

NAU SAE BAJA Front Suspension

Hardware Status Update - 100% Build

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Design Efforts (CAD)

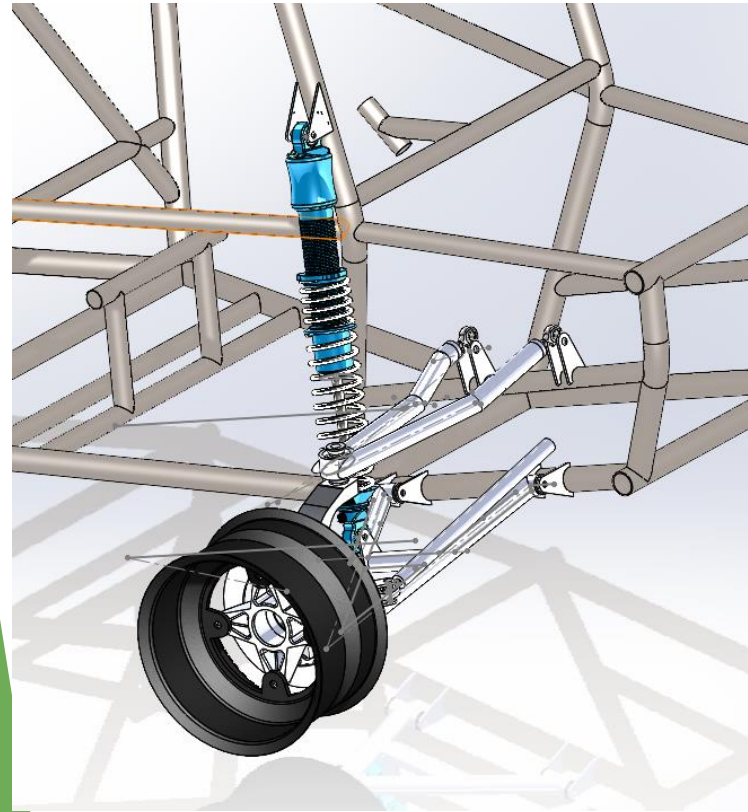


Figure 1: Front-End Isometric View

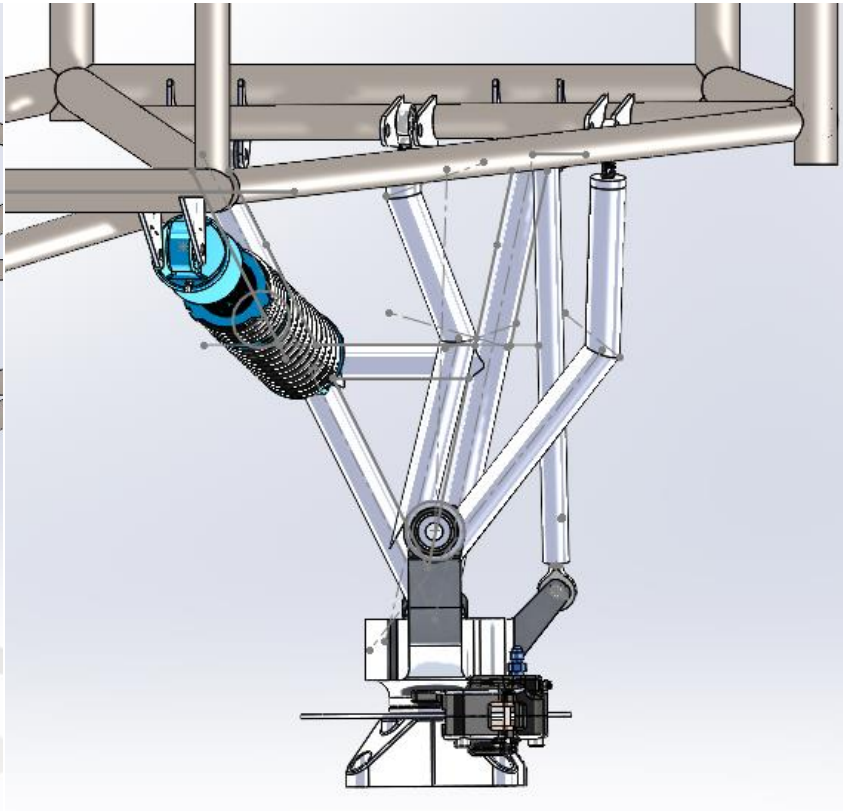


Figure 2: Front-End Top View

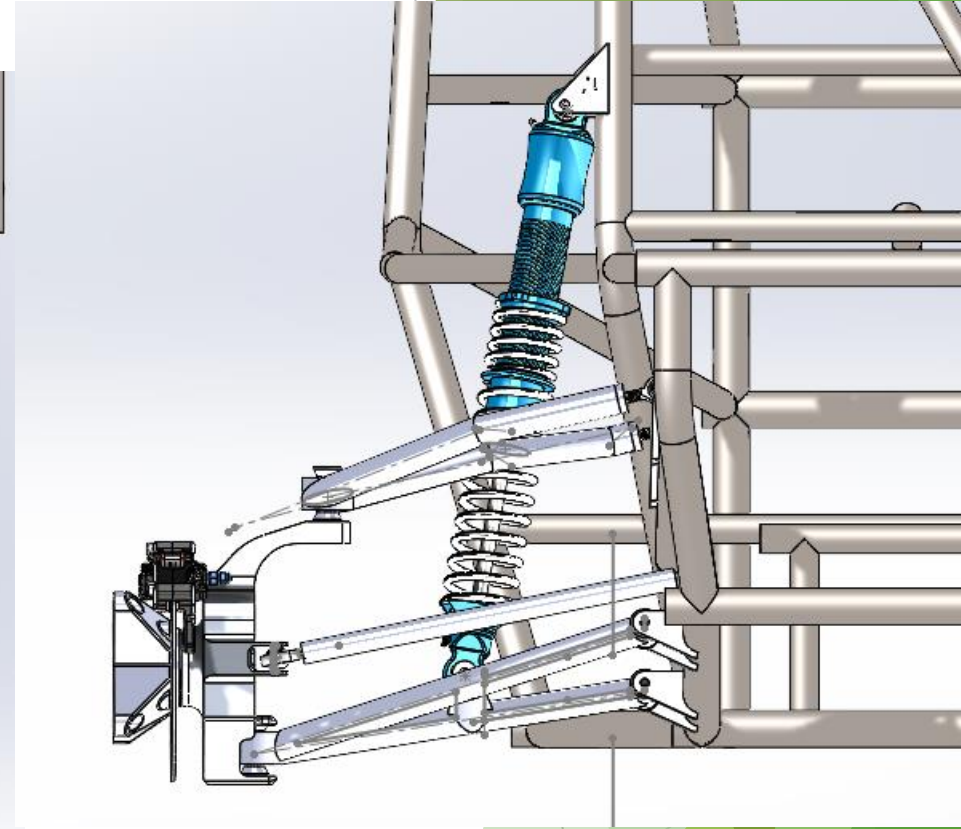


Figure 3: Front-End Front View



Purchasing

Table 1: Front-End Purchasing Excel Sheet

Front Suspension											
No.	Part Name	Action Needed	Size/Dimensions	QTY	Price (Each)	Price (Total)	Link to Website	Part No. (From Website)	Primary Vendor	Secondary Vendor	Manufacturer
1	Lug Nuts	Purchase	ID: 3/8 in	8	\$ -	\$ -	N/A	N/A	Copper State	N/A	N/A
2	Axle Nuts	Purchase		2	\$ -	\$ -	N/A	N/A	Go Az Motorsports	N/A	Yamaha
3	Wheel Studs	Purchase	OD: 3/8 in	8	\$ -	\$ -	N/A	N/A	TMS	N/A	TMS
4	Hubs	CAD and Fab		2	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
5	Hub Bolts	Purchase		2	\$ -	\$ -	N/A	N/A	Copper State		
6	Rotors	Purchase		2	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
7	Calipers	Purchase	ID: 3/8 in	2	\$ -	\$ -	N/A	N/A	Hyper Racing	N/A	HBS
8	Caliper Bolts	Purchase	OD: 3/8 in	4	\$ -	\$ -	N/A	N/A	Hyper Racing	N/A	HBS
9	Brake Pads	Purchase		4	\$ -	\$ -	N/A	N/A	Hyper Racing	N/A	HBS
10	Brake Flares	Purchase	TBD	2	\$ -	\$ -	https://www.napaonline.com/en/search?text=8135455&referer=v2	TBD	Napa Auto Parts	O'Reillys	TBD
11	Barbs	Purchase	TBD	2	\$ -	\$ -	https://www.napaonline.com/en/search?text=8135455&referer=v2	TBD	Napa Auto Parts	O'Reillys	TBD
12	C-Clips for Hubs	Purchase	ID: 62 mm, Groove Dia: 65 mm	4	\$ 1.39	\$ 5.56	https://www.mcmaster.com/98455A395/	98455A395	McMastercarr	O'Reillys	TBD
