Title / Post Start

Heading 1

Heading 2

Text

1. Lists should be in norm text
2. images should be correctly sized for Chief
3. Verify all grammar is correct

Hey CD!



2025 Links

- CAD
- Github
- Website
- Youtube
- Instagram

4192 is excited to join the #openalliance for the 2025 Season! We'll be competing week 2 at Plano and week 4 at Fort Worth.

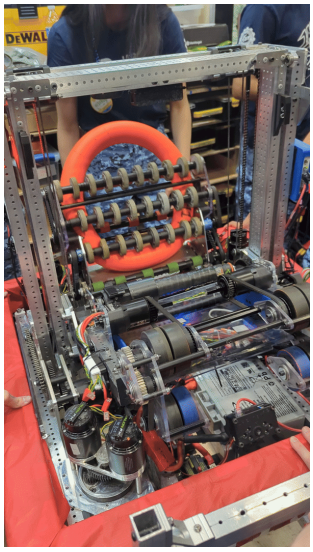


Crescendo Recap

https://youtu.be/AyV49GX-A0M?si=N68D07ko9QdBQi4l

Highlights

- Received Impact Award at Plano
- Ranked 4th at Amarillo
- Received Innovation in Control award at Amarillo
- Ranked 15th at FiT DCMP Apollo Division
- Received Team Sustainability award at DCMP
- Ranked 39th in FiT District (3 DCMP playoff wins away from Champs)





I'd also like to congratulate our own FTC team 12791 for winning the FTC Inspire Award and representing team USA at FIRST Global!

NTX

At NTX, we ran our 2024 robot unmodified from the 2024 season. We had several issues and mostly played defense as a result.

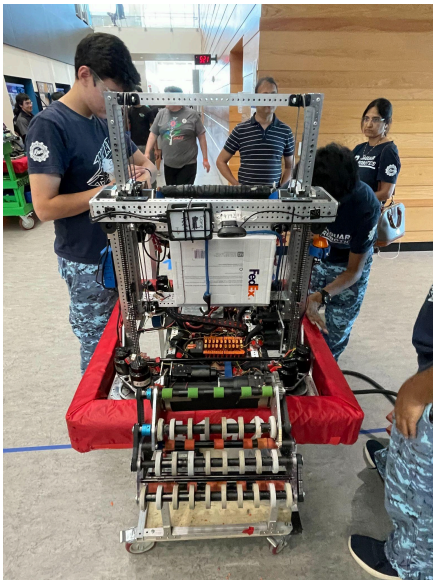
Thanks to 3676 Redshift and 6369 Mercenary Robotics for inviting us to your alliance!

Problems & Solutions!

1. Left shooter motor wasn't working (pre-event)
    a. Reconfigured Spark Flex CAN ID, still don't know why it reset.
2. Intake rollers didn't have enough friction to intake note (pre-event)
    a. Moved redirect plate
    b. Solution: switched to using newer notes

https://youtu.be/8zFXHLkMhTQ?si=M-MkXqEqNeCQatSR

3. Shooter flywheel bearings fell off (Qual 5)
    a. Solution: don't shoot without shooter angled up
4. Elevator carriage rigging lost tension (Quals 10+)
    a. Retensioned using CAM (worked temporarily)
    b. Solution: we gave up on using elevator to focus on fixing our intake



5. Intake pivot chain lost tension (Quals 10+)
    a. ~~Tensioned using original slots (Didn't provide enough tension; quickly failed)~~
    b. ~~Removed chain link (chain was too small)~~
    c. ~~Ran zip-tie to tension chain (zip-tie snapped)~~
    d. Solution: Only ran intake at start of match, then switched to defense
6. Intake pivot mounts bent after truss collision (Elim 2)
    a. Solution: ~~Hammered~~ *Rebent* intake into frame perimeter
7. Batteries constantly browned
    a. Swapped batteries
    b. Verified condition with beak before match
    c. ???
    d. ??????????????????????????????



Lessons

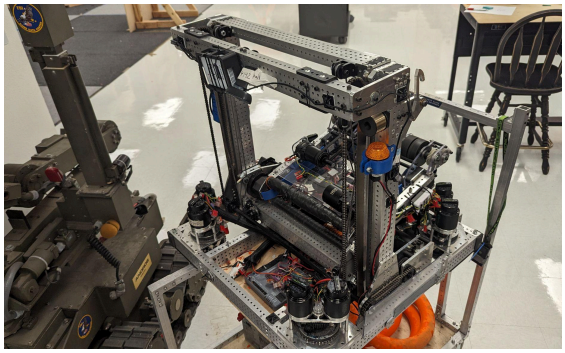
1. Lower bumpers = better defense
2. ALWAYS include chain tensioner in design
    a. Or, <u>don't use chain</u>
3. You can overdo battery mounting (our batteries were almost impossible to remove; 2 4" strips of velcro + a strap above made the swaps a pain)
4. Simpler = better

a. Almost every mechanism broke, costing us tons of time between matches.
b. Our elevator was never used, so having a better intake + shooter would've probably improved our performance
c. Basically just Karthik's second golden rule

