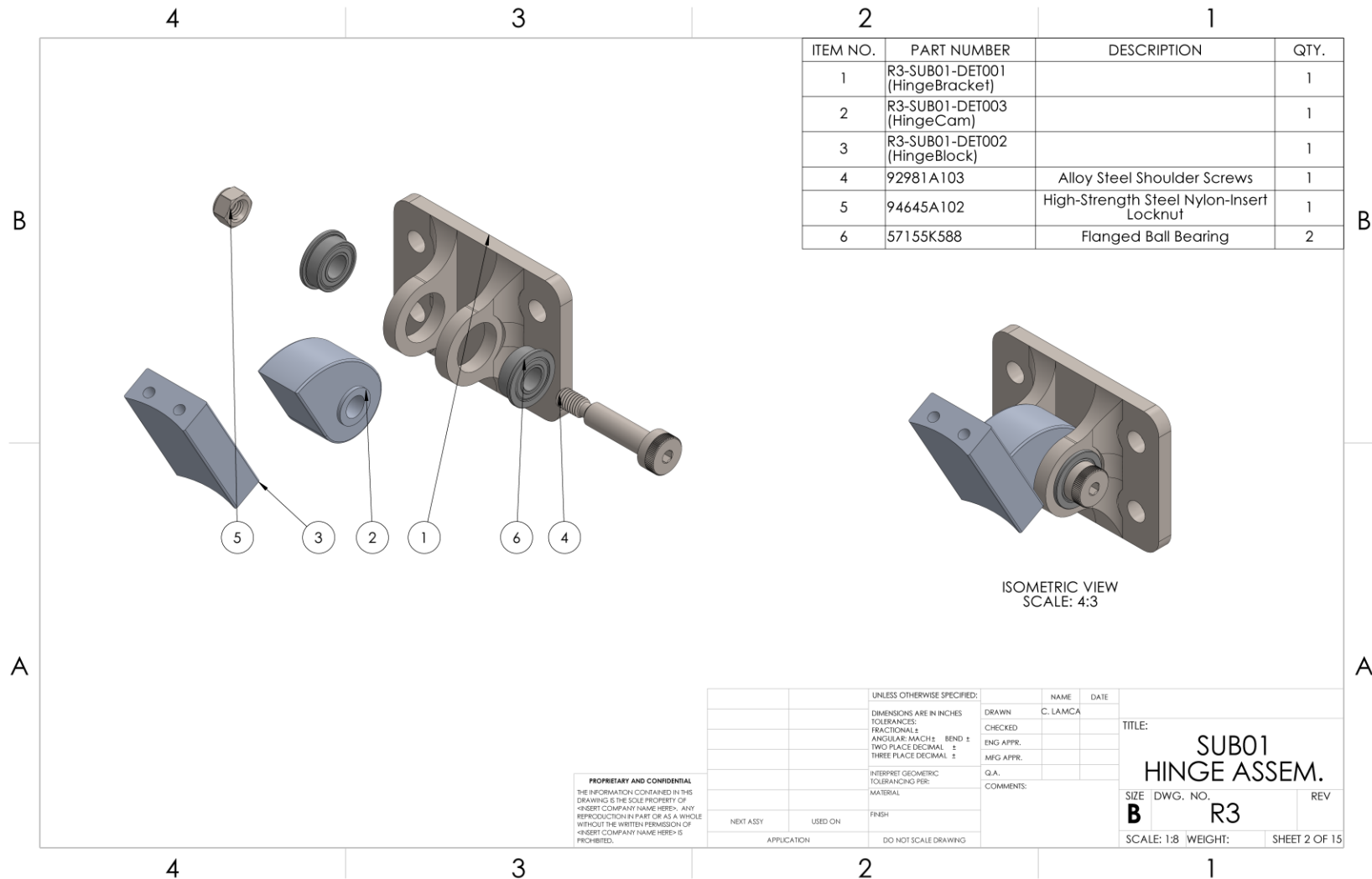
INTERPRET GEOMETRIC TOLERANCING PER MATERIAL

FINISH

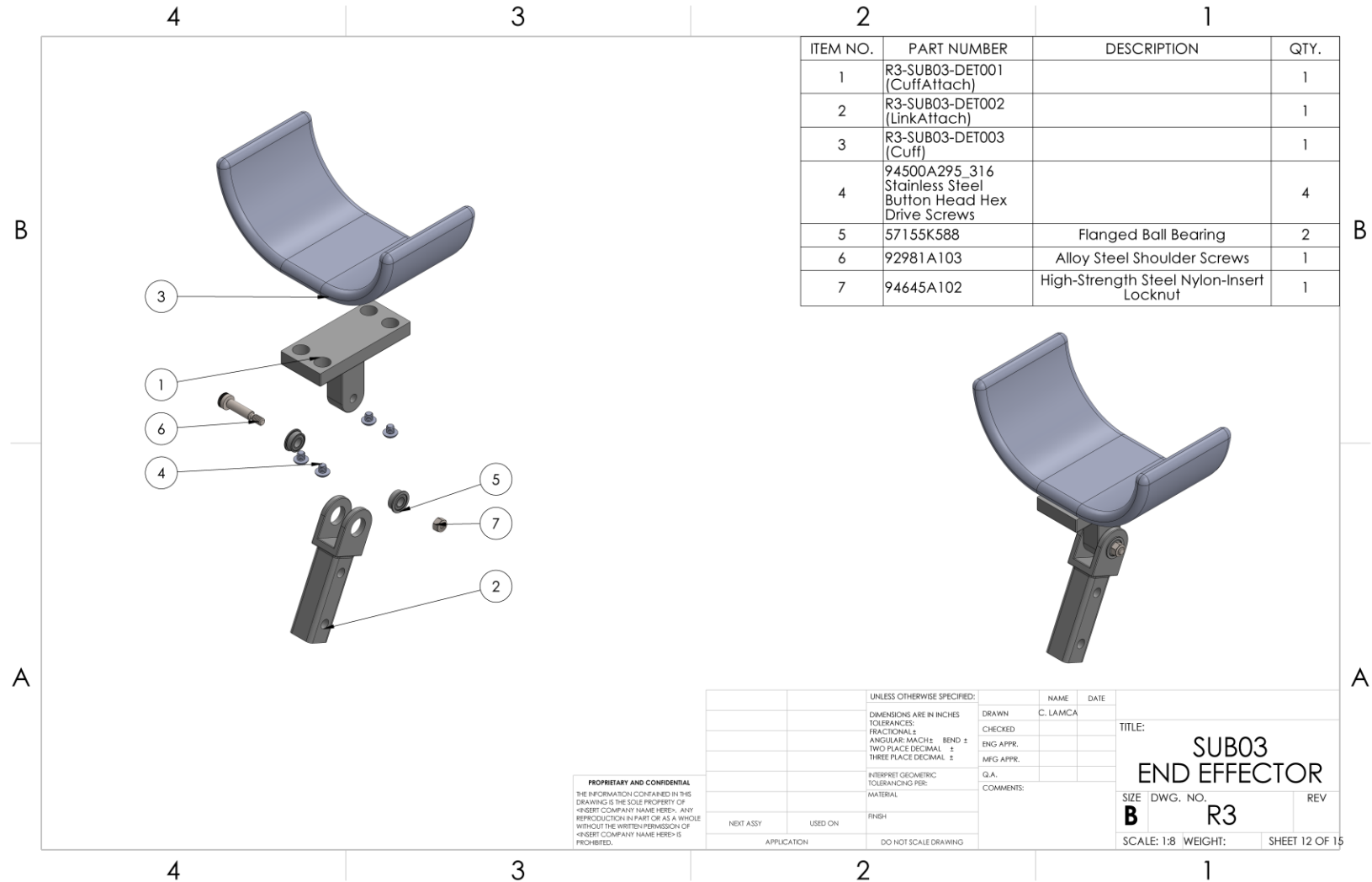
