



# *Electric Quahogs*



## *25%*

2022 - 2023 SEASON ENGINEERING  
PORTFOLIO

# POWER PLAY<sup>SM</sup>

PRESENTED BY



**Raytheon**  
Technologies

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## TEAM DESCRIPTION

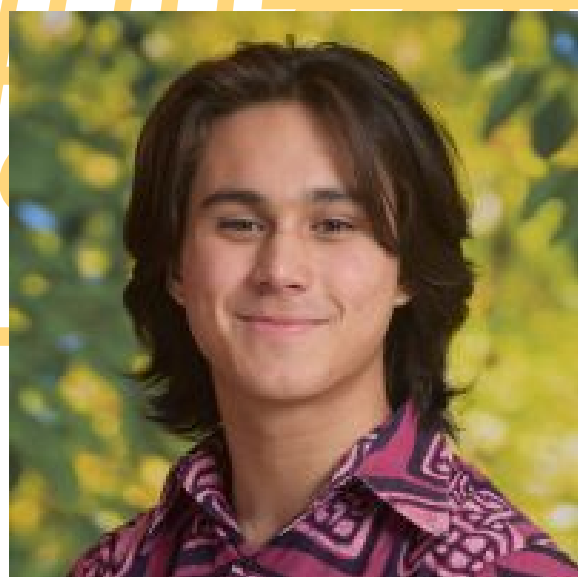
WE ARE TEAM 252, ELECTRIC QUAHOGS, AN FTC TEAM COMPETING OUT OF THE WHEELER SCHOOL IN PROVIDENCE, RHODE ISLAND. WE’VE BEEN PARTICIPATING IN FTC FOR 15 YEARS!

## SUSTAINABILITY PLAN

WE HAVE LAUNCHED A NEW PRE-SEASON TRAINING PROGRAM IN WHICH RETURNING MEMBERS BRUSHED UP ON OLDER SKILLS AND NEWER MEMBERS GET AN EARLY START ON LEARNING WHAT FIRST PARTICIPATION LOOKS LIKE. BECAUSE OF OUR RECRUITING EFFORTS AND SUCCESS IN COMPETITION LAST YEAR, WE MANAGED TO DOUBLE THE SIZE OF OUR SCHOOL’S ROBOTICS PROGRAM FROM 10 MEMBERS TO 22 THIS YEAR. THIS MEANS THAT WE NOW HAVE PEOPLE DEDICATED TO FUNDRAISING AND OUTREACH; GAINING US 2 NEW SPONSORS AND PROVIDING FOCUS TO SOLIDIFY OUR FINANCIAL SYSTEM.

ON TOP OF ALL OF OUR INTERNAL GROWTH WE HAVE MADE AN EFFORT TO CREATE AND MAINTAIN LASTING RELATIONSHIPS WITH OTHER TEAMS IN OUR COMMUNITY SUCH AS TEAM 16008 THE ARMORED ARTEMIS’S, AND TEAM 22686 THE BLACKSTONE ACADEMY BULLDOGS.

# OUR TEAM



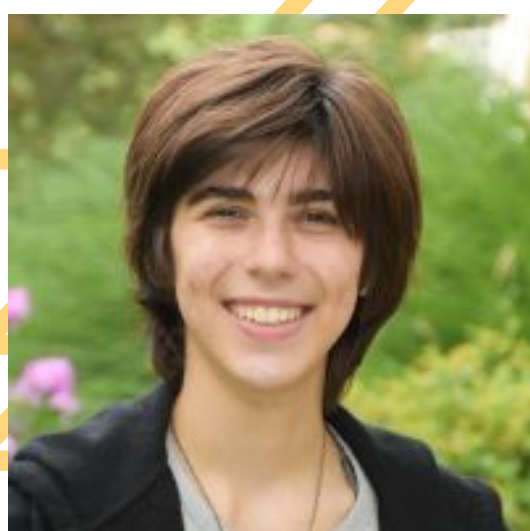
**MYLES JOHNSON, CO-CAPTAIN '23 HE/HIM**



**MAYTE SEGURA, CO-CAPTAIN '24 SHE/HER**



**BEATRICE SCHROEDER, '24 SHE /HER**



**LILY THORNTON, '24 XE/HE/SHE**



**DANIEL DUARTE-BAIRD, '25 HE/HIM**



**GRIFFIN HAISMAN, '25, HE/HIM**



**CHARLIE SHEA, '25, HE/HIM**



**LUYAO LEI, '26 SHE/HER**



**SABRINA ANDREU GONZALEZ, '26, SHE/HER**

# COACH & MENTORS

## NAPALI RAYMUNDO

PROGRAMMING/MECHANICS MENTOR  
FTC ALUM, #4174

## DYLAN RYDER

COACH  
WHEELER SCHOOL DIB LAB DIRECTOR

## ZOE RUDOLPH-LARREA

OPERATIONS MENTOR  
FTC ALUM, #252

## SOPHIE GINSBERG-HAYES

MECHANICS MENTOR  
FTC ALUM, #2856 & 8032

## REBECCA WOLKOFF

PROGRAMMING MENTOR  
FRC #695

# TEAM DETAILS

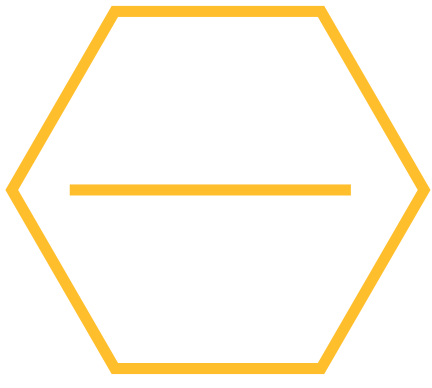
AS MENTIONED BEFORE, THIS YEAR WE LAUNCHED OUR PRESEASON PROGRAM! NEW AND RETURNING MEMBERS SPENDING TIME TOGETHER BEFORE THE SEASON STARTED, ESTABLISHED A LEARNING FRIENDLY ENVIRONMENT WHERE VETERANS WERE ABLE TO HELP TEACH NEWER MEMBERS IMPORTANT SKILLS FOR THE UPCOMING SEASON LIKE: PROGRAMMING, BUILDING, CAD, FUNDRAISING, AND OPERATIONS. THIS GAVE NEWER MEMBERS A HEAD START ON THINGS THEY WOULD HAVE OTHERWISE HAD TO LEARN DURING THE SEASON.

BY INTRODUCING THESE SKILLS EARLIER, MEMBERS WERE ABLE TO LEARN FASTER. WE ALSO FOCUSED ON MIDDLE SCHOOL CENTERED OUTREACH WITHIN OUR SCHOOL, ALLOWING 18 SEVENTH AND EIGHTH GRADERS THAT REGULARLY ATTENDED OUR WORKSHOPS AND OPEN HOUSES LAST YEAR ADMISSION FOR PRE-SEASON. IT WAS SO SUCCESSFUL A SECOND TEAM WAS CREATED - 636 OCCAM’S RAZOR CLAMS.

## PRE-SEASON SCHEDULE

| Monday                             | Tuesday                            | Wednesday                          | Thursday                         | Friday                             |
|------------------------------------|------------------------------------|------------------------------------|----------------------------------|------------------------------------|
| 8/29                               | 8/30                               | 8/31                               | 9/1                              | 9/2                                |
| 9AM – 11:30PM:<br>Programing Pt. 1 | 9AM – 11:30PM:<br>Programing Pt. 2 | 9AM – 11:30PM:<br>Building Pt. 3   | 9AM – 11:30PM:<br>Building Pt. 4 | 9am – 11:30PM: CAD<br>Pt. 2        |
| 12:30PM – 3PM:<br>Building Pt. 1   | 12:30PM – 3PM:<br>Building Pt. 2   | 12:30PM – 3PM:<br>Programing Pt. 3 | 12:30Pm – 3PM:<br>CAD Pt. 1      | 12:30PM – 3PM:<br>Programing Pt. 4 |



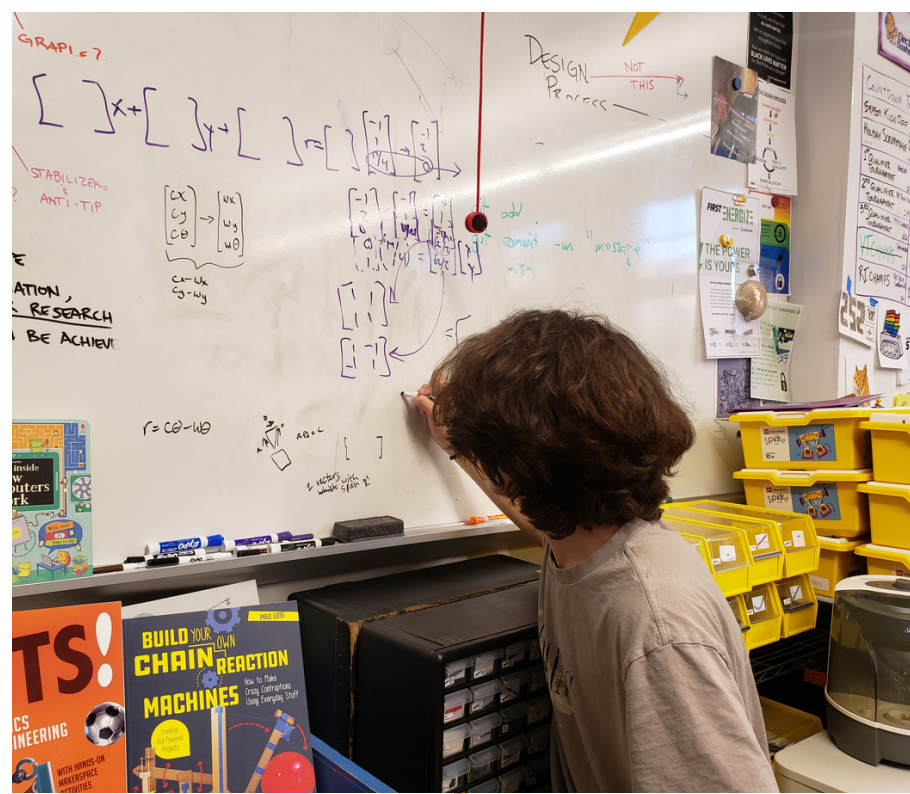
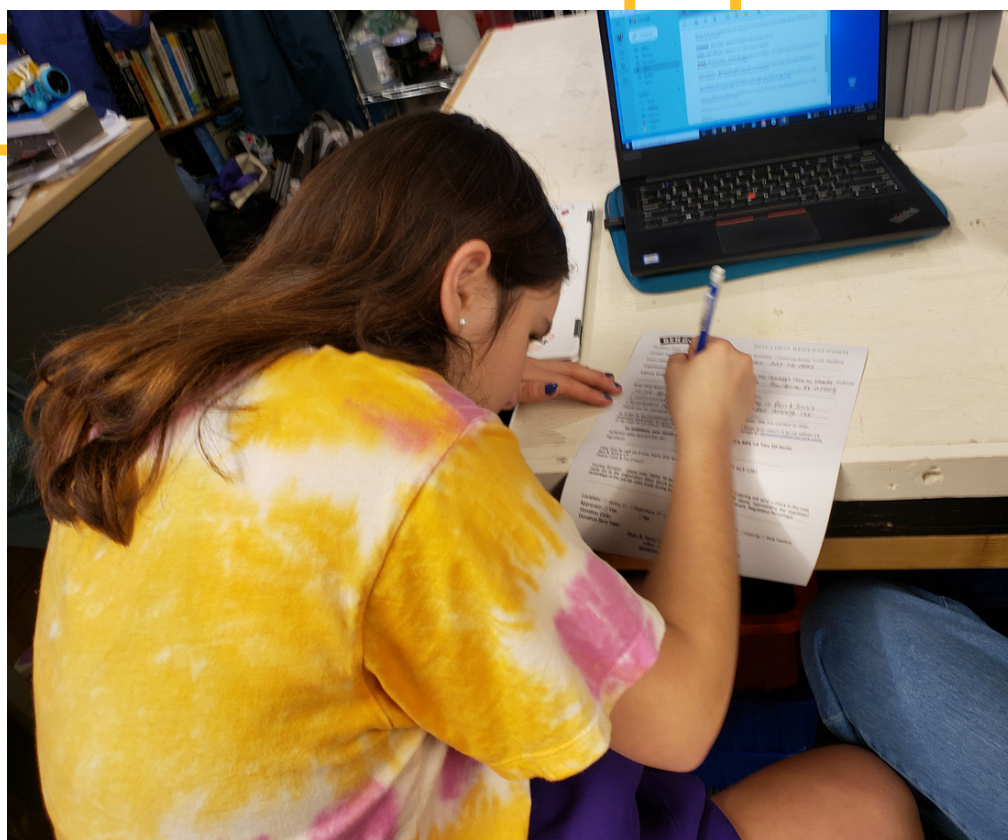