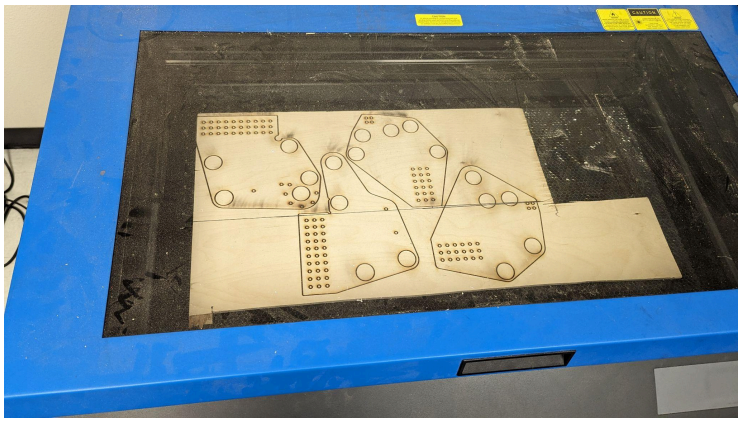
We had a blast at NTX, thanks to all the volunteers and teams who made the event possible!

Offseason UTB Intake

We disassembled our 2024 intake after NTX. We kept our shooter/elevator together for reference/part storage for 2025, but our intake is back in the cabinets.

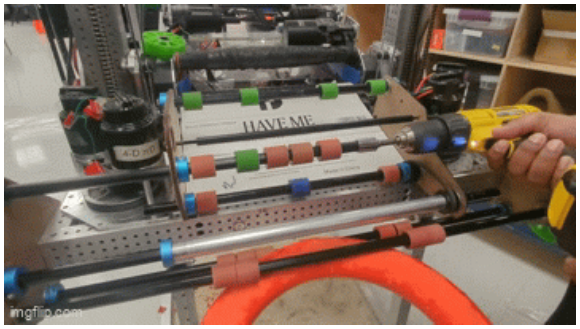


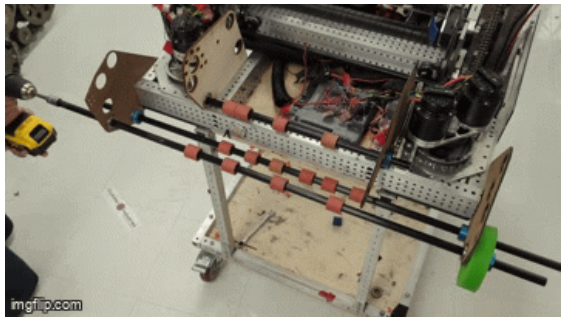
Rapid Prototyping



To practice rapid prototyping, we built an UTB intake, and it mostly worked!

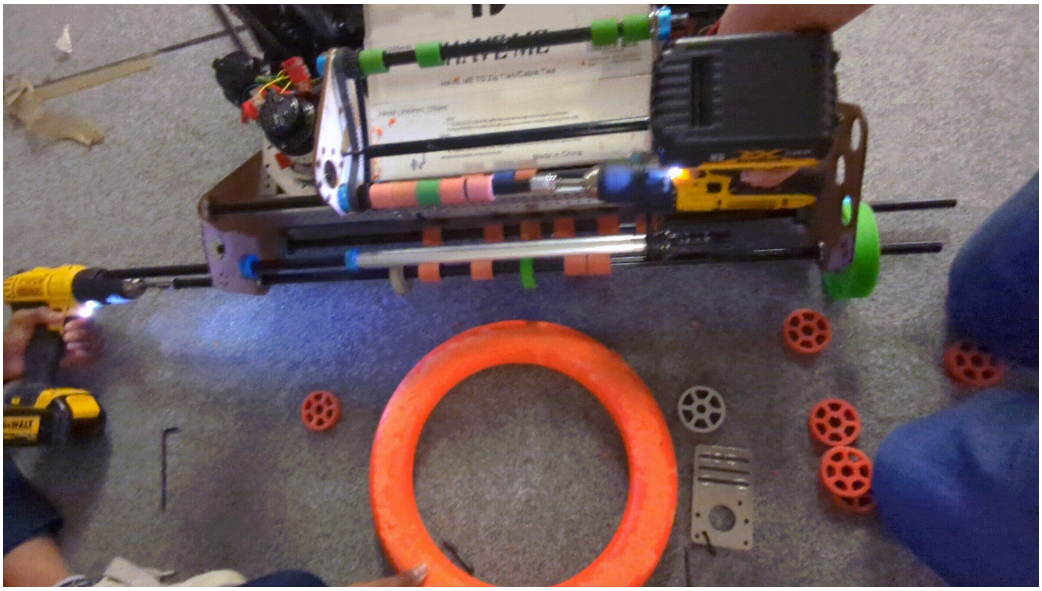
We used both 1/5” plywood and 1/8” hardwood with success.