APPROVALS:
 DRAWN: _____
 CHECKED: _____
 ENG APPR: _____
 MFG APPR: _____
 G.A.: _____
 COMMENTS:

TITLE:
 SIZE DWG. NO. REV
B R3
 SCALE: 1:8 WEIGHT: SHEET 1 OF 1

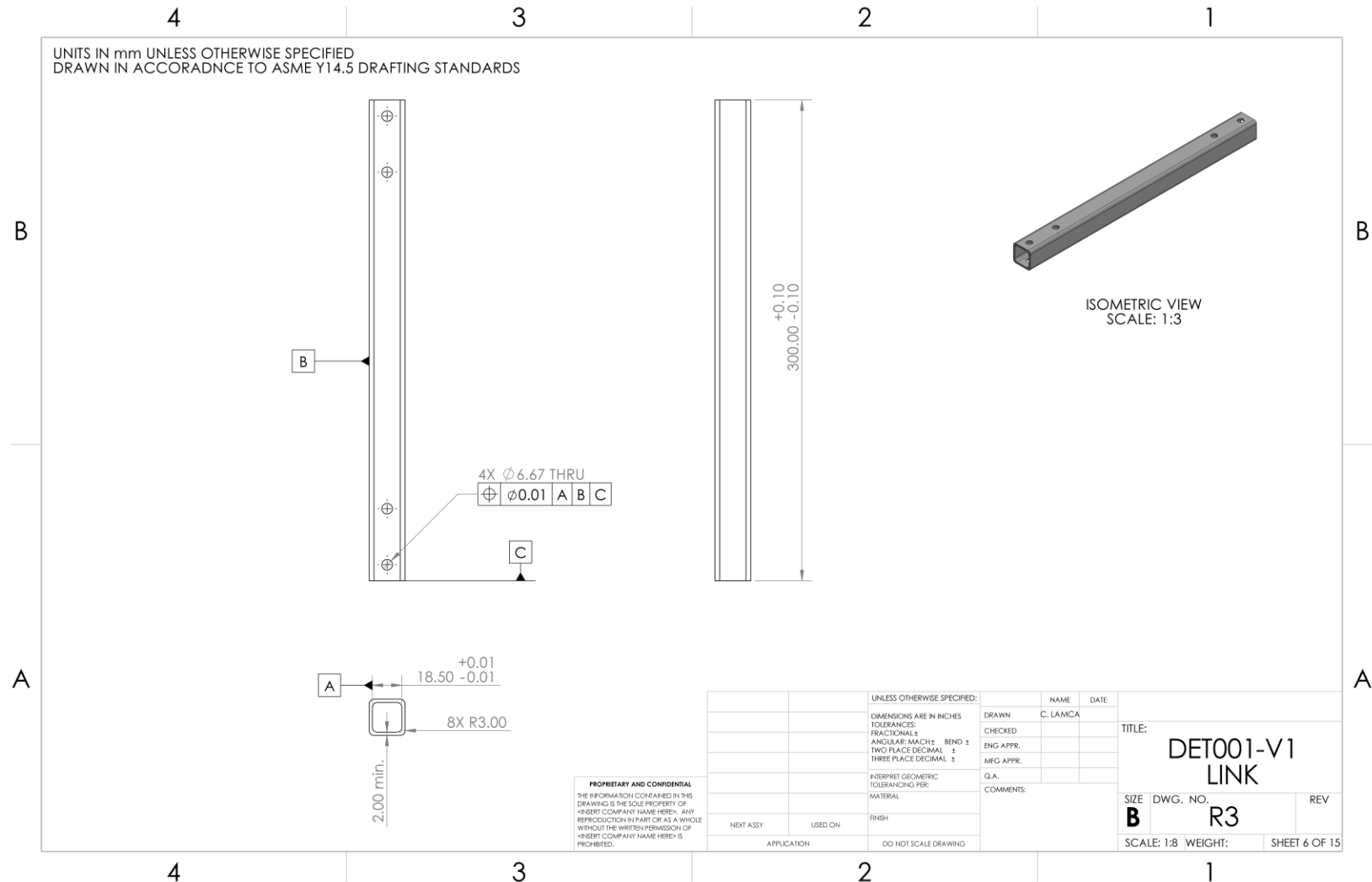
Design Efforts - Continued



