

**TEAM
MINEKEE
FRC 2023**

FRC 2023 CHARGED UP MEETING SUMMARY

DRIVE TEAM - Aaron, Mike, Adien, Aidan, Justin, Sebastian

ARM TEAM - Robin, Andrew, Jason, Deo, Trent

HAND TEAM - Shayne, Aimee, Daniel, Leo, Kyle

AI TEAM - Aaron, Adam, McQueen, Harry, Kenneth, Eric, Recon

ARM TEAM

January 7, 2023 - written by Robin

What happened

- Kick off day for FRC 2023 Season
- Read over game manual and discussed about the game
- Started developing ideas about possible designs
- First design was a reflex arm but after some rethinking decided it was not the best
- Robin and mentor Adam stayed behind and discussed more ideas
- New idea is two staged arm powered by a high torque motor, mounted some distance above the chassis (just at same height as second pole)
- Could be high torque motor or elevator to move arm up and down
- Actual arm might be a two stage box climber from AndyMark
- We can do this idea or challenge ourselves and make a more realistic arm with joint rotation

What's going to happen

- Going to have a meeting on Sunday about it (next day)
- Robin will make a CAD model to visualize it

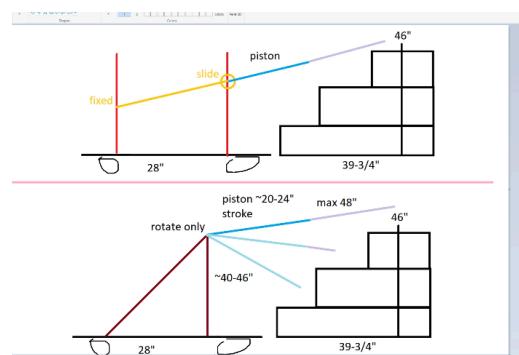
January 8, 2023 - written by Robin

What happened

- Arm team and some other members had an online meeting to discuss what we discovered.
- The high torque motor arm design using a two staged box in a climber design was presented
- Aaron came up with a second idea similar to Robin's other ideas of having an elevator to adjust angle of arm
- Second idea is to have two elevators, the back one is fixed onto the elevator and the front is free moving. This should require a three staged climber
- Shayne's idea for hand is to have it facing towards the floor like a crane hand (might be dangling)
- We are not sure if the box in a climber is capable of completing the function of grabbing an item since we are not sure how it works

What's going to happen

- Aaron is going to create the design for the elevators (second design) for mounting them onto the swerve base



FRC 2023 CHARGED UP MEETING SUMMARY

- Adam Li is going to create a mounting design for the high torque beams on the tank base
- Next meeting on Tuesday

HAND TEAM

January 8, 2023 - Shayne - Hand

Todays Meeting

Goal:

Brainstorming Grabber Ideas + Delegating Work

Work:

Aimee - Shape of arms

Leo - Grabber Material (high friction coefficient to rubber)

Justin - String Organization

Daniel - Hand Mounting

Shayne - Organizing Meetings, Writing Reviews (Like this one)

Shayne + Kyle - Putting Design into Solidworks

Next Meeting - Wednesday 5pm

Reviewing work done over past few days + Discussion for problems with the grabber + Prep for building a prototype

New Member - @Kyle

Saturday, Jan. 7, 2023:

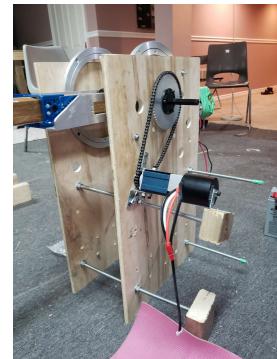
Participants: Mike, Justin, Aiden, Aiden

Progress: Started to build the new tank base. Planning to finish by next Saturday.