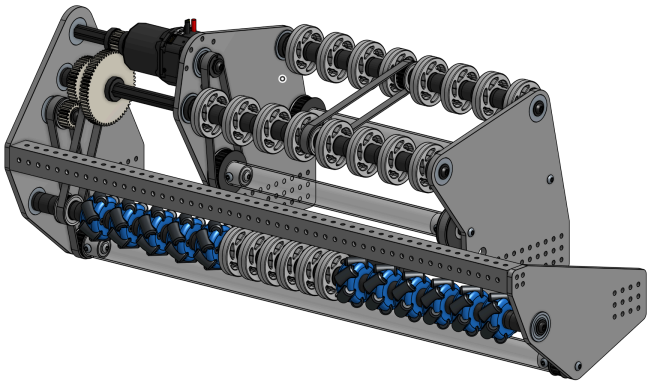
Prototyping went well, but we made a few mistakes.

1. We prototyped with our robot on the cart, which made the note path unrealistic. On the ground, the intake would burn up the note (and carpet).



2. We originally didn't cover our rio, and potentially got more note powder in the holes.
3. The chassis tubes on CAD were different from real life, so our mounting didn't work that well.
4. When we cut the first pieces, the laser didn't cut through the entire part in 1 pass.

Final Design

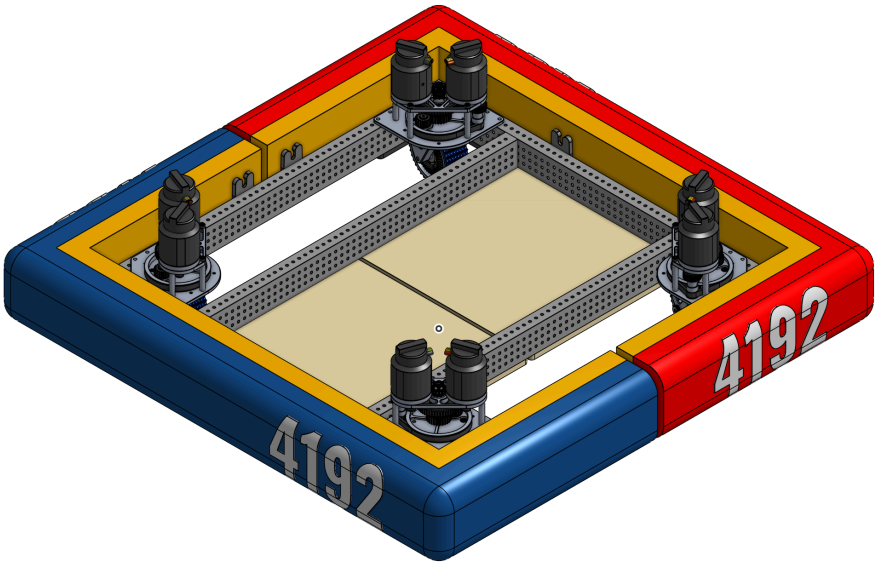


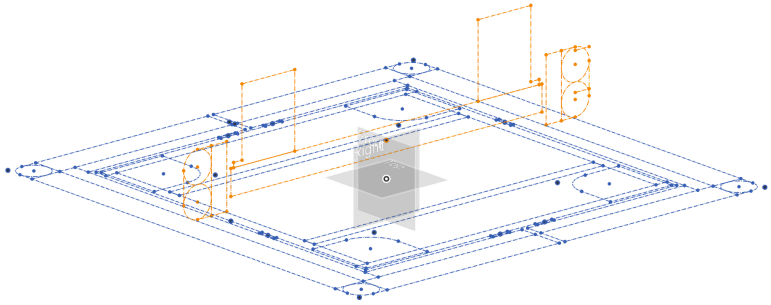
CAD

Democracy

fix name