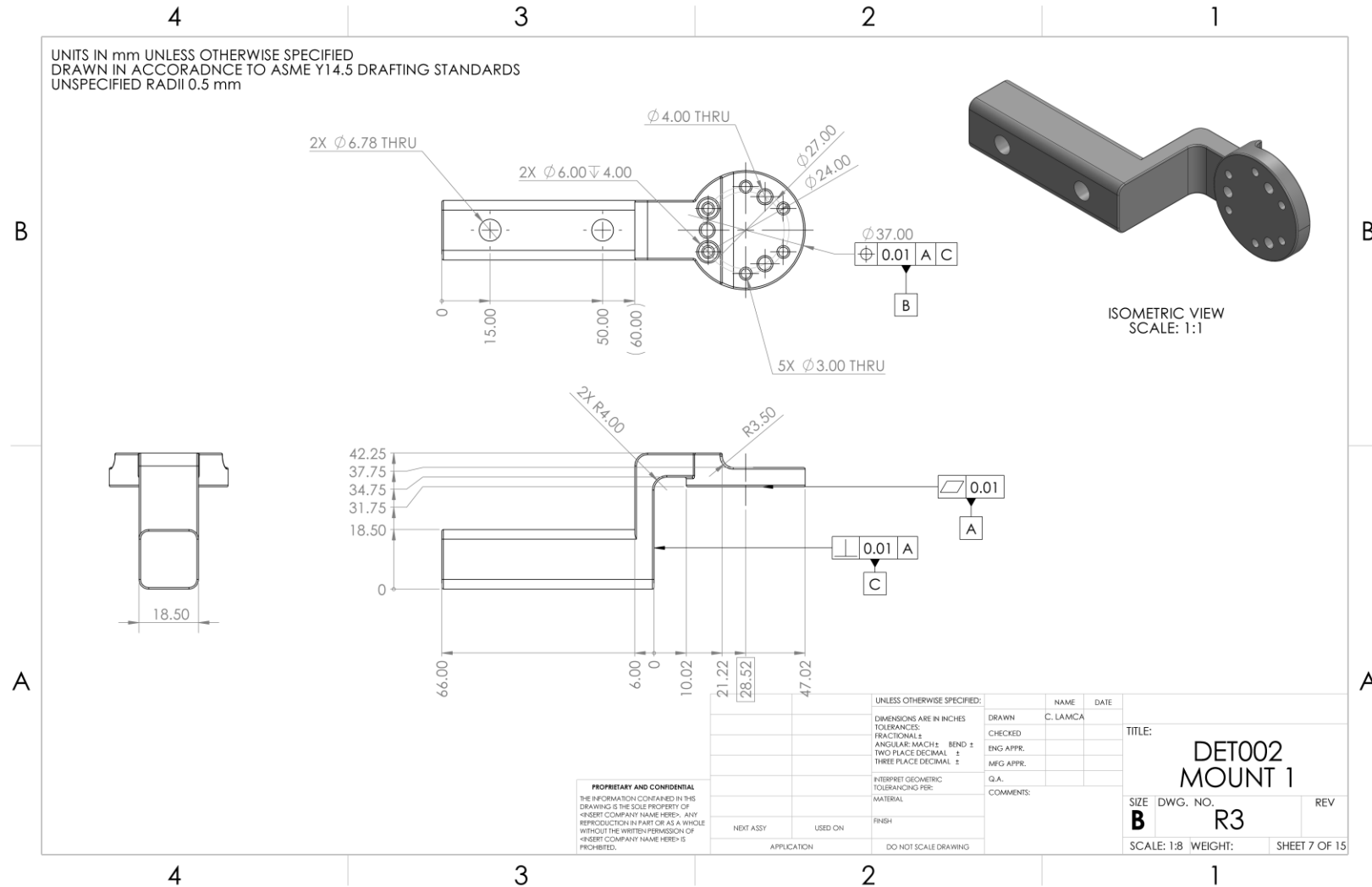
Design Efforts - Continued



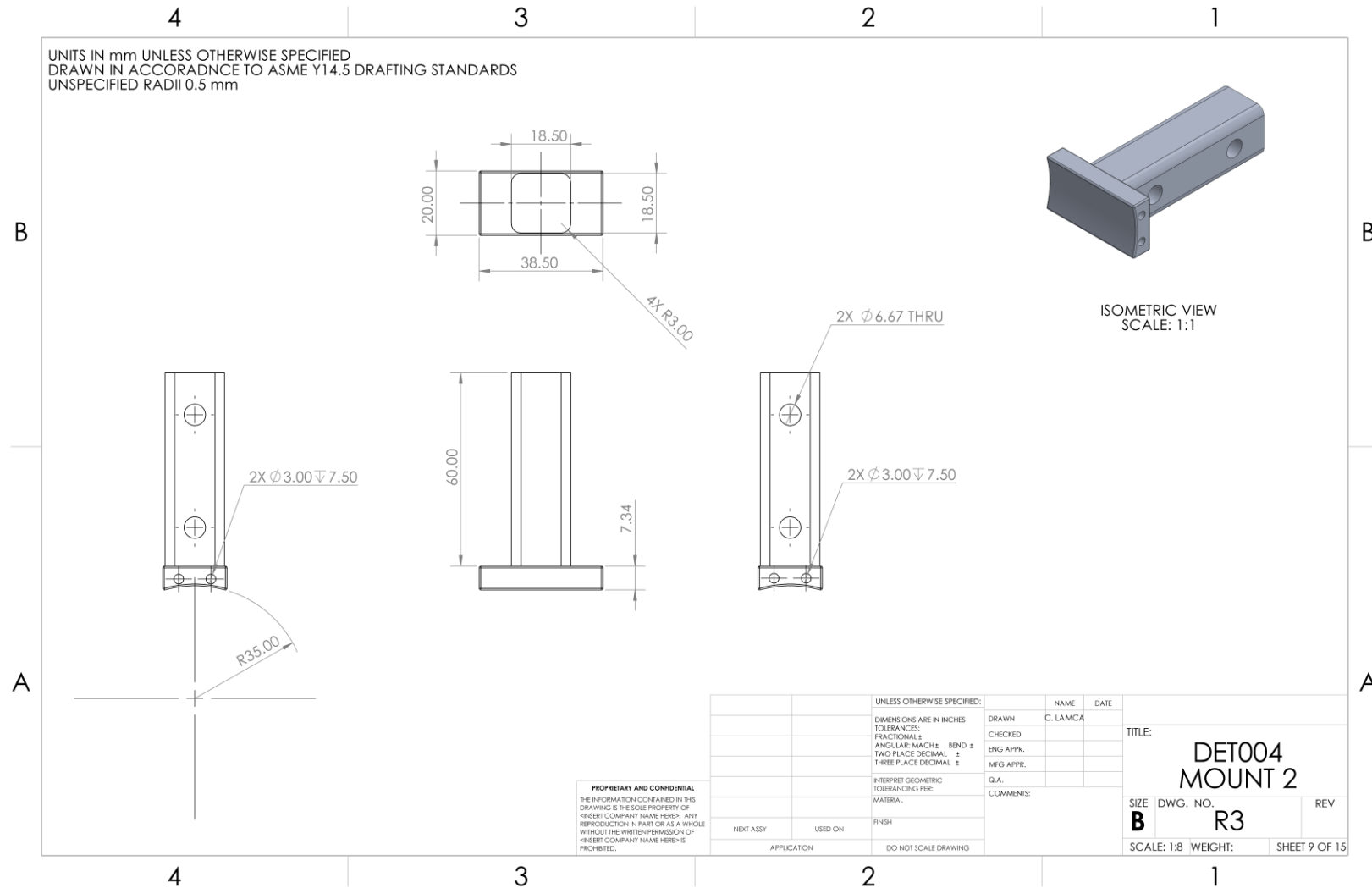