13	Hub Ball Bearings (Shielded)(Outer)	Purchase	ID: 35 mm, OD: 62 mm, Thick: 14 mm	4	\$ 15.73	\$ 62.92	https://www.mcmaster.com/5972K365/	5972K365	McMastercarr	N/A	TBD
14	Hub Sprag Bearings	Purchase	ID: 35 mm, OD: 72 mm, Thick: 17 mm	2	\$ -	\$ -	N/A	4752N82	McMastercarr		GMN
15	Knuckles	CAD and Fab		2	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
16	Knuckle Ball Bearings (Shielded)	Purchase	ID: 30 mm OD: 62mm, Thick: 16 mm	4	\$ 13.79	\$ 55.16	https://www.mcmaster.com/5972K342/	5972K342	McMastercarr		McMastercarr
17	Outer Spindle Axles	Fab in House	OD: 35mm	2	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
18	CV Axles with Inner Splines	Purchase		2	\$ 120.00	\$ 240.00	https://www.goaz.com/		Go Az Motorsports		Yamaha
19	Spherical Bearing (20 degrees rotation)	Purchase	ID: 3/4 in, OD: 1 7/16 in, Thick: 3/4 in	4	\$ 17.27	\$ 69.08	https://www.mcmaster.com/63195K19/	63195K19	McMastercarr		McMastercarr
20	High Misalignment Spacers	CAD and Fab	Length: 1/2 in	8	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
21	Ball Joint Bolts	Purchase	OD: 3/8 in, 24 Thread/in	8	\$ 2.80	\$ 22.40	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=5	N/A	Home Depot		TBD
22	Ball Joint Nuts	Purchase	ID: 3/8 in, 24 Thread/in	8	\$ 0.85	\$ 6.80	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=6	N/A	Home Depot		TBD
23	Ball Joint Washers	Purchase	ID: 3/8 in	8	\$ 0.50	\$ 4.00	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=7	N/A	Home Depot		TBD
24	A-Arms (lower)	CAD and Fab	N/A	2	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
25	A-Arms (upper)	CAD and Fab	N/A	2	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
26	Spherical Bearing housing	Purchase		4	\$ -	\$ -					NAU Machine Shop
27	Suspension Tabs	CAD and Fab	ID: 3/8 in	16	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
28	Tie Rods	CAD and Fab	Length: 13 in	3	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
29	Heims (J-arm) w/ jam nuts	Purchase	OD: 3/8 in, 24 Thread/in	4	\$ 16.29	\$ 65.16	https://racetechtitanium.com/?ecid=FAlstGobChYLlWw9qmT_DlVWvati8h2KwQEAAYASAAfclhJPD_BwE	RT95270-1	Racetech Titanium		Racetech Titanium
30	Heims (Tie Rod Inner) (Left Thread)	Purchase	ID: 7/16 in, Thick: 9/16 in	4	\$ 8.84	\$ 35.36	https://www.mcmaster.com/2458K15-2458K152/	2458K15	McMastercarr		
31	Heims (Tie rod outer) (Right Thread)	Purchase	ID: 3/8 in, Thick: 7/8 in	4	\$ 13.74	\$ 54.96	https://www.mcmaster.com/6960T23-6960T231/	6960T23	McMastercarr		
32	Heim Bolts	Purchase	ID: 7/16, 3/8 in	4	\$ 2.20	\$ 8.80	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=5	TBD	Home Depot	ACE Hardware	TBD
33	Heim Nuts (Tie Rods)	Purchase	Same as above	4	\$ 0.60	\$ 2.40	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=5	TBD	Home Depot	ACE Hardware	TBD
34	Shoulder Bushings (Delrin Stock)	Purchase	OD: 1", Length: 2"	1	\$ 21.23	\$ 21.23	https://www.onlinemetals.com/en/buy/plastic/1-acetal-round-rod-delrin-homopolvmer/black/pid/6569	6569	Online Metals	ACE Hardware	Home Depot
35	Shoulder Bolts	Purchase	OD: 3/8 in, Length 2 1/2 in	8	\$ 2.75	\$ 22.00	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=5	TBD	Home Depot	ACE Hardware	Home Depot

Key	
Item Already owned (reused or material in house)	21
Item To Order(Total)	30
Item Ordered/ Purchased	30
Remaining Items to Purchase	7
Running Total (\$)	\$ 905.72
Percent Purchased	
	100%
Percent on Hand	
	100%
Home Depot Running Total	
\$	72.80



Purchasing (Cont.)

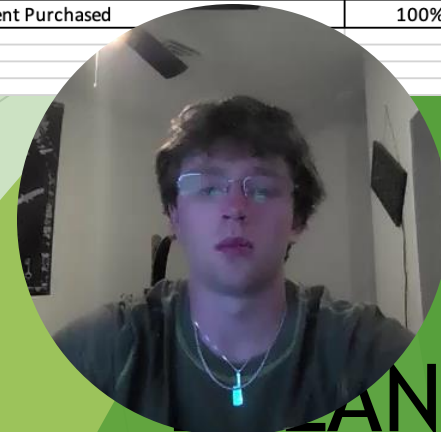
Table 1 Continued: Front-End Purchasing Excel Sheet

35	Shoulder Bolts	Purchase	OD: 3/8 in, Length 2 1/2 in	8	\$ 2.75	\$ 22.00	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=5	TBD	Home Depot	ACE Hardware	Home Depot
36	Shoulder Nuts	Purchase	ID: 3/8 in	8	\$ 0.80	\$ 6.40	https://www.homedepot.com/s/Nuts%20and%20bolts?NCNI=5	TBD	Home Depot	ACE Hardware	Home Depot
37	Shocks	Purchase	N/A	2	\$ -	\$ -	https://www.afcoracing.com/	TBD	AFCO	N/A	AFCO
38	Steering Rack	Purchase		1	\$ -	\$ -		TBD			
39	Steering Column (Shaft)	Purchase	Length: 20 in, Dia: 3/4 in	1	\$ -	\$ -		TBD			
40	Steering Wheel	CAD and Fab	TBD	1	\$ -	\$ -	N/A	N/A	N/A	N/A	NAU Machine Shop
41	Quick Release	Purchase	N/A	1	\$ -	\$ -		TBD			
42	Steering Nuts	Purchase	TBD	4	\$ -	\$ -		TBD			
43	Steering Bolts	Purchase	TBD	4	\$ -	\$ -		TBD	Home Depot	ACE Hardware	
44	Accelerator Pedal (Any Material)	CAD and Fab	TBD	1	\$ -	\$ -		TBD			
45	Brake Pedal (Alloy)	Purchase	N/A	1	\$ -	\$ -		TBD			
46	Brake Master Cylinder	Purchase	N/A	1	\$ -	\$ -		TBD			
47	Brake Pressure Switch	Purchase	See Link	2	\$ 22.99	\$ 45.98	https://www.speedwaymotors.com/Brake-Light-Switch-Ki	#9109117	Speedway Motors	Speedway Motors	N/A
48	Brake Fittings	Purchase	N/A	2	\$ 4.50	\$ 9.00	https://www.napaonline.com/en/search?text=8135455&refer=2	TBD	Napa Auto Parts		
49	Brake Light	Purchase	See Link	1	\$ 61.99	\$ 61.99	https://www.amazon.com/Polaris-Assembly-Scrambler-D	2411092-432	Polaris	Amazon	Polaris
50	Steel Brake Line	Purchase	3/16in x 72in	1	\$ 4.99	\$ 4.99	https://www.jegs.com/JJ626555/635227/10002/117	555-635227	Jegs	Jegs	N/A
51	Braided Brake Line	Purchase	3/16 in (30in Length)	2	\$ 16.60	\$ 33.20	https://www.amazon.com/Allstar-Performance-Allstar	N/A	N/A	Amazon	Allstar Performance
52	Braided Brake Line	Purchase	3/16 in (16in Length)	1	\$ 14.36	\$ 14.36	https://www.amazon.com/Allstar-Performance-Allstar	N/A	N/A	Amazon	Allstar Performance
53	Brake Reservoir	Purchase	N/A	2	\$ 6.99	\$ 13.98	https://www.amazon.com/AUTOVIC-Transparent-Motorcycle-Reservoir-Sportsman/dp/B083NDS9SI/ref=sr_1_3?keywords=braked+fluid+reservoir&qid=1676516494&sr=8-3				
54	Aluminum Foot Plate	Purchase	12in x 12in x 0.25in	1	\$ 39.99	\$ 39.99	https://www.amazon.com/WONGWAI-Aluminum-Sheet	N/A	Amazon	N/A	Mukchap

Misc Requirements

No.	Part Name	Action Needed	Size/Dimensions	QTY	Price (Each)	Price (Total)	Link to Website	Part No. (From Website)	Primary Vendor	Secondary Vendor	Manufacturer
1	Kill Switches	Purchase									
2	Battery	Purchase									
3	Wiring	Purchase									
4	Fuel Lines	Purchase									
5	Goggles & Tearoffs	Purchase									
6	Gloves	Purchase									
7	Fire Wall	Purchase									

Items to purchase	0
Items Purchased	2
Item already owned	5
Percent Purchased	100%



Manufacturing Plan

Table 2: Front-End Manufacturing Excel Sheet

Importance	Part	Number of parts	Who	Time to manufacture/part (hr)	Total time (hr)	Raw Material	Location	Material on hand	Percentage Complete
CNC Mill									
1	Steering Knuckles	2	Henry/Jared	10	20	6061 T6	Machine shop	Yes	100%
2	Hubs	2	Henry/Jared	5	10	6061 T6	Machine shop	Yes	100%
3	Steering Rack	1	Zac	6	6	Steel/6061 T6	Machine shop	Yes	100%
Plasma Cutter									
1	Half Avacados	24	Tanner	0.08	2.00	4130	Family shop	Yes	100%
Fab									
1	Upper control arm	2	Jared	3	6	4130	Machine shop	Yes	100%
2	Lower control arm	2	Jared	2	4	4130	Machine shop	Yes	100%
3	Floor Board/ Skid Plate/Controls	2	Dylan	3	6	4130/6061 T6	Machine shop	Yes	100%
Lathe									
1	Spline Inserts	3	Zac	2	6	4130	Machine shop	Yes	100%
2	Upper control arm inserts	6	Travis	0.25	1.5	4130	Machine shop	Yes	100%
3	Tie Rods	2	Zac	2	4	6061 T6	Machine shop	Yes	100%
4	Axle Conversion	2	Dylan	2	4	Steel	Machine shop	No	25%
5	Heim spacers	10	Zac	0.25	2.5	6061 T6	Machine shop	Yes	100%
Mill									
1	Steering Rack Mounting Plate	1	Dylan	4	4	6061 T6	Machine shop	Yes	100%
Outsource									
1	Steering Wheel	1	Dylan	4	4	Carbon/ Fiber Glass	Novakinetics	Yes	100%
			Percent Build=	96%					

Demonstration



Figure 4: Partial Suspension Travel



Figure 5: Isometric Vehicle View

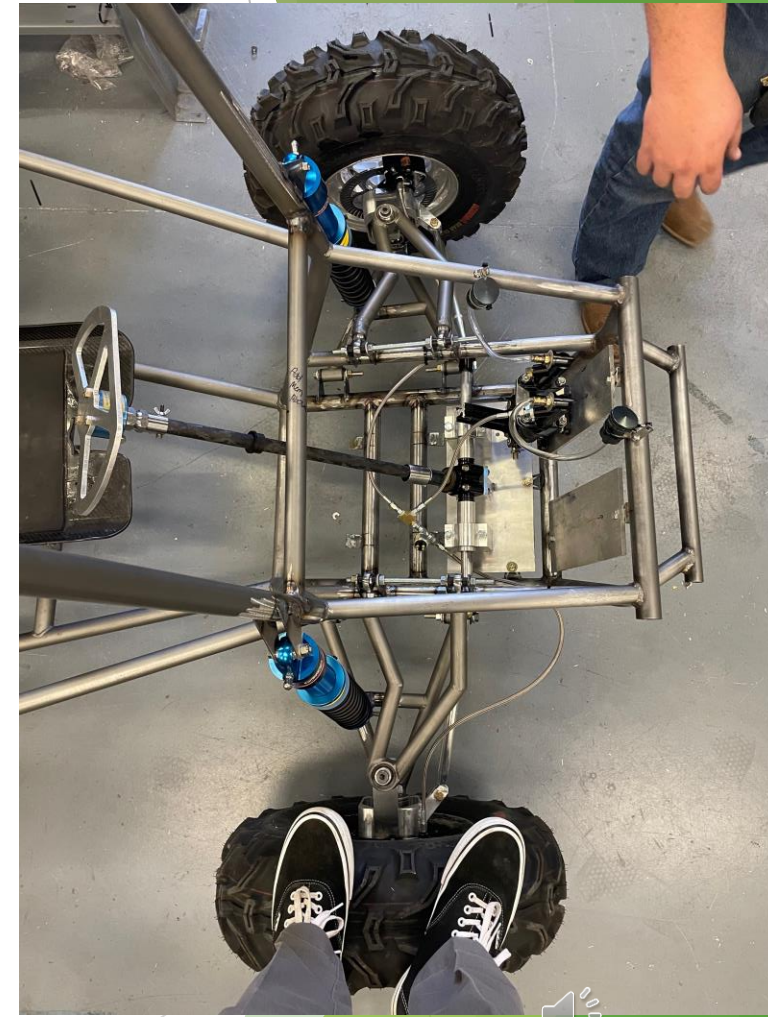


Figure 6: Top-Down Vehicle View

Demonstration (Videos)



Video 1: Steering



Video 2: Braking



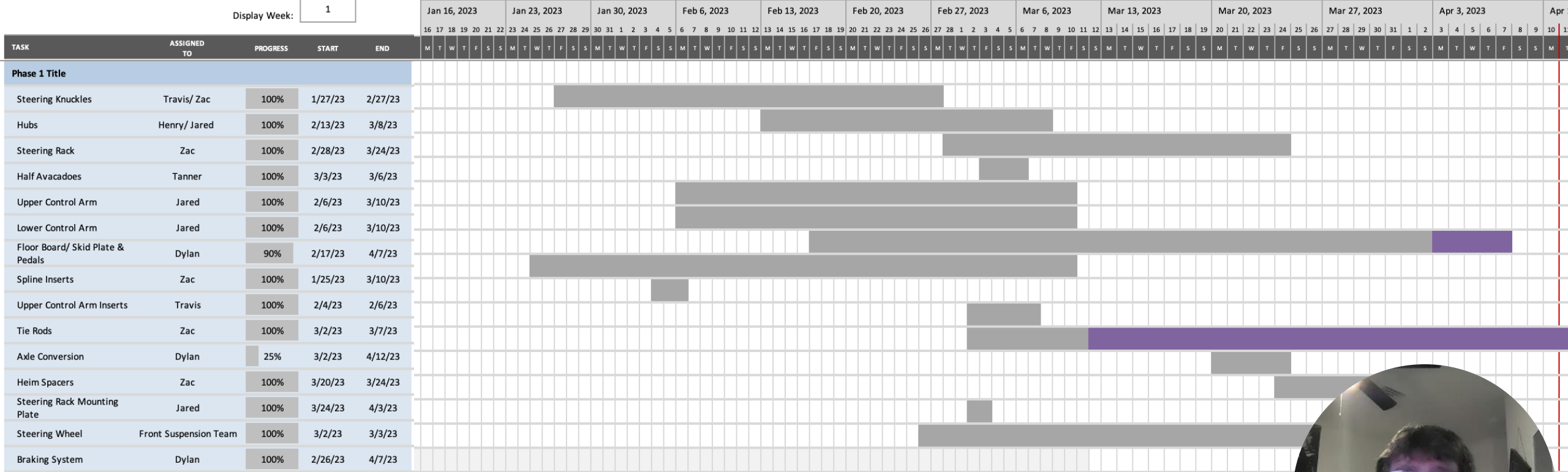
Moving Forward - Gantt Chart

Front Suspension

Lumberjack Motorsports

Project Start:

Display Week:



AN

CV Axle Conversions



Figure 4: CV Axel Ends Modified for Sprocket Attachment



Figure 5: CV Axel Modification with Sprocket Drive Mount



Questions?