CAD



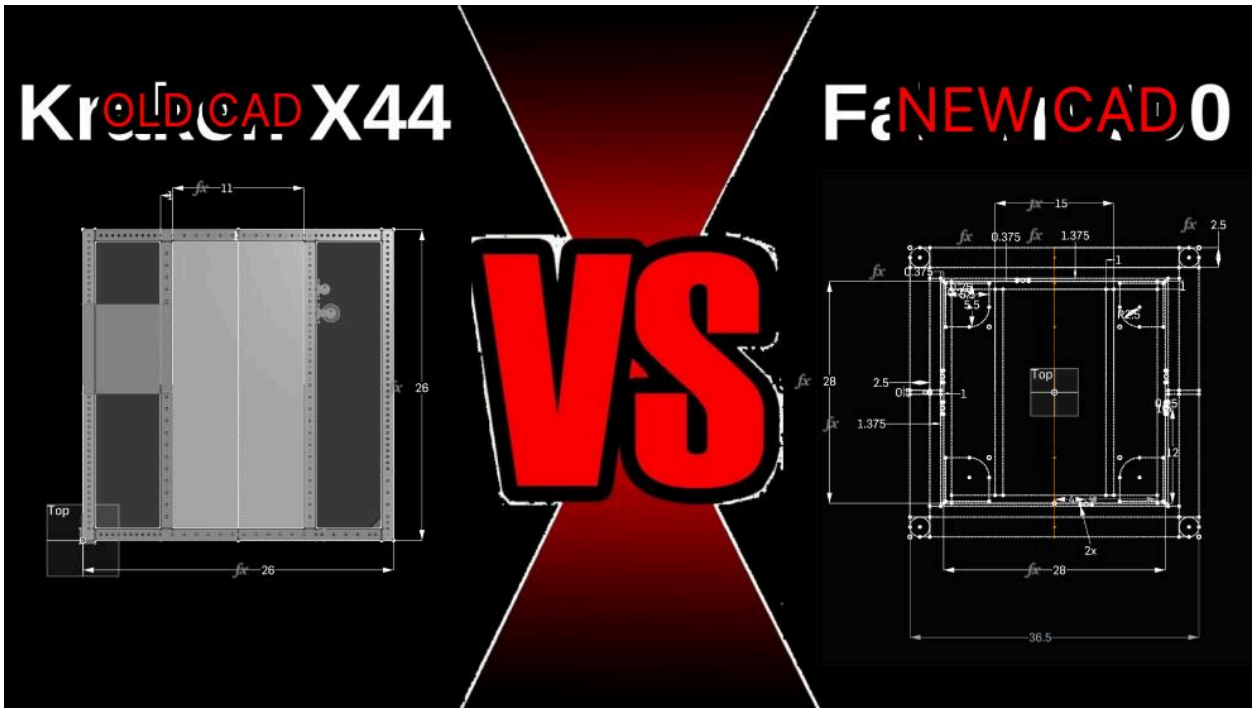


Based on the leaked reefscape manual, we designed our 2025 drivetrain. For 2025 we're planning a 28"x28" chassis.

The bumpers are composite parts, so hiding them when looking "behind the bumper" should be easier.

Why?

Thanks to onshape, drivetrains are easy to cad, so having a configurable drivetrain ready before the season doesn't cost much time. More importantly, the drivetrain can be a reference for good practices and file organization.



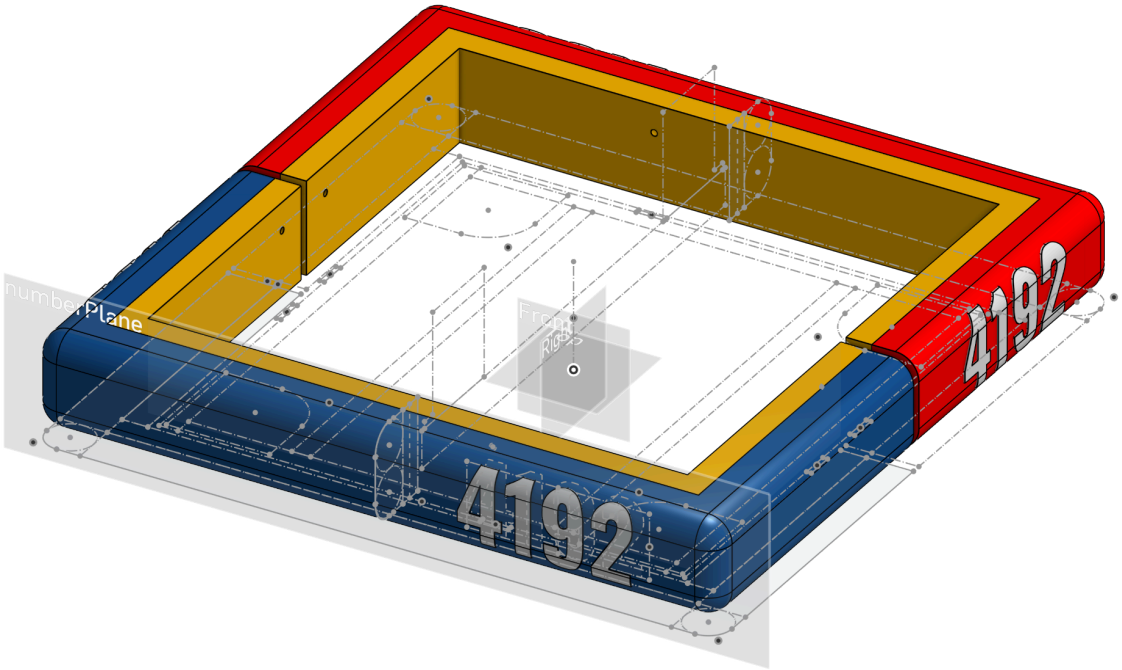
~~Bumpers <- not posting this~~

CAD

For 2025, we are following Andymark's bumper recommendations.