January 15 2023 - written by Robin

What happened:

- Test arm by Robin was completed!
- Arm test uses the 2021 FTC robot lazy susan and a 100:1 gearbox neo motor
- Tested and it works really well, not perfect
- Substitute hand by Deo and Trent is not complete
- Test hand by shayne has been made, pistons added and pneumatics working
- Hand can grab cones sufficiently when up right
- Cannot grab cubes yet and is still in development
- Drive team assembled chassis skeleton and added gearbox with neo motors(and Sparkmax controllers) but forgot to grease the gearbox



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What's going to happen:

- Continue making sub hand to attach to test arm
- Make test arm programmable
- Add elevator to test arm
- Put test arm onto a chassis
- Add proper weights to back of arm
- Grease gearbox for chassis
- Upgrade current test hand design
- AI?

January 19 2023 - written Robin

(not actually meeting, just research)

What did we find:

Extruder Arm

- Climber In a Box
 - Looks very adaptable for arm (pre-built and extends), but AndyMark said that climbers can only support 6lbs together. With a hand on the end the climber will slide (not stay open). We can replace the metal tape with stronger ones but it cannot be guaranteed to work.
- Linear Actuator
 - From current choices given by Mentor Adam, one is too light and the other looks sturdy but is too expensive. Currently unsure of this option.
- Homemade Climber In a Box
 - We build our own climber in a box but instead of a tension/retraction force from metal tape, it's either a rack & pinion or rubber wheels pushing the inside bar.
 - Seems do-able

Jointed Arm

- Everybot Swing Arm
 - Everybot/Robonauts robot had a jointed arm which took advantage of physics. Upper arm is pushed with a high torque motor, and the lower arm is lifted using elastic bands etc.
 - Seems do-able
- Fully Jointed Robot Arm
 - Will require lots of high torque motors.
 - Is possible but not fastest build time

January 21, 2023 - written by Robin

What happened:

- We had a team party and we made dumplings
- AI team got disbanded
- Arm team tried to test the everybot arm idea
- Arm team substitute hand was finished
- Replaced long arm with bending arm (looks like a desk lamp mechanism)

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- Arm can pick up cone but had trouble reaching to last pillar without a good hand
- Arm could enter a “lock” state where the physics of the geometry would flip the arm upside down and keep it there forever
- There is too much of an unbalance, and the bent arm can’t pick things up from the ground due to its geometry physics
- It could with an elevator
- Tank base team started electrical wiring and applied most of the devices
- Swerve base team started coding
- Hand team????



What's going to happen:

- Arm team is going to test linear actuator next time, might be final test
- There won't be much activity during the week due to exams

Jan 28/2023 - written by Robin

What happened:

- Arm team started drawing how the final arm would look like in solidworks
- We are following the structure of a lamp
- Lamp test was not finished due to missing chain tool
- Test hand from Deo and Trent is finished; servo was attached
- Robin and Aaron discovered the microphone and thought we could copy it
- Team had a discussion about fundraising (garage sale, thrift zone, bottle drive, school collab, 3d printing shop...)
- Swerve base team got the base driving, though not great at the moment
- Hand team...?
- AI team members have received raspberry pi's



What's going to happen:

- Robin comes back on sunday to get the lamp running
- Also to measure and draw the microphone lamp stand on solidworks
- Swerve base team continues to program
- Ai...?
- Hand...?

FRC 2023 CHARGED UP MEETING SUMMARY

Jan 28, 2023 -written by Linda Ren / Fundraising action plan			
Parent action plan			
Category	Compay	Action person	Notes
BANK	RBC	Skye	Update on Feb 12
	TD	Sean	Update on Feb 12
	嘉道财富	Kevin	Update on Feb 12
	Manulife	Linda	Update on Feb 12
Company	TTC	Linda	Update on Feb 12
	AMD	Hongtao	Update on Feb 12
	GM	XiaoShan	Update on Feb 12
MPP	Vincent Ke	ChenTao	Update on Feb 12
Willowdale Councillor	Lily Cheng Councillor_Cheng@toronto.ca	Tina	Update on Feb 12
Gift card/mobile App	Linda		Update on Feb 12
Learning school	华尔逊	Tina	Update on Feb 12
	维多利亚教育集团	Freda	Update on Feb 12
	Olympiads	XiaoShan	Update on Feb 12
	TT Math	Kevin	Update on Feb 12
	非凡教育	Hongtao	Update on Feb 12
Prepare email template		Ken	By Feb 5
Prepare supplier list		Linda	Update on Feb 12