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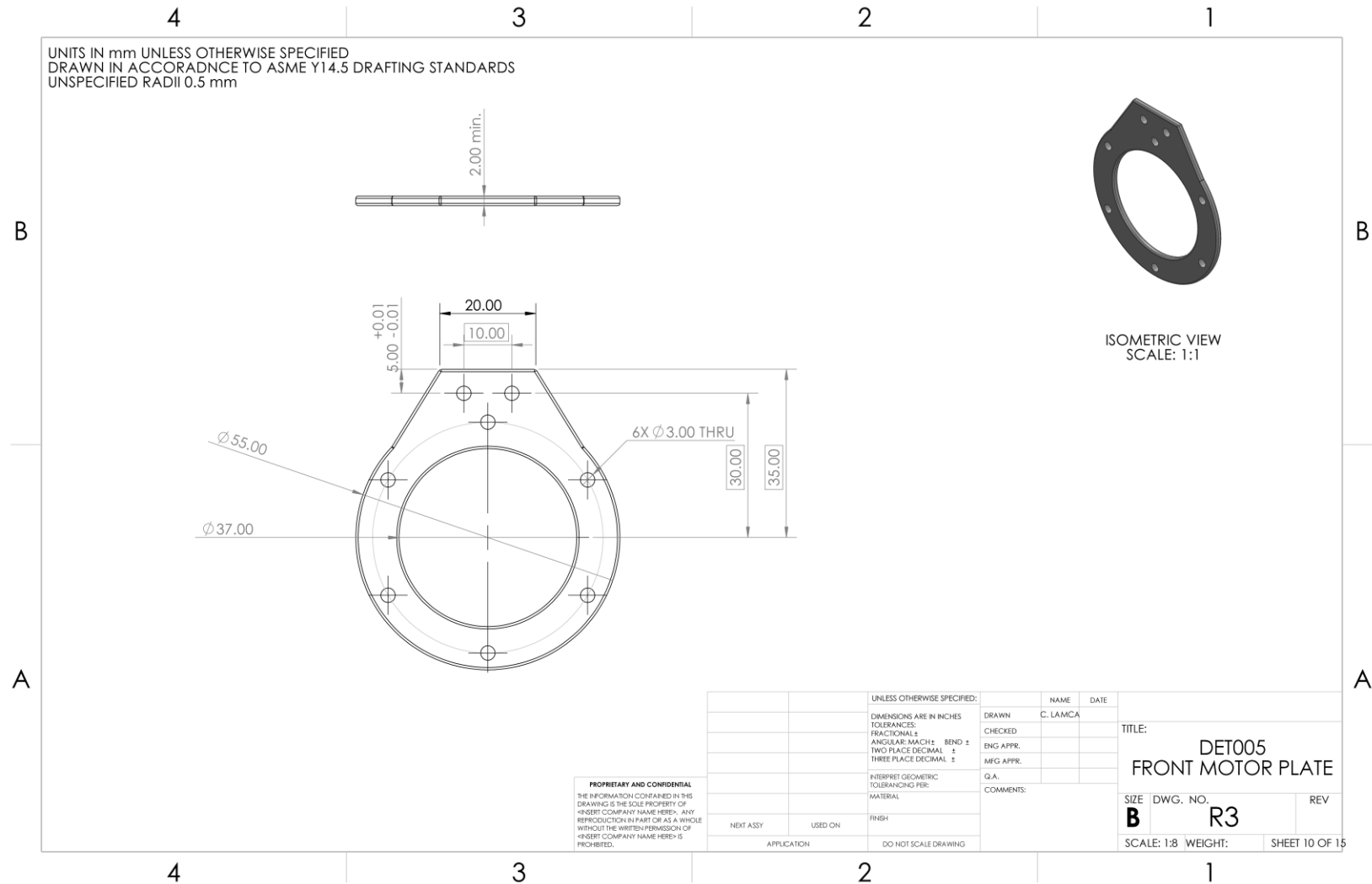
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