

Notebook Overview

TEAM

Bios - We have a photo summary of our team's brief history, bios of all our team members, mentors, and coaches, and a page about our sister team, Overload (9161).

ENGINEERING

Design Notebook/Officer Logs - Instead of putting our entire robot design process in with our meeting logs we decided to keep it mostly separate, hence this Moleskine notebook. We have tabbed the pages most relevant to our current robot design stage.

Crab - This is our section all about our robot. We have an overview of all of his features, including scans of some of the designs drawn in our Design Notebook.

Programming - In here we have snippets of our code and explanations of our autonomous and tele-op, as well as documentation of specific issues or goals and our solutions.

OUTREACH

Community Outreach - This section documents our journey from the unknown to where we stand today as a result of what we've done to connect with our community and spread *FIRST* and STEM.

Fundraising - Along with our outreach we try to make connections with other people in the STEM field. From little pen sales to large sponsorships with well-renowned companies, we are deeply involved with our community's donors.

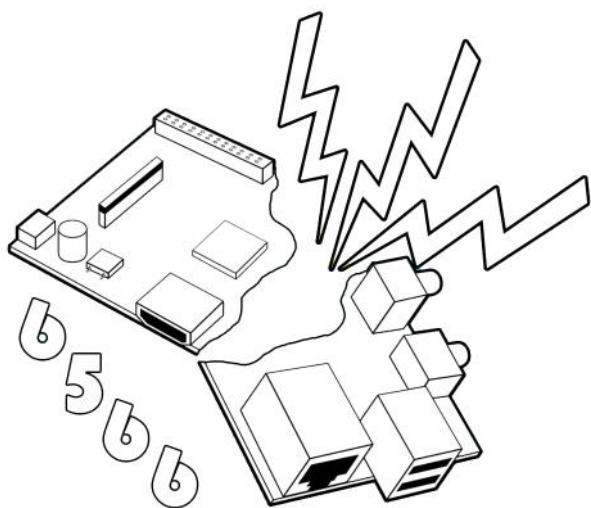
Marketing/Sustainability - In fall of 2015 we started our website aledoroboticsclub.com. From there our social media presence has sky-rocketed. We plan to continue this trend.

Business Plan - We keep track of our budget, purchases, and donations via an Excel spreadsheet, which is included in this section. There is also a summary of our general plans regarding income and expenses.

MEETING LOGS

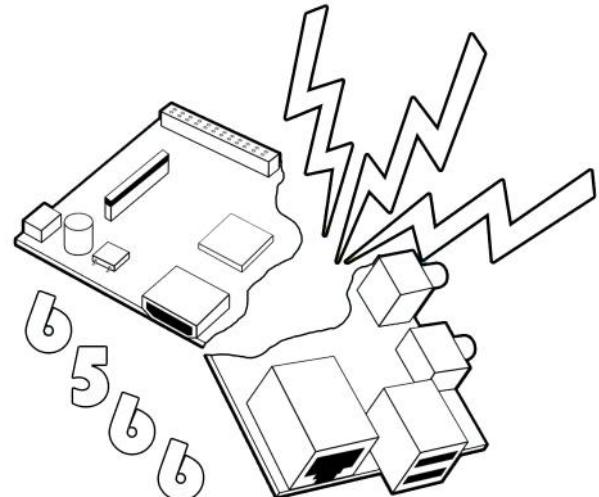
Meeting Logs - This is our social and overview timeframe. We talk about things we do as a club and accomplishments we make as a team. Some of the early meetings have design schematics in sleeves (this was before we had the idea for the separate Design Notebook).

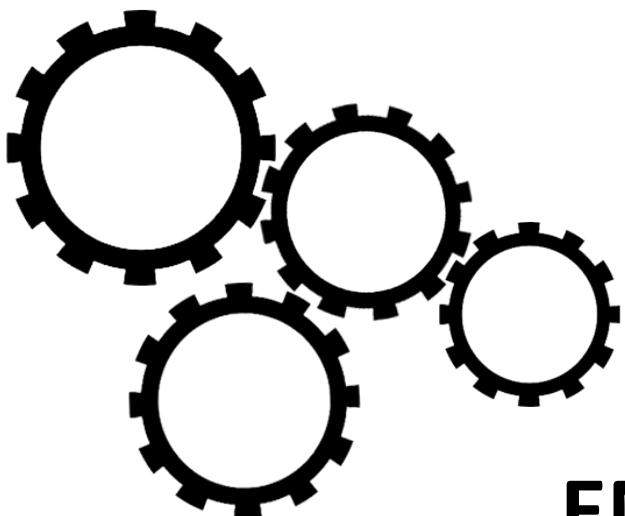
Meets - We have blank copies of the game spreadsheets and scouting logs that we use at competitions, as well as some filled out ones from past meets to show what they look like completed.



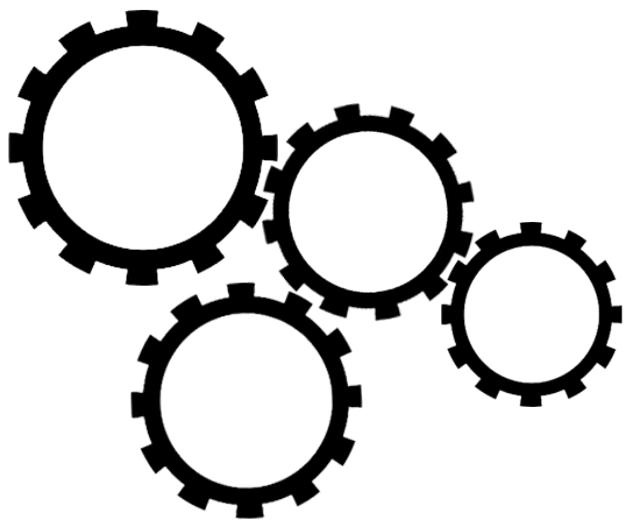
TEAM

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ENGINEERING



ENGINEERING



OUTREACH





MEETING LOGS

MEETING LOGS



Executive Summary

Our Mission Statement

Our mission is not only to publicize robotic engineering as a viable career option, but also to inspire students to become the leaders and innovators they have the potential to be. We welcome creativity and new ideas, and always strive to give everyone a chance to contribute. Because of this, another important goal of ours is to promote *FIRST* in our community, and in doing so make Aledo an active network of open communication about STEAM, *FIRST*, and the future of robotics.

Our History

Aledo Robotics Club first started in the fall of 2012 based at Aledo High School. The first competition we debuted with our team 6566, known as "Victory Robotics." Later along our journey the club picked up more members and thus we had to split via mitosis and our sister team, 9161 "Overload", was born. It's hard to believe we are five years old and all our first members have since graduated. We hope to keep our team's legacy living on.

Our Teams' Dynamic

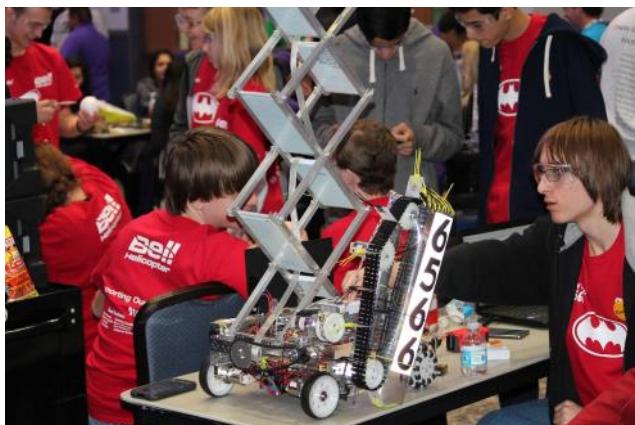
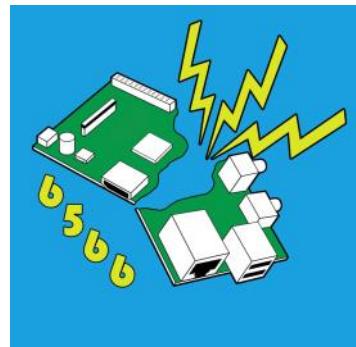
Although we (Aledo Robotics Club) are two teams, we work as one unit, except in competitions (where our sibling rivalry is unmatched), sharing a room, tools, and funds. We help each other out, and mock each others' failures, as all functioning pairs of sister teams must.

Our Hopes and Dreams

As a small robotics community within a large football community, it's exceedingly difficult for us to gain recognition in our city, and yet we try and try until Aledo can't help but acknowledge us. We have gone in front of the school board, the education foundation, and small and large businesses throughout the Aledo area to request funding and a spotlight to spread STEAM and *FIRST*. We hope that our efforts will continue paying off so that our club may continue to operate for years to come, and we dream that it will grow so much that competing in FRC will become a real possibility rather than the fevered dream of a graduating madman. We also hope that our influence will cause more small teams to sprout up in the Fort Worth area and our own numbers to continue rising.

Introducing FTC Team #6566 - Circuit Breakers

It's been a long five years. This is our first year with none of the original team (all graduated). We've been through many changes in team name, color scheme, and goals, but at heart we've always been the same... sort of; we have always been #6566, and that will never change. We have finally gotten to the point where we have a formidable reputation and a system throughout the season for our progress, and we couldn't be prouder of how far we have come since our sad 2014 performance in Block Party... (We've also finally broken the tradition of changing our shirt color every year)



2016-2017 Season - Velocity Vortex



Kevin a.k.a. The King

Grade: 12

Years in club: 4

"Sounds like a *FIRST* world problem!" --Kevin

Now when we handed out the bio sheet to fill in Kevin basically wrote his whole life story, so if that doesn't describe Kevin perfectly than I don't know what does... (He's an AP Literature nerd so not sure what I expected, but I'm lowkey sad I don't get to put in that many entertaining comments.)

"I saw the robotics booth at an information expo whilst in 8th grade and found it to be very exciting, and I decided to join when I got to high school so that I could pursue my interests in engineering and computer science (though I wasn't fully aware of what either word really meant). I even knew at that age that I had the slightest inkling toward a computer-based career, and through robotics club that has blossomed into my undertaking a computer engineering major when I embark to college at the University of Oklahoma this fall."

So, Kevin's favorite animal is The Demented Crab. I wonder what that is... (see Crab section)

"We gotta zip-tie it up" --Kevin

"I aspire to become a computer engineer and work with emerging advanced technology and artificial intelligence in order to improve humanity and further the search for knowledge."



"I am very interested in politics and art, especially graphic design. I have deeply interred my passion for graphic design in my work for robotics club, being the primary designer and marketing/PR rep over the years. I designed our teams' logos, banners, business cards, website, and t-shirts, and have managed our social media accounts as part of my community outreach initiative which began in 2015. I also compete in UIL academics in several STEM events as well as in literary criticism, proving that even a math kid can have a passion for literature."

Okay but seriously, all those beautiful designs and banners and such you see our teams showing off is all thanks to Kevin. We will all be sitting around working on stuff and Kevin will just randomly turn his computer screen around and show us new gorgeous designs. No kidding, we all die at the spot.

"Blue? My favorite color is cyan..." --Kevin

"I am the President of Aledo Robotics Club, and serve as the figurehead and community face for the organization. I talk to potential sponsors and mentors, run our marketing operations, and oversee all purchases and club activities. I am the primary designer for our team's robot, working closely with our head engineer John to create the components that make up our bot. In meetings, I delegate, make announcements, work closely with other members to achieve tasks for the day, and attempt to make our team as successful as it can be. I love the competitive atmosphere of tournaments, which couples nicely with the camaraderie among nerds which takes place at any *FIRST* event. I love the technical nature of our work, and the exciting real-world applications of the things we do, as well as the opportunity FTC provides to have a fun four years along the way."



John a.k.a. The Tool

Grade: 12

Years in club: 4

**"John is a tool. I mean he's our tool guy.
John = the ultimate tool."** --Kevin

"I am the co-captain and head engineer for 6566. I am also a backup programmer, Android Studio Troubleshooter, and am responsible for being up-to-date about the rules, including content on the FTC Forums. This year I set up a team account for posting in the public forums, and made use of this account to post our first question, which was about allowed electronics. Because I've had access to the forum, I've been able to help several teams that have had errors I have previously seen on our robot."



**Kevin: "John do you like
the walkie-talkie?"
John: "I really do"**



John has been here since freshmen year and he recalls joining on a whim because "It looked interesting..." John's official title as an officer is Head Engineer, but he also codes sometimes (Oh Android Studio...). He is the co-captain of the team along with Kevin and he is one of the drivers. In particular he is usually in charge of controlling the main drive train.

Other than Robotics, John participates in many others clubs. First of all, he is a high class band nerd being a part of Tri M National Honor Society. Second of all, he's got the good grades and is a part of National Honor Society and all the AP classes. And lastly, John is an Eagle Scout. Not going to lie, it surprised me when I found out... that explains why he is so good at tying knots...

**"The average human being consists
of 70% water, but John is 25% sweet
tea and 50% Dr. Pepper..." --Hebah**

John will be attending Oklahoma State University and majoring in electrical engineering. Side note: he's pretty grumpy about Kevin's college choice -- I guess OU and OSU are rival schools or something...?

John angrily crossed out the "What is your favorite word?" Question, then proceeded to proclaim how illogical of a question this was. Is this truly how John feels about his favorite word or does he have some suppressed feelings about his favorite word? Whatever the case, the world will never know if he even has a favorite word...



So John's (and Kevin's) favorite day of the week is Wednesday. Don't know if its cause its meeting day or you know just cause...

The Page About Paige

Grade: 12
Years in club: 2.5

"Wait, I gotta use the little boy dikes. These are the big boy dikes and these are the little boy dikes." --Paige

Paige is our Head Programmer and also our Treasurer. All that autonomous you see, it's partly because of all the hard work Paige puts in. She and Kevin manage the finances.

"Ah, it works! Okay we are done; for one day I want to leave this place on a good note." --Paige

Paige aspires to become a computer scientist/ software engineer. Later in life, she hopes to own her own company. Fun fact: Paige being the brilliant soul she is has attracted the attention of this college who keeps calling her and worrying about her admission papers. She is very flattered and has since committed to going there.



Why did Paige join, you ask? She says it was because Carter, our former president, and Mrs. Reynolds kept nagging her. It's why her "Years in club" is 2.5; she joined in the middle of Cascade Effect.

Paige says her favorite day of the week is Wednesday. Again, I don't know for sure, but I'm pretty sure it's because we have meetings on Wednesday.

"I GOT THE COLOR SENSOR WORKING!!" --Paige

So Paige is one of those people who does everything that is even remotely related to math. For example: UIL (mathematics, computer science, calculator applications, science) and Math Club. Don't forget the fact she is in Calculus BC and has taken 5 AP science courses. She also does a few other things such as: National Honor Society and Young Democrats.



Paige likes the word "brontide," but currently my computer is saying that isn't even a word...

Hebah a.k.a. The Heebs

Grade: 10

Years in club: 2

Hebah: "RIP Toshiba..."

Kevin: "More like Tosh-Hebah"

"I was the first person from our middle school's FLL team to graduate up to FTC. It all started 8th grade when after art club after school I would see the robotics club over there also finishing meetings. It peaked my interest and I asked about it. Not too long later I was fully immersed into the club. It wasn't even a question if I would join in high school. In fact I even used to come to the high school club meetings after school near the end of my 8th grade year."



**"hey,... does
this?... hey"
--Hebah**



"It's now my sophomore year and I can proudly say I have loved every second of it (not counting a few of those times...). I am now the secretary of the club, honestly, probably because I felt no one else could hold the position as well as I could. I am also the head of the engineering notebook; if you recognize some of the writing style then it might have been me who wrote it. I am also learning how to run the marketing committee and I head our lovely Instagram (@aledoroboticsclub check us out). I don't know why I like robotics, but I'm a little bit addicted..."

**"I'm gonna eat a FRUIT CUP, somebody
hold this" --Hebah**

Other than robotics Hebah participates in too many other things. Listing them off: UIL (mathematics, calculator applications, number sense, and computer science), National Art Honor Society, and Young Democrats. But the one she loves the most is robotics. <3

**"You know those people who sit in a lab and play
all their life? That's going to be me." --Hebah**

Fun fact: Hebah is a little person. She is only 5 foot 2 inches. She claims that's only 2 inches below average so she is not that short, but still our robotics team weirdly has a ton of giants. Anyway, this means her hands are the smallest out of every one on our team. She is the resident person-you-go-to if there is something hard to screw/ tighten/ fix on the robot.

"Hebah's like a T-rex except all of her is little" --Tate



Ethan a.k.a. Safety Captain

Grade: 12

Years in Club: 2

"I'm the safety captain: captain of safety and safety management." --Ethan

Unlike a lot of our other normal members, Ethan joined straight up because he was interested in computer science. He says that he's also got a slight intrigue in robotics too though.

"Safety rules don't apply to the safety captain; Safety Captain is invincible." --Ethan

Ethan is into all the sports. Just kidding only Tennis and running, but still that's more than anything Kevin could do!

***shrug* "Programming is the most entertaining." --Ethan**

Later in life Ethan wants to become a programmer for a start-up company.



Upon seeing this page, Ethan scoffed and claimed he totally forgot about when we did the bio photos, and was therefore very amused at his expression in above said photo. (Apparently it's because the shirt was a large and he usually wears a medium...)

Now, I can get behind Ethan's favorite word. "Dubiously." How haughty of him though. This word is Hebah-approved.



Kevin: "We have E-6000 somewhere in this room..."

Ethan: "That's like finding a needle in a haystack!"

Kevin: *points* "It's right there."

Ethan: "The haystack is quite small."

Ethan likes Sun Chips and monkeys, however, I don't think he'd like them together...

Kyle And Michael a.k.a. Kychael

Grade: 10

Years in club: 1

"Kychael is the ultimate engineering machine." --Michael

Kychael? What is a Kychael? Well a Kychael is a strong bond between a Kyle and a Michael. It happens when, well it's hard to explain so I'll spare you the details. Just know they are Kychael.

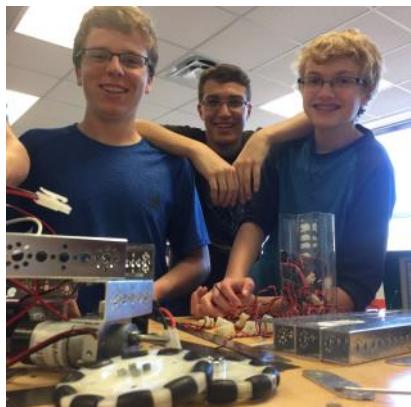
Now there are also differences in Kychael. Michael likes to play games, while Kyle would prefer Netflix. However, both Kychael love to ride bikes.