Kids' action plan		
Action	Action Person	Notes
Ask student council for	Adam / Shayne / Robin	Robin has asked and got approved Update action plan (when, where, how)on Feb

FRC 2023 CHARGED UP MEETING SUMMARY

organizing a robot event		12
Bottle Drive	McQueen	Update action plan (when, where, how)on Feb 5
Garage Sale	Aidan / Sebastian	Update action plan (when, where, how)on Feb 12
Thrift Zone	Robin	Update action plan (when, where, how)on Feb 12
53D Print Service	Aaron / Kenneth	Update action plan (when, where, how)on Feb 12
Email broadcasting	All kids	Update action plan (when, where, how)on Feb 12

1/29/2023 - written by Rob in

What happened:

- Robin screwed up using the chain tool but still managed to learn it
- The chain was too loose on the elbow gears so a tensioner was added
- Added a balance weight to the forearm but changed it to rubber bands
- Started testing out motors on the Neo 500 and 550
- The arm is now moving!
- Tested Servo's but for some reason they refuse to work
- Works for 1 minutes dies for the rest
- Programmed to control the arm using a controller
- Tested the arm to the grid
- Arm is 48 inches plus a hand which is 15 inches
- The arm with the hand exceeds outside the robot perimeter by 49 inches, which is too long
- At the current height it was tested (20 inches tall), the arm could not reach the end pole but it has hope



What's going to happen:

- Robin will measure the microphone length and the current prototype length for a better version
- Will draw on Solidworks
- Thinking of having new prototype use metal
- Arm placement might be at front of the base instead of at the middle

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- Robin needs to make a code piece that protects the arm from errors (safety program)

Feb 5, 2023 - written by Robin

What happened:

- Robin spent the last week drawing the solidworks model
- Although it was not greatly organized, people helped implement the drawing into real life
- Mounting plates were made, bicep, for arm, and bicep2 were created.
- Mounted bicep onto bar, but arm contraption is not complete
- Support beams are still not determined of their location
- Derek and Aiden completed their drive base
- Aaron got the swerve drive working!
- Hand group started drawing CAD of...?
- Leads talked about the hand issue- current testing hand breaks distance rule

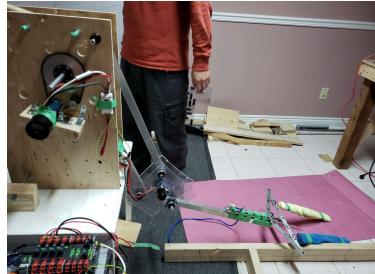
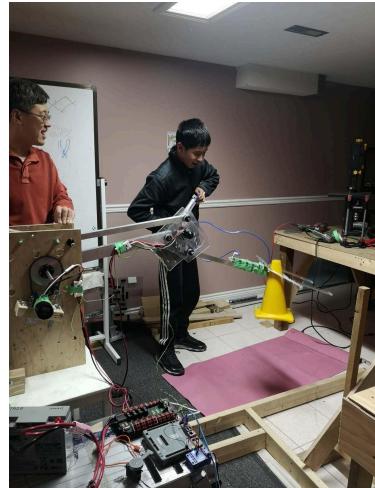
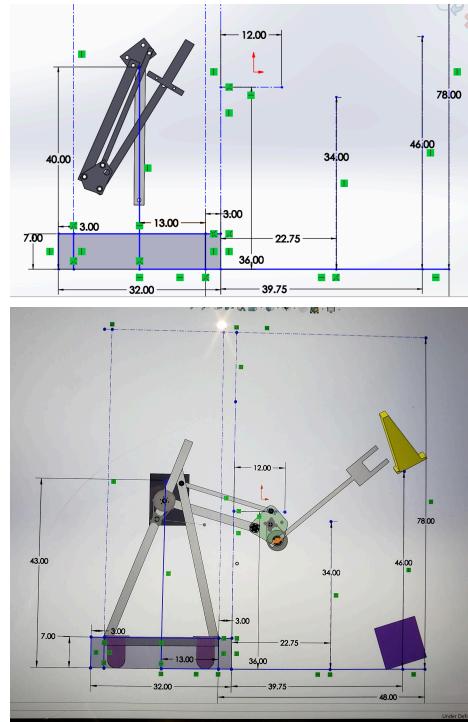
What's going to happen:

- Robin will go back to complete hand on sunday
- (the rest idk)

February 6, 2023 - written by Robin

What happened:

- Basically arm day
- Finished final assembly of the arm
- Filed/cut/trimmed some parts because false measurements
- Attached all motors
- Stole some sprockets from the old robot (cuz current sprockets aren't good)
- Used a lot of bearings and stoppers
- Changed some code and tested the arm
- Arm can successfully move omni directional
- Can rest folded up (but people need to hold it up)
- From drawing the arm can reach the last pole but reality says other wise
- The test is 3-5 inches under the wanted height (cuz table but the drawing is also affected due to some early errors)
- Outward reach is roughly 2-4 inches short??? Not sure how
- Despite the hand's current sword hand not being effective, we still attached it to the hand

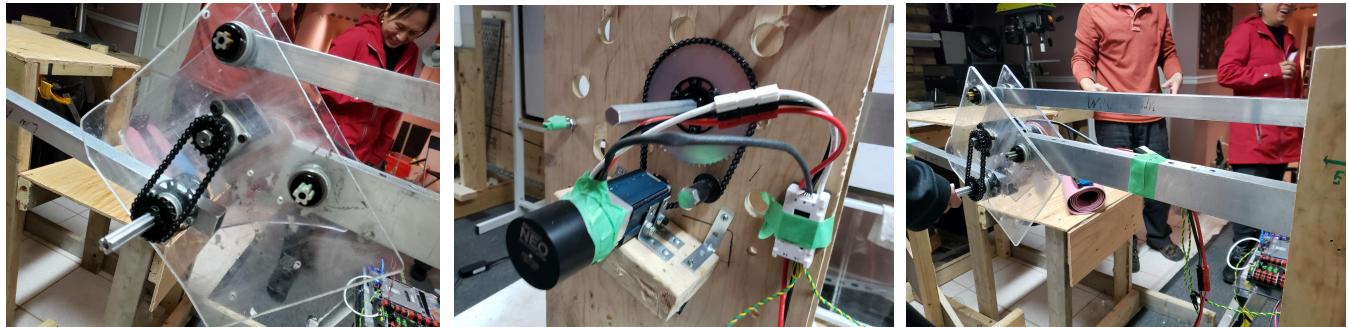


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- By the way the ratio for the Neo550 on the elbow has a 100-1 gearbox but due to improper solidworks production, the chain would refuse to have a proper interlink. The outside gear ratio is 18-22 so basically 1-1
- Aaron helped control the hand
- Based on the sword hand (which is not a very good evidence of ability) we could not dunk the cone but could place cubes
- The arm can flip toppled cones and pick both game pieces up
- Aaron added a brake function to the spark max - stops arm from ragdolling after disable

What's going to happen:

- Robin will have to finalize some parts in the drawing to be CNC'ed
- NEW arm prototype will need some fixes
- Support beams or standing bars might be added?



Feb 12 2023 - written by Robin

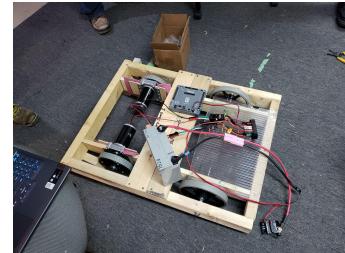
What happened:

- Robin came early again to start building support beams
- 4 72" beams were sacrificed for this cause
- Deo and Trent finished making the test hand V2
- Old prototype needed to be partially disassembled to make new
- AI team had presentation about Photon vision and goals
- Eric's robot had a camera and could detect and move to April Tags
- Test hand was tested and could be programmed
- The FTC people weren't very happy with us stealing their parts...
- Aaron, Derek, Andrew, Aiden, Mike, Trent, Sarah, and Robin formed a man cluster to hold the beam assembly while it was being built
- The assembly is unfortunately much wider than the CAD drawing
- The assembly base was made out of wood and aluminum L bars but the connection between the L bars to the actual beams have not been made