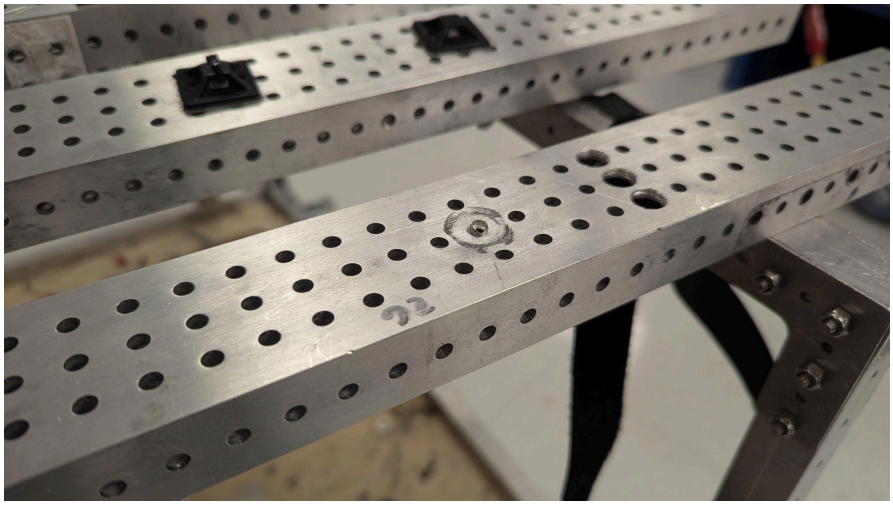
We will use the classic 3/4" plywood + noodle with floor tiles between the plywood and rod.

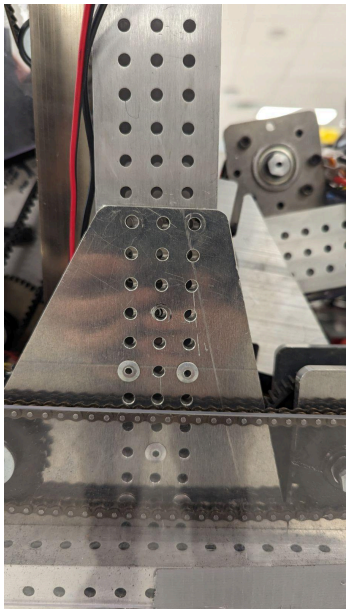


We are also switching from 1-piece bumpers to 2-piece bumpers for easier mounting. Our numbers will be right-aligned, not center aligned, to provide a 25.4% boost in robot functionality.

2024 Robot Damage

We disassembled our drivetrain, and inspected the damage from 2024.





The damage wasn't too bad this year: our drivetrain tube did bend at the bumper mounts, but the damage was contained to a small area.

Overall, while we're happy with our current levels of damage, we'll make a few improvements for reefscape:

- Switch bumper mounts from rivets to bolts
- Run more crush blocks between bumpers and chassis
- Secure bellypan with bolts instead of zip-ties
- Add more bumper mounts

I have spent the past decade protecting robots. The bumper you see before you is the product of over 100,000 robot matches.