"Come on Kyle, we have to finish scouting." *struts off* --Michael

Both parts of Kychael love Saturdays; I'm assuming cause it's when we go to our competitions.



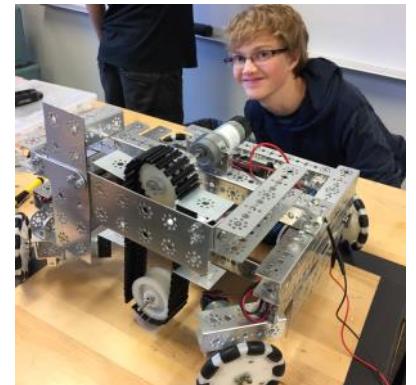
So Kychael provides to the team very similarly. They each have differences though. Michael might have a little more of a kick helping out Kevin and John with the building process, while Kyle might prefer to ponder about different designs and possibilities for our robot. We love Kychael. They always make our day.



To Kychael, robotics seemed like a cool thing to join, so one day they walked in and bam, signed up.

"I love being part of the design team. It's always fun to see designs put to the test as well as seeing other people's designs." --Kyle

"I am part of the engineer team. I love it because I get to see the 'birthing' process of our robots." --Michael



Kyle's favorite word is Odontophobia, while Michael's favorite word is so basic and so cringeworthy I refuse to write it in here...



(Kyle didn't think the safety scissors were safe enough so he added a sheath... "We don't want to displease the safety captain.")

"HI I'M KYLE" --Everyone

Tate a.k.a The Mascot

Grade: 10

Years in club: 2

Tate: *holds up two crossed files* "Have you guys seen the X-FILES!"

Kevin: *holds up rivet gun* "Yeah, it's RIVETING!"

no one else is amused

Tate is our designated mascot. He says he loves it because he "can hide," but we all know he loves cheering up the crowd. It all started last year when our president spontaneously bought a robot costume and Tate wore it for one of the practice meets. The next meet he showed up with a brand new costume he made himself. He said he "didn't like the old one and could totally make a better one."

"Tate, you need to stop." --Michael



Tate joined the club the summer before his freshman year. His interest was sparked by all the mechanical ware and he has been here since!

Kevin: "Dude this is a nut-free classroom, you can't eat nuts in here!"

Tate: "Its fine, I'll just eat around the nuts."

Tate's crafting skills as previously mentioned can probably be contributed to his mom who is one of the AHS art teachers. She has helped us a great deal to get connections and sponsors. She is also one of the heads of the STEAM lab they have at our ninth grade center. We all sometimes help her out to, you know, get people excited. (because nothing is more exciting to freshman and football players than robotics...)



Being the mascot isn't Tate's only job! He also helps out with our design teams and with constructing whenever he can. (for example, Kevin is very bad at removing hubs from axles and lifting the vice, and Tate claims his raw strength is what enables him to prevail...)

Tanner: "Anyone know where the spacers are?"

Tate: "Those are called ASTRONAUTS"



Ben a.k.a. The Freshman

Grade: 9

Years in Club: 1

"I like engineer!" --Ben

Ben was one of our middle school's FLL participants. (he came a year after Hebah.) Now Ben is our resident crazy kid. His dad, our mentor Mr. Oaks, does all these awesome things with him, like building RC cars, planes, and drones. One of Ben's favorite hobbies is "gambling" with people on eBay for cheap hardware. He said that if the club ever needs anything they can count on him!

Ben mainly likes the building side of things. He's always sticking around our builders and giving little suggestions when we are having structural support problems.



(Ben at soccer practice WHEN HE SHOULD BE AT ROBOTICS!)



Ben's answer to literally everything about robotics is something about engineering. When we cornered him about this all we got was a laugh and "I like engineer."

"What's wrong with me? I like to live life with a little bit of spice" --Ben

Ben filled out the favorite day of the week section with a "Friday Duh!" I mean DUH, it's the day before our competitions. How could you not be excited for robotics?

Ben says his favorite word is "Bazinga." I would be horrified if I hadn't read Michael's cringeworthy word first.



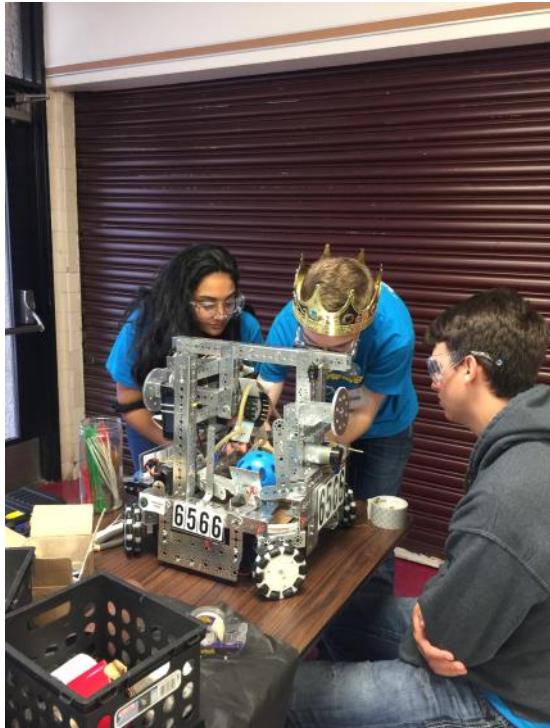
At our first competition this season, we were all frantically running around, checking code and wiring, trying to fix our launcher motor, which hadn't been working the round before, then Ben just looks at it, says something about the motor polarity, then fixes it in a minute! I'm sure we would've figured out something like that eventually, but the 'robotics way' tends to involve lots of panicked rushing. It's good to see that fad has an adversary!

"The trick is, polarity..." --Ben

Crab a.k.a. The Demented Crab

Crab is who really brings this team together, with his enthusiasm, his hijinks, and his A+ attitude!

**"If I had one complaint about Crab,
it would be that he mindlessly
follows orders and can't do
anything on his own" --John**



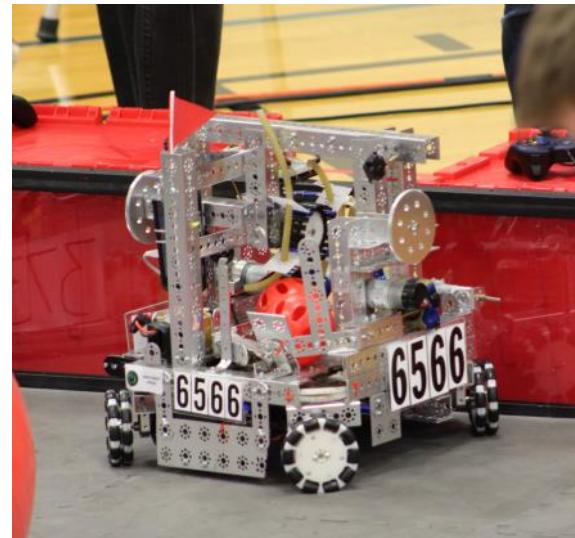
Crab likes when we listen to dramatic movie music at meetings (it reminds him of his time in the film industry) and it really puts us in the mood for robotics! Recently Crab has been getting into Bollywood music. Let's just say things have been getting a little crazy...

**Classmate: "C.R.A.B. is an acronym right?"
Kevin: "Uhh, totally.... It's 'Cool Robots Are Built'"**



"LOOK AT THE LIGHT AND STOP MOVING!" --Kevin

In his spare time, when he's not competing in extracurriculars like robotics club, he likes getting frequent tune-ups and playing Final Fantasy XIV.



We thought of a better acronym later though...

Circuits
Really
Are
Broken

Mrs. Reynolds

Job: AHS Computer Science teacher by day, Robotics club mentor by night (and day, it takes up a lot of time), and UIL coach in between
Years with Club: 5

"*high pitch nervous voice" Nooooo, I don't think that'll work..." --Mrs. Reynolds

Mrs. Reynolds is our faithful computer science teacher. She has loved programming all her life.

"Five years ago I was approached by a student who wanted to start an FTC team. His enthusiasm inspired me to help found the team."



Why Mrs. Reynolds loves Robotics...

"Working with the robotics team is fun and challenging. I enjoy watching the students develop into team leaders. We have a great time when we are together both after school and at meets. I am looking forward to a successful season in both FTC and UIL robotics."

on bus ride to regionals

Mrs. Reynolds: *angrily* "Travis, what's your middle name?!"

Travis: "uh, Andrew..."

Mrs. Reynolds: "No! Today your middle names are Gracious and Professionalism!"

Other than being our coach for robotics, she is also the UIL coach for Number Sense and Computer Science. A lot of us also have her class or are on her UIL teams, so we all see her a lot and love her very much.

"I'm not very creative but hey, I'm good at stealing stuff." --Mrs. Reynolds

Mrs. Reynolds loves chocolate. Now we know what to get for her end of the season gift...

"You guys are here programming on a Saturday morning while most kids are out smoking their vapor pipes or whatever it is they do."
--Mrs. Reynolds

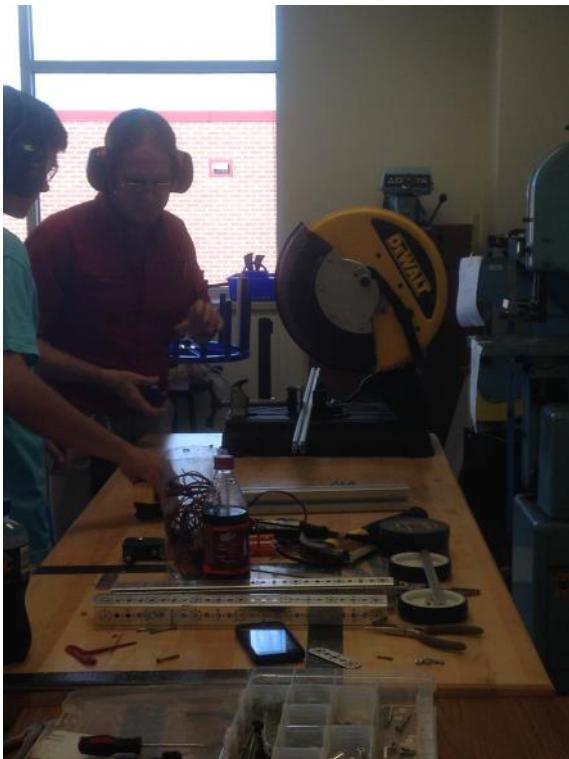
Also she loves cats. And I (Hebah), being an avid cat lover, approve.

Mr. Chapin

Job: Materials Engineer with Lockheed Martin
Years with Club: 5

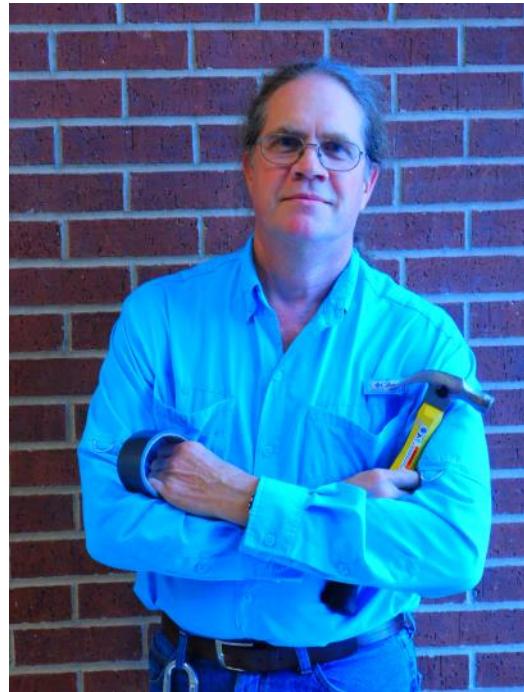
"You guys should *really* probably get a higher gauge wire..." --Mr. Chapin

Chapin is a mentor who loves seeing the growth in the students and the excitement in their eyes when they learn something new. He gets so excited, when he sees how much the teams are able to get done in a short period of time.



We asked Chapin to help us with our heat gun, which we were attempting to use to bend and shape some plexiglass for our robot's ramp, and he simply declared that our heat gun wasn't strong enough, and mysteriously took some scrap plexiglass and left the meeting. Later he sent us pictures of it grotesquely bent and contorted with the caption: "blowtorch works."

"...It's like a bromance..." --Kevin



"I joined to help students learn about engineering and how to work together." --Mr. Chapin

Curtis Chapin, more commonly called Chapin, is a mentor of Boy Scouts. He said he likes to do flying in his spare time; we are not sure what this entails, but oh well. He also likes to do hunting and water sports, which we think he does when he is with the boy scouts.

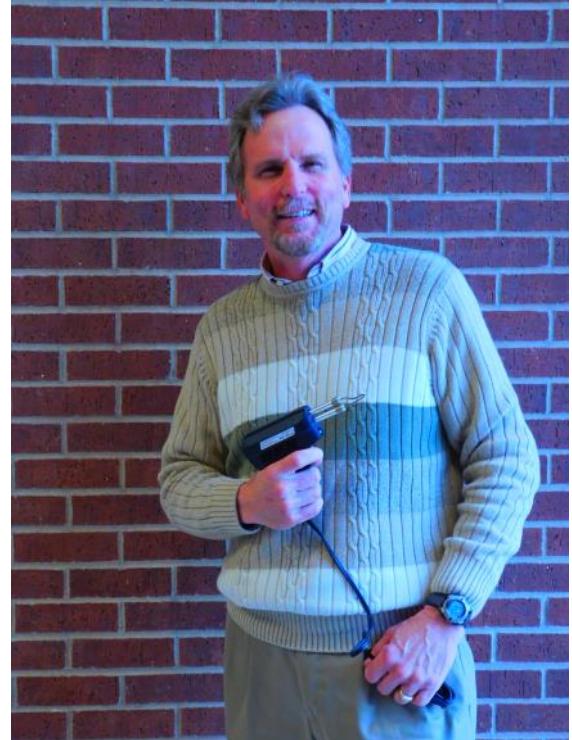


Mr. Oaks

Job: Software Engineer with Lockheed Martin
Years with Club: 1

What does Mr. Oaks do in his spare time, you may ask? He loves remote control planes made out of wood, which he calls his foam. He also likes fixing things, but he didn't specify, so what he likes to fix, we're not sure. Sometimes, he likes to play with microprocessors and programming languages.

"My aspiration is to always learn something new and to explore new areas of knowledge." -Mr. Oaks



Ben and his dad are our relationship goals.

Mr. Oaks, whose first name is Robert, just joined this season, because his son Ben who is a freshman advanced from the middle school FLL team to our high school FTC team. He had been mentoring their team before moving up to helping us.

**Mr. Oaks: "You should probably check your wheels?"
Kevin: "Ah, that's probably not it."**

(Spoiler Alert: that was it.)

Mr. Oaks apparently feels that holding a soldering gun is the most representative photo of him that we could ask for the bios, so we just went with it...

Mr. Robbirds

Job: Robotics/Engineering Teacher with AHS
Years with Club: 2

**"Sorry guys, I don't have my key today,
ask Mrs. Reynolds." --Mr. Robbirds**



Mr. Robbirds is usually the one taking photos (he was a photographer in the military), so we have very few with him in them...

He is the engineering and robotics teacher at our school, and helps us with design components of our robot. We make sure he or one of our other engineers approves our design ideas before we order any expensive parts.

"I need a new drone..." --Mr. Robbirds

Mr. Robbirds is notorious for breaking / losing drones very quickly after either buying or building them. His students are all aware of this and make sure to bring it up as often as possible. We in the robotics club know him as the only other person with a key to the room, but who never seems to have it with him...

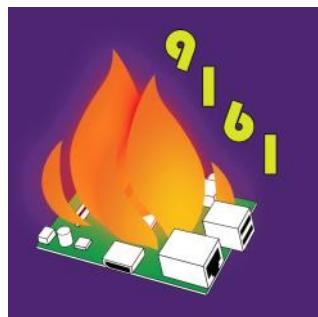
While he was gone on paternity leave we *may* or may not have *borrowed* some parts from his engineering classroom (it's *fine*, his students haven't gotten to the Tetrix unit...).

**Robbirds: "Hey Kevin can you pass me that Splenda?"
Kevin: "...These are lemons...?"**

WE LOVE OUR SISTER TEAM!!!

Well, Austin says we should be brother teams but either way, that doesn't mean there aren't rough patches and bitter competition at times!

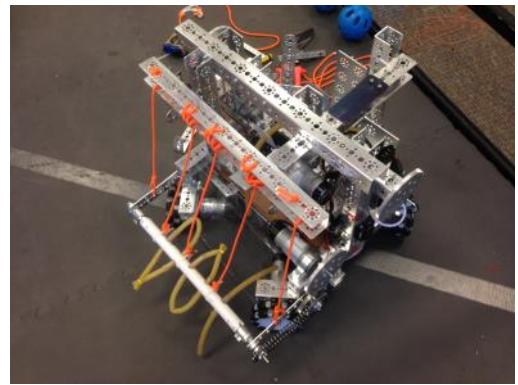
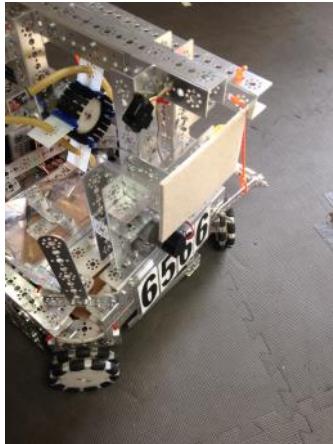
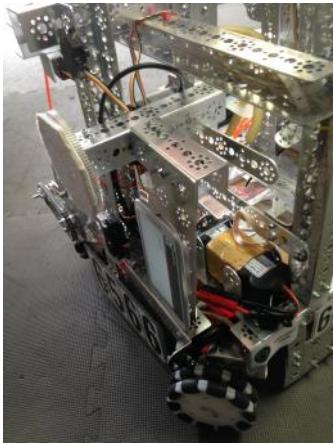
We begrudgingly admit that their robot is actually really cool... but we contend that ours is better!