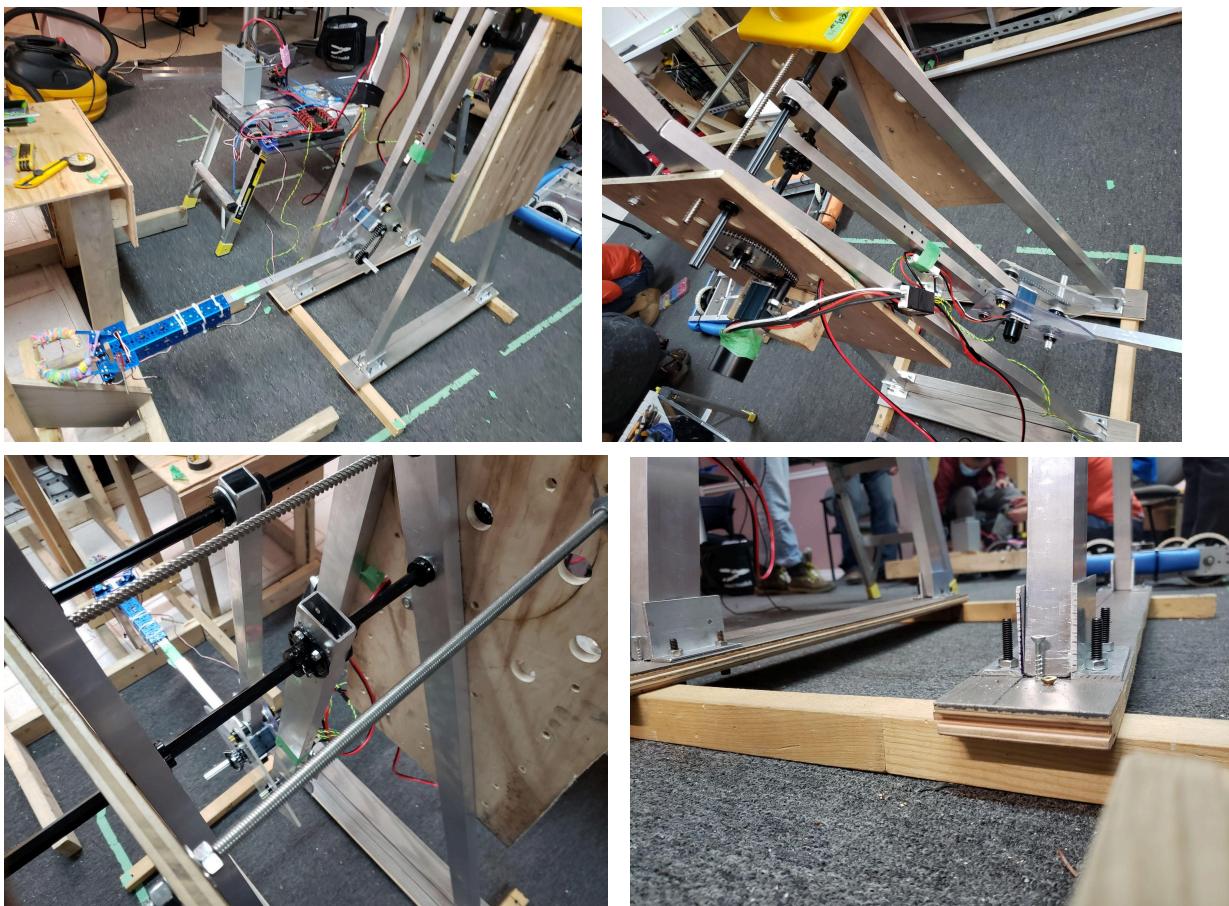
FRC 2023 CHARGED UP MEETING SUMMARY

- The wooden plate is also not fully attached
- After strapping the test hand onto the arm, it moved pretty well
- However, the ENTIRE ARM with the HAND only reaches 40 inches outwards (how is that even possible my drawing tells me otherwise) so we still have space to work with
- The test hand powered by servos worked very well
- Grabbed cones but haven't tested cubes
- What did the hand team do...?
- Macuin's tank base motors were not placed properly in the gear box - fixed
- Swerve base got white pool noodles
- MAC tank base finished wiring, is going into coding now