2024 Bumpers

help @jamesCH95 a bolt fell off my robot when it hit the truss at 22ft/s

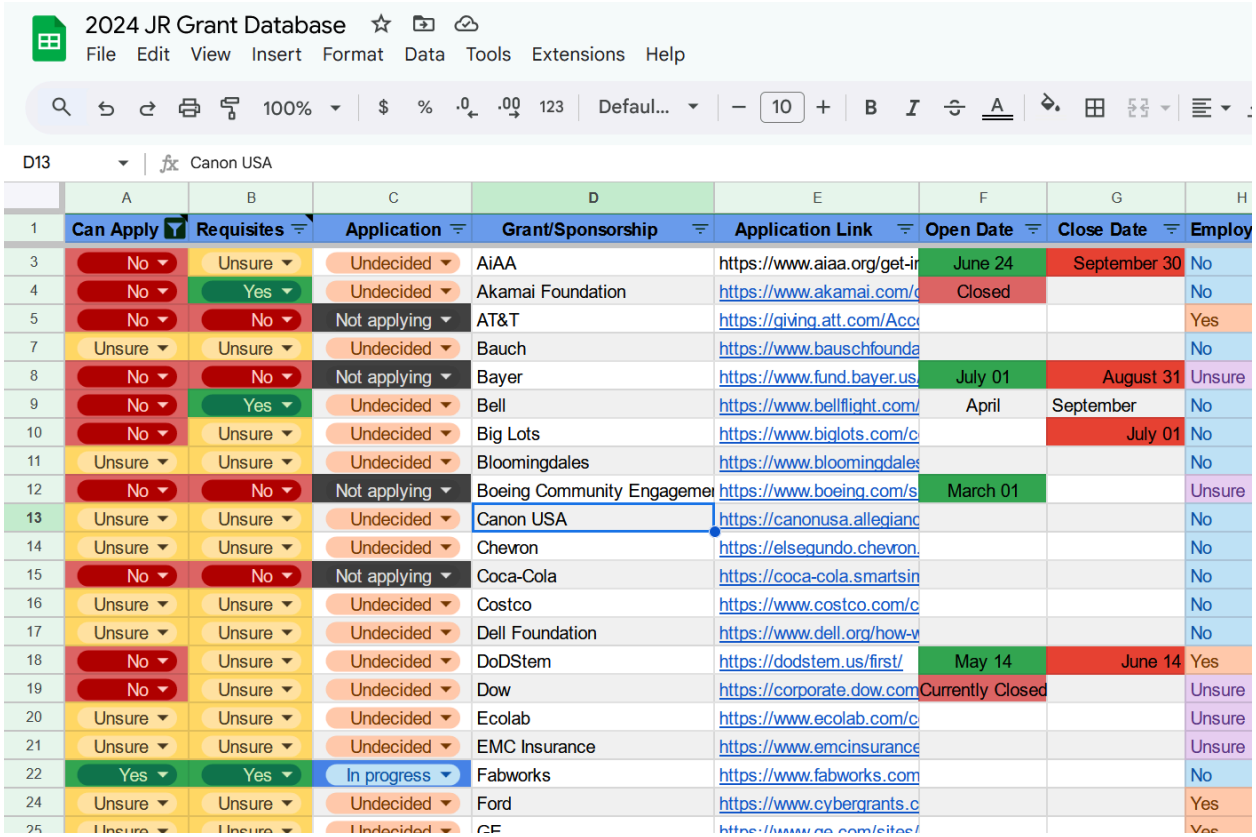


2025 Bumpers

Spreadsheets/Documents

I've made too many spreadsheets/docs for FRC over the years, here are some that you may find useful!

Grant Database



2024 JR Grant Database

File Edit View Insert Format Data Tools Extensions Help

D13 | Canon USA

	A	B	C	D	E	F	G	H
1	Can Apply	Requisites	Application	Grant/Sponsorship	Application Link	Open Date	Close Date	Employ
3	No	Unsure	Undecided	AiAA	https://www.aiaa.org/get-ir	June 24	September 30	No
4	No	Yes	Undecided	Akamai Foundation	https://www.akamai.com/c	Closed		No
5	No	No	Not applying	AT&T	https://giving.att.com/Acc			Yes
7	Unsure	Unsure	Undecided	Bauch	https://www.bauschfounda			No
8	No	No	Not applying	Bayer	https://www.fund.bayer.us	July 01	August 31	Unsure
9	No	Yes	Undecided	Bell	https://www.bellflight.com/	April	September	No
10	No	Unsure	Undecided	Big Lots	https://www.biglots.com/c		July 01	No
11	Unsure	Unsure	Undecided	Bloomingdales	https://www.bloomingdales			No
12	No	No	Not applying	Boeing Community Engageme	https://www.boeing.com/s	March 01		Unsure
13	Unsure	Unsure	Undecided	Canon USA	https://canonusa.allegianc			No
14	Unsure	Unsure	Undecided	Chevron	https://elsegundo.chevron.			No
15	No	No	Not applying	Coca-Cola	https://coca-cola.smartsin			No
16	Unsure	Unsure	Undecided	Costco	https://www.costco.com/c			No
17	Unsure	Unsure	Undecided	Dell Foundation	https://www.dell.org/how-w			No
18	No	Unsure	Undecided	DoDStem	https://dodstem.us/first/	May 14	June 14	Yes
19	No	Unsure	Undecided	Dow	https://corporate.dow.com	Currently Closed		Unsure
20	Unsure	Unsure	Undecided	Ecolab	https://www.ecolab.com/c			Unsure
21	Unsure	Unsure	Undecided	EMC Insurance	https://www.emcinsurance			Unsure
22	Yes	Yes	In progress	Fabworks	https://www.fabworks.com			No
24	Unsure	Unsure	Undecided	Ford	https://www.cybergrants.c			Yes

This sheet, developed by teams 353 and 358, has helped us a ton with submitting grants/sponsorships (and my college apps lol). This is the same as the original, but with more formulas (google sheets is the only programming language I know).

Because the shared sheet is not actively updated, the dates/requirements may be off. I also removed some that were not relevant to us, but adding new grants/sponsorships is not too difficult. Make sure to check with the original and update any incorrect ones (:

Thanks 353 and 358 for the awesome resource!

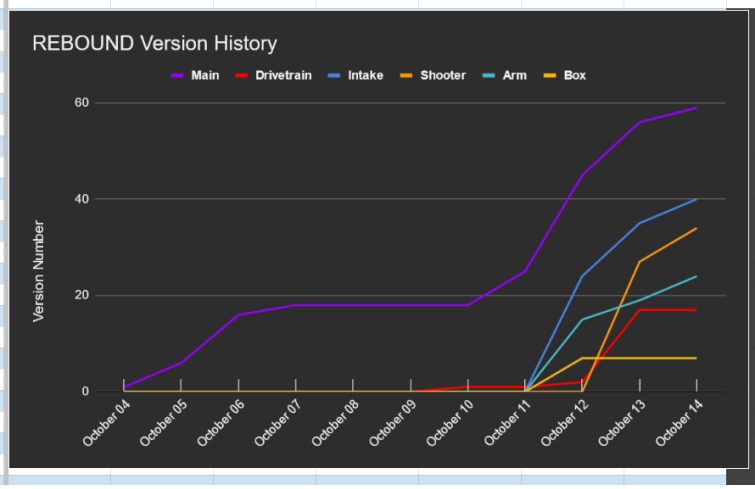
driveCalc

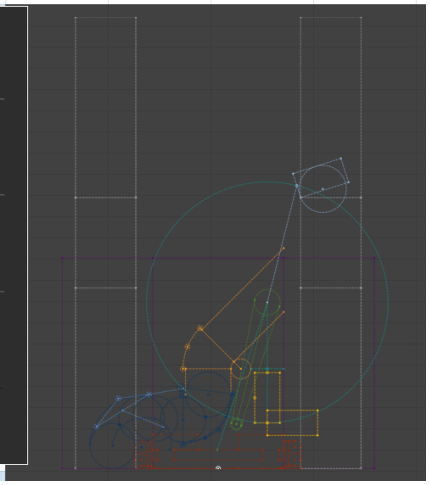
	A	B	C	D	E	F	G	H	I	J	K	L
1	Module	Ratio	Motor	10' Sprint	27' Sprint	54' Sprint	Tractive Force	timeSum	DF Score	FF Score	MF Score	avg Score
2	Mk4	L3	Falcon	0.96	1.88	3.36	109.36	6.2	36.73644883	2.998353597	2.935030395	2.966691996
3	Mk4	L3	Kraken	0.96	1.92	3.48	115.88	6.36	37.46551724	2.945402299	2.891522989	2.918462644
4	Mk4	L3	Vortex	1	1.88	3.24	99.56	6.12	34.79222485	2.989755713	2.904386656	2.947071185
5	Mk4	L4	Falcon	1.04	1.84	3.04	91.85	5.92	34.1853877	3.035337089	2.920920613	2.978128851
6	Mk4	L4	Kraken	1	1.84	3.12	97.33	5.96	35.28246934	3.048494983	2.950947603	2.999721293
7	Mk4	L4	Vortex	1.08	1.88	3.04	83.62	6	31.34818651	2.976597818	2.850617975	2.913607897
8	XS2	X1	Falcon	0.96	1.92	3.48	114.97	6.36	37.20402299	2.945402299	2.891522989	2.918462644
9	XS2	X1	Kraken	0.96	1.96	3.6	121.83	6.52	37.98707483	2.895408163	2.850056689	2.872732426
10	XS2	X1	Vortex	1	1.92	3.36	104.68	6.28	35.19642857	2.93452381	2.860119048	2.897321429
11	XS2	X2	Falcon	1	1.84	3.12	95.37	5.96	34.65426421	3.048494983	2.950947603	2.999721293
12	XS2	X2	Kraken	1	1.84	3.2	101.06	6.04	35.66820652	3.024456522	2.942934783	2.983695652
13	XS2	X2	Vortex	1.04	1.88	3.08	86.83	6	32.14000361	2.999394223	2.881958467	2.940676345
14	XS2	X3	Falcon	1.08	1.84	2.92	79.64	5.84	31.1387069	3.040279708	2.898826462	2.969553085
15	XS2	X3	Kraken	1.08	1.84	2.96	84.4	5.88	32.37824781	3.026395961	2.894198546	2.960297254
16	XS2	X3	Vortex	1.12	1.92	2.96	72.51	6	28.21685972	2.948037323	2.793194981	2.870616152
17	X2	X1	Falcon	0.96	2	3.68	124.73	6.64	38.01902174	2.856884058	2.813405797	2.835144928
18	X2	X1	Kraken	0.96	2.08	3.84	132.17	6.88	38.50580929	2.784455128	2.744391026	2.764423077
19	X2	X1	Vortex	0.96	1.96	3.52	113.56	6.44	36.4067718	2.914347557	2.856369821	2.885358689
20	X2	X2	Falcon	0.96	1.92	3.36	110.79	6.24	37.13988095	2.976190476	2.901785714	2.938988095
21	X2	X2	Kraken	0.96	1.96	3.52	117.4	6.44	37.49768089	2.914347557	2.856369821	2.885358689
22	X2	X2	Vortex	1	1.88	3.28	100.87	6.16	34.81687857	2.978463934	2.90062273	2.939543332

This is just data from reca.lc in a spreadsheet comparing different COTS Swerve ratios. The scores are arbitrary and don't work. The spreadsheet assumes a 118 lb robot (our 2024 weight) with 15 lb of auxiliary weight. I've used this sheet to compare ratio choices between teams and motors (L4+ Vortex on a 40lb robot is the future).

REBOUND History

	October 04	October 05	October 06	October 07	October 08	October 09	October 10	October 11	October 12	October 13	October 14
Main	1	6	16	18	18	18	18	25	45	56	59
Drivetrain	0	0	0	0	0	0	1	1	2	17	17
Intake	0	0	0	0	0	0	0	0	24	35	40
Shooter	0	0	0	0	0	0	0	0	0	27	34
Arm	0	0	0	0	0	0	0	0	15	19	24
Box	0	0	0	0	0	0	0	0	7	7	7





This is a document showing the progression of our DunkTank robot REBOUND's version history. It creates some pretty cool graphs, and highlights "trends" (procrastination) in our design process. I'm definitely making one for our 2025 season bot; we're at version 30 or so already (:

Amarillo 4192 Flower Mound High School Jaguar Robotics Week 5 pre-scouting

	A	B	C	D	E	F
1	Match	Winner	Predicted	Blue Mid Notes	Red Mid Notes*	ACCURACY
2	1	RED	RED	0	5	0.8888888889
3	2	RED	BLUE	3	2	
4	3	RED	RED	0	5	
5	4	RED	RED	1	4	
6	5	BLUE	BLUE	4	1	
7	6	BLUE	BLUE	3	2	
8	7	RED	RED	0	5	
9	8	RED	RED	0	5	
10	9	RED	RED	1	4	
11	10	RED	RED	1	4	
12	11	RED	RED	0	5	
13	12	RED	RED	2	3	
14	13	RED	RED	1	4	
15	14	RED	RED	0	5	
16	15	RED	BLUE	3	2	
17	16	BLUE	BLUE	3	2	
18	17	BLUE	RED	2	3	
19	18	BLUE	BLUE	5	0	
20	19	BLUE	BLUE	4	1	

Here's our prescouting before Amarillo. We used QRScout for data collection, but quickly realized quantitative data was mostly useless (vibes>data). The cool thing about this is the "PlanoData" Sheet, where I calculated that, through match 27, the alliance who collected the most midline notes won 89% of the time. Interestingly, we were on the only alliance in this dataset to win a match with only 1 midline note (statbotics gave us an 8% chance of victory before the match). We had a wild numerical season: statbotics went 4-8 at our first event, 10-2 at our second (with a streak of 10 matches) and 12-0 at dcmp (22 correct qualification match streak).

Post Amarillo Scouting

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Pre-Match			Auto Avg			TeleOp Avg				Post-Match Avg		
2	Team	Name	No Show	Mobility	Scored	Missed	Amp Scored	Amp Missed	Speaker Scored	Speaker Missed	OSKill	DSkill	Died
3	1164	Project NEO	0	0.00%	0	0	0	1	0	0	1	0	0
4	457	Grease Monkeys	0	0.00%	0	0	0	0	0	0	0	0	1
5	2789	TEXPLOSION	0	0.00%	0	0	0	0	0	0	0	0	1
6	4063	TriKzR4Kidz	0	83.33%	2.16666	0	1.333333333	0	6.333333333	0.1666666667	2.3333	0	0
7	3676	Redshift Robotics	0	100.00%	2.25	1	5.125	0.125	0.625	0.125	1.625	0.125	0
8	9136	Rampage	0	50.00%	0.16666	0.33333	0	0	2.666666667	0.8333333333	1.1666	0.1666	3
9	9105	TechnoTalons	0	100.00%	0.75	1.375	0	0.125	4.625	2	1.625	0.125	0

For our first pick at Amarillo, we basically just used vibes (the data on teams was too close to determine the “correct” pick). Afterwards, I wanted to see how we could avoid making the same mistake in the future. Here are some of my findings:

- We were cooked in our position, 4153 was a good pick and did well in playoffs
- Autonomous route scouting would be useful
- removing each team’s worst match would have given us better data (rampage was phenomenal even with 3 dead matches; honestly my favorite texas team)
- My vibes > @Varunaboys2 (but he predicted alliance 1-6 1st picks/captains at dcmp night before, so maybe Amarillo is cursed)

Ultimately, we switched to Lovat for dcmp, which helped us improve for playoffs/alliance selection.

FiT Events Planning

	A	B	C	D	E	F	G
1	Event	Week	Top Team (opr)	2nd Team (opr)	3rd team (opr)	Rank (opr)	Trev Rank
2	Dallas	1	3005	2468	2582	9	6
3	Waco	1	1477	6800	6672	11	10
4	Channelview	2	5427	118	3035	7	5
5	Belton	2	5414	3802	5892	7	4
6	Fort Worth	3	6672	3005	3310	12	12
7	San Antonio	3	2468	2687	6800	18	10
8	Houston	4	118	3847	5892	13	9

I created this spreadsheet to find the “easiest” event for us in 2025. It’s not particularly useful, but it does provide some interesting insights. Rank (opr) and Trev Rank are both

for 4192 (where our opr ranks, and where I rank us. If I remade this today, the trevrank would be <7 for all events)

	A	B	C
1	**Needs**	**Wants**	**Don't Include**
2	Ground Intake (touch it, own it)	Amp scorer	Source chute intake
3	telescoping Shooter	long rage shooter	harmony climb
4	Speaker Note + movement auto	chain climb	
5	4 teleOp Notes	automanitc spotlight human	
6	trap scorer	small bot (<27")	
7			