# TEAM DETAILS

**OUR PRACTICES ARE A MIXTURE OF IN-SCHOOL TIME AS WELL AS OUT-OF-SCHOOL TIME.**

**ON TUESDAYS DURING THE SCHOOL DAY, WE HAVE AN “ENRICHMENT” PERIOD. DUE TO TIME RESTRAINTS DURING THIS PERIOD, WE FOCUS ON BETTERING OUR OVERALL OPERATIONS WORK. MONDAY, WEDNESDAY AND FRIDAY ARE AFTER SCHOOL DAYS THAT MEMBERS CAN COME IN ON.**

**THIS UNIQUE MIX OF AFTER SCHOOL AND IN-SCHOOL MEETINGS ALLOW TEAM MEMBERS TO BETTER DEVOTE WHAT TIME THEY HAVE TO THE TEAM.**



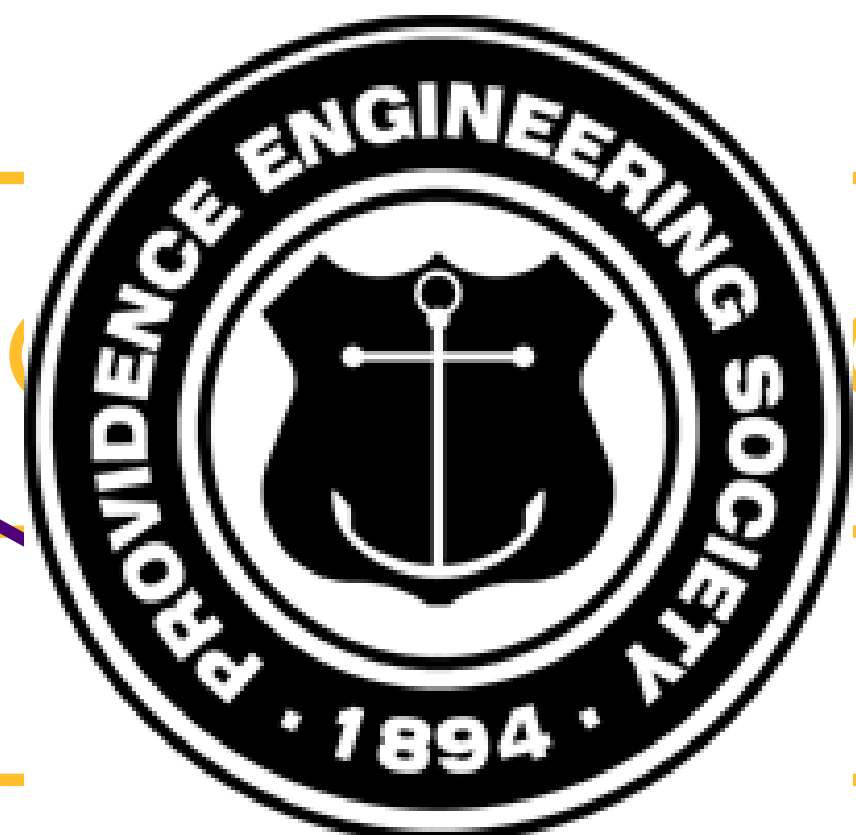
**TEAM 636 OCCAM’S RAZOR CLAMS IS A TEAM OF ROOKIES THAT WE STARTED THIS YEAR; LARGELY COMPRISED OF NINTH GRADERS AND MIDDLE SCHOOLERS, WITH A FEW 11TH GRADERS. NEAR THE BEGINNING OF THE SEASON IT WAS APPARENT THAT INTEREST LARGELY OUTWEIGHED AVAILABLE SPACE ON OUR TEAM. 252 LEADERSHIP SAT DOWN AND MADE THE DIFFICULT DECISION OF WHICH 2 NEW RECRUITS WE WOULD GRACIOUSLY INVITE TO OUR TEAM. WHEN MAKING OUR DECISION WE MADE AN ACTIVE EFFORT TO ENSURE ENOUGH DIVERSITY IN INTEREST AND SKILL LEVEL AMONG THE TEAM TO PROVIDE A SOLID FOUNDATION FOR SUCCESS. WE SHARE OUR PRACTICE TIME WITH THEM AND HAVE MADE AN ACTIVE EFFORT TO PROVIDE THEM WITH ALL OF THE SUPPORT THEY NEED, FROM CODING ADVICE TO TEAM MANAGEMENT TIPS.**



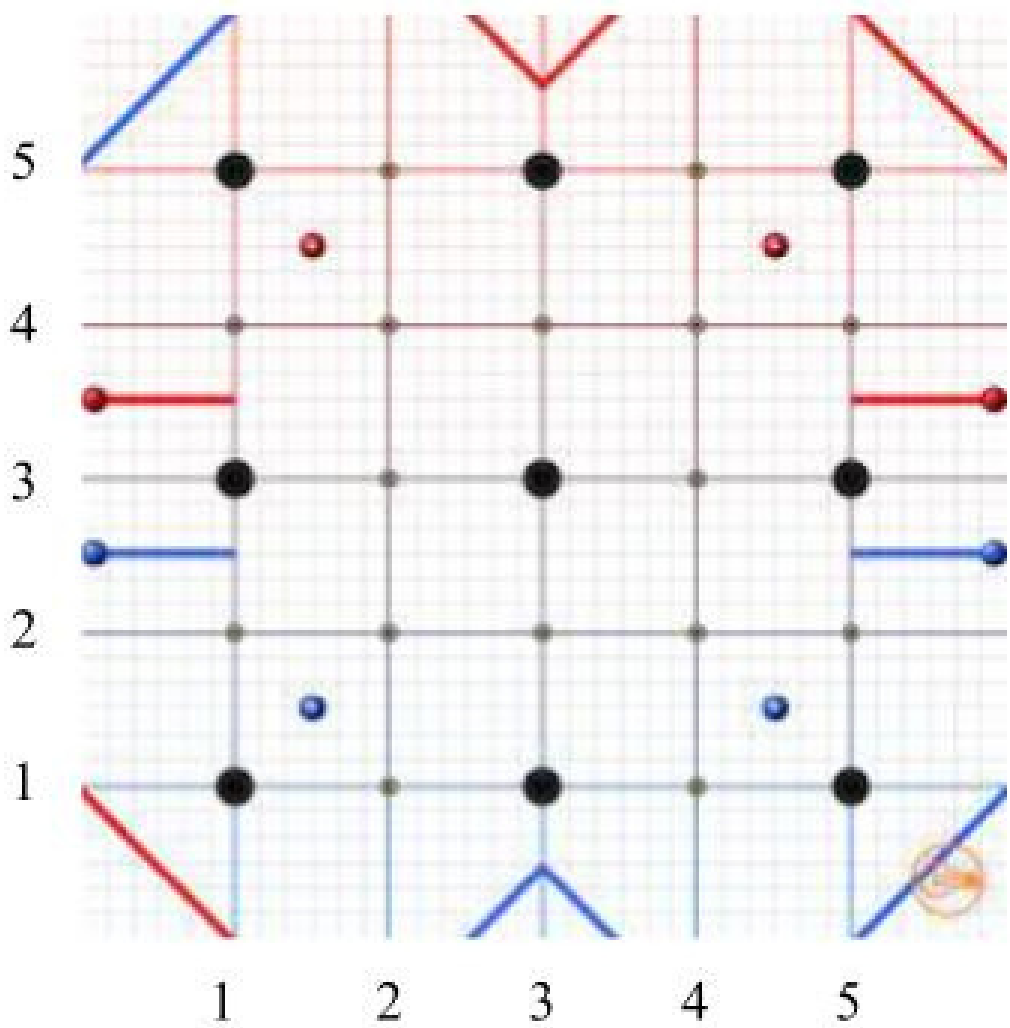
| Grant / Donor Name             | Amount     | Date       | Notes / Follow Up |
|--------------------------------|------------|------------|-------------------|
| (example) Wheeler School       | \$1,000.00 | 9/1/2022   |                   |
| Dave's Market                  | \$250.00   | 11/28/2022 |                   |
| Providence Engineering Society | \$500.00   | 12/5/2022  |                   |
|                                |            |            |                   |
|                                |            |            |                   |
|                                |            |            |                   |
|                                |            |            |                   |
|                                |            |            |                   |
| Total Grants & Donations       | \$1,750.00 |            |                   |
|                                |            |            |                   |
| Total Income                   | \$1,750.00 |            |                   |
|                                |            |            |                   |
|                                |            |            |                   |
| In-Kind Services               | Amount     | Date       | Notes / Follow Up |
| GT3 Creative Inc.              | \$200.00   |            | Free vinyl banner |
|                                |            |            |                   |

**WE HAVE GROWN OUR NETWORKING WITH POTENTIAL SPONSORS, AND THROUGH THIS WORK, WE HAVE GAINED TWO NEW DONORS: DAVE'S MARKETPLACE AND THE PROVIDENCE ENGINEERING SOCIETY--WHO HAVE DONATED A TOTAL OF \$750 TO OUR TEAM. WE ALSO RECEIVED AN IN-KIND GIFT FROM GT3 CREATIVE INC. OF A VINYL BANNER, WHICH WE PLAN TO UTILIZE AT EVERY OFFICIAL COMPETITION WE ATTEND FOR YEARS TO COME.**

# DONORS



# GAME STRATEGY



- CREATE A VERSATILE ROBOT THAT COULD REACH ALL THREE JUNCTIONS AND BE A STRONG ALLIANCE PARTNER.
- PRIORITIZE DRIVER PRACTICE TO MAXIMIZE CYCLE TIME WITH THE ARM AND CLAW
- CREATE A GRID SYSTEM TO DIFFERENTIATE BETWEEN THE DIFFERENT JUNCTIONS TO MINIMIZE DRIVER-COACH MISCOMMUNICATION DURING MATCHES (SEE PICTURE ABOVE)
- WATCH HIGH-SCORING MATCHES ON YOUTUBE TO RESEARCH AND DEVELOP OUR OWN GAME STRATEGIES

# DESIGN PROCESS

## 1 - BRAINSTORMING

WE IDENTIFY A GOAL WE WANT OUR ROBOT TO ACHIEVE, THEN BRAINSTORM WHILE SIMULTANEOUSLY RESEARCHING AND EVALUATING MECHANISMS FOR THEIR EFFECTIVENESS AND EFFICIENCY FOR COMPLETING THE TASK.

## 2- PROTOTYPING

CONCEPTS ARE THEN QUICKLY PORTOTYPED WITH MATERIALS LIKE CARDBOARD

## CASE STUDY: ROBOT 1'S SIDE PLATES



AFTER BRAINSTORMING THE IDEA FOR THE ROBOT, WE PHYSICALLY PROTOTYPED THE ROBOT 1 WITH CARDBOARD, IT SERVED AS A MODEL WHEN WE STARTED TO CAD.

## 5 - TESTING

EFFECTIVENESS OF THE MECHANISM IS TESTED AND RECORD TO SEE HOW EFFICIENT IT IS.

## 3 - CAD/DESIGN

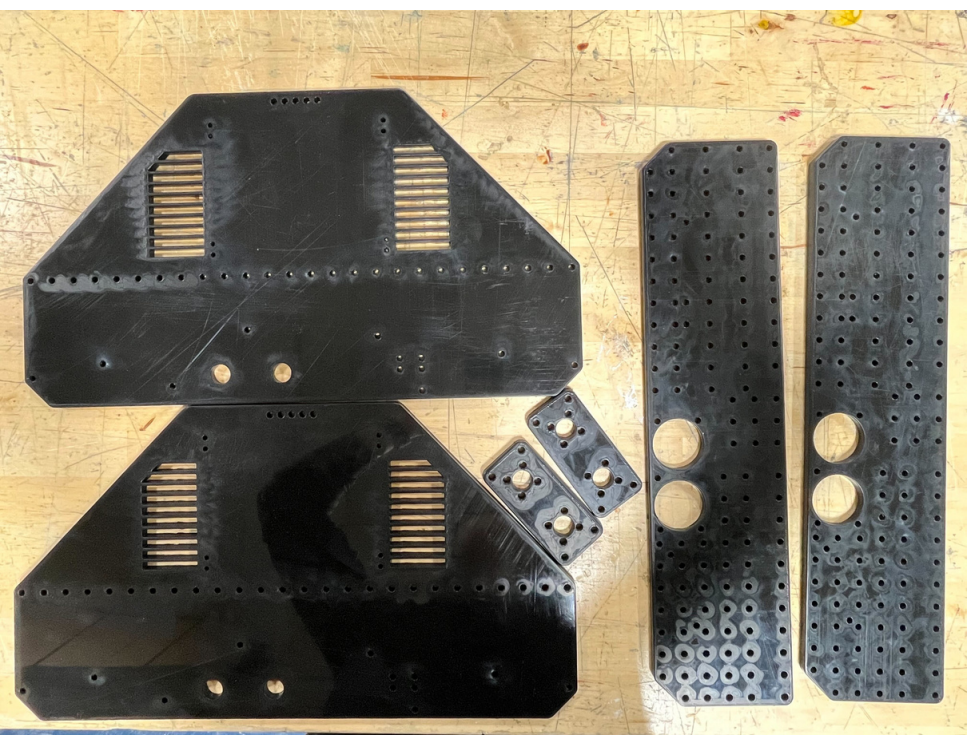
THEN THEY ARE DIGITALLY FABRICATED WITH CAD USING INFORMATION GATHERED FROM RESEARCH AND THE ORIGINAL PROTOTYPE.



AFTER RESEARCHING OTHER TEAMS SIDE PLATES WE DIGITALLY FABRICATED A CUSTOM DESIGN IN ONSHAPE.

## 4 -BUILDING

MECHANISMS ARE THEN ASSEMBLED USING THE CAD MODEL AS A REFERENCE.



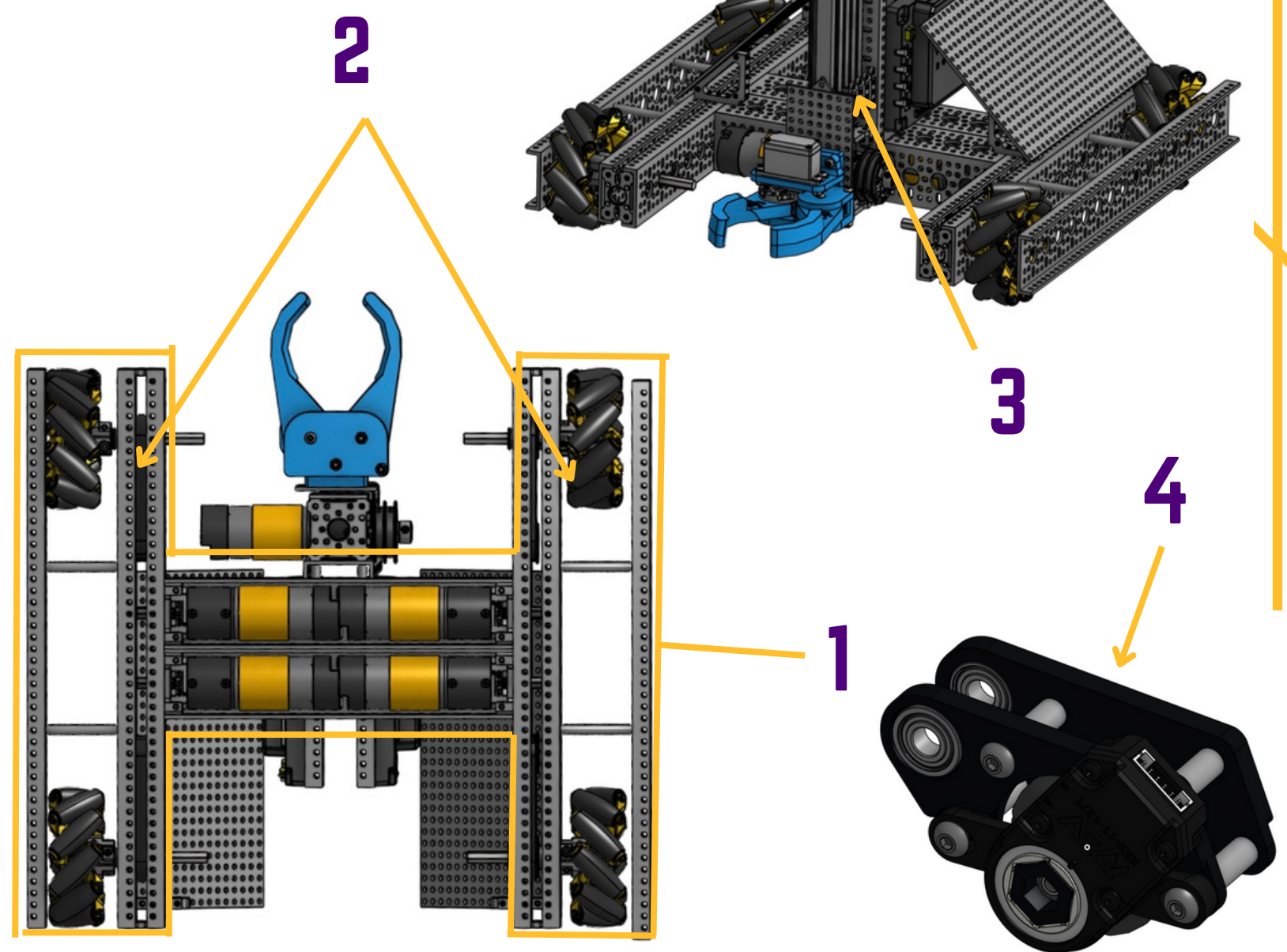
WE THEN LASER CUT OUR SIDE PLATES OUT OF DELRIN PLASTIC AND ASSEMBLED OUR ROBOT BASED ON THE CAD.

“DESIGNING THE SIDE PLATES FOR LENNY WAS AN INTERESTING PROCESS WITH A LOT OF NEW THINGS TO LEARN. I HAD TO LEARN HOW TO MAKE CUSTOM PARTS USING ONSHAPE, WHICH INCLUDED KNOWING ALL OF THE PARAMETERS WE WOULD NEED TO ACCOUNT FOR.” - CHARLIE

# ROBOT 00 OVERVIEW

"FRANT"

- 1 - H-SHAPED CHASSIS
- 2 - BELT DRIVEN MECANUM WHEELS
- 3 - CLAW ON LINEAR SLIDE
- 4 - 3D PRINTED ODOMETRY WHEELS

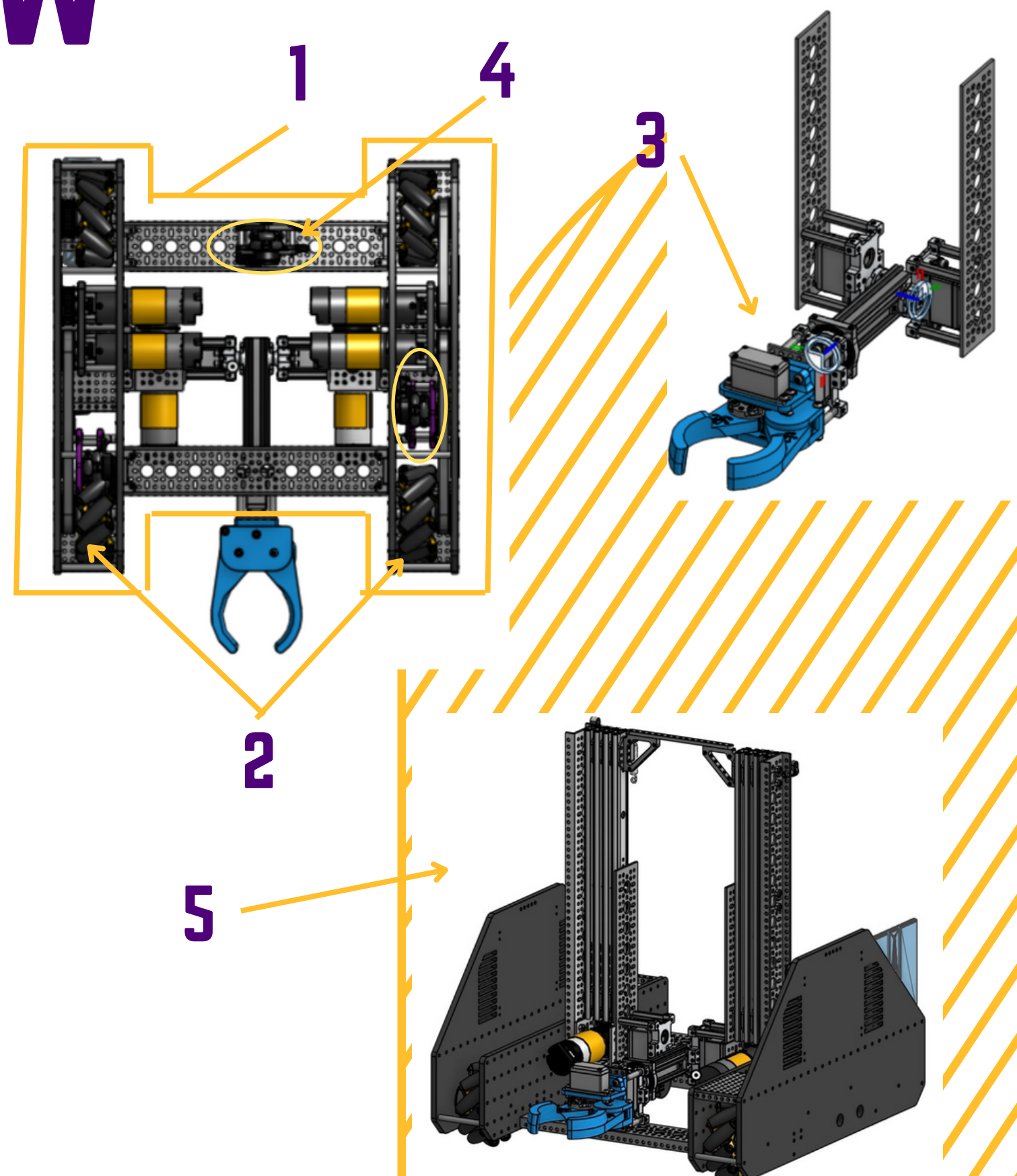


AFTER QUALIFIERS, WE RECOGNIZED THAT ROBOT 00 DID NOT DISPLAY OUR BEST WORK. NOT MUCH THOUGHT WAS PUT INTO THE DESIGN OR THE PARTS USED. THIS LACK OF CAREFUL PLANNING RESULTED IN AN AWKWARD LAYOUT MAKING DRIVING DIFFICULT. IN ORDER TO FIX THIS, OUR TEAM DECIDED TO CREATE A BRAND-NEW DESIGN IN THE SPAN OF 6 WEEKS. FOR ROBOT 01, WE WANTED TO CUT DOWN OUR CYCLE TIME BY BUILDING A THROUGH-BOT AND IMPROVE OUR CAD SKILLS BY LEARNING HOW TO CREATE CUSTOM SIDE PLATES.

# ROBOT 01 OVERVIEW

"LENNY"

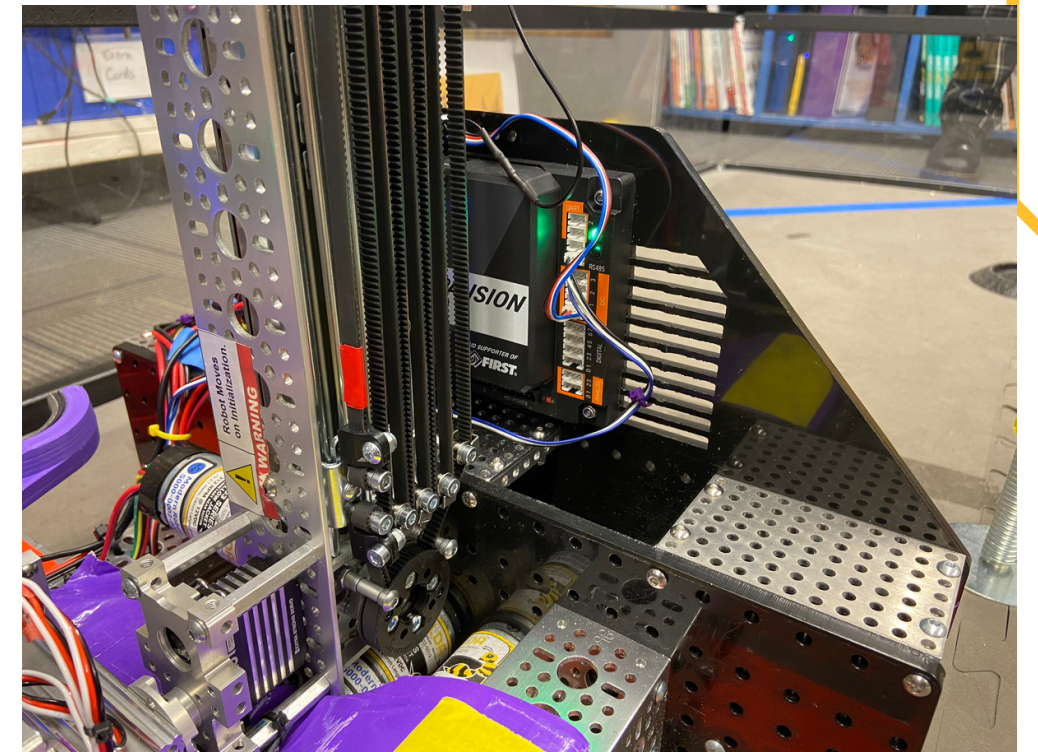
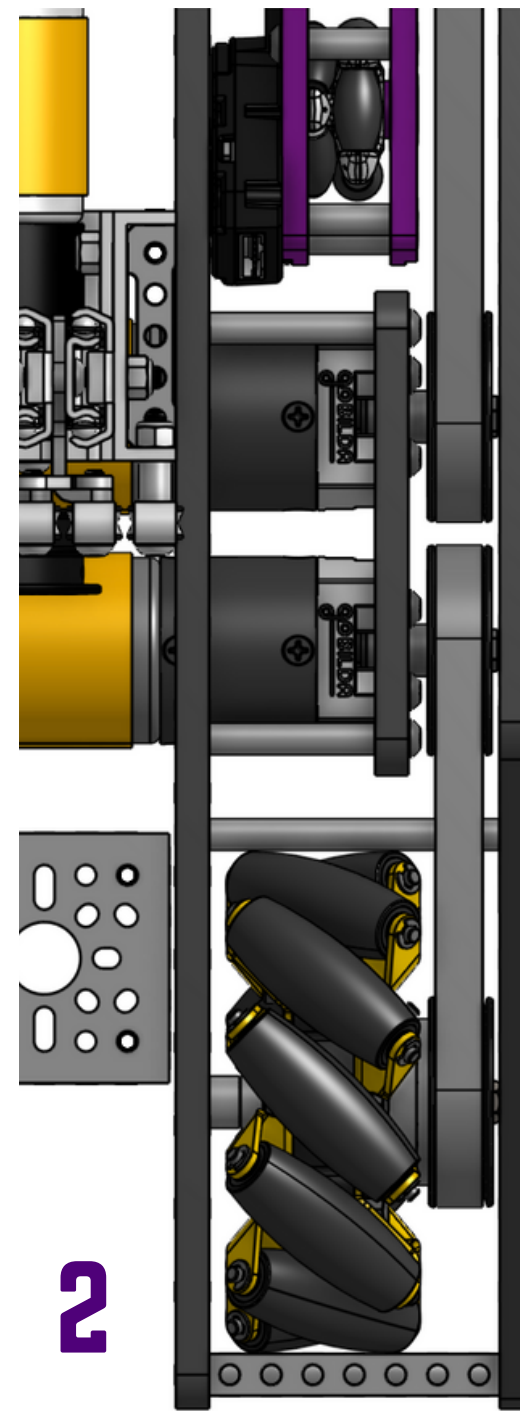
- 1 - CUSTOM CHASSIS
- 2 - BELT DRIVEN MECANUM WHEELS
- 3 - ARM AND WRIST CLAW
  - CENTERED BETWEEN LINEAR SLIDES, INCREASING STABILITY
- 4 - 3D PRINTED ODOMETRY WHEELS
- 5 - CUSTOM LASER-CUT CHASSIS PLATES
  - HOUSES CONTROL HUBS
  - SHOWS SPONSORS + TEAM NUMBER



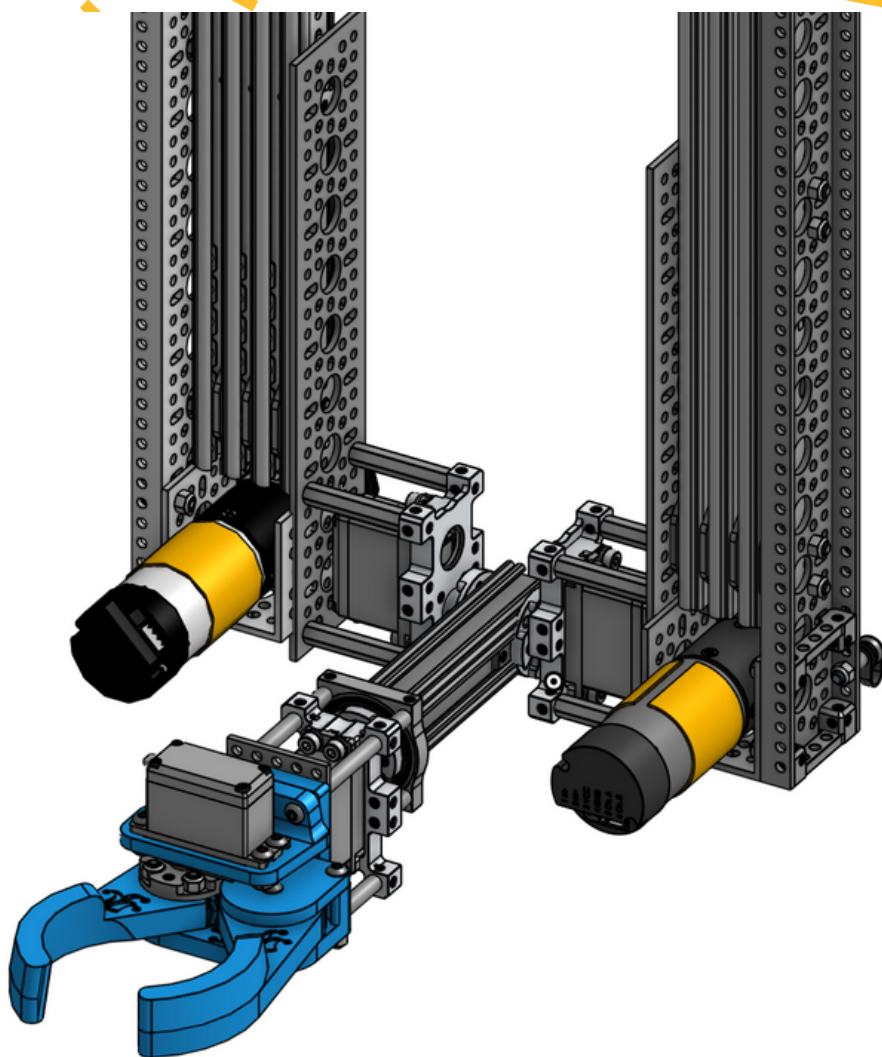
# CHASSIS

3

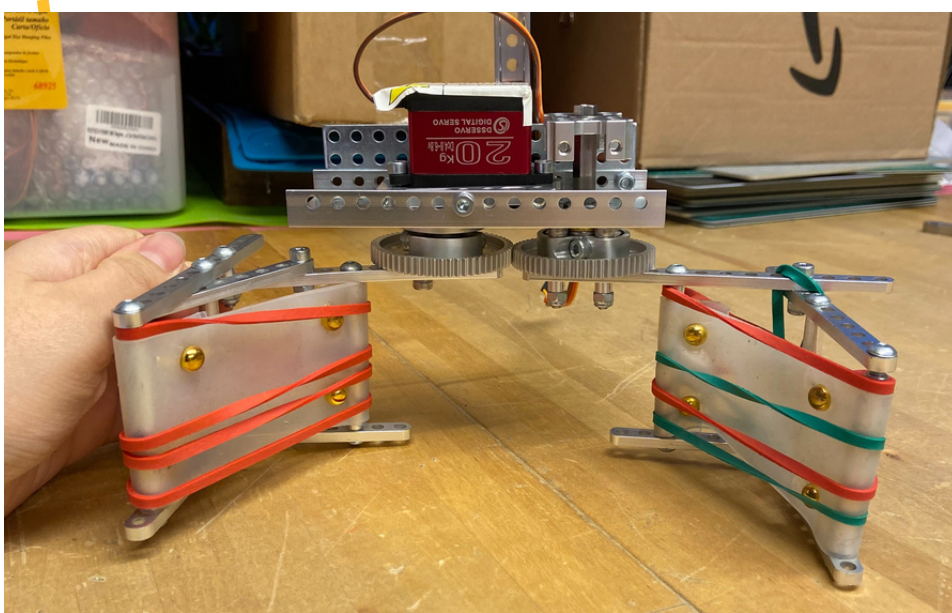
- (1) CUSTOM DELRIN CHASSIS PLATES ARE DURABLE AND RIGID
- TWO CHASSIS PODS
  - (2) CONTAIN WHEELS, MOTORS, BELTS, AND PULLEYS
  - (3) CONTROL + EXPANSION HUBS
- 1) MOTORS SUNKEN IN SIDE PLATES, SAVE SPACE
- MECANUM WHEELS WITH BELT DRIVE



# INTAKE

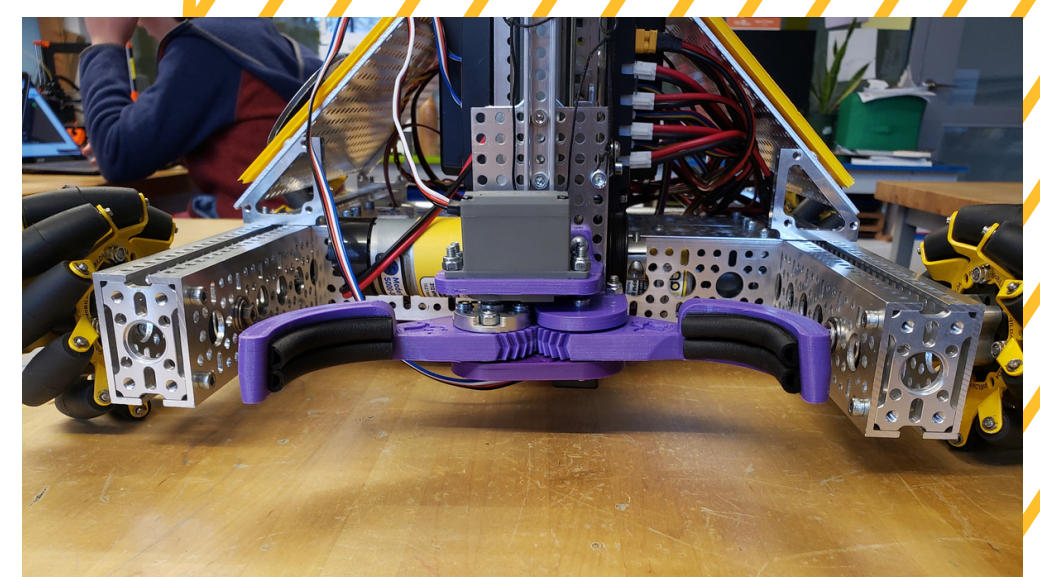


- THROUGH DESIGN - ARM FLIPS THROUGH WHILE INSIDE OF THE ROBOT TO REACH OTHER SIDE
  - TWO SYNCED SERVOS ON EITHER SIDE OF ARM
- WRIST FLIPS 180 DEGREES TO SET CONE UPRIGHT ON EITHER SIDE
  - ONE SERVO TO FLIP WRIST; ONE TO OPEN/ CLOSE CLAW
- BELT-DRIVEN LINEAR SLIDES THAT DO NOT REQUIRE CONSTANT TENSIONING; CAN REACH ALL THREE JUNCTION HEIGHTS



FIRST - BUILT WITH GOBILDA PARTS AND RUBBER BANDS  
NOTABLE: FLIMSY PARTS, DID NOT ALIGN PROPERLY FOR A SECURE GRIP

## TWO ITERATIONS

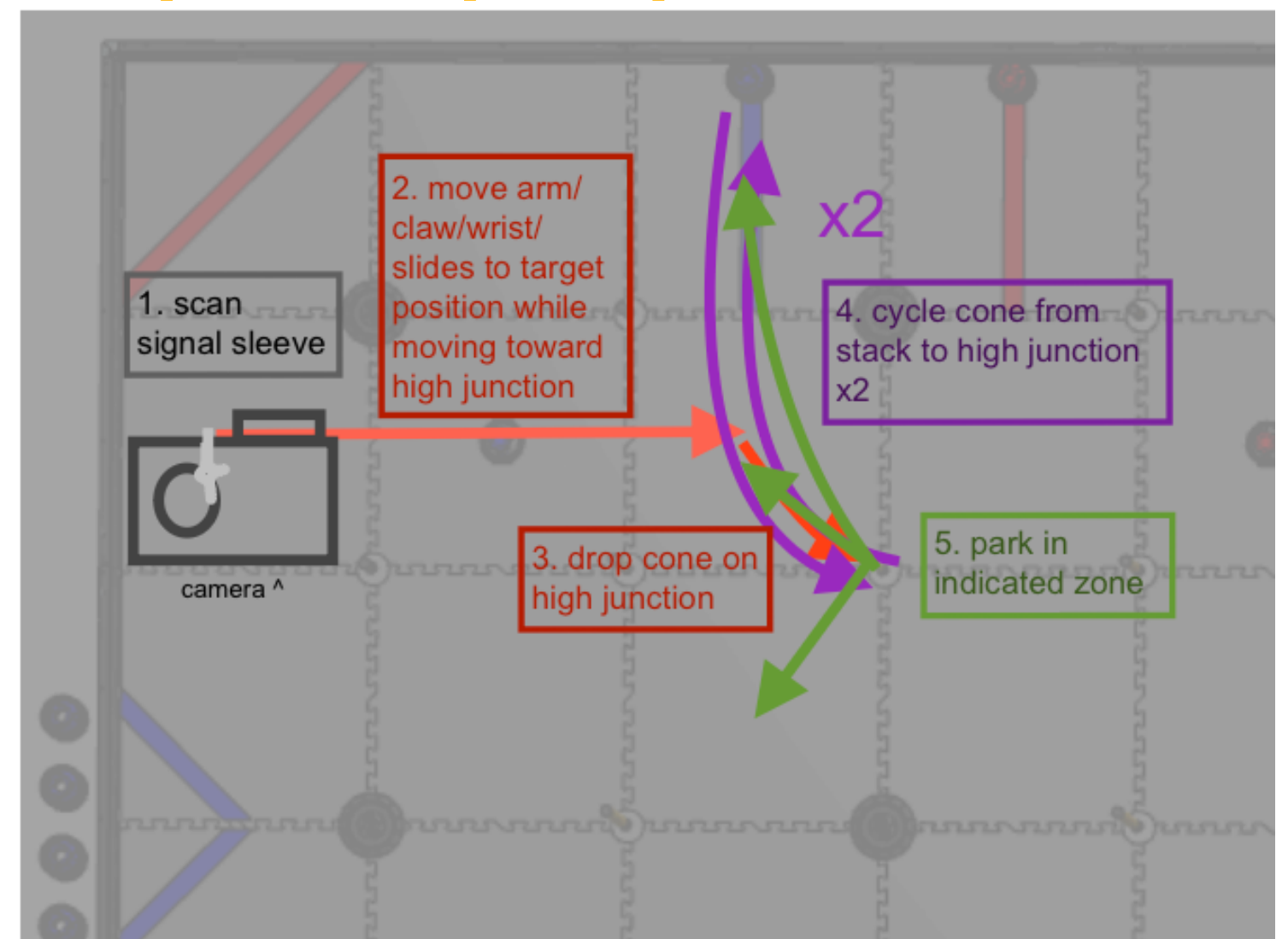


SECOND - 3D PRINTED DESIGN FROM LOONY SQUAD  
NOTABLE: MOLDED GRIP AROUND CONE ALONG WITH A STRONGER SERVO MAKES IT MORE SECURE

# PROGRAMMING

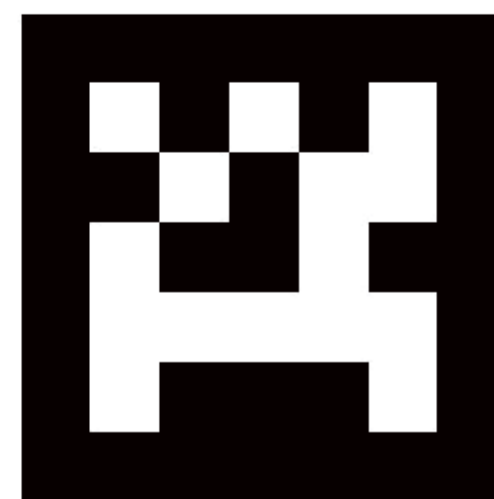
## AUTONOMOUS PERIOD

1. DETECT CONE ROTATION  
A. USING APRIL TAGS
2. PLACE PRELOAD ON HIGH JUNCTION
3. CYCLE 2 CONES FROM CONE STACK ONTO THE HIGH JUNCTION
4. PARK IN THE INDICATED ZONE

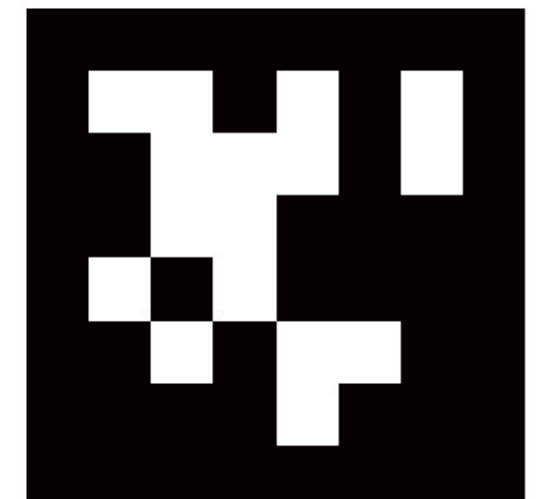


## APRIL TAGS

- RELIABLE WAY TO DETECT CONE POSITION
- WORKS IN ALL APPLICABLE LIGHTING CONDITIONS



Tag25h9



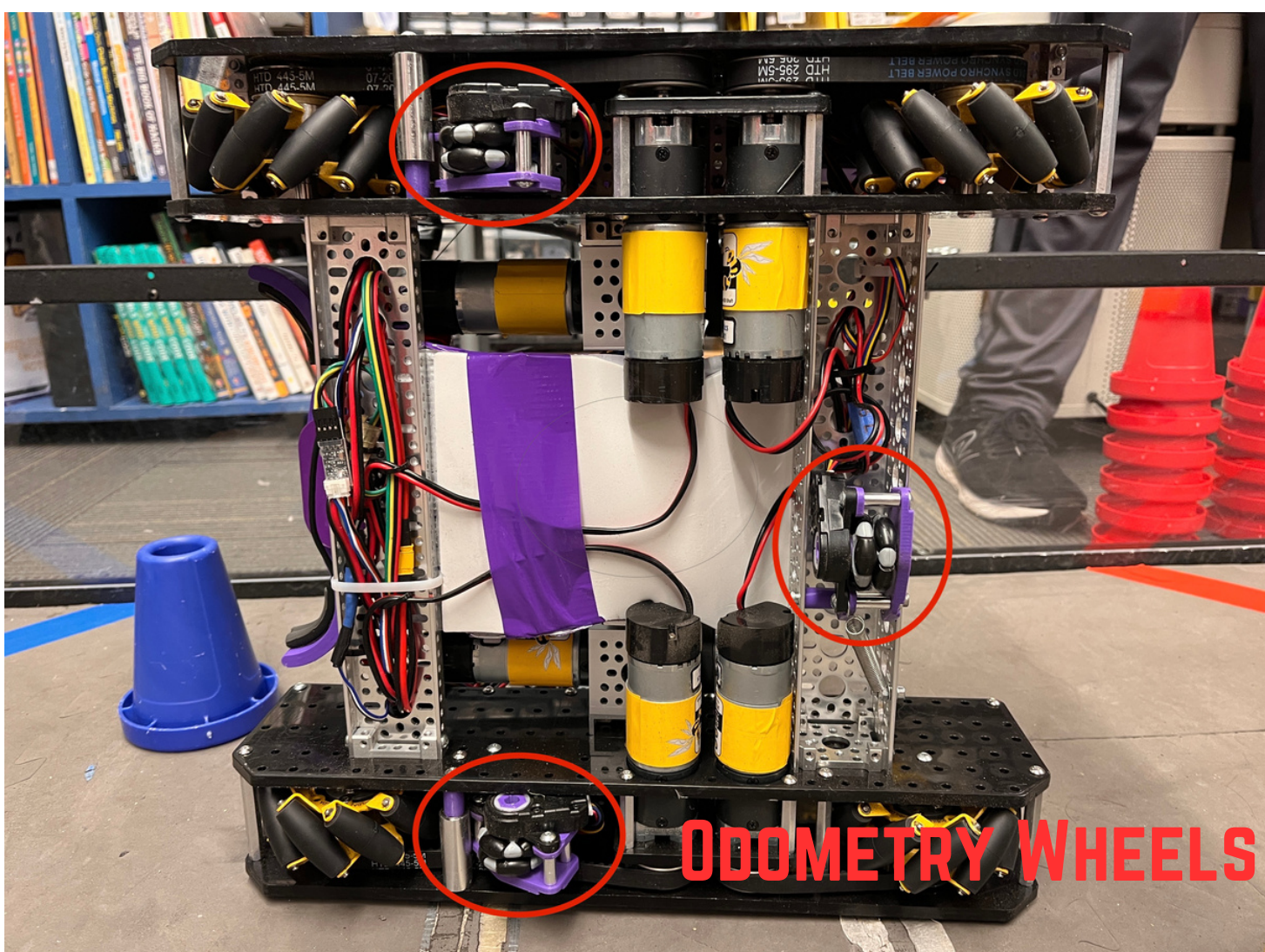
Tag36h11

## LOCALIZATION

WE LOCALIZE USING THREE WHEEL ODOMETRY AND THE ROADRUNNER LOCALIZER

## DRIVER ENHANCEMENTS

- MACRO BUTTONS FOR DROPPING AND FLIPPING THE CLAW OR PICKING UP AND RAISING THE SLIDES
- REVERSED DRIVING DIRECTIONS WHEN ARM FLIPPED FOR MORE LOGICAL DRIVING
- MACROS FOR THE DIFFERENT CONE STACK AND JUNCTION HEIGHTS FOR MORE ACCURATE CONE PLACEMENT



# PROGRAMMING

## NON-BLOCKING AUTONOMOUS CONTROL LOOP

OUR AUTONOMOUS RELIES ON AN ASYNCHRONOUS CONTROL LOOP WHERE WE CAN TRIGGER ARM, WRIST, AND CLAW EVENTS AT DIFFERENT BOT POSITIONS. THIS ALLOWS US TO EFFICIENTLY MOVE THE ROBOT IN TANDEM WITH THESE ARM, WRIST, AND CLAW MOVEMENTS IN A PRECISE FASHION.

## ARMITRAGE PID CONTROL

OUR WRIST CLAW PRESENTED US WITH A NEW AND COMPLEX WAY TO MANIPULATE CONES, AND WITH THAT CAME NEW AND COMPLEX SOFTWARE CHALLENGES.

### SOME CHALLENGES INCLUDED...

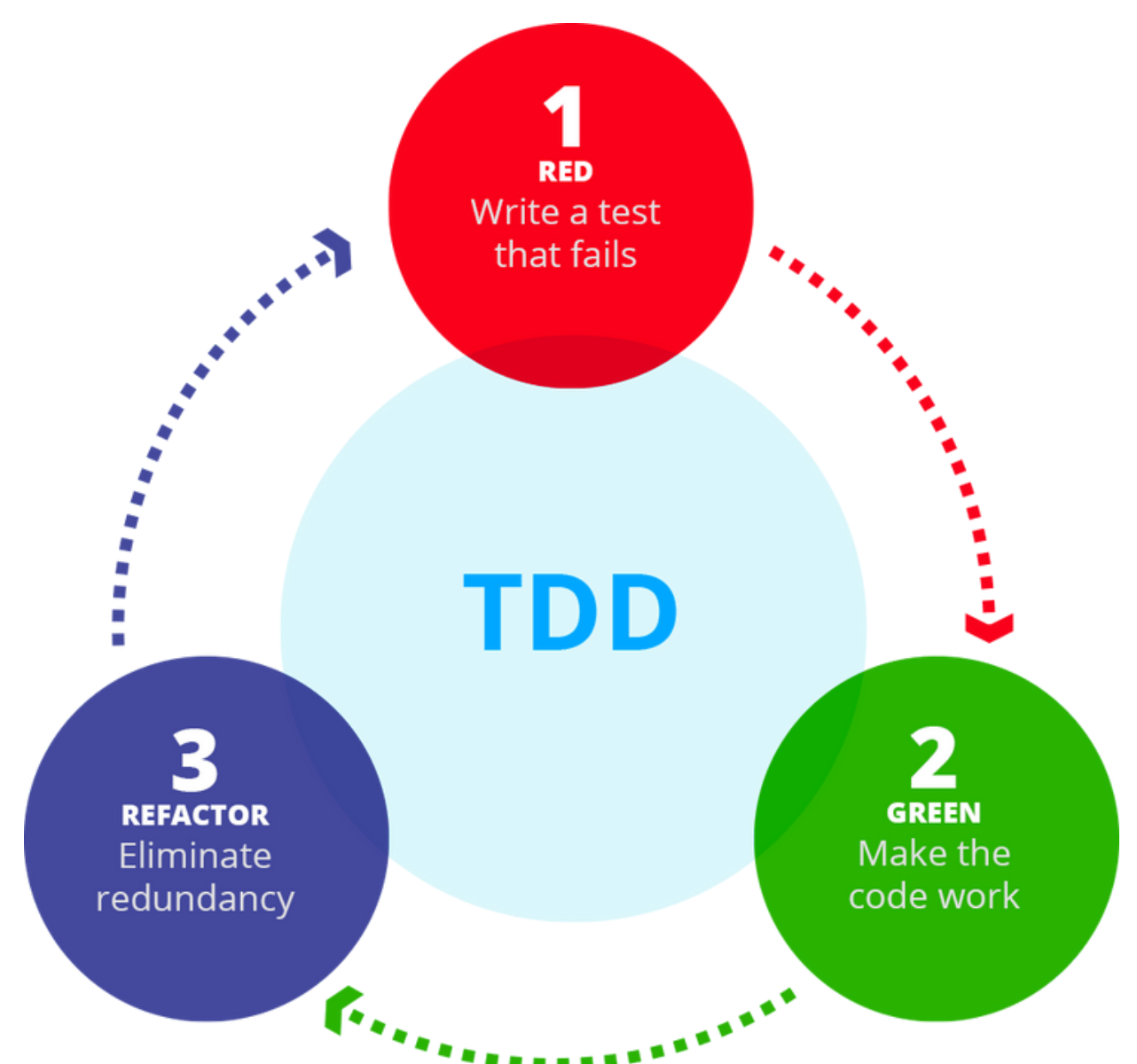
1. BOTH LINEAR SLIDE MOTORS HAVE TO OPERATE IN SYNC
2. BOTH SERVOS ON THE ARM HAVE TO OPERATE IN SYNC
3. THE SLIDES CANNOT STOP TO ABRUPTLY OR ELSE THE BELTS WILL SLIP
4. DISTANCE SENSOR REPORTED INCONSISTENT VALUES

### HOW WE OVERCAME THEM...

1. DESIGNED A PROPORTIONAL CONTROL SYSTEM USING THEIR ENCODERS TO MAINTAIN SYNCHRONICITY
2. DESIGNED A SYSTEM WHERE THE SERVOS CAN ONLY BE ACCESSED AS A PAIR
3. MADE A MAXIMUM ACCELERATION USING PID AND THE SIGMOID FUNCTION
4. IMPLEMENTED CUSTOM ALGORITHM TO AVERAGE MULTIPLE VALUES

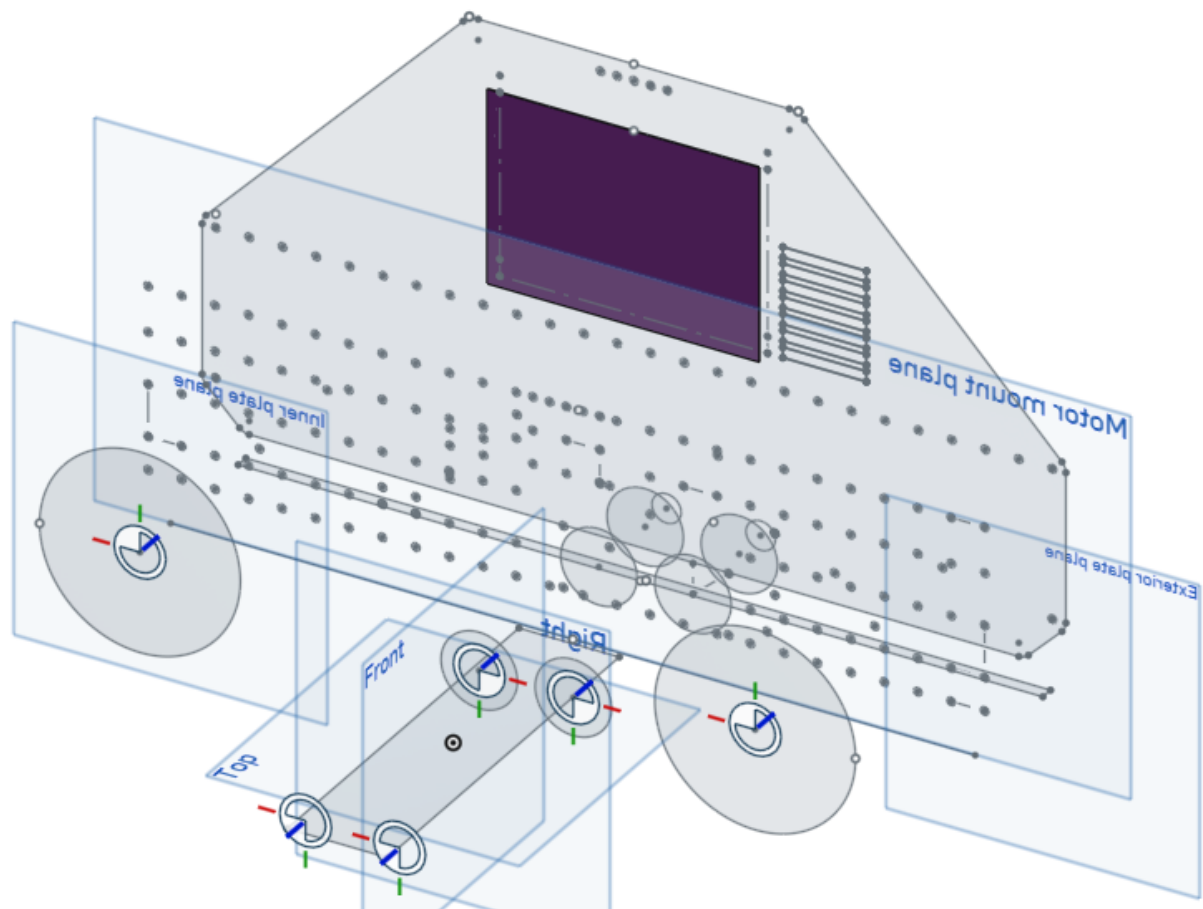
### TEST DRIVEN DEVELOPMENT

WE DECIDED TO USE TEST DRIVEN DEVELOPMENT TO RAPIDLY TEST OUR PID SYSTEM. EVEN WITH OUR LITTLE KNOWLEDGE OF THE PROCESS AT THE BEGINNING OF THE SEASON, WE WERE ABLE TO LEARN THE PARADIGM, AND GREATLY SPEED UP THE DEVELOPMENT PROCESS.

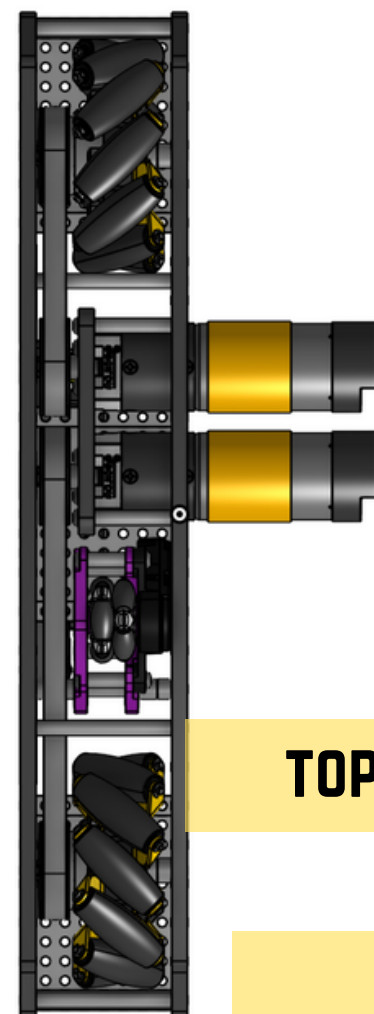


# DIGITAL FABRICATION

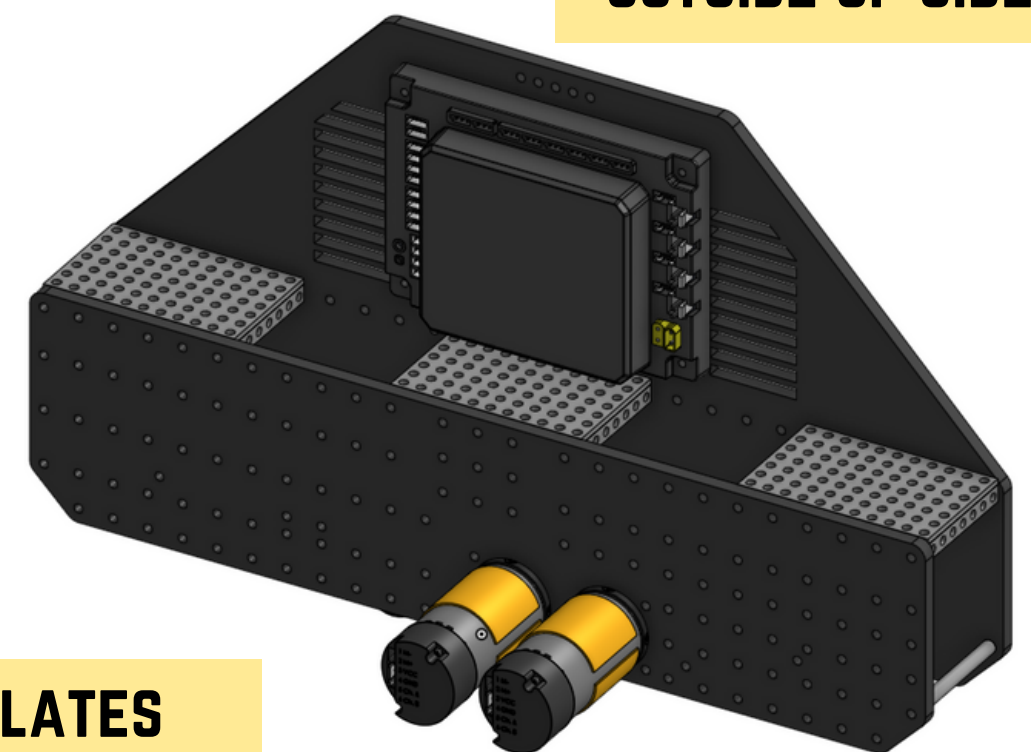
WE USE ONSHAPE TO DOCUMENT OUR DESIGN PROCESS AND CREATE CUSTOM PARTS, AS WELL AS VIRTUALLY CONSTRUCT OUR ROBOT. THIS HELPS US TO VISUALIZE AND EFFICIENTLY EDIT OUR ITERATIONS, WHICH HELPED A LOT IN THE DESIGNING/CREATION OF OUR SIDE PLATES.



SKETCH OF SIDE PLATES



TOP VIEW OF PLATES



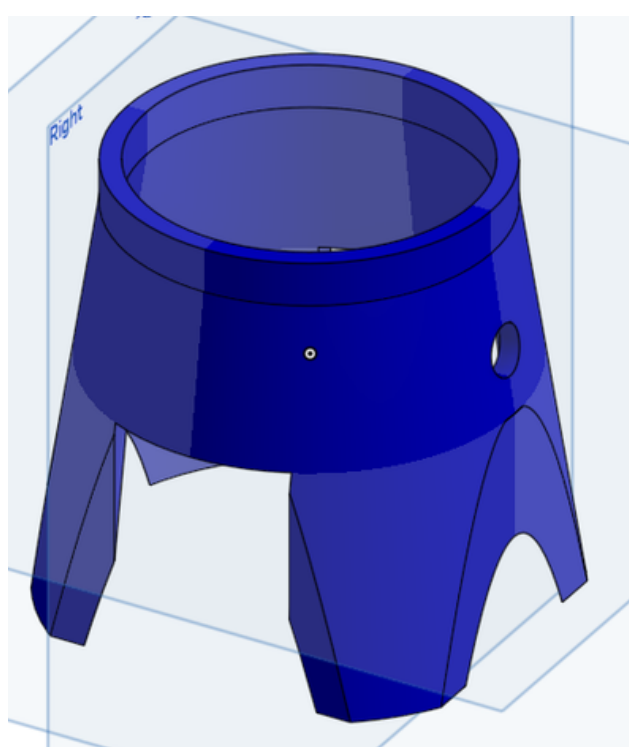
OUTSIDE OF SIDE PLATES

BECAUSE CREATING CUSTOM CHASSIS PLATES REQUIRED EXTENSIVE KNOWLEDGE OF CAD, MANY OF THE SKILLS DISPLAYED HERE WERE LEARNED BY OUR MEMBERS IN LESS THAN 3 WEEKS.

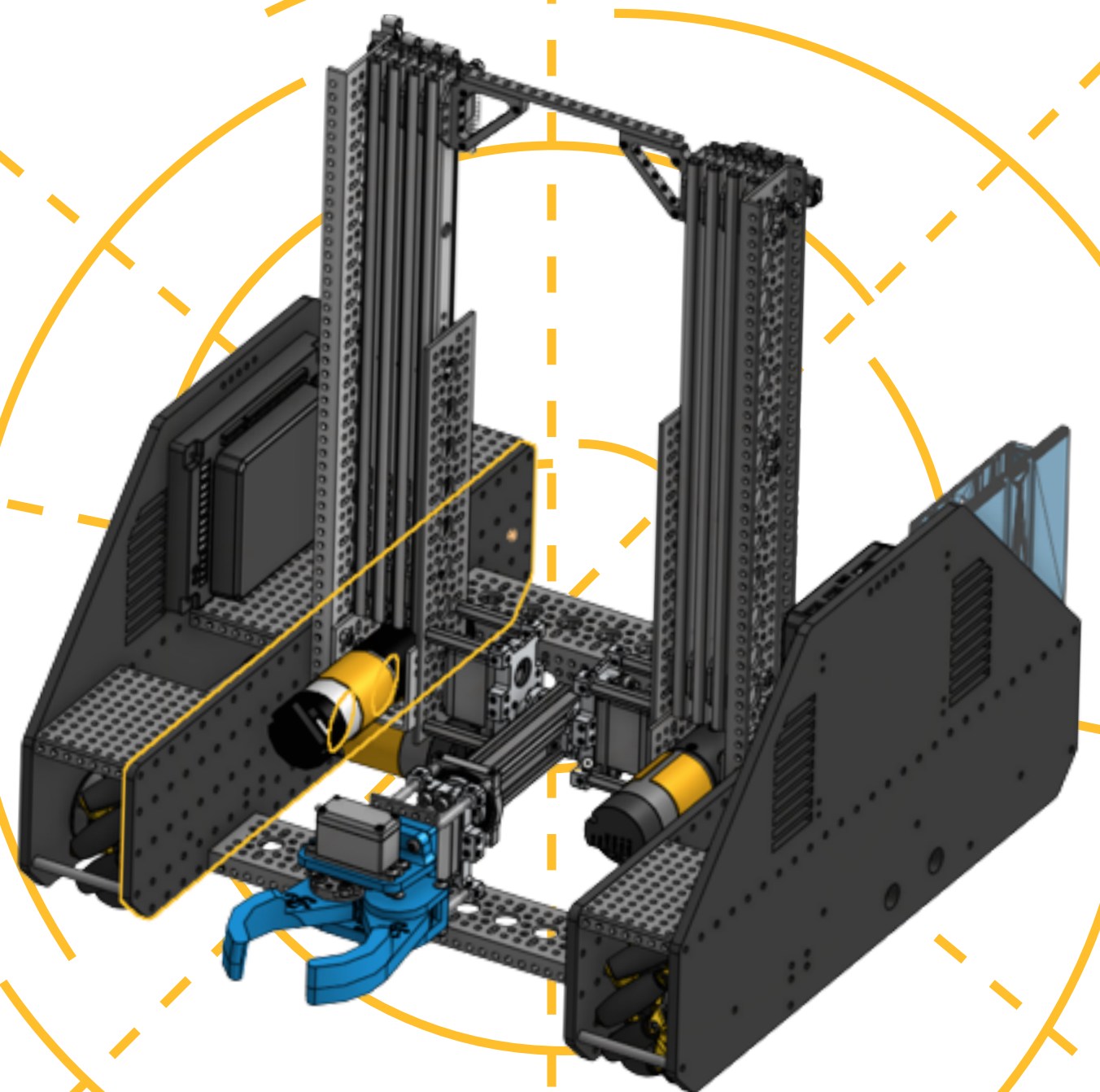
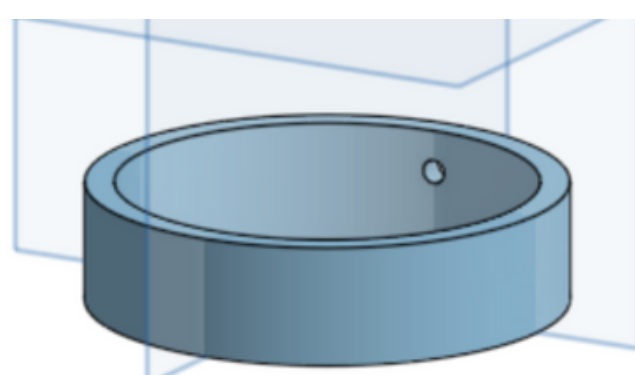
CHASSIS PLATES  
BEFORE LASER-CUTTING OUR CUSTOM SIDE PLATES, WE HAD TO DESIGN THEM IN CAD. DURING THIS PROCESS, WE LEARNED MANY NEW THINGS, INCLUDING HOW TO INTEGRATE CUSTOM PARTS AND COTS PARTS IN CAD.

## BEACON

OUR FIRST BEACON WAS DESIGNED TO SIT ON THE TOP OF THE CONE, ABOVE THE CLAW.



OUR SECOND BEACON SITS BETWEEN THE BOTTOM OF THE CONE AND THE CLAW SO THAT WHEN OUR ARM ROTATES, THE BEACON DOESN'T FALL OFF THE CONE.



FULL ROBOT

ALONG WITH THE MANY CUSTOM PARTS ON OUR ROBOT, WE ALSO HAVE OPEN-SOURCE PARTS MADE BY OTHER TEAMS. THESE PARTS BEING, THE ODOMETRY WHEEL HOUSINGS--MADE BY PRIMITIVE DATA TEAM 18209, AND OUR CURRENT CLAW--DESIGNED BY LOONY SQUAD, A TEAM OF 5 THAT ONLY WORKS ON CAD.

# OUTREACH



## OPEN HOUSE - 10/22/22

**DURING OUR SCHOOL'S OPEN HOUSE, SOME OF OUR TEAM MEMBERS TOOK TIME OUT OF THEIR WEEKENDS TO COME PROMOTE FIRST AND THE ELECTRIC QUAHOGS. WE TALKED TO OVER THIRTY POTENTIAL WHEELER STUDENTS AND THEIR FAMILIES: SPREADING THE WORD ABOUT FIRST, OUR ROBOT, AND AWARDS. HOPEFULLY CONVINCING THEM TO JOIN THEIR SCHOOL'S ROBOTICS TEAM, WHEREVER THEY ENDED UP ENROLLING!**

**WE HAVE OBTAINED OVER 246 NEW FOLLOWERS SINCE SEPTEMBER OF 2022, ADDING TO OUR TOTAL OF 506 FOLLOWERS! WE POST WEEKLY CONTENT, AND USE THE SOCIAL MEDIA PLATFORM TO KEEP IN TOUCH WITH OTHER FTC TEAMS. ON OUR INSTAGRAM PAGE, WE AIM TO SHARE THE MUTI-LAYERED PARTICIPATION REQUIRED BY FIRST BY POSTING BOTH OUR OUTREACH WORK AND LANDMARK COMPETITION MOMENTS. ONE OF OUR VIDEOS HAS OVER 1,700 VIEWS, WHICH WE ARE VERY PROUD OF! OUR LEAD PROGRAMMER CREATED OUR ELECTRIC QUAHOGS WEBSITE, WHERE WE TRY TO POST BLOGS IN ORDER TO KEEP PEOPLE UPDATED ON OUR WORK.**

## ASSISTING BLACKSTONE ACADEMY BULLDOGS- 10/25/22

**WE HOSTED THE BLACKSTONE ACADEMY BULLDOGS AND SHOWED THEM THE ROPES OF BEING A PART OF THE FTC COMMUNITY! WE ASSISTED THEM IN CREATING THEIR INSTAGRAM ACCOUNT-- WHICH HAS OVER 70 FOLLOWERS--, PROVIDED TIPS ON TEAM ORGANIZATION AND GAVE THEM AN INTRODUCTION TO CODING WITH ONBOT JAVA. THEY WERE A VERY NICE AND CHEERFUL TEAM, AND WE CANNOT WAIT TO SEE THEM AGAIN!**

## HOTING QUALIFIER - 1/7/23

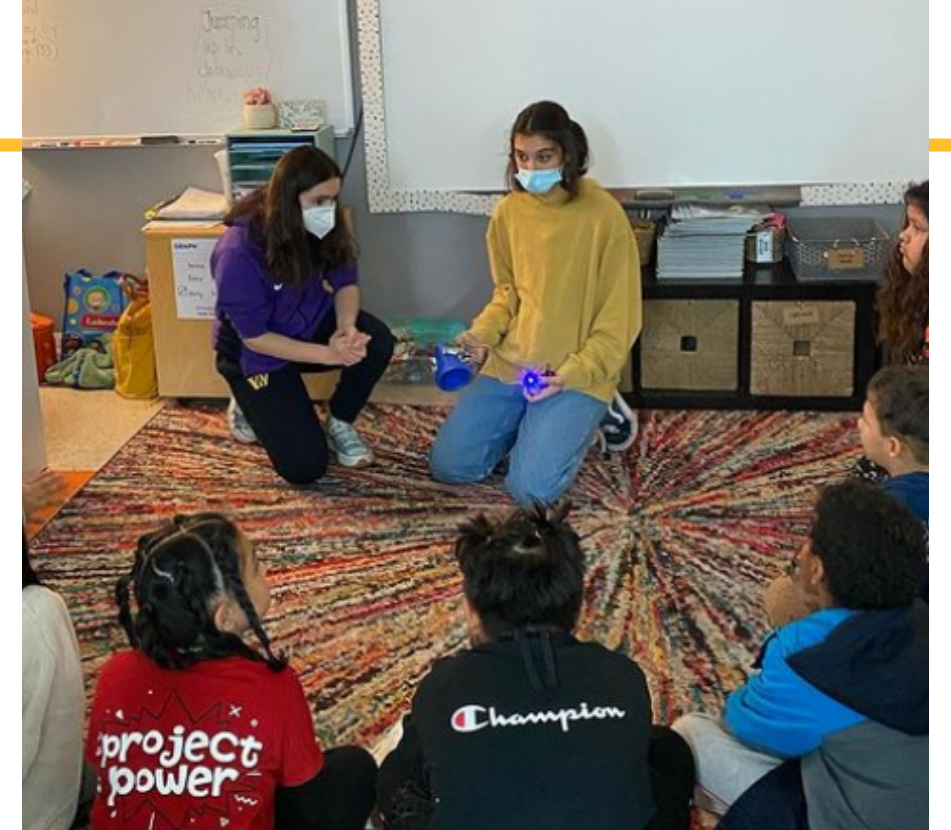
**WE HAD THE AMAZING OPPORTUNITY OF HOSTING THE FIRST RI 2023 QUALIFIER AT OUR SCHOOL! WE HOSTED AROUND 12 FTC TEAMS, GIVING US THE CHANCE TO MEET AND TALK WITH THEM ABOUT STRATEGIES. WE WERE ALSO ABLE TO RECONNECT WITH OTHER TEAMS THAT WE HAVE MET IN THE PAST. IT WAS A WONDERFUL WAY TO SHOW OUR NEW MEMBERS WHAT QUALIFIERS ENTAILED. WE HAD AN AMAZING TIME HOSTING AND WOULD LOVE TO DO IT AGAIN NEXT YEAR!**



# OUTREACH

## LEARNING COMMUNITY - 12/4/22

MEMBERS OF TEAM 252, ASSISTED BY MEMBERS FROM TEAM 636 OCCAM'S RAZOR CLAMS, WENT TO THE LEARNING COMMUNITY CHARTER SCHOOL, WHERE 97% OF THEIR STUDENTS IDENTIFY AS PEOPLE OF COLOR, TO RUN A WORKSHOP WITH A CLASS OF THIRD-GRADERS! OUR TEAMMATES TALKED TO FOURTEEN STUDENTS ABOUT ROBOTICS AND STEM, AND LED A WORKSHOP. THE WORKSHOP HAD STUDENTS HAD MAKE BRIDGES WITH POPSICLE STICKS. THIS ACTIVITY WAS A LESSON IN HOW IMPORTANT THE DESIGN PROCESS IS, AS THEY HAD TO CREATE A DESIGN BEFORE BUILDING. IT WAS A LOT OF FUN AND WE ARE ALREADY PLANNING TO GO BACK AND DO ANOTHER WORKSHOP!



Providence  
Public  
Library

## THE PROVIDENCE PUBLIC LIBRARY - 3/8

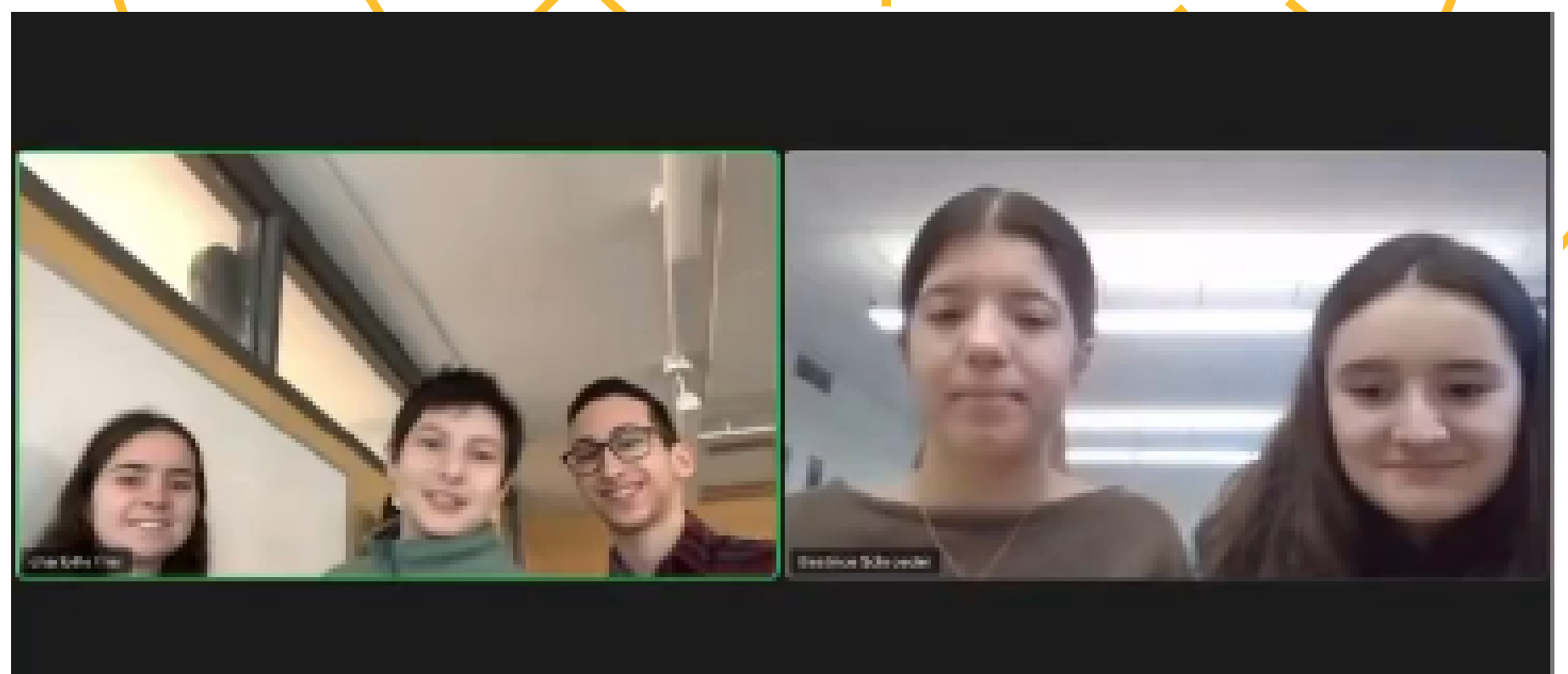
ON MARCH 8TH, WE WILL HOST A WORKSHOP AT THE PROVIDENCE PUBLIC LIBRARY! WE WILL BE VISITING THE STEAM CLUB FOR KIDS AGES 6-10 AND WE WILL BE TALKING TO THEM A LITTLE BIT ABOUT FIRST AND HELPING THEM CREATE FUN CRAFTS.

## UNDERWATER ROBOTICS PRESENTATION - 11/21/22

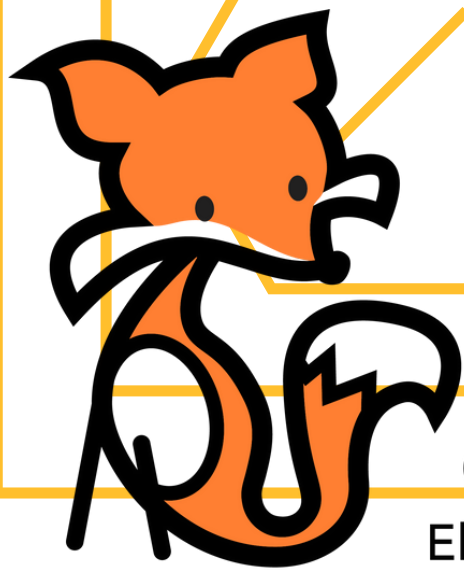
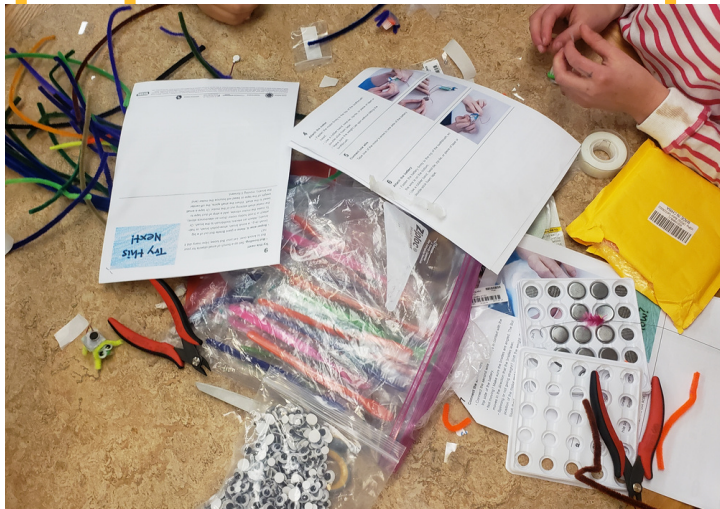
WE HOSTED A LECTURE BY PROFESSOR BRENNAN PHILLIPS, AN UNDERWATER ROBOTICS PROFESSOR AT THE UNIVERSITY OF RHODE ISLAND. THROUGH HIS TALK, THE AUDIENCE WAS ABLE TO LEARN ABOUT: PROFESSOR BRENNAN'S LINE OF WORK, HOW IMPORTANT ENGINEERING AND ROBOTICS ARE TO OCEAN EXPLORATION, AND ALL OF THE OPPORTUNITIES URI PROVIDES TO HIGHSCHOOLERS AND COLLEGE STUDENTS ALIKE. AROUND THIRTY MEMBERS OF OUR COMMUNITY CAME (INCLUDING OUR TEAM'S MEMBERS). IT WAS A VERY EDUCATIONAL AND INTERESTING LECTURE!

## CALLING TEAM 20789, RIVERDALE NY - 1/10/23

WE HAD THE OPPORTUNITY TO MEET TEAM 20789 FROM RIVERDALE, NY! WE SPOKE TO EACH OTHER ABOUT STRATEGY AND OUTREACH APPROACH. IT WAS INTERESTING AND EXCITING TALKING WITH THEM. WE BOTH LEARNED A LOT FROM EACH OTHER!



# OUTREACH



Vartan  
Gregorian  
Elementary School

## VARTAN GREGORIAN STEM WORKSHOP- 2/15/23

FOUR OF OUR MEMBERS WENT TO THE VARTAN GREGORIAN PUBLIC ELEMENTARY SCHOOL WHERE WE HELD A FUN STEM WORKSHOP FOR 2ND AND 3RD GRADERS! DURING THE WORKSHOP, APART FROM BUILDING DANCING ROBOTS, WE TAUGHT THE SEVENTEEN STUDENTS THE IMPORTANCE OF BEING PATIENT AND TO BE OK WITH MAKING MISTAKES. WE ARE PLANNING ON HOSTING ANOTHER WORKSHOP AT THIS SCHOOL!



## ROCHAMBEAU LIBRARY WORKSHOPS

WE ASSISTED OUR SISTER TEAM, TEAM 636 OCCAM'S RAZOR CLAMS, WITH ACTIVITIES THEY ARRANGED AT THE ROCHAMBEAU LIBRARY, A PUBLIC LIBRARY IN OUR COMMUNITY. ON DECEMBER 12, WE READ STEM THEMED PICTURE BOOKS ALOUD TO YOUNG CHILDREN. WE RETURNED ON JANUARY 11, WHERE WE HELD A WORKSHOP TEACHING CHILDREN FROM 4-11 YEARS OLD HOW TO BUILD THEIR VERY FIRST ROBOT! THE ROBOTS IN QUESTION WERE SIMPLE WIGGLE BOTS MADE WITH A TOOTHBRUSH HEAD, MINI VIBRATING MOTOR, BATTERY, AND TAPE. AT THESE EVENTS WE WERE ABLE TO TALK ABOUT OUR TIME WITHIN FIRST AND ENCOURAGE THE YOUNG STUDENTS TO LOOK FURTHER INTO STEM!

## PROVIDENCE BIKE COLLECTIVE- 12/4/22

WE REACHED OUT TO THE PROVIDENCE BIKE COLLECTIVE SEEKING TO FORM A RELATIONSHIP, HELP AT THE SHOP, AND LEARN FROM EACH OTHER. WE HELPED MOVE THEM MOVE TO THEIR NEW LOCATION AND PAINT IT, WE ARE CURRENTLY IN THE PROCESS OF PLANNING TO HELP THEM DESIGN THEIR NEW SPACE, AND HOST/ATTEND WORKSHOPS.

## Wheeler Robotics - Behind the Bots



## BEHIND THE BOTS - 2/27/23

WE COLLABORATED WITH 636 OCAM'S RAZOR CLAMS TO CREATE AN EVENT FOR THE ROCHAMBEAU PUBLIC LIBRARY. THIS SPECIFICALLY WAS TARGETED TO KIDS AGES 12+ AND FOCUSED ON THE MECHANICS OF FIRST AND HOW BOTH OUR TEAMS FUNCTION. WE ALSO DID A STEM THEMED CRAFT AND EXPLAINED TO BOTH KIDS AND THEIR FAMILIES HOW FTC HAS CHANGED OUR LIVES FOR THE BETTER.

## PVD BIKE COLLECTIVE