What's going to happen:

- AI team split into sub teams, each team finds about apriltags, reflective tape, cube, cones, and some other stuff
- The hand team will need a WORKING prototype Soon
- Any bases will need to wrap up soon
- Arm team will likely continue working on the support beams and ways to attach the beams to the robot via an adaptable structure
- Robin will go through hell

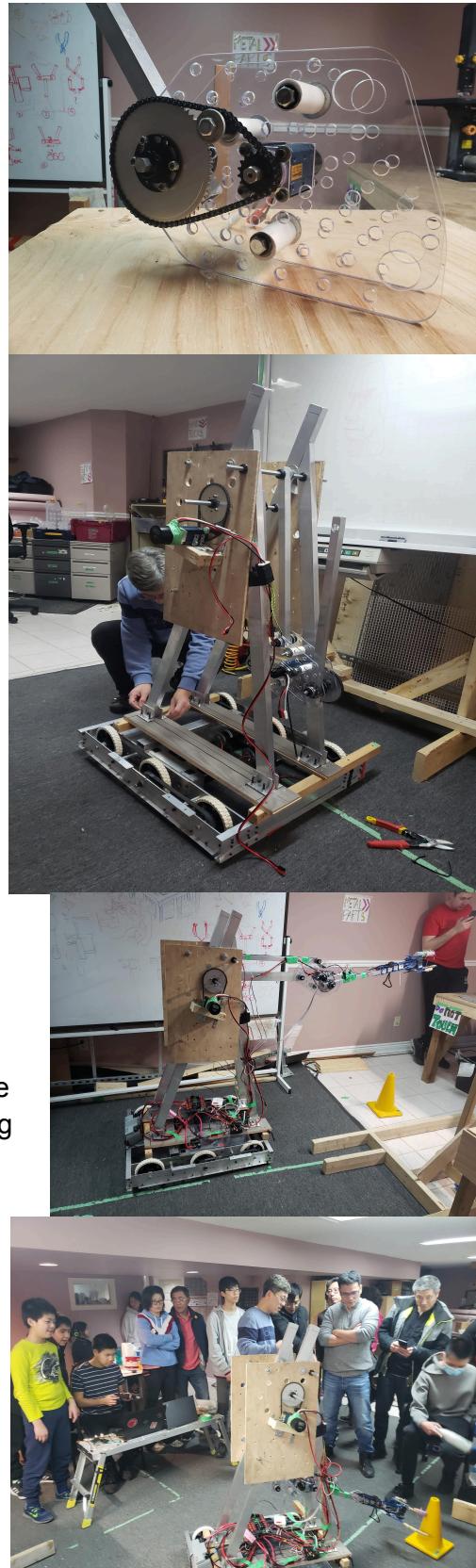


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February 18, 2023 - written by Robin

What happened:

- Epic new machine made elbow plates received!
- The new plates were swapped with the old ones, and internal support made from plastic tubings were added
- It seemed that the 18 tooth to 60 tooth gear ratio with an EVEN numbered chain worked pretty well
- It was slightly loose but a tensioner was added
- Entire arm assembly (some parts are still wood) was “jankly” mounted onto the very first base that Mike and Shayne made
- Arm assembly was tied using ropes to the base
- FTC hand improved version (now with 4 servos and 4 fingers) was mounted to the arm also by using ropes
- Arm team’s testing circuit was shoved onto the base + arm assembly (later to be taped to the boards)
- Some of the circuit wires were too short (most importantly the PWM ribbon)
- Roborio had to be mounted to the shoulder plate
- Speed controllers added to the circuit
- Upgraded the arm code; stick for driving, holding right bumper + sticks is arm movement
- Robin and Andrew spent a measly 2 hours figuring out why a speed controller wasn’t working (because the code initiation for the speed controller was a Victor!)
- Sarah, DIO, trent, and kyle helped define some measurements for the to-be-machined shoulder plate
- Hand team was given instructions to continue making hand
- Aaron began 3d-printing Shayne’s hand
- Swerve base team worked on bumpers (team number was finished, cloth was stapled, began addings clips)
- Adam received Robin’s dad’s computer for testing purposes
- AI team continued their training process
- The arm assembly works! It drives, it grabs and moves its parts!
- Some members took a shot at driving