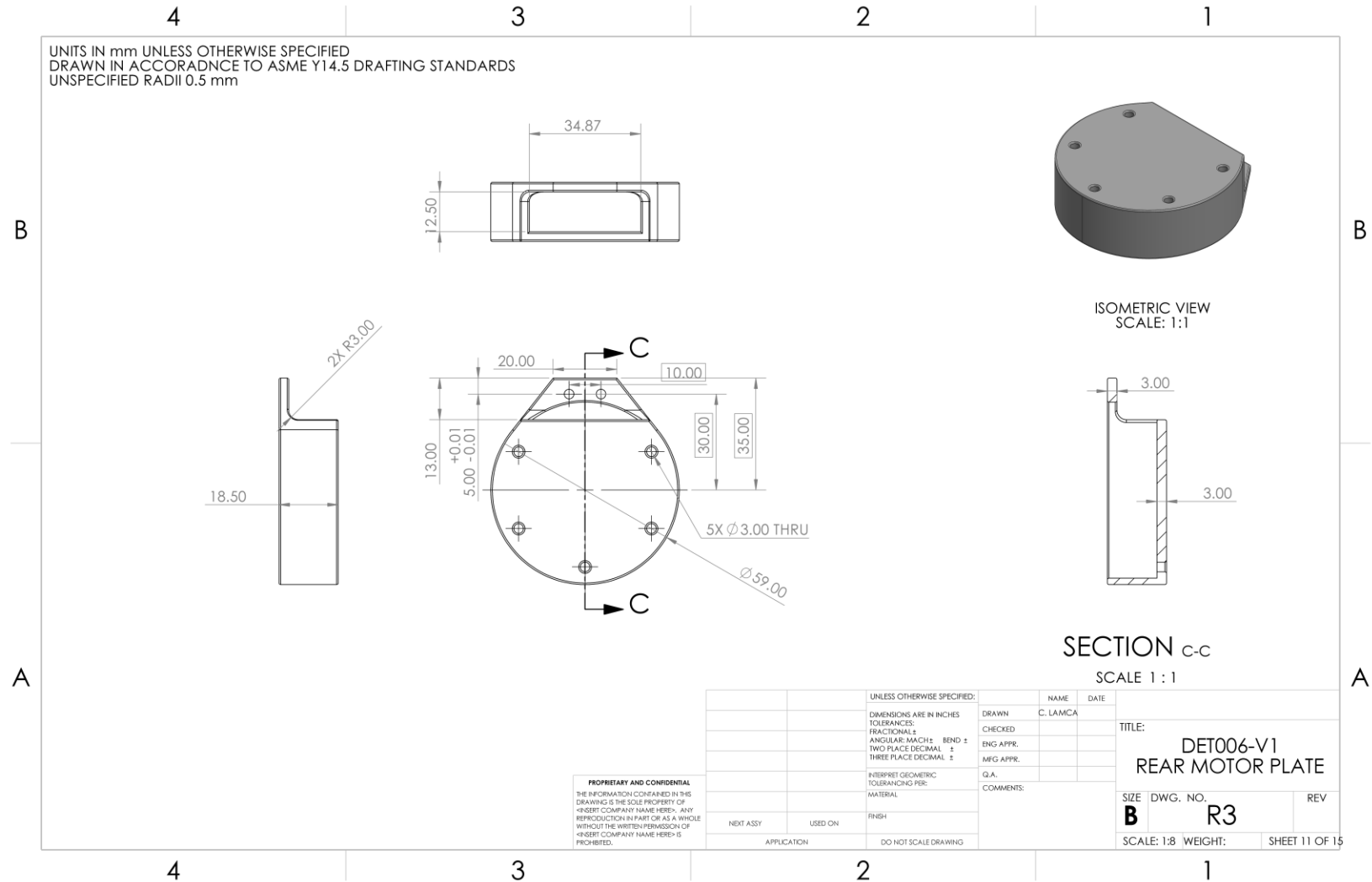
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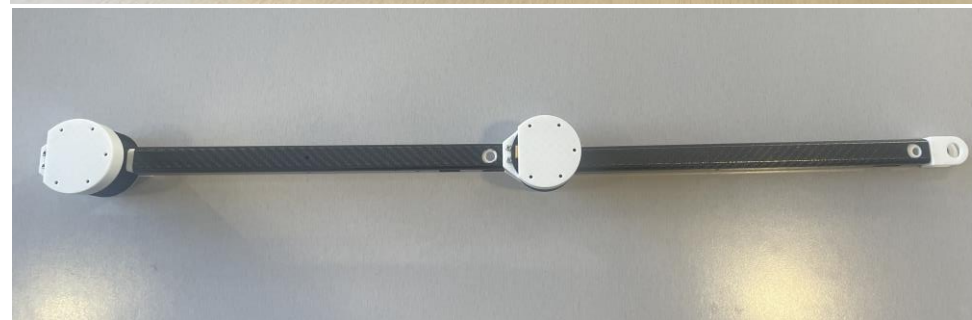
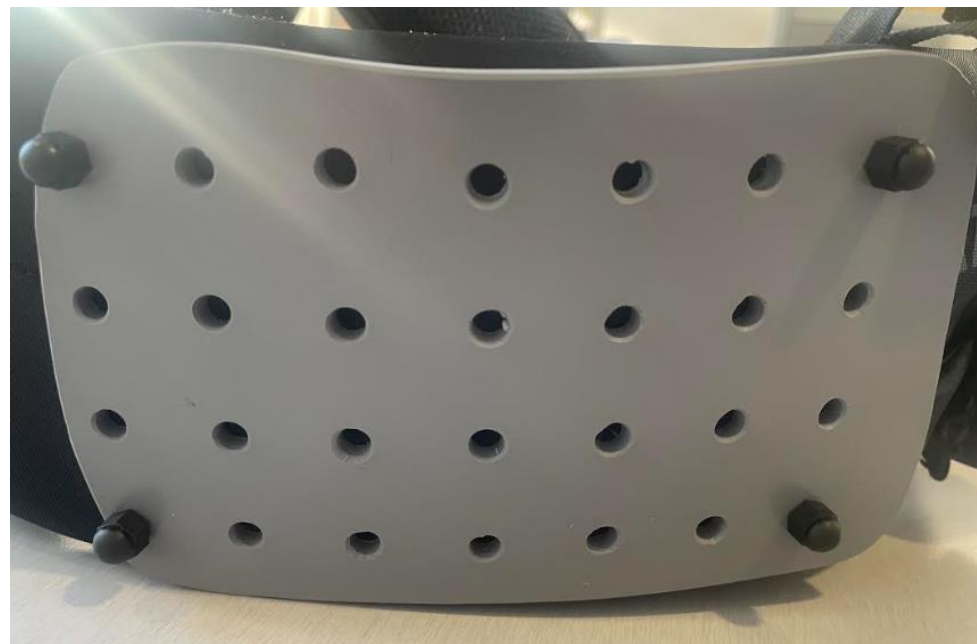
Design Efforts - Continued



Design Efforts - Continued

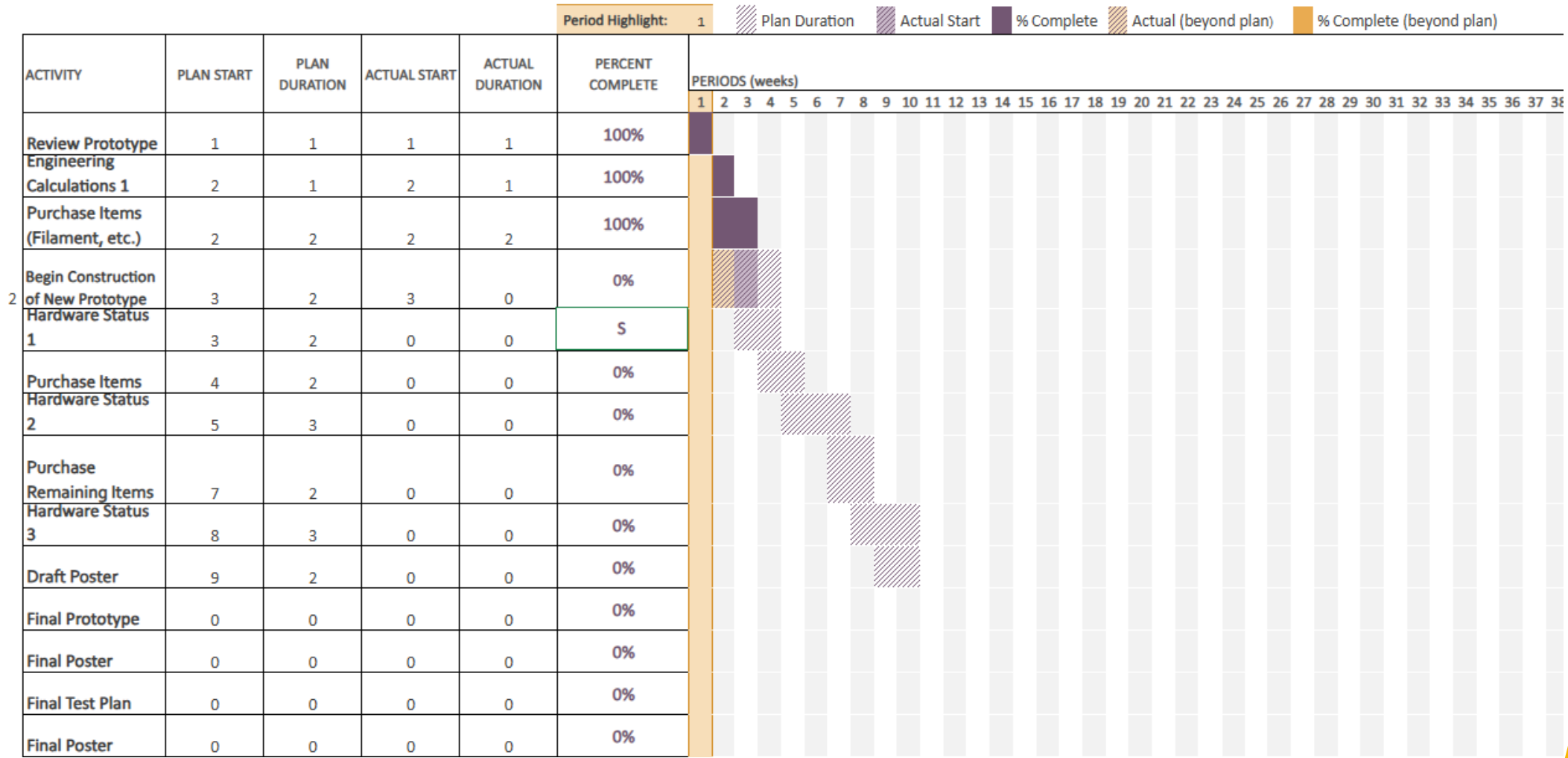


Demonstration



Gantt Chart

Semester 2



**Thank you
And
Any Questions?**