Overload's
Team
Captain,
Austin

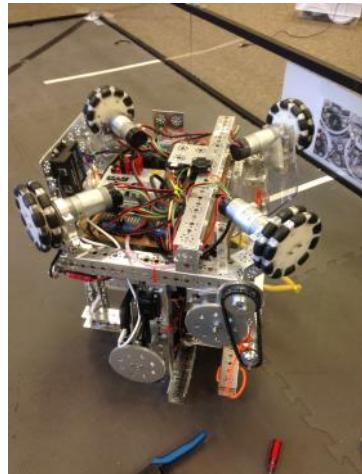
Meet Crab, Our Robot

This is Crab, our robot. "Crab?" you ask. Yes, Crab. His full name is The Demented Crab. We like to call ourselves The Keepers Of The Demented Crab. He got his name because of his drive train. It is omnidirectional. It simply looks unnatural when it moves. It's as if it's possessed or something. We are actually afraid of him. Just a little bit.



Crab has a particle lift on what we consider the front of the robot. There is a horizontal PVC bar that runs across and spins. Through it we have latex surgical tubing loops that reach out and pull in particles as we drive into them. The particles are swept up a plexiglass ramp we molded. This whole pickup system can fold up to fit within the 18" and is released down to its running position when the match starts.

Our beacon pusher is a gear screwed in with flat-head screws which is covered by furniture pad material that we cut from a larger rectangle of it. This gives a pretty large and flat surface area that is perfect for beacon pushing. Also, in order to reduce ramming we set up the gear so that it braced along two structural c-channels of our robot, making it super stable and fully secure, meaning the robot does not move or bend by the force. On the opposite side of Crab we have a full rectangle of this furniture pad for beacon pressing, since this side is only used during tele-op, and doesn't need to leave room for a color sensor or the RC phone's camera.



Along the ramp to the shooter, Crab has a circular tread with surgical tubing weaved through it. This is called our central spinner. This offers an extra boost for the particles going down our ramp into the launching bay.

Our launcher is a spring steel "flicker" that spins against a peg to gain torque and releases against a particle horizontally, propelling it up the ramp. This "flicker" was made by cutting out a piece of blued spring steel from a drywall scraper.



Our Robot Controller phone is mounted using industrial velcro for easy removal/reattachment while coding quick and frequent changes to minimize wasted time (and annoyance). The phone is also upside-down. This is so that during autonomous (and certain methods during tele-op) the phone's camera has good line-of-sight for us to use Vuforia (an image processing software which we coded to work with our drive train) to pathfind to the vision targets under the beacons so that we can press them. We also use an Integrating Gyro sensor for our turns, Color sensors for finding the white line and determining beacon color, and Range sensors for finding our distance from the wall.

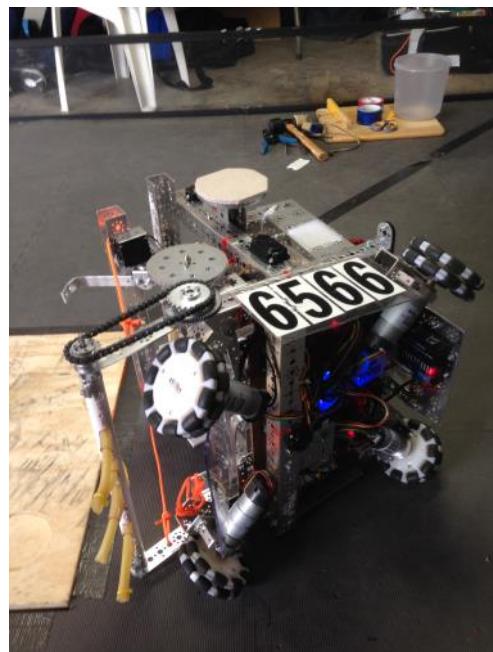
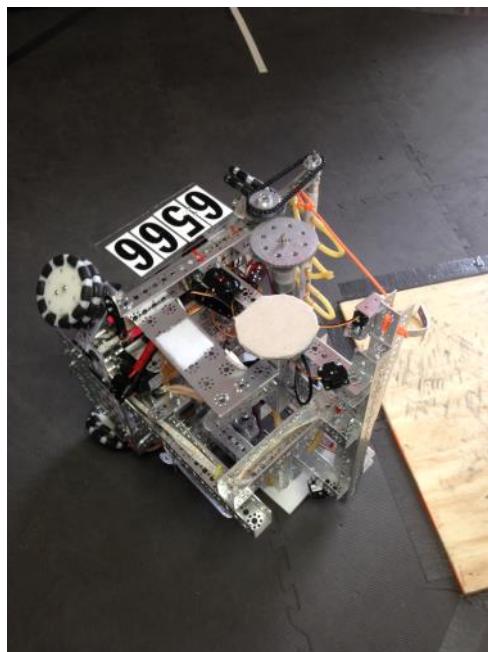
Comments Concerning Crab's Creation

Technicality --John

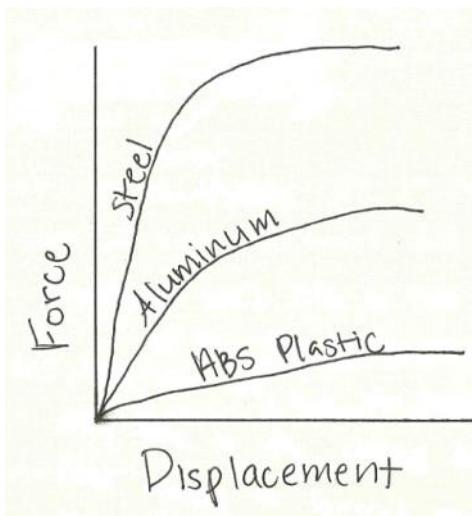
The robot consists of 3 basic mechanical units and one control unit. The mechanical units consist of a drive train, a pickup mechanism, and a launcher. The control unit consists of a CPDM, Legacy Module, Robot Controller, Battery, 5 Hi-Technic Motor Controllers, 1 Hi-Technic Servo Controller, 1 CDIM, 3 Modern Robotics Color Sensors, 2 Range Sensors, and 1 Integrating Gyro Sensor. The Drivetrain is a holomorphic design with omni wheels angled diagonally on all four corners, allowing movement in all directions without turning as well as full turning in place. This aspect makes the Gyro Sensor incredibly useful during autonomous for turning in place. The Pickup Mechanism uses a spinning PVC pipe with surgical tubing weaved through it to raise the particles to the launcher. The pickup mechanism also consists of a motor mounted to the crossbar with the "central spinner" attached, which is a circle of tread with flaps and surgical tubing used to get balls from the pickup area to the launcher bay. The Launcher consists of a piece of high-torque spring steel attached via an L-bracket and a motor hub to a motor which is bent against a pin until it gives and releases, flinging the ball up and into the center vortex. We use the camera of our Robot Controller phone to run image processing and have the robot autonomously position itself directly in front of the closest beacon's vision target, where we then use our other sensors to make a decision on which button to press.

Practicality --Kevin

"Crab," as Hebah insists we call our robot, is designed to be omnidirectional so that we can quickly maneuver around the field and easily get to balls and shoot them, and press beacons in tele-op. This also makes our autonomous simpler as we can move directly to wherever we need to go without having to turn. The details of the chassis design and units which make up the different functional components of our robot (as well as each of the different phases of design this season) are drawn in detail throughout our Design Notebook.



Crab's Components: Launcher



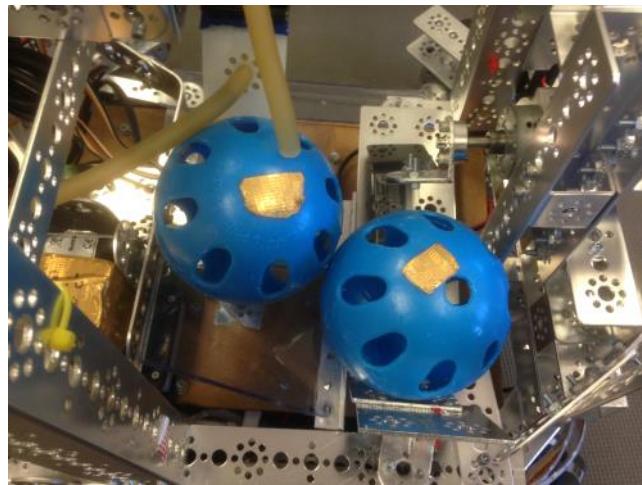
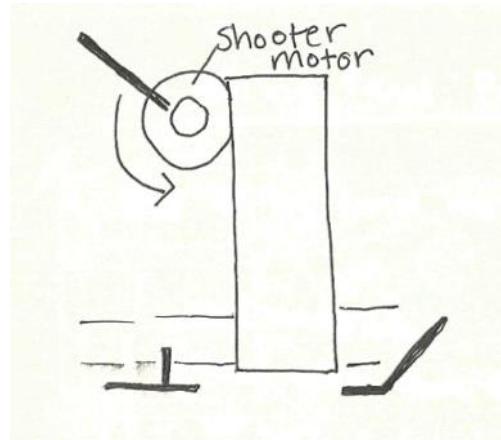
We tried to maximize force vs. displacement in order to maximize torque on the ball when launched.



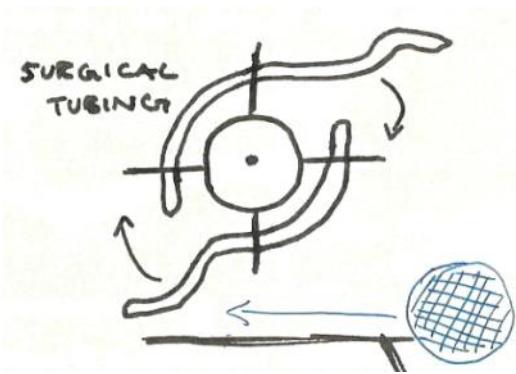
The "flickers" are made from blued spring steel cut from a drywall knife.



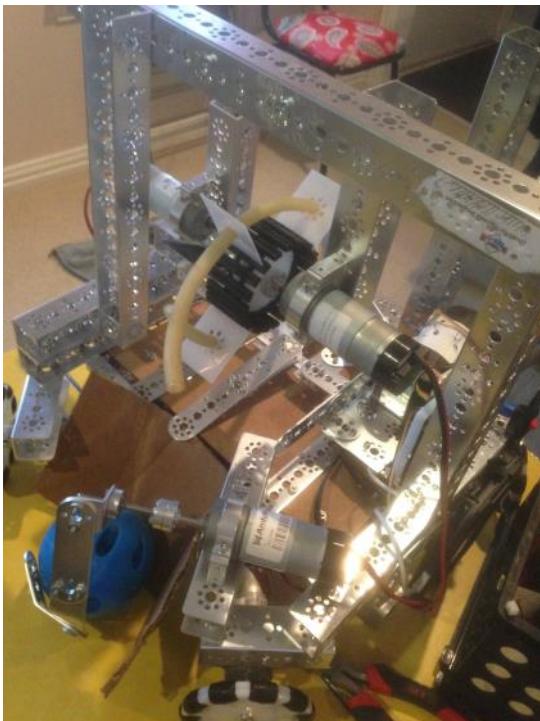
The spring steel "flicker" is bent against a peg by the 60:1 NeveRest motor, and when it releases it launches the particle up the ramp and high enough to make it into the center vortex.



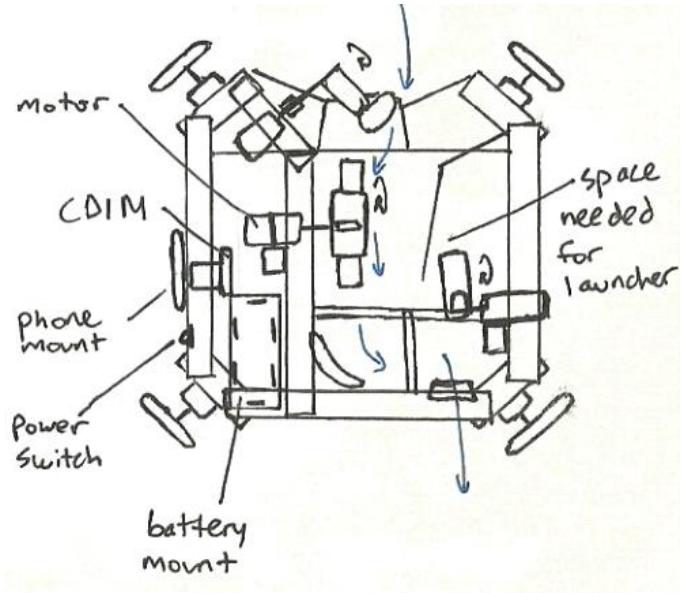
Crab's Components: Central Spinner



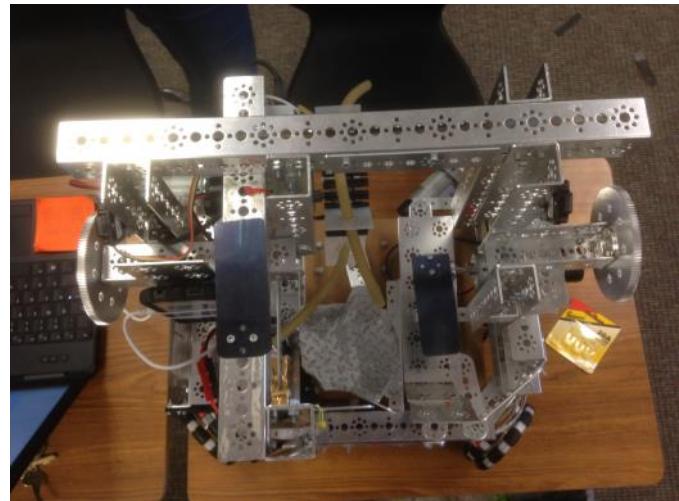
It is a tread gear wheel with 20 tank tread links in a loop on it, with a conveyor tab on every 5th tread link. Latex surgical tubing is weaved through the tabs in order to gain the necessary friction on the particles.



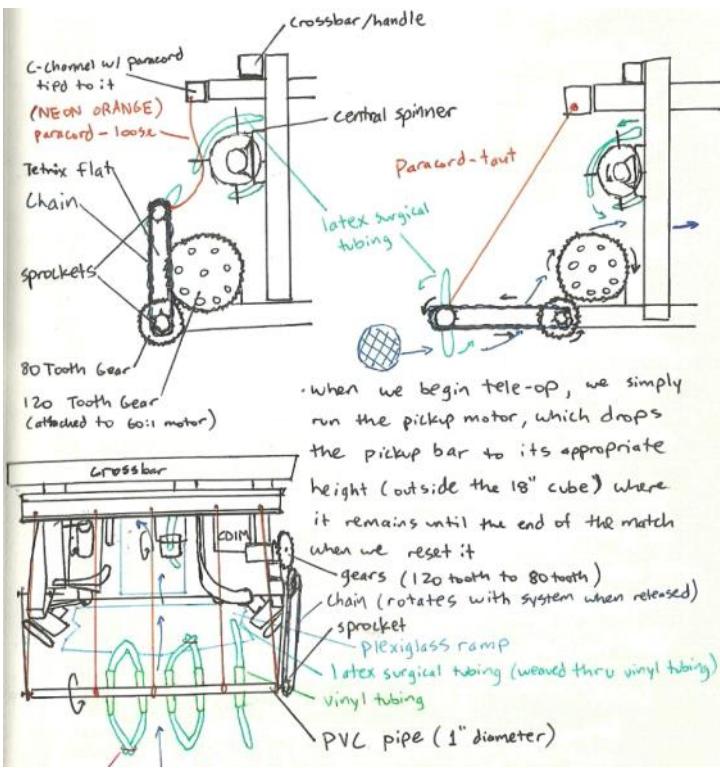
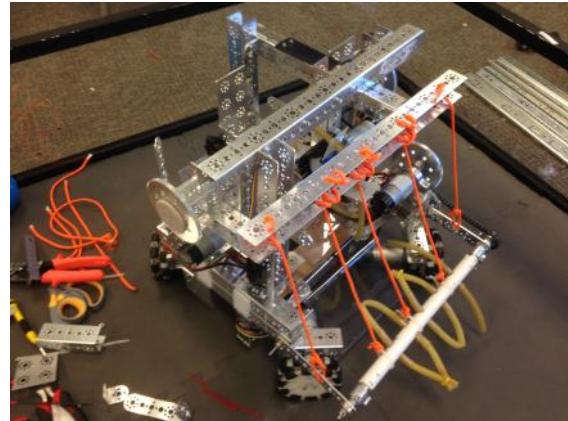
The "central spinner" is run by a 60:1 NeveRest motor mounted from the underside of the crossbar which forms the upmost portion of our robot.



It is positioned centrally on the robot, over the molded plexiglass ramp which conveys the particles from the pickup to the launcher bay.



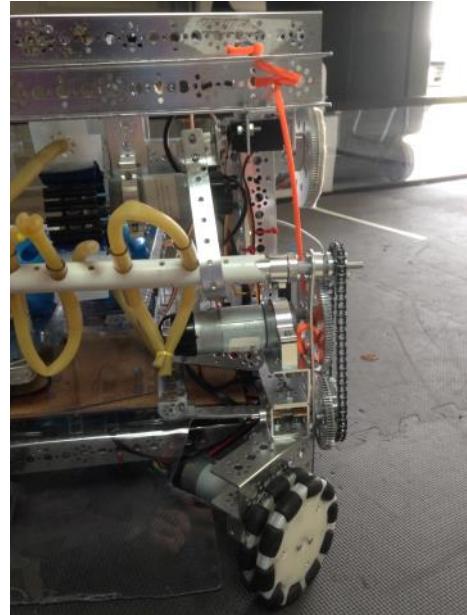
Crab's Components: Particle Pickup



We have a 1 to 9 gear ratio from a 60:1 NeveRest motor, which connects to a sprocket, which is connected via chain to another sprocket on our spinning pickup mechanism. These two components are kept together by Tetrix flats which are free-spinning, and rotate down when the hook releases at the start of the autonomous period.

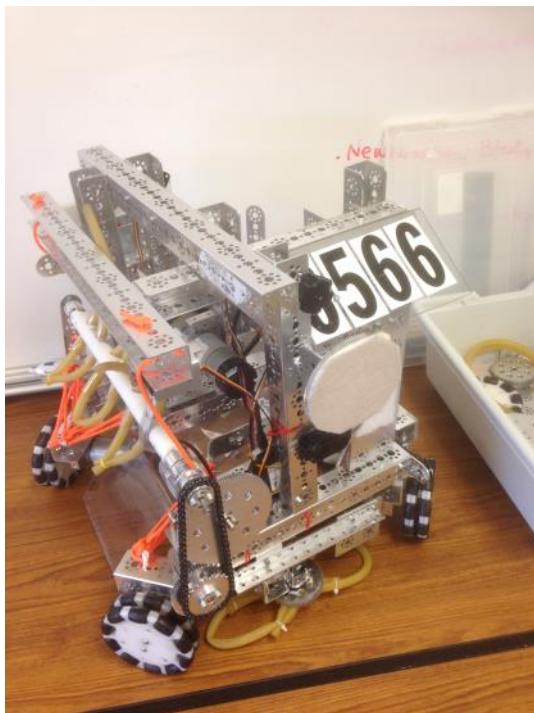
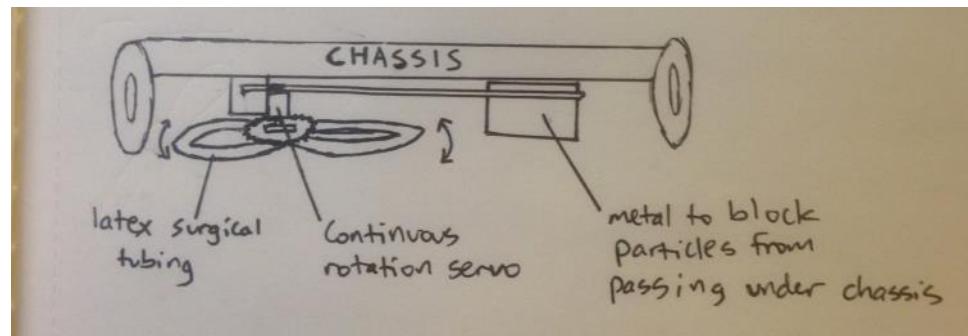
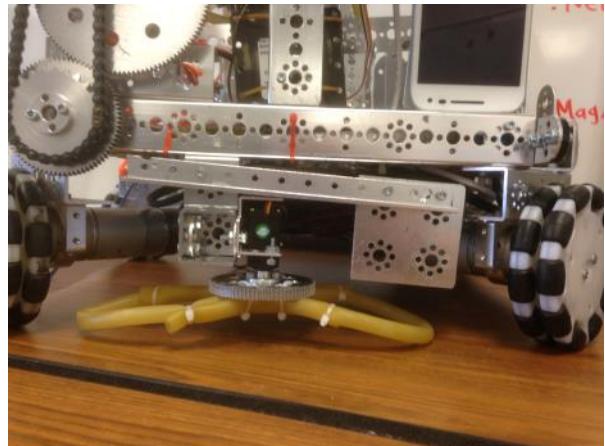
Through the PVC spinning pickup, we have latex surgical tubing weaved through stiffer vinyl tubing, which adds the support we need without sacrificing too much flexibility.

Our main problems with our particle pickup near the beginning of the season was that, with our design and wiring panel layout, there simply wasn't room within the 18" for the type of pickup we wanted to make. We solved this issue by creating a pickup which folds out (outside the 18") when we start the match. We use a servo with a hook to make sure the pickup releases.



Crab's Components: Particle Sweeper

Our main problem during autonomous at Super Regionals was when we successfully pathed to the beacon and picked the correct side, but then couldn't hit the button because a particle got stuck between Crab and the wall, which completely threw him off course for the rest of autonomous. We corrected this issue by creating a particle "sweeper" using a continuous rotation servo and latex surgical tubing, which serves the purpose of pushing particles to one side out of the way before they can get trapped.



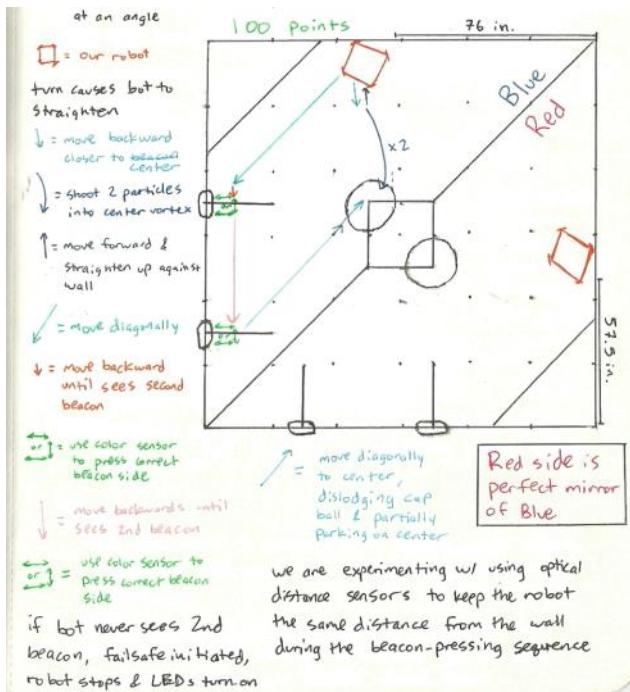
We set the sweeper to begin spinning when Vuforia starts running, and turn off when Vuforia is done. The direction it spins depends on which color alliance we are on, since we always sweep the particles to the back corner, away from the corner vortex. We can't feasibly make the changes that would be necessary to improve its 50% success rate, such as lengthening the surgical tubing (which would allow it to get caught on the drive wheels) or moving the servo further out (which would prevent Crab from fitting in the 18" box). We are okay with this rate, since it's better than not having it at all.

Game Plan: Summary

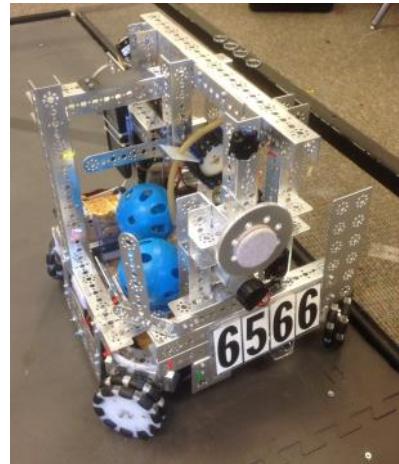
Our plan for the tele-op (driver-controlled) period is to pick up and launch as many particles as we can into the center vortex, pressing nearby beacons when we have the chance. We can usually score 6-8 particles into the center before endgame, at which time we switch to beacon duty and keep the beacons our color until the match ends.

Our main points come from autonomous. We have a fully operational 100 point autonomous which is detailed in our Design Notebook, in which we shoot two particles into the center vortex, press both beacons, and partially park in the center, removing the cap ball. We also have many other autonomous op-modes to complement any team with whom we may be paired. These paths are all documented in the Autonomous subsection (pages 11-12), as well as in a handout that we keep copies of at our table, pass out in scouting, and give to our alliance partners so we can figure out (with visual aid) which path will best match theirs. These vary on starting position, end parking spot, starting delay, and obviously total points. The main similarity is that no matter which autonomous we run, we can always count on scoring two particles into the center vortex, and ending this portion of the game with at least 35 points on our own. And yes, this means that we have 12 op-modes on our driver station just for our team's different autonomous paths.

Our only 'inhibition' is that we cannot lift the cap ball in any way. We focus on the other aspects of the game more than the cap ball, which is worth the same points as ending a game with four beacons on our color. Additionally, since only one team in an alliance can cap the ball, and we feel that enough teams at this level can cap, it is not necessary for us to waste our time on building a ball lift; it is better for us to spend our time improving our autonomous, since that's where we score most of our points.



One of our autonomous paths drawn out in our Design Notebook



Crab with two particles pre-loaded

The Problems with Programming

Me and my Android Studio --John

I am the team's head Android Studio troubleshooter. Back in July when both of our teams advanced to UIL State, we planned on allocating several days for slight improvements since the regular season. However, there had been an FTC app update, and we could not figure out how to fix it, resulting in us traveling to the state meet without working code. After that fiasco, I took it upon myself to get Android Studio working. At the start of this season, I had to spend two weeks to try to get it working, with me ending up completely reinstalling everything. After this, I was responsible for making sure Android Studio was working, generally whenever there was an app update. I have very much of a love-hate relationship with the program, getting especially frustrated when I hit the [Troubleshoot](#) button and it doesn't do anything. It is nice whenever it finally works, but that is generally after at least two installs of the app. I am the member of the team that people turn to when stuff throws unexpected errors.

Sensor Calibration --Paige

The problem with sensors started with us plugging in more than one color sensor, one on the bottom of the robot and one on the side to read the color of the beacon. While programming the color sensors, we did not realize that all colors have the same eight-bit hexadecimal address of 0x3c. When we tried to use telemetry to print the values of the color sensors, it printed out weird numbers because it was reading both sensors as one sensor. To fix this, we had to go in and manually change the addresses of the sensors that are duplicated with the Modern Robotics Core Device Discovery Software. However, we faced the problem of the software and the sensors both using eight-bit hexadecimal addresses, while Android Studio only uses seven-bit hexadecimal addresses. After researching how to change from an eight-bit to a seven-bit hexadecimal, which was simply dividing the eight-bit by two to get the seven-bit, we were finally able to program the sensors.



!opModelsActive... --Ethan

We made methods for each of our movement types so that programming our autonomous is WAY easier, but we had the issue of while a method was executing, pressing the "stop" button on the Driver Station to set opModelsActive to false wouldn't actually stop the method; it would stop after the current method was done running. We solved this issue by modifying each method to continuously check opModelsActive rather than simply pass it as a parameter and check at the beginning. This allows the methods to successfully terminate less than a second after the "stop" button is pressed, rather than potentially several seconds.

Drive Train Logic

The handwritten notes include a small sketch of a coordinate system with a vertical and horizontal axis. Below it is a table titled "Direction" with four columns labeled FR, FL, BR, and BL. The rows represent movement in four cardinal directions: Forward, Backward, Right, and Left. The values in the table range from -.5 to .5.

Direction	FR	FL	BR	BL
Forward	-.5	.5	-.5	.5
Backward	.5	-.5	.5	-.5
Right	.5	.5	-.5	-.5
Left	-.5	-.5	.5	.5

We also added the feature of our driver being able to change which direction on the robot is considered the "front." By holding Left on the D-Pad, our driver can change the code input so that the left side of Crab (i.e. one of the beacon pressing sides) is now the "front" and pressing forward on the joystick will now move Crab in this direction, to the left.

This is very useful for ease of maneuverability, since Crab gets turned all around during the driver-controlled period, and it is easy to re-orient so that driving is again understandable from the driver's perspective.

Our drive train, being omnidirectional, requires specific logic in order to move in any given direction. We have created a simple table of motor values which allow us to simply reference when coding any movement in one of the four main cardinal directions.

Throughout our code, we always list the four motors in the same order so that our table always applies without us having to think about it too much.

When moving diagonally, we simply leave the two perpendicular omni wheels stationary, and move only the two motors whose wheels are parallel to the intended direction of movement.

```
if(DLeft){  
    FL.setPower(Range.clip((.5*RY+.5*RX+RT-LT),-1,1));  
    BL.setPower(Range.clip((-5*RY+.5*RX+RT-LT),-1,1));  
    FR.setPower(Range.clip((.5*RY-.5*RX+RT-LT),-1,1));  
    BR.setPower(Range.clip((-5*RY-.5*RX+RT-LT),-1,1));  
    telemetry.addData("Drive Mode", "Beacon");  
}  
else if(DRight){  
    BL.setPower(Range.clip((.5*RY+.5*RX+RT-LT),-1,1));  
    BR.setPower(Range.clip((-5*RY+.5*RX+RT-LT),-1,1));  
    FL.setPower(Range.clip((.5*RY-.5*RX+RT-LT),-1,1));  
    FR.setPower(Range.clip((-5*RY-.5*RX+RT-LT),-1,1));  
    telemetry.addData("Drive Mode", "Shoot");  
}  
else{  
    FR.setPower(Range.clip((.5*RY+.5*RX+RT-LT),-1,1));  
    FL.setPower(Range.clip((-5*RY+.5*RX+RT-LT),-1,1));  
    BR.setPower(Range.clip((.5*RY-.5*RX+RT-LT),-1,1));  
    BL.setPower(Range.clip((-5*RY-.5*RX+RT-LT),-1,1));  
    telemetry.addData("Drive Mode:", "Normal");  
}
```

Telemetry Tester

```
@Override  
public void init_loop() {  
}  
  
//Code to run ONCE when the driver hits PLAY  
  
@Override  
public void start() {  
}  
  
//Code to run REPEATEDLY after the driver hits PLAY but before they hit STOP  
  
@Override  
public void loop() {  
  
    telemetry.addData("Status", "Running: ");  
    telemetry.addData("Encoder Position:", position);  
    telemetry.addData("Runtime", runtime);  
  
    telemetry.addData("Red:", beacon.red());  
    telemetry.addData("Blue:", beacon.blue());  
}  
  
//Code to run ONCE after the driver hits STOP  
  
@Override  
public void stop() {  
}
```

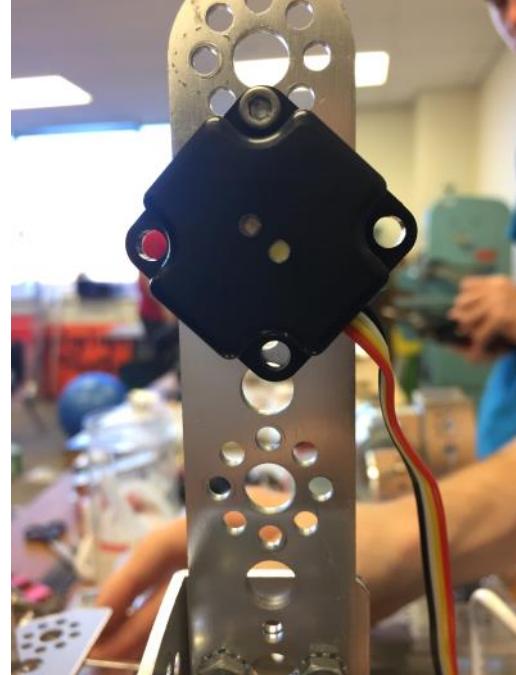
We have since adapted this into an "everything" tester; the driver phone uses telemetry to output the values being read by the Color sensors, Range sensors, Gyro sensor, and even the Vuforia parameters determined using the Robot Controller phone's camera, including a Boolean stating if it can see the vision target, and another stating if the robot is close enough to the vision target to initiate our beacon-pressing methods (as it would during autonomous). This adaptability has made this op-mode an invaluable debug tool for us as well as other teams experiencing similar issues.

We were having trouble getting our autonomous to work because of the variance in lighting in our room, so we made a simple code to check what values our color sensor is outputting.

We used this throughout all of our work on autonomous to make sure any problems we were having were due to coding error and not simply unexpected change in lighting conditions.

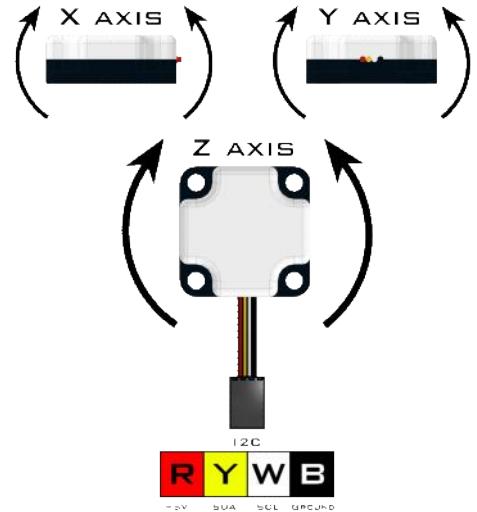
This simple but useful code has helped us many times to avoid redoing code that actually does work.

This code has also allowed us to realize that on the practice field at a competition to which we went (with really dark lighting) the color sensors always see red, which is why no team's beacon autonomous was working.



Gyro Sensor Correction Formula

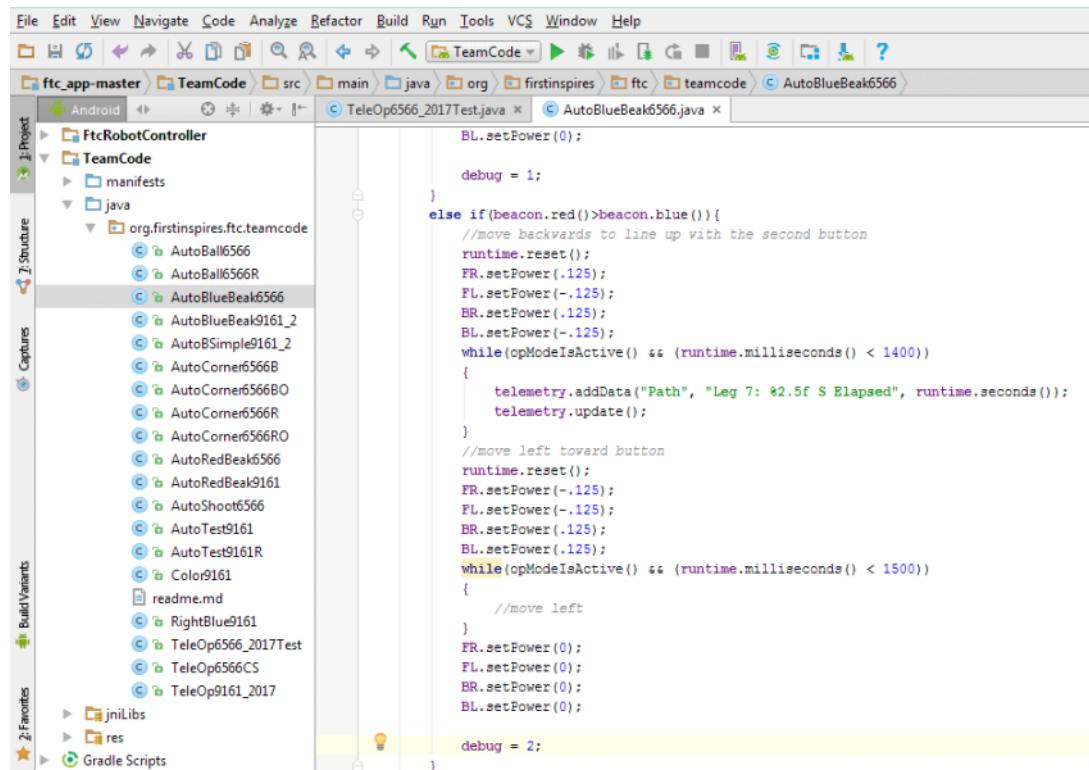
Since we started using the gyro sensor, we noticed that past 150 degrees, the sensor would become more and more inaccurate. We recently took several data points, comparing the measured angle and the actual angle. We plugged these points into a graphing calculator and using the scatterplot, found the linear regression equation relating the measured angle and actual angle. We then created another line using the values of the first line and multiplying by a constant. Through trial and error, we determined two numbers - one for clockwise and one for counterclockwise - which, when multiplied by the desired angle, would produce the input angle needed to achieve the desired angle with the actual gyro.



```
public void smartTurn(double power, int target){  
    if(Math.abs(target)>100){  
        if(target>0){  
            target = (int)Math.round(target/1.052);  
        }else{  
            target = (int)Math.round(target/1.0365);  
        }  
    }  
  
    zAccumulated = gyro.getIntegratedZValue();  
  
    while (Math.abs(zAccumulated - target) > 3 && myOpMode.opModeIsActive()) { //Continue while the robot direction is further than  
        if (zAccumulated > target) { //if gyro is positive, we will turn right  
            FR.setPower(power);  
            FL.setPower(power);  
            BR.setPower(power);  
            BL.setPower(power);  
        }  
  
        if (zAccumulated < target) { //if gyro is negative, we will turn left  
            FR.setPower(-power);  
            FL.setPower(-power);  
            BR.setPower(-power);  
            BL.setPower(-power);  
        }  
  
        zAccumulated = gyro.getIntegratedZValue(); //Set variables to gyro readings  
        myOpMode.telemetry.addData("Target:", target);  
        myOpMode.telemetry.addData("Degrees:", zAccumulated);  
        myOpMode.telemetry.update();  
    }  
  
    FR.setPower(0);
```

This formula has been integral in streamlining autonomous testing, with us being able to much more easily change turn values to modify our autonomous paths than we were able to beforehand, wherein we needed to run multiple guess-and-check trials to achieve the angle we wanted.

Autonomous



The screenshot shows the Android Studio interface with the following details:

- File Bar:** File, Edit, View, Navigate, Code, Analyze, Refactor, Build, Run, Tools, VCS, Window, Help.
- Toolbar:** Includes icons for file operations like Open, Save, Find, and Run.
- Project Structure:** Shows the project tree under "1-Project".
 - FtcRobotController
 - TeamCode
 - manifests
 - java
 - org.firstinspires.ftc.teamcode
 - AutoBall6566
 - AutoBall6566R
 - AutoBlueBeak6566
 - AutoBlueBeak9161_2
 - AutoBSimple9161_2
 - AutoCorner6566B
 - AutoCorner6566R
 - AutoCorner6566RO
 - AutoRedBeak6566
 - AutoRedBeak9161
 - AutoShoot6566
 - AutoTest9161
 - AutoTest9161R
 - Color9161
 - readme.md
 - RightBlue9161
 - TeleOp6566_2017Test
 - TeleOp6566CS
 - TeleOp9161_2017
 - jnilibs
 - res
 - Gradle Scripts
 - Code Editor:** Displays the Java code for AutoBlueBeak6566.java. The code handles beacon detection and movement logic.

We have a detailed set of autonomous pathways which we have coded for many separate scenarios. Above is a segment of our code which achieves the purpose of pressing the 2nd beacon. We have since integrated Vuforia into our beacon-finding sequence (see Vuforia section on page 13).

If we have an autonomous partner who cannot do anything during autonomous, we will run our full autonomous program which shoots two particles into the center vortex, moves diagonally to the 1st beacon, presses it, moves horizontally to the 2nd beacon, presses it, and moves diagonally to the center, partially parking on the center and dislodging the cap ball.

If our partner has a full autonomous, we can simply shoot the two particles without moving, or shoot and then, after a variable delay of 0, 5, 10, or 15 seconds, move to the center or corner vortex.

We also have varying autonomous modes that allow us to start in different positions, and then run either of our simple auton plans (parking in the center or on the corner), allowing us to start in either the inner or outer position on all of our auton op-modes except the full 100 point path, which requires the inside starting position.

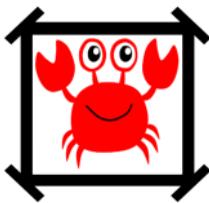
We have so many op-modes that it can sometimes become hard for even our drive team to remember how to set each of them up, so we made a simple cheat-sheet with graphics to help them out, as well as to give to other teams to show them what we can do. We have printouts of this sheet on our table in the pits, and it is also available on our website, along with a breakdown of all of Crab's abilities and functionalities!

We like to refer to ourselves as the Ultimate Partner Bot!

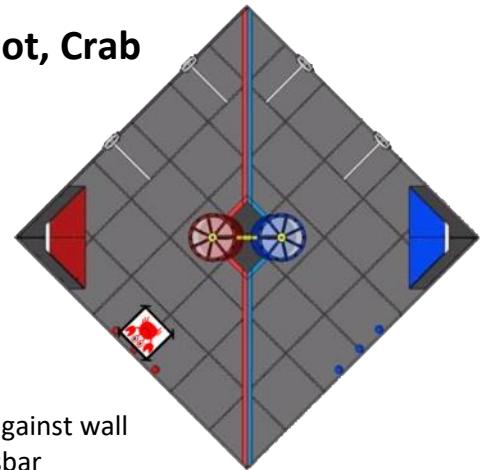
6566 Circuit Breakers - Red Autonomous

Beacon - 100 Points

- Starts at "inside" position
- Shoots 2 particles into center
- Hits both beacons
- Parks on center, moves ball



= our robot, Crab



All except Beacon path have variable delay of 0, 5, 10, or 15 seconds

Ball (inside) - 40 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on center, moves ball

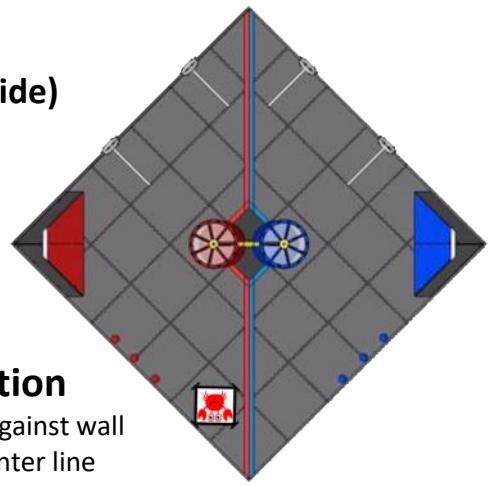
"inside" position

- Both front wheels against wall
- Perpendicular crossbar directly over tile border

Corner (inside) - 35 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on corner

("Front" = Ball Pickup side)



Ball (outside) - 40 points

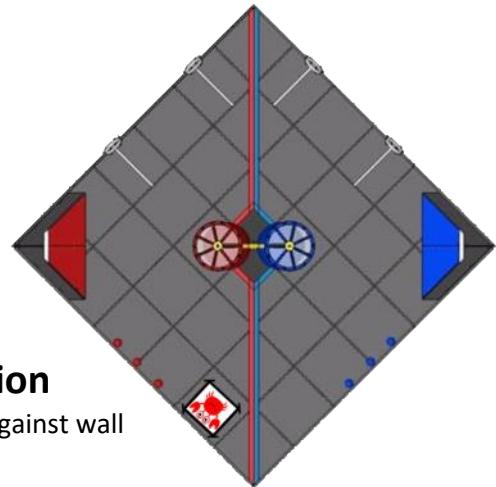
- Starts at "outside-W" position
- Shoots 2 particles into center
- Parks on center, moves ball

"outside-W" position

- Front-Right wheel against wall
- Left side 2" from center line

Corner (outside) - 35 points

- Starts at "outside-C" position
- Shoots 2 particles into center
- Parks on corner



Shoot - 30 points

- Starts at "inside" position
- Shoots 2 particles into center

Driver-Controlled

- Min. 6-8 particles into center
- Keep beacons pressed
- No capping in end
- Can push ball onto corner

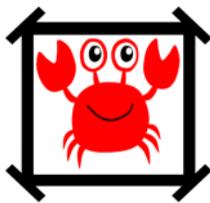
"outside-C" position

- Both front wheels against wall
- In center of tile

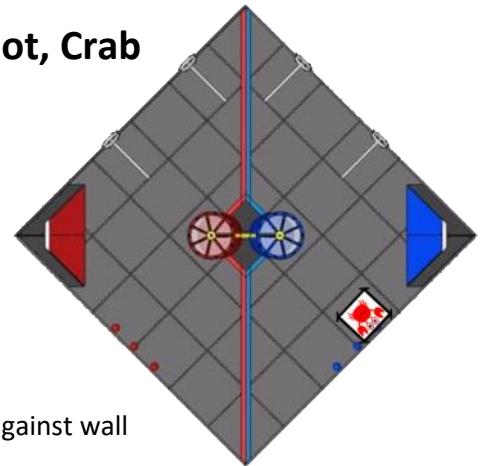
6566 Circuit Breakers - Blue Autonomous

Beacon - 100 Points

- Starts at "inside" position
- Shoots 2 particles into center
- Hits both beacons
- Parks on center, moves ball



= our robot, Crab



**All except Beacon path
have variable delay of
0, 5, 10, or 15 seconds**

Ball (inside) - 40 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on center, moves ball

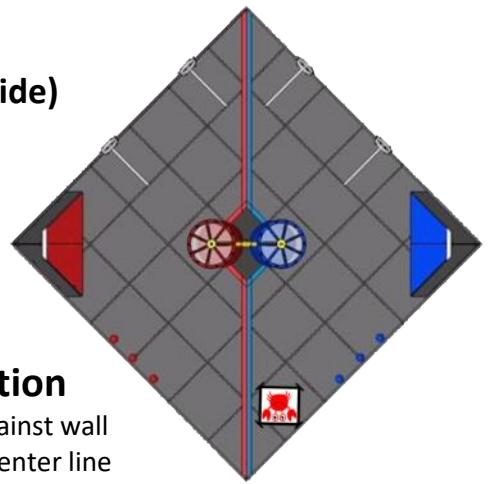
"inside" position

- Both front wheels against wall
- In center of tile

Corner (inside) - 35 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on corner

("Front" = Ball Pickup side)



Ball (outside) - 40 points

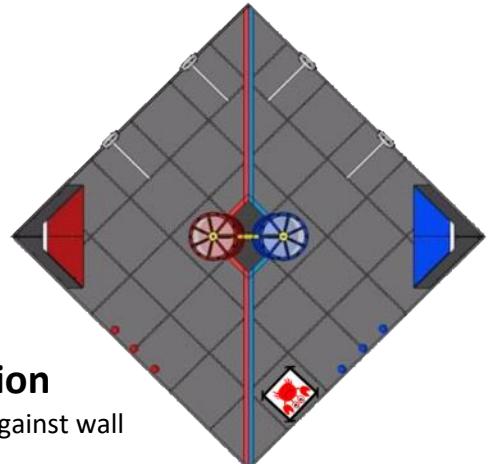
- Starts at "outside-W" position
- Shoots 2 particles into center
- Parks on center, moves ball

"outside-W" position

- Front-Left wheel against wall
- Right side 6" from center line

Corner (outside) - 35 points

- Starts at "outside-C" position
- Shoots 2 particles into center
- Parks on corner



Shoot - 30 points

- Starts at "inside" position
- Shoots 2 particles into center

Driver-Controlled

- Min. 6-8 particles into center
- Keep beacons pressed
- No capping in end
- Can push ball onto corner

"outside-C" position

- Both front wheels against wall
- In center of tile

Vuforia: Augmented Reality / Image Processing



Vuforia is an image processing software that we utilize with the camera on the Robot Controller phone in order to find the vision targets which are mounted directly under the four beacons on the game field. We have a class of methods which use Vuforia to find where the vision target is in relation to Crab and determines how best to use Crab's drive train logic to get him positioned in front of it. We have several methods which run during our full beacon autonomous, which calculate the Axial, Lateral, and Yaw variables, all of which are necessary to pathfind to the beacons.

We use telemetry to output on the driver phone Boolean variables for if Vuforia is initialized, if the phone sees the target, and if the robot is close enough to the target to initiate the beacon-pressing sequence. This has been essential in our weeks of debugging and perfecting our full autonomous.



Not only do we use Vuforia during our beacon autonomous, but we also use it during the driver-controlled period in order to make our beacon-pressing more efficient. Since the drive team has poor visibility of two of the beacons for the entire game, it is immensely handy to be able to simple pilot Crab into the area we need, and hold down our Vuforia enabler, which runs this code segment in a loop until Crab automatically presses the beacon's right-side button, and when we let go of the button, normal drive control resumes.

We adapted a basic Vuforia code for our preliminary testing, which used a standard chassis with 4 parallel drive motors, so we had to rewrite most of the logic to fit our 4-wheel omnidirectional chassis and to integrate it into our op-modes. We use Vuforia alongside several Modern Robotics sensors in order to make sure that Crab will do exactly as we want during autonomous. Vuforia handles the positioning, which has allowed us to phase out our bottom color sensor which was previously used to stop Crab over the white line as well as our range sensors which were used for maintaining distance to the wall, but we still use an Integrating Gyro for turn degrees measurements and two Color sensors to decide which side of the beacon to press.

Drive Methods

```
/* Local OpMode members. */
private ElapsedTime runtime = new ElapsedTime();

public Methods6566() {}

+💡 public void init(HardwareMap ahwMap) {...}
+💡 public void driveForward(double power, int time, boolean active){...}

+💡 public void driveBackward(double power, int time, boolean active){...}

+💡 public void driveRight(double power, int time, boolean active){...}

+💡 public void driveLeft(double power, int time, boolean active){...}

+💡 public void driveDiaFrontLeft(double power, int time, boolean active){...}

+💡 public void driveDiaBackLeft(double power, int time, boolean active){...}

+💡 public void driveDiaFrontRight(double power, int time, boolean active){...}

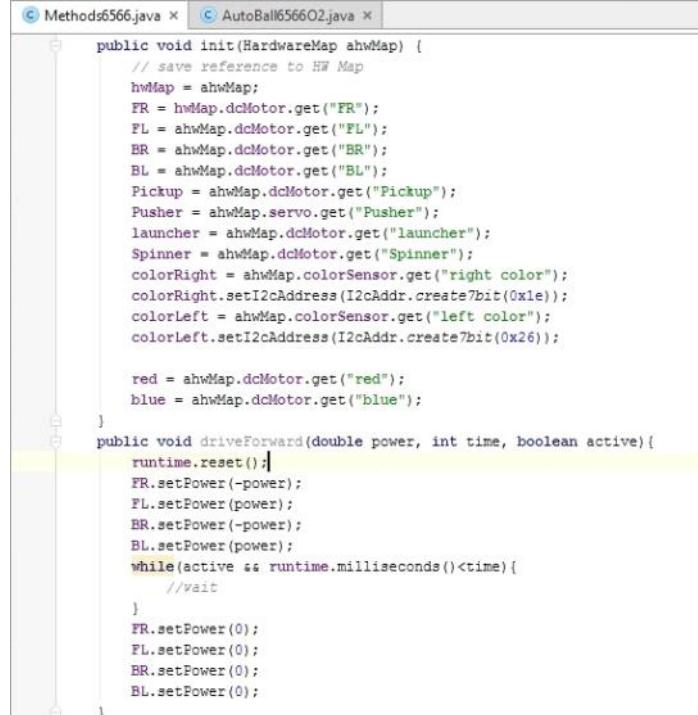
+💡 public void driveDiaBackRight(double power, int time, boolean active){...}

+💡 public void wait(long time, boolean active){...}

+💡 public void shoot(boolean active){...}
```

We got fed up with constantly having to reference the value table we made as well as copying and pasting entire sections, changing values slightly, and tediously scrolling to find the part of the autonomous we are working on, so we simplified all of our drive movements to a separate file of methods for moving in each of the eight main directions, as well as some that move until the beacon is in range, and we simply reference these throughout our code, with parameters for motor power and time, greatly simplifying and shortening our autonomous code.

We also made a whole separate class for using Vuforia, which we call often in our main autonomous code. This class is responsible for keeping track of, setting, and calculating the Axial, Lateral, and Yaw variables which we use to determine how Crab will pathfind to the vision targets with his unique drive train logic.



```
public void init(HardwareMap ahwMap) {
    // save reference to HW Map
    hwMap = ahwMap;
    FR = hwMap.dcMotor.get("FR");
    FL = hwMap.dcMotor.get("FL");
    BR = hwMap.dcMotor.get("BR");
    BL = hwMap.dcMotor.get("BL");
    Pickup = ahwMap.dcMotor.get("Pickup");
    Pusher = ahwMap.servo.get("Pusher");
    launcher = ahwMap.dcMotor.get("launcher");
    Spinner = ahwMap.dcMotor.get("Spinner");
    colorRight = ahwMap.colorSensor.get("right color");
    colorRight.setI2cAddress(I2cAddr.create7bit(0x1e));
    colorLeft = ahwMap.colorSensor.get("left color");
    colorLeft.setI2cAddress(I2cAddr.create7bit(0x26));

    red = ahwMap.dcMotor.get("red");
    blue = ahwMap.dcMotor.get("blue");
}

public void driveForward(double power, int time, boolean active){
    runtime.reset();
    FR.setPower(-power);
    FL.setPower(power);
    BR.setPower(-power);
    BL.setPower(power);
    while(active && runtime.milliseconds()<time) {
        //wait
    }
    FR.setPower(0);
    FL.setPower(0);
    BR.setPower(0);
    BL.setPower(0);
}
```

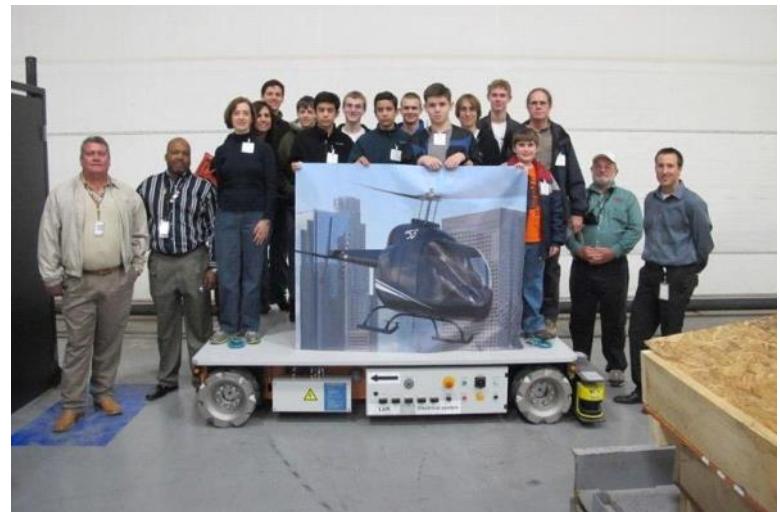
Trading Tech with the Army

A group of army engineers happened to be hosting a recruitment table right next to our booth during our 2016 fundraiser, and once they saw our robot in action we got to talking, and managed to convince them to bring up two of their uber-expensive bomb-squad robots one afternoon that the army actually uses in the field! They let some of our members as well as students in the robotics and engineering classes drive them in the parking lot to show us the tech and get us interested in the army as a real possibility for robotics engineers. (They also made us sign up for their email-newsletter, which we begrudgingly but happily did so we could get our hands on a *real* robot)



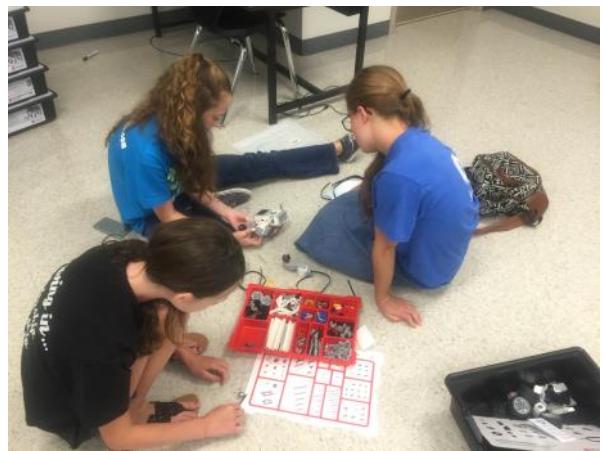
Bell Helicopter

In our room we have a giant poster of a helicopter that was signed by a sponsorship rep who works for Bell Helicopter. This (along with a substantial grant) was a gift from them when we visited and toured their production facilities in 2014. We met a lot of respected engineers and learned a lot from seeing the equipment in their robotics lab! They have renewed their sponsorship every year since, and we have another tour lined up later this season!



Summer Camp

For a few years now we have been hosting a summer camp for the younger members of our community. In this one week adventure, kids from 3rd - 8th grade participate in fun introductory challenges to robotics. With them we usually have a blast teaching the basis of NXT and EV3 modules, drag and drop RobotC programming, and even Tetrix for the curious quick-learners. Overall, it's a great introduction into our crazy world of robotics and we hope to excite kids and maybe get them interested in some future innovative options, as well as to prepare them to join FLL when they get to the middle school.



We had kids pair up and take turns giving their blindfolded partner instructions to walk through the school in order to show them just how exact you have to be when programming a robot



Aledo High School Robotics Camp

Your Child Will:

- Learn basic programming and engineering from experienced high school students and Robotics Club members
- Use Lego Mindstorms and EV3 for all parts and software
- Gain a greater knowledge of technology and computers in general
- Be broken up into teams based on skill level
- Work together to complete assigned tasks

When: To be determined; follow our website for updates! (aledoroboticsclub.com)

Morning Class: 9:00 AM – 12:00 PM; Grade 4 – 5

Afternoon Class: 1:00 PM – 4:00 PM; Grade 6 – 8

Where: Lab B105 at Daniel Ninth Grade Center

Cost: \$125 per student, includes t-shirt (AISD Employee Discount: \$75)

Student Name:
Incoming Grade:
T-Shirt Size:
Allergies or Special Concerns:
Parent Phone:
Parent Email:

For more information, contact us (aledoroboticsclub@gmail.com) or Julia Reynolds (jreynolds@aledo.k12.tx.us)

Drop off or send applications to:

Aledo High School

Robotics Club

1000 Bailey Ranch Rd.

Aledo TX, 76087

Make Checks Payable to Aledo High School

Write "Robotics Club" on Memo Line

Robotics Club Sign Up Form



Name: _____

Grade: _____

Phone Number: _____

Experience Level (1 to 10): _____

Relevant Experience: _____

Other Clubs and Activities You Participate In: _____

Other Info: _____

Robotics club meets Thursdays after school in room B210 at the Daniel Ninth Grade Center. Everything is done at the meetings and therefore attendance to most - if not all - of the meetings is required for participation in this club. Competitions are on Saturdays during second semester.

To sign up for the club remind: Text @aledorobo to 81010

Student Signature: _____

Parent Signature: _____

School Board Shenanigans



We are notoriously known by the School Board of being "that club." We do a ton of (admittedly vexing) stuff and naturally the AISD Board got interested in what we were doing. So we packed up Cascade Effect and brought it to them. The demonstration was a lot of fun, and certainly provoked further interest in the technical applications of FIRST. They are still making sure to keep count of us. (If you are reading this School Board, we love you.)

Booths!

In Aledo, we attend scores of events and we end up with tons of booth experience under our belts. They range from multiple mildly successful Information Expos each year to (mildly unsuccessful) football game stands to Halloween festivals. We may or may not have set up this super awesome candy collecting competition at the 2015 Halloween carnival... As part of our spring fundraiser we had a booth at lunch every day for two weeks! (see Fundraising tab)



Inspiring the FLL Teams

In our school district, the 5th-6th grade center and the middle school both harbor FIRST Lego League teams, and we make it our responsibility to make sure they have the means to be successful, whether it be getting them sponsorship money through our connection to Bell Helicopter, or inviting them to our room at the high school to see what they will be doing in a few years if they stick with robotics.



STEAM Carnivals

We have paired up with the rest of the CTE department at our school as well as the Art department in order to attend and host STEAM Carnivals (Science, Technology, Engineering, Art, and Math!). At one, we had an entire room solely devoted to all of our district's robotics clubs, where we set up our field structure from Res-Q and let kids drive around the robot, as well as see the full progression through the FIRST Lego League all the way up to the high school's FTC team. This year, we had our field set up in the gym and let kids pair up to drive our competition robot to pick up and shoot particles into the center vortex. We made sure to pass out lots of summer camp forms!



Introduction to the Competition



FIRST

FIRST (For Inspiration and Recognition of Science and Technology) strives to instill within young children an interest in science and technology, and to allow an outlet for participation in areas otherwise unavailable, such as robotics engineering and entrepreneurship.

According to the *FIRST* website:

"For students aged 6-18, it's the hardest fun you'll ever have. For team Mentors, Coaches, and Volunteers, it's the most rewarding adventure you'll ever undertake. For Sponsors, it's the most enlightened investment you could ever make. FIRST is a 501(c)(3) not-for-profit organization devoted to helping young people discover and develop a passion for science, engineering, technology, and math. Founded over 20 years ago by inventor Dean Kamen, the 2014-2015 FIRST season brought together more than 400,000 young people, and Volunteers filling over 180,000 roles, in more than 80 countries. The annual programs culminate in an international robotics competition and celebration where teams win recognition, gain self confidence, develop people and life skills, make new friends, and perhaps discover an unforeseen career path."

We participate through *FIRST* because it really is the best way to learn about STEM topics and express ourselves through active participation in the *FIRST* Tech Challenge.

FIRST Tech Challenge (FTC)

At the high school level, we participate in the category known as FIRST Tech Challenge, or FTC. Our district also has two FLL teams at the middle school level, and we hope to start an FRC team sometime in the foreseeable future.

According to the *FIRST* website:

"FTC is designed for high-schoolers who want to compete head to head using a sports model. Teams of up to 10 students are responsible for designing, building, and programming their robots to compete on a 12 X 12' field in an Alliance format against other teams. Robots are built using a TETRIX® platform that is reusable from year-to-year using a variety of languages. Teams, including Coaches, Mentors, and Volunteers, are required to develop strategy and build robots based on sound engineering principles. Awards are given for the competition as well as community outreach, design, and other real-world accomplishments."

FTC is the mid-level robotics program for high school students, and we have been a part of it for five years, since our beginning in 2012.

Marketing

Website

2015 marked the launch of our very own team website, which we have since used as an archive of our activities and a brochure of what we are all about. Through the website parents, community members, or anyone who's just interested can keep up with any major updates, find links to all of our social media pages, downloads for all the forms/flyers we pass out at events, and general activity summaries and pictures. We have vastly simplified the website since last year, and it now only contains the essentials: a page for each team, an info page on our robot's specs, an event calendar, relevant links and downloads, and tributes to our sponsors and *FIRST*.

URL: aledoroboticsclub.com



Social Media

Aledo Robotics Club has a Twitter account and a Facebook page, where we post updates and photos about our progress and activities, to let the community keep up with our journey. We use these mainly as a way to quickly get a message out to those following our progress, and to connect with members of our community, as well as other teams.

This year, we also have a newly made Instagram account where we post about our meetings/shenanigans and give people some visual insight into our activities and day-to-day lives. For an even more extensive insight into our daily robotics-filled lives, people can also check out our vlogs and match recordings which we post on our YouTube channel!

Twitter: [@AledoRoboClub](#)

Instagram: [@aledoroboticsclub](#)

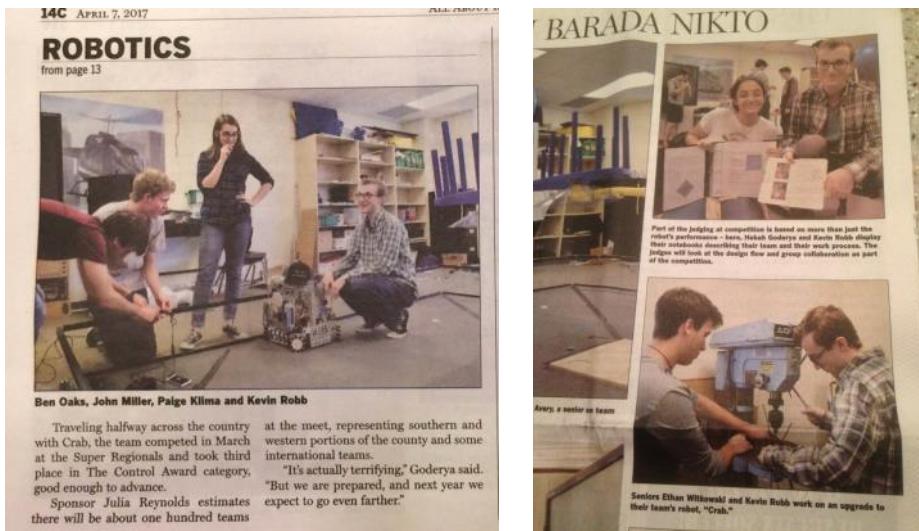
Facebook: [Aledo Robotics Club](#)

YouTube: [Aledo Robotics Club](#)

METRIC	LAST WEEK	PREVIOUS WEEK	TREND
Page Visits	33	49	↓32.7%
Weekly Total Reach	5.74K	62	↑9,159.7%
People Engaged	507	8	↑6,237.5%
Total Page Likes	66	54	↑22.2%

Publicity: Aledo Robotics in the News

Our team and club has consistently been featured in articles in the Aledo Community News, the Weatherford Democrat, and the Weatherford Star Telegram in the past few years. Just this season, we have been interviewed for articles in all three concerning our progress over the years and our second time advancing to Regionals and first time to Super Regionals and Worlds.



A couple years ago, we had a team member (Carter Haber) become a national Dean's List finalist, which gained us some great attention from our community, onto which we latched in order to launch a lasting community outreach initiative which we are still continuing today.

At the end of our 2016 season, FIRST ResQ, our team captains were interviewed by Channel 11 News for a segment titled "Real Science: Building Dreams With Robots.", in which we were able to convey our mission and our ideals to a television audience, rather than just the newspaper readers we had become accustomed to.



Copies of some of the articles we have been in this season are in the sleeve to the left; feel free to temporarily remove and read through them!

Connecting with Other Teams

Sharing is Caring

When it comes to helping out other teams, we do not shy away! Often do other teams at competitions ask us to lend them certain tools such as our saw or vice, and sometimes parts that they desperately need in order to compete, such as our backup legacy module or a battery fuse. Our willingness to share the contents of our toolbox earned us the Gracious Professionalism award at the Robot Roundup state meet in July of 2016, and has led to us making many friends on other teams along the way.

Spread of Information

Our sister team's cap ball lift gained a lot of attention from other teams who were trying to perfect their lifts, and consequently we received direct messages on Twitter as well as in-person asks at competitions how they managed certain portions of it, and of course we were glad to comply. We helped the Prototypes (8626) with figuring out their servo wiring for their lift after Regionals, and as a result they offered to load our robot in with their stuff for the trip to Georgia since we were flying and had been unable to figure out how we would get it there... We believe these actions of mutual benefit truly preach to the camaraderie created by *FIRST* and every team's desire to aid other teams in any way they are able.



This season, the main problem that everyone has had is with the Android Studio IDE (see Programming section). At the Robot Roundup this past summer, we drove to Austin, TX, without working code, and once there, were able to find a team that had it sorted out and use their laptop to transfer our code and therefore compete. Paying back this good deed, our head engineer John spent weeks figuring out all the details of the software and has since spent his extra time at meets with other teams' programmers who have been unable to reconfigure with the updates to the IDE.

Another major issue this season is the Modern Robotics color sensors, and the company's support staff (or lack thereof). The forums are full of people desperately attempting to get more than one sensor working in the same iterative loop, and seemingly no one has solved it. At our first meet this season, we were emailing with the BCS Ambassadors (FTC 5970), and we were able to help each other further understand the potential solutions. We have since solved our issues and have been helping out other teams on the forums who haven't.

Scouting

An important part of the *FIRST* competition experience is talking to other teams and cataloguing the things their robot can do. We have some members dedicated to scouting specifically, as well as keeping track of everything that happens in matches, and to simplify this process, our head engineer John made an "app" (*cough* Google Form *cough*) that allows them to simply fill out a survey while talking to another team, which then transfers all the information into a spreadsheet for easy interpretation by our whole team.

Practice Field Problems

It seems that the most commonly neglected aspect of competitions is the practice field. None of the first four tournaments we went to this season has had charged or even fully working beacons, and two had no particles on the field at all. Luckily, we bring our beacons and particles with us to competitions for this use specifically.

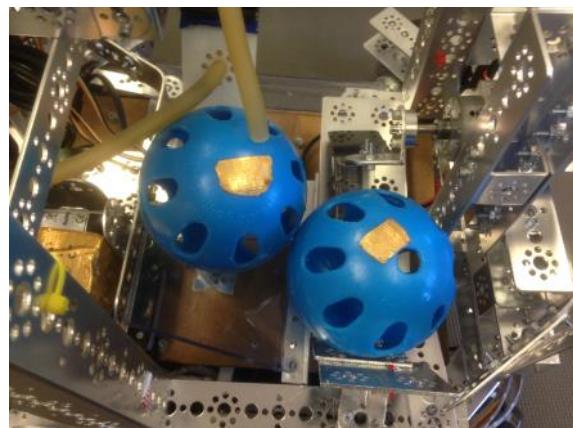
Since it seems the beacons' primary purpose is draining 9-volt batteries, no tournament host ever has enough to last the day on the competition field, much less the practice field. Consequently, we went through our supply of batteries by donating them at a competition, and since our school makes buying things frustratingly complicated, rather than buy more our head engineer John modified our beacons using some extra powerpole kit (leftover from when we redid our robot wiring) so that the beacons can be powered by our 12-volt robot batteries.

This means that at each of the qualifying tournaments we attended this season, our two beacons and two of our robot batteries have been powering the practice field, as well as the particles that we bring with us.

It seems that the beacons break each time we allow their use on the practice field, and by this point they barely function, so we have bought new electronics kits for them. We later realized that AndyMark sells a powerpole battery connector specifically for use on these beacons — we are fairly certain they did not have that at the beginning of the season — so we purchased some to replace our custom-made and constantly-breaking mess of wiring. Unfortunately, it seems AndyMark had some sort of electronics oversight, and their upgrade kit fries the beacons' circuit boards, meaning that we had no beacons going into Regionals and no autonomous practice for the weeks preceding or succeeding it...

Another major problem with practice fields has been the lighting, which we can identify as the problem using our telemetry tester op-mode, but which we cannot fix. This allows us to inform other teams (as well as our own) that the problems with their autonomous which they struggle to fix are simply the cause of bad lighting interfering with their color sensors, and not an issue with their coding.

We never forget the philosophy that if it works perfectly at home, it will most certainly not work on the practice field at a competition (or probably even on the playing field...).



Fundraising

Corporate Sponsorships

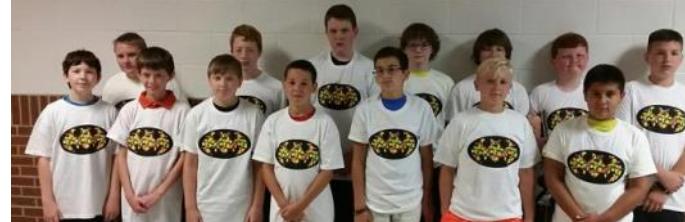
We committed much of our time last season to going out into the community and finding sponsors, the fruits of which can be seen by our budget as well as the backs of our t-shirts! We received many small donations from local startup companies or small businesses and a few large donations from established, nationally recognized corporations such as Bell Helicopter, Lockheed Martin, and Elbit Systems of America.



Local Fundraising

Summer Camp

Each year, we host a summer camp for kids in the community who are interested in technology, which serves to fund our high school robotics program as well as find potential future members of the middle school's FLL team and we hope eventually the high school FTC team. (More info in Community Outreach section)



Some of our members last year had the idea of selling custom silicone flash drive wristbands with our team name and number, so we did just that. We went through CustomUSB to design and order them, and set up booths at school functions all Spring to sell them and promote our club, which drastically improved our school's recognition of us as well as our financial situation! (Our advancement to Worlds has also aided immensely in the recognition aspect)

We also sold custom metal ballpoint pens at the same time, which were even more popular than the flash bands!



This Season's Sponsors

Bell Helicopter
Elbit Systems of America
Fun Publications, Inc
FIRST in Texas
Texas Workforce Commission
Aledo ISD
State Farm
3M
Lockheed Martin Corporation
Fire Department International
Haber Wealth Management
GAS Analytical Services
Unmanned Aerial Solutions
JHC Ranch
Goderya Family
Brazos Logo Shop
Effortless Branding
Couture Hair Salon





3M Science.
Applied to Life.™



Bell
Helicopter
A Textron Company

 **State Farm**®

Join our Sponsors in Helping us Train
the Next Generation of Engineers!

Aledo High School FIRST Robotics Competition Team & Sponsorship Donation Form

Friend of Team (\$50-\$99)

- Logo on Team Website

Helper of Team (\$100-\$499)

- Small Logo on Team Shirt Back
- Logo on Team Website
- "Thank You" Certificate

Megabyte (\$500-\$999)

- Small Logo on Team Shirt Back
- Logo on Team Website
- "Thank You" Certificate
- Team Poster

Gigabyte (\$1,000-\$4,999)

- Large Logo on Team Shirt Back
- Logo on Website
- "Thank You" Certificate
- Team Poster

Terabyte (\$5,000+)

- Logo on Robot
- Large Logo on Team Shirt Front
- Logo on Website
- "Thank You" Certificate
- Team Poster

Please send a high quality logo of your company (if applicable) to aledoroboticsclub@gmail.com for processing and a business card so that we may acknowledge your sponsorship on our team materials and our website. Please make your check payable to Aledo High School (in memo, write "Robotics Club"). Send this form, check, and business card to Aledo High School:

Aledo High School

1000 Bailey Ranch Road

Aledo, Texas, 76008

Visit our website at www.aledoroboticsclub.com to view our current sponsors, as well as a compilation of our community activities and updates on our team's progress in the competition. We also have a Facebook page ([Aledo Robotics Club](#)) and a Twitter ([@AledoRoboClub](#)), so follow us there for more information, photos, and updates about our progress in the coming competitions. Thank you for your consideration of Aledo Robotics Club as we break Aledo records and train the inventors of tomorrow!

Sponsorship Level (Listed Above):

Company/Rep. Name:

Contact Email:

Business Plan

Date	Amount Spent	Recipient	Description	
9/7/2016	49.9	Amazon	Over-Glasses Safety Goggles (x10)	16-17 Starting Balance
9/26/2016	341.4	Andymark	Half Field w/ Two Beacons - Velocity Vortex	4692.8
10/6/2016	293.6	Modern Robotics	Color Sensor (x4); Core Device Interface Module (x2)	
10/11/2016	50.34	Amazon	Phone Accessories	Total Spent
10/17/2016	241.22	Effortless Branding	Team Shirts 2016-2017	7009.78
11/4/2016	335	Dell	Laptop (Latitude 3150)	
10/27/2016	115.21	Pitsco	Tires, Rack and Pinion Pack, Servomounts	Total Earned
11/3/2016	600	80/20	Overload's Lift	5713.14
11/16/2016	133.5	Pitsco	Hitechnic motor controller (x2)	
12/13/2016	104.14	Amazon	Tape, LED strips, Powerpole kit	Current Balance
12/13/2016	245.69	Andymark	Motors, Wire	3396.16
12/13/2016	186.01	Pitsco	Screws, Nuts, Misc. TETRIX pieces	
1/18/2017	63.8	Modern Robotics	Optical Distance Sensor (x2)	
1/20/2017	140.95	Pitsco	Omniwheels (x4), Misc. TETRIX pieces	
1/23/2017	65.9	Modern Robotics	Integrating Gyro Sensor (x2)	
1/24/2017	508	Amazon	New Phones (x4)	
1/28/2017	340		Bus fee for meet	
1/30/2017	225		Registration - Qualifying Meet	
1/30/2017	315.95	Modern Robotics	Color Sensor (x2); Optical Distance Sensor (x2)	
1/30/2017	184.98	Andymark	Beacon Electronics, Motors	
2/3/2017	299		Retractable Banner	
2/6/2017	500		Registration - Regionals	
2/7/2017	265.03	Pitsco	Sprockets, Servos, Hubs	
2/7/2017	265.7	Amazon	Cart, Power Strip, Drawer Slides, Misc.	
2/8/2017	96.94	AndyMark	40:1 Motors (x3)	
3/3/2017	89.91	Pitsco	Robot Batteries (x2)	
3/3/2017	87.61	Andymark	Beacon Electronics (x2)	
3/3/2017	500		Registration - Super Regionals	
3/6/2017	365	National Pen	CB Buttons (x1000)	
3/10/2017	420	Brazos Logo	Custom Team Hats	

Date	Amount Added	Donor	Description	
8/26/2016	713.14	FIRST in Texas - TW	Reimbursement for Grant	
8/31/2016	2000	Fun. Publications	to activity account	
9/26/2016	2000	Bell Helicopter	to education foundation account	
2/17/2017	1000	FIRST in Texas		

The members of our club are in charge of managing and keeping track of our budget, and submitting purchase orders through our school's business office. We have two separate accounts with the school, both of which we use to buy parts, file registration, pay transportation fees, and more.

The finances are mainly managed by our senior members, led by our Treasurer, Paige, and Team Captain, Kevin.

Our Education Foundation account is funded largely by small business owners in Aledo who are a part of the foundation and independently donate to our club, as well as funding we receive from the foundation due to our presentations before them. A few of our big name sponsors donate through the foundation as well, including our primary contributor, Bell Helicopter.

All other donations to our club go through our direct account with the high school, our Activity Account. Our other main sponsors as well as small businesses not associated with the foundation donate through this school account, and we have easier access to it.

2015 really marked the beginning of our active seeking of sponsors, wherein our head officers would go out to any corporation that would see us, present our engineering notebook and the reasons why *FIRST* and the *FIRST* community would benefit from our ability to better participate through more funding, as well as the credibility that is to be gained from being a *FIRST* team sponsor. We may have been turned away by some such as Ace Hardware, but we managed to claim donations from Elbit Systems of America, GAS Analytical Systems, Unmanned Aerial Solutions, and several other large and small companies. We have continued this approach to marketing for over a year now, and our budget is seeing better days than it ever has in the past. Our members who will not be graduating this Spring understand the approach to fundraising and the methods for filling out purchase orders, so we are confident the club and our team will continue to prosper as we have been enabled to for these past two seasons.

Sustainability & The Future of Aledo Robotics

Soon all of our seniors (who make up the majority of our officers) are going to graduate! Only two officers are going to be left next year: Tanner, our current vice president (and programmer for Overload), and Hebah, our current secretary.



Members

Over time we have students in the club step up to take officer roles that will be open soon. Those are usually the inquisitive ones. We try to encourage our members if they want to contribute more to the club, because being an officer is honestly grueling, since we put in so much time and effort into the club, but it is so much more fun, and it's the people who have an unconditional love for robotics who can usually handle the task.

We gain new members through our incoming freshmen and just random people who become interested. Sometimes if we spot a person we think would be interested we nudge them toward FTC or our district's FLL teams and then snatch them up when they get to high school.

Funding

Currently as a club we are doing alright, but we are still among some of the poorer of FTC teams. Next year we hope to gain a few more sponsors and contacts.

Last year we had a blast selling flash drives and pens, this year we are thinking about maybe selling t-shirts with our two-team design concept incorporated.

Outreach

Our club has always been really good about talking to people in our area. We go to a ton of expos and events to help spread our name. However, we want to try and take a more global approach and try expanding our vlog channel on YouTube.

Additionally, we want to find a way to excite people at our school. We live in a very football crazy world and instead of trying to fight it, Hebah has been talking with the football coaches about creating an official Aledo Robotics Club t-shirt cannon for use at the football games, since the ones they have are in a sorry state.

Summer Plans

Most of the time during the summer people are pretty busy and sometimes as a club we forget about robotics all together (except for at the robotics camp fundraiser!). This year we want to try to do fun activities and small projects. We are already talking about stuff we are interested in that we can't do in FTC (pneumatics, raspberry pi, etc.). Our mentors are excited to play around with this "new technology," even if we can't use it in the competition. We also want to practice a lot more Ultimate Frisbee so next time we play the Prototypes we don't lose horribly...

Awards

This season has been one for the record books, with our teams nearly tripling our number of trophies from 4 over the past four years to a current total of 11, including a new Connect, Control, PTC Design, and two Finalist Alliance awards! We have also advanced further than we ever have in the past, with last year being the first time we made it to Regionals, and this year with us attending the South FTC World Championship! We're very proud, to say the least, and couldn't be happier to have made it this far!



Pilot: Welcome to Aledo Robotics Club

Wednesday, August 31, 2016 4:00 PM

Tasks:

- 1) Introduce all the officers
- 2) Tell the history of the club
- 3) Show the competition video from last year
- 4) Demonstrate robots and let new members play around with them

What's the Haps?

In the beginning something as big as FTC can be really intimidating for a new member. So the officers try their best to get everyone comfortable in their new environment. Kevin, our president, gave a brief intro to everything each officer does (see Officer section in Constitution), and also talked about our club's glorious history.

Since the new competition hasn't been released yet, we showed the new members the competition from last year to give them an idea about what competition is going to be like in the upcoming year. Oh *FIRST* ResQ, how we will miss you...

To go along with the video, we also gave a demonstration of our robots and then we allowed our new members to play around with the controls. Not going to lie, even the old members had a ton of fun driving the robots.

So far it looks like this year is going to be great!



Circuit Breakers' robot from last year,
before it was taken apart :(

Episode 2: Getting Organized For The New Season

Wednesday, September 7, 2016

4:00 PM

Tasks:

- 1) Give the new members a tour of the room
- 2) Give a rundown of all the materials
- 3) Explain the different committees
- 4) Have everyone sign up for the Remind and GroupMe

What's the Haps?

The Robotics room is divided into two main sections. Each team has a section that they work in. Materials are along the back wall, tools are along the front wall, and tables line the edges of the room. It's good to know your way around so club life is easy and almost stress free.

In order to stay organized and keep everything running smoothly we keep committees. Committees decide what role you play in the club. Members can be a part of multiple committees and they all do different things. (If interested in learning more see our Constitution and Bylaws in the binder's back flap)

Last year we had a Remind run by our coaches and our officers, this year we have also added a GroupMe. "What is a GroupMe?" It's just a simple messaging app we can use to communicate with our members and plan events.



Season Premiere: KICKOFF! Introduction To Velocity Vortex

Saturday, September 10, 2016 4:00 PM

Tasks:

- 1) Watch the new competition video
- 2) Read the new game rules
- 3) Start brainstorming on design ideas
- 4) Discuss possible methods and strategies

•••• AT&T LTE 7:32 PM 38% 

< Photo >



kevin_number_7, sam.manning and 8 others

aledoroboticsclub KICKOFF!! We've just had a super rad meeting for the challenge release. #velocityvortex is gonna be loads of fun!! Hope everyone's season is starting out well :)

SEPTEMBER 10, 2016

Episode 3: Saying Goodbye To Last Year's Robots

Wednesday, September 14, 2016 4:00 PM

Tasks:

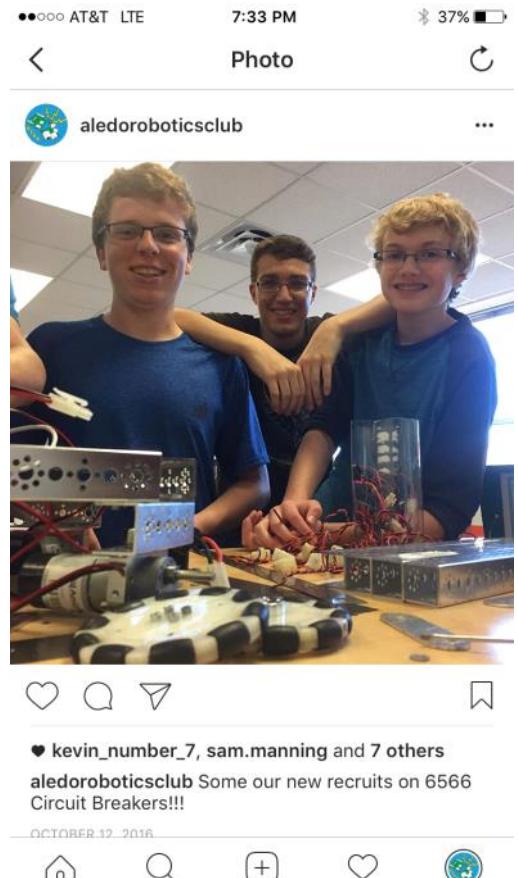
- 1) Discuss teams and committees
- 2) Learn the different parts by taking apart the old robots
- 3) Start creating designs

What's the Haps?

We showed this year's competition video for those who could not make the kickoff meeting and those who forgot already. Then each of our team captains, Kevin of 6566 and Austin of 9161, talked about their leadership goals and how they want the season to go. After they finished talking, we let the members pick their team, trying to lean members so that both teams have enough people for each general role. Once everyone was on a team, we spoke of the committees, of which everyone should belong to at least one. For more information see our Constitution and Bylaws in the binder's back flap.

It was a sad day to see the two old robots taken apart for scrap pieces, although it went well because we had the new members do it so they can get hands on with how the parts go together and work. Both bots were taken apart with care, so we are able to reuse the parts and put them to use for our new robots.

There were so many ideas thrown out, but we had to decide on one design. However, it was not just one person's design, it was a combination of several people's ideas, and it was not a permanent design, because as the team learns and grows, the robot's design should do the same. We ended choosing an omnidirectional chassis for its beacon-pressing practicality and convenience with maneuverability on the field.



Episode 4: Lol, We May Have Forgotten To Take A Meeting Log

Wednesday, September 21, 2016 4:00 PM

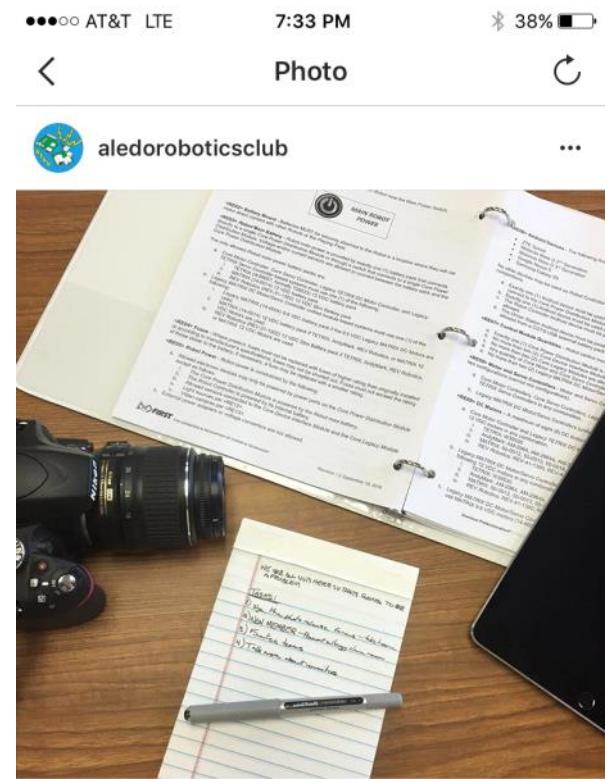
Tasks:

- 1) Go over Constitution and Bylaws with both new and returning members
- 2) Further Designs

What's the Haps?

Before we could move on to working, we had to go over our constitution, so our new members can understand what everyone expects of them and for the returning members to get a refresher. Once everything was read and agreed to, every member had to sign the constitution so we can hold everyone accountable to our rules (however lax they may be).

We continued to develop the robot design because all we had decided on was the chassis. So we started to put pieces together to try to get the chassis mapped out. We had a hard time trying to get the omnidirectional concept to work while trying to keep a stable base and an open side for the ball intake. We are currently trying to get that as stable as possible without sacrificing this mechanic.



kevin_number_7, hebahjeebah and 4 others
aledoroboticsclub Meeting today! Finalizing teams and committees.

[View all 2 comments](#)



Episode 5: "Okay, But Guys, The Engineering Notebook Is Actually Important!"

Wednesday, September 28, 2016 4:00 PM

Tasks:

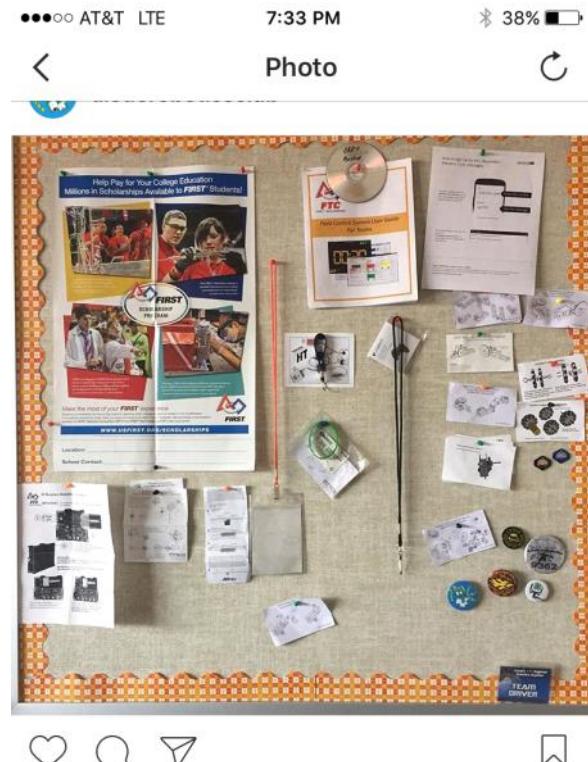
- 1) We need the FORMS (ASAP)
- 2) Finalize teams again
- 3) PowerPoint on Engineering Notebook
- 4) Draw the designs for the chassis in detail
- 5) List any parts you need on design to be approved for purchase

What's the Haps?

Before we began the meeting small chores we had to complete included club sign-up forms and finalizing teams.

So, before we got too far into the season we went in depth about the engineering notebook. We had a cute little PowerPoint presentation by the officers and we got roles for this year's notebook assigned. The head of the Engineering Notebook committee for our team this year is Hebah. She is also the club's secretary. A lot of the formatting and final bits of the notebook are credited to her.

More designs! Chassis is now all figured out and as stable as it's going to be before we add in our particle picking up mechanism.



kevin_number_7, sam.manning and 5 others

aledoroboticsclub "Okay, but guys, the Engineering Notebook is actually important!" We went over the aspects of the engineering notebooks and the best way to stay organized this season. Anyone have any awesome design plans for this year?



Episode 6: No One Can Say They Ever Get "Board" In Robotics

Wednesday, October 5, 2016 4:00 PM

Tasks:

- 1) Build Field
- 2) Get paperwork and T-shirt sizes
- 3) Finish Chassis
- 4) Measure, cut, and configure wiring control board

••••• AT&T LTE 7:33 PM 38% 🔋

< Photo ⌂ ...

aledoroboticsclub



Heart Comment Share Bookmark

kevin_number_7, sam.manning and 6 others

aledoroboticsclub This ban saw is super old but it is still cranking today. Oh, our faithful companion...

OCTOBER 5, 2016

Home Search Plus Heart Profile

Cutting the polyboard for our wiring panel

Episode 7: The Drive Train Has Left The Station

Wednesday, October 12, 2016 4:00 PM

Tasks:

- 1) Turn in FORMS
- 2) Collect sizes and order T-shirts
- 3) Start organizing pictures and meeting logs
- 4) Engineering Notebook Work
- 5) Wire EVERYTHING
- 6) Start the driver-controlled program

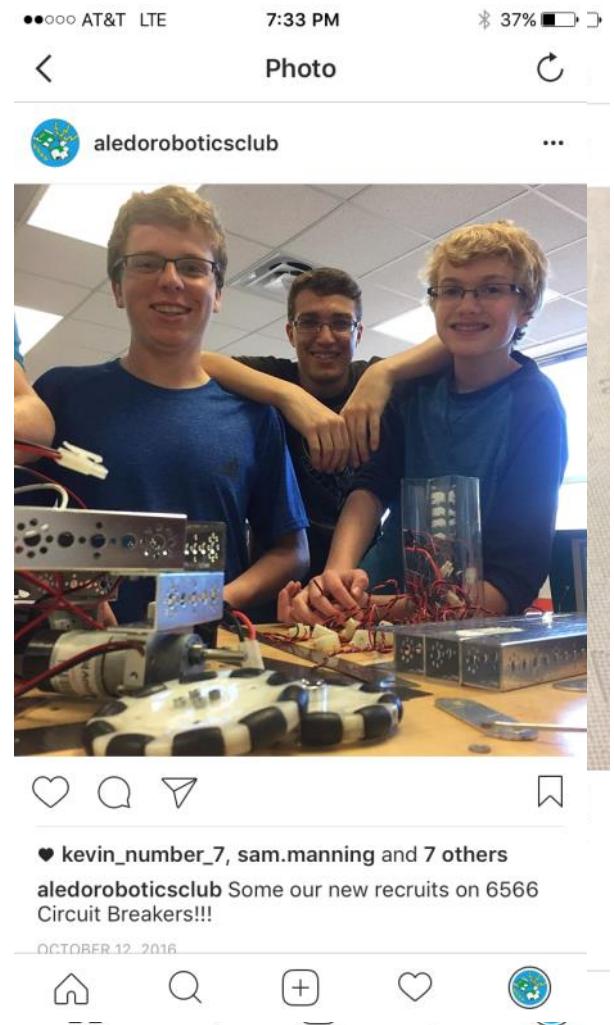
What's the Haps?

We are still working on getting all those forms in. In the meantime though T-SHIRTS!!! Kevin's design this year is super cool!

It's about time we really start organizing the notebook and right now the meeting log "formula" is being developed.

With the control board safely secured, it's time to start wiring. We are lowkey trying to keep everything as clean as possible, but no promises.

With the base done Paige and Ethan are getting started on programming the drive train. It's a pretty strange base, with complicated movement logic, so you should totally look in the Design Notebook to learn more... (it's the 4th tab!)



Episode 8: Running On STEAM (Carnival)

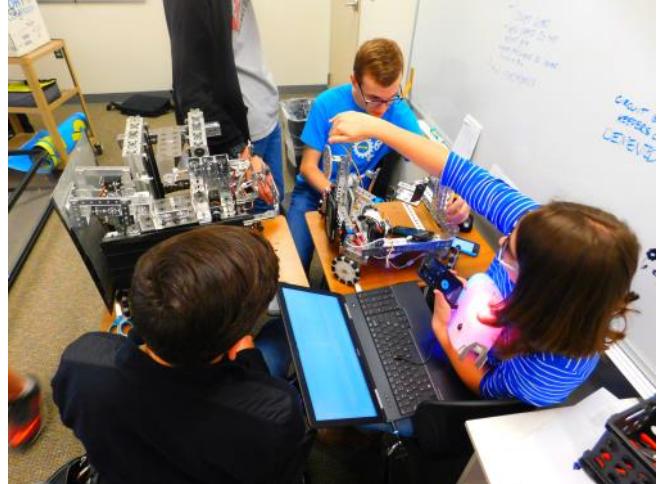
Wednesday, October 19, 2016 4:00 PM

Tasks:

- 1) Finalize paperwork
- 2) Get everyone on Remind
- 3) Finish wiring/ soldering
- 4) Conceptualize ball picking-up mechanism
- 5) Discuss our trip to ESC11 STEAM Carnival
- 6) Finish programming tele-op drive train

What's the Haps?

We had to get everyone's paperwork in before we could continue to work on the robot, take trips, and go to competition. Everyone turned in their paperwork, so we were able to move right onto the next task on hand. We needed to make sure we are able to communicate with everyone on the team to let them know if we had any changes, so we had everyone sign up for our remind. We also created a group conversation where we can get the members to respond using GroupMe.



To get the robot to turn on, we had to finish the wiring and soldering. We had Mr. Chapin, a club mentor, demonstrate to the new members how to solder. The demonstration was also a great refresher to the returning members. After the demonstration was completed, we were able to get the wiring and soldering completed quickly.

We want our robot to be able to pick up and shoot balls into the center vortex. We ended up with a single spinner idea, which would include a bar with surgical tubing threaded through it, that spins. While the engineers were working hard on the wiring, the programmers had to finish the tele-op drive train. It was a challenge to get it working correctly, but we came up with a formula that would make it drive smoothly.

We talked about the great booths and innovation that we saw at the ESC11 STEAM Carnival that we attended on Monday, and how we can incorporate some of that into our presentations at information expos and our own STEAM Carnival which we are having in May again this year.

(STEAM = Science, Technology, Engineering, Art, and Math)

Episode 9: "Right Now We Build Safe; In The Offseason We Welcome Danger"

Wednesday, November 9, 2016 4:00 PM

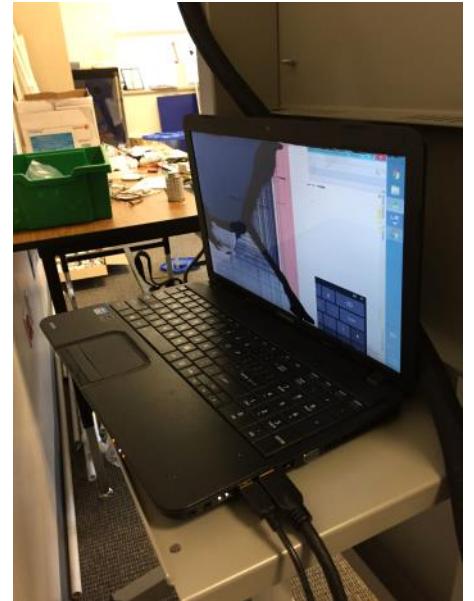
Tasks:

- 1) Take a moment to remember our Toshiba laptop which was sadly screen-broken last season.
- 2) Build ball-picking up mechanism

What's the Haps?

We were just working away, designing some new possibilities for our pick-up mechanism when our lovely sophomore boys (Kychael, Tate, and Conner) started goofing around. Particles and surgical tubing, not a good match. Anyway, this prompted Robbirds to tell them off, and the officers to recount the story about the Toshiba...

It was last year. Carter, our former president, was working diligently on his robot and Paige, our current head programmer, was programming their robot. Carter wanted something done. Paige thought he was being stupid. In the heat of the moment Carter gets upset and the piece of scrap metal he was holding gets flung towards Paige. Paige on instinct ducks and the scrap metal attacks our poor Toshiba who had no form of defense. Our Toshiba was beat up. Day by day he got worse, his screen slowly depleting. And then in a few days he finally passed. We will always remember you, our faithful Toshiba.



Episode 10: "John's Giant Jug Of Sweet Tea..."

Tuesday, November 15, 2016 4:39 PM

Tasks:

- 1) Start coding autonomous program
- 2) Refresh our refreshments...

What's the Haps?

Drive train is done and pick-up mechanism is currently on the way. It's about time we start mapping out our autonomous programs.

Hebah and Mrs. Reynolds were sitting down having a chat about the engineering notebook when Hebah looked out into the sea of chaos that is the robotics club and saw two giant jugs of sweet tea. She was confused. She stopped Kevin who was passing by, "Hey, why is there sweet tea under the table?" John, who was standing around, suddenly bends down and grabs one of the jugs and proceeds to chug a pretty good amount. "I guess that's John's giant jug of sweet tea..." (said by Mrs. Reynolds.



♥ themiracleworkerz, kevin_number_7 and 6 others

aledoroboticsclub John's giant jug of sweet tea...

NOVEMBER 15, 2016



Episode 11: We Needed To Commandeer Our Laptop From Our Sister Team..."

Monday, November 21, 2016 10:00 AM

Tasks:

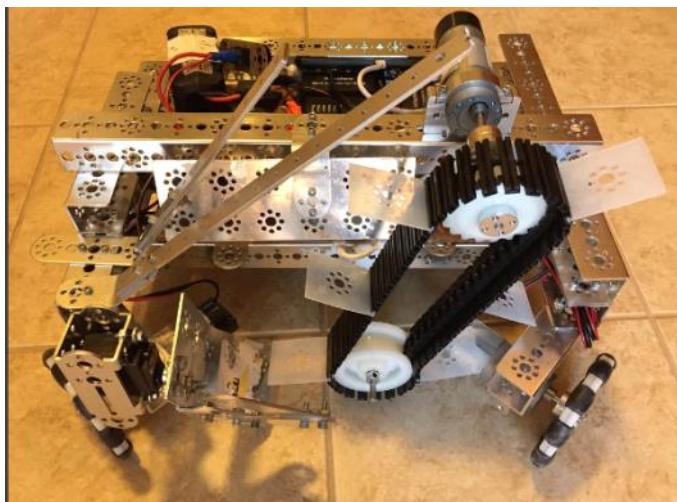
- 1) Design a way to lift the particles as efficiently as possible
- 2) Run some tests

What's the Haps?

Now it is Thanksgiving break. We are working on our robot at Hebah's house trying to develop a proper shooter (the elev-gate-or had just been built) when we realized our laptop was nowhere to be found. We searched through all the equipment we had brought over. We couldn't have left it at school. Then we realized. Austin had it...

We as a club have one laptop: we have to share it with our sister team. It gets annoying at times, but we do what we gotta do even with the limited supplies we have.

- While Austin has our laptop, we've decided to practice our picking up mechanism. We took logs of how efficient it was at picking up and times as it went along. Long and kind of annoying, but really useful.



♥ themiracleworkerz, kevin_number_7 and 8 others
aledoroboticsclub Guess who's back! Our previous leader Carter has come back! HE HAS RETURNED!!!
NOVEMBER 21, 2016



The Elev-Gate-Or!

Episode 12: The Birth Of Our Autonomous

Wednesday, November 30, 2016

4:00 PM

Tasks:

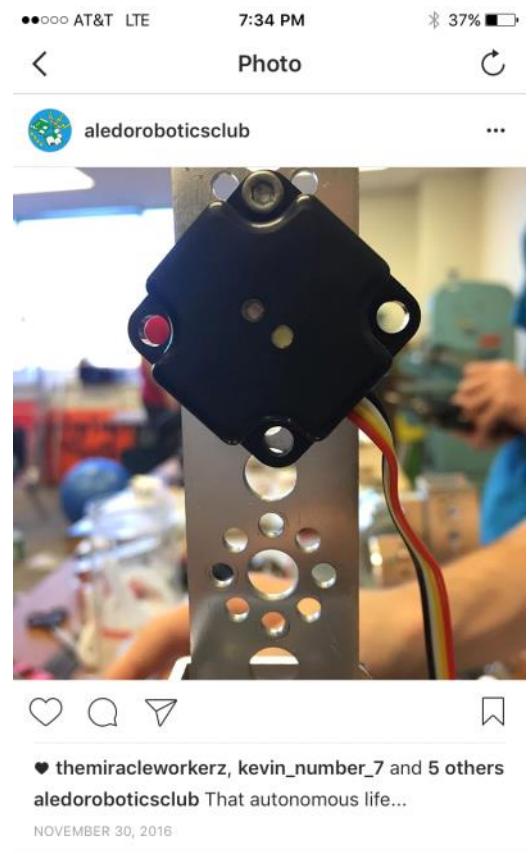
- 1) Attach color sensor
- 2) Start coding color sensor
- 3) "Build" corner vortex

What's the Haps?

It was so exciting to see that our color sensors came in that we basically installed them right then and there. However, It was hard to decide where to put the sensor because we were not sure where we were going to fit the beacon button pusher.

We made headway through the autonomous with color sensors. But we hit a wall because the color sensors are not reading the correct values.

We realized we don't have a rivet gun so... the corner vortex is not *that* necessary.



Episode 13: "We Are The Keepers Of The Demented Crab"

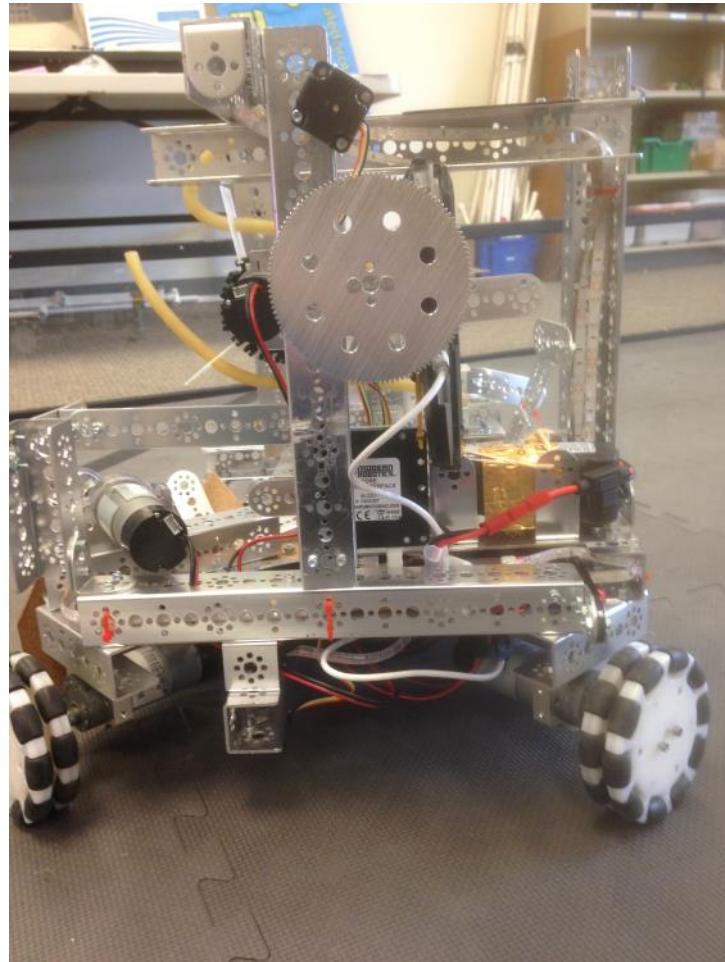
Thursday, December 1, 2016 4:00 PM

Tasks:

- 1) Program some quick backup autonomous programs

What's the Haps?

The last meeting we had we were not able to get the color sensors to work properly, so to get points in the autonomous, we created several back up programs. We had one that just shoots the balls into the center vortex. We have another one that shoots the balls into the center vortex, pushes the ball out of the way, and park on the center vortex. We also have one that shoots the balls and parks on the corner vortex. These programs also make us very compatible with other robots.



Episode 14: You Can Only Practice So Much...

Friday, December 2, 2016 4:00 PM

Tasks:

- 1) Practice. Some more Practice. And practice.

What's the Haps?

We wanted to do some driving and shooting practice so when we are in at a competition, we will be more prepared. Our drivers, Kevin and John, practiced so they are more efficient at picking up ball and shooting them. We also had the other team members practice so if our main drivers are gone, anyone can step up.



Heart Comment Share Save

themiracleworkerz, kevin_number_7 and 12 others

aledoroboticsclub When you are locked out of your school and you have a meet in an hour 😬😬😬

DECEMBER 3, 2016

Home Search Plus Heart Save

Post from our meet that Saturday...

Episode 15: Making A Few Changes...

Tuesday, December 6, 2016 4:00 PM

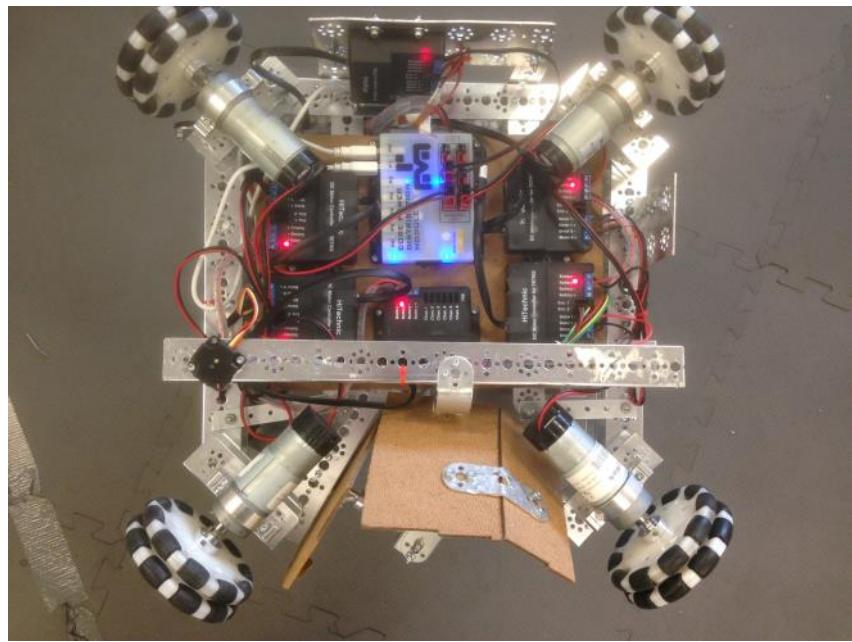
Tasks:

- 1) Move wiring panel as