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- A very big issue appeared (or was already existing but only came to light now)
- In a state of panic or lack of knowledge, a driver may accidentally over turn the arm, causing a motor to continue turning while the actual arm was locked. This makes the chain skip (or it can strip the hex shaft or literally pull the motor out of its seat)
- Robin stayed behind to create some more safe code
- A rule: IF YOU SMASH THE ARM BARS THREE TIMES, EVERYONE IN THE TEAM WILL KICK YOUR BALLS (a different method of punishment will be applied to females)
- A better way to remember: "F*ck the robot and we'll f*ck you"

What's going to happen:

- Robin may want to teach some coding theory?
- Robin needs to add better protection circuitry and code
- Robin needs to finalize solid works shoulder plates
- Reinstall shoulder plate when we get the new ones
- Draw ACTUAL mounting mechanism to base...?
- Find a solution to avoid the arm from shaking when driving
- AI team continues training
- Swerve team needs to finalize bumpers and make them usable
- Hand team needs to continue making their hand ASAP

2/25/2023 - written by Robin

What happened:

- New shoulder plates were machined
- Wooden plates were disassembled
- All bars got new holes drilled
- Deo and Trent thought of the "latches" idea for the mounting mechanism
- Didn't really work... Thinking of using screws on Bars to bar
- Bar connecting both ends of ONE side of the arm to a bar underneath it
- Trisupport bars were added
- No bar for motor mount yet
- Swerve base mounted a gyroscope
- Front is always the same no matter how you turn (:its a video game!)
- Hand team got some 3d prints down
- Were too full of a circle and had to cut down
- Could grab cone, but not enough force or efficiency
- Ai team...?
- Tank team?



What's going to happen:

- Will have to draw CAD of the motor mount (might be machined)
- Need to finish arm mounting mechanism in CAD
- Team is going to hamilton for testing

FRC 2023 CHARGED UP MEETING SUMMARY

March 4 & 5, 2023 - written by Robin

What happened:

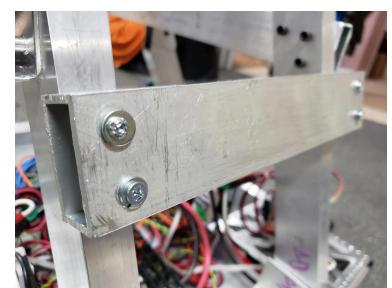
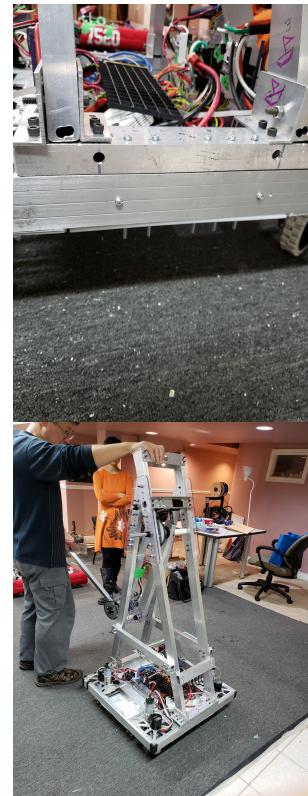
- Plan for mounting the arm onto the swerve base was completed
- Trents drawing planned to mount bars on the sides of the bottom
- The reasons for having it this way was forgotten and was overridden by an idea we previously rejected
- Now, front and back ends of arm bottom will have bars which the brackets will be mounted to
- Motor mount bars was machined and some holes/sides needed to be trimmed for better fit
- Trent and DIO mounted the connecting bars at the very top using L brackets
- Arm was remounted
- Back connecting bar near the bottom was mounted
- The red power drill was damaged in a the process
- Photoswitch and lever switch were not mounted
- Motor mount hit against the chains so it was grinded a little
- Motor during action may be ripped off of the mount (hypothetically)
- Added a hopefully effective L bracket under the motor to protect IN CASE the motor fell
- Arm axles were given white tubing for spacing in replacement of collars
- Battery location on swerve base was MOVED
- Side to side shaking prevention triangle bars added (only 1 for now)
- Not all brackets were screwed (need to be completed)
- Trent was assigned to draw the solution to mounting the arm onto the tank base
- Deo was assigned to complete thee CAD for swerve (finishing was trent did)
- Andrew was assigned to research and make a CAD solution for adding springs to the arm (and where/how to put a camera)
- Still no solution for preventing the arm from shaking while driving (actual arm)

March 5

- Due to the slow pace of development for the hand, other team members have been assigned tasks
- Robin has started working off of shayne's CAD
- Leo and kyle worked on improving and making CAD of what is currently existing

What's going to happen:

- Andrew finish a solution BEFORE saturday
- Arm support shaking bars must be put on BEFORE saturday
- Screws on the brackets must be SCREWED on properly
- Some other stuff i forgot



FRC 2023 CHARGED UP MEETING SUMMARY

March 8-11 2023 - written Robin

What happened:

March 8

- Angled shaking support beams which prevent the arm from swaying was added
- Arm was put onto the the swerve base and screws on the brackets were given nuts
- THe hand which Robin made was mounted

March 9

- Lever switch was physically mounted
- Arm code was tested
- Created cube arm positions
- Made some speed limitations'
- Zipped/taped some green compliant wheels onto the bars to prevent shaking

March 10

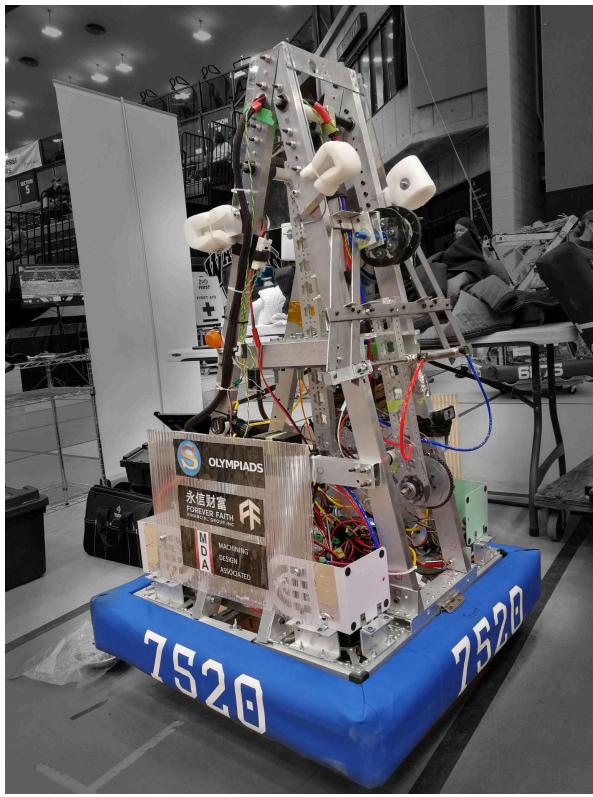
- Semi-attached photosensor to the arm
- Re-stylized arm code into Aarond's command based style
- Brackets were ribbited to mounting bar

March 11

- Went to hamilton to test what we had
- Tested shaynes idea
- Aaron implemented PID to arm (changed the code a little)
- Tested substation grab, worked
- Discovered many problems
- Swerve base can drive up charging station, may have a little trouble
- Problems:
 - Bumper number thickness too small
 - Robot height (not arm) is taller than 4' 8"
 - Plug in joystick properly
 - Mounting bars take too long to put on
 - Bumpers do not WORK WELL
 - Driver notes
 - Manual swerve/arm calibration
 - Gears in swerve drive snapped
 - Tank base must be ready
 - Swerve wheel protection isn't great
 - Arm shakes too much
 - Hand is too fragile, broke
 - Arm can't grab from floor
 - Motor wire on elbow kept disconnecting
 - Arm chain is too loose

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Mid Game Pictures During March:



Off Season Pictures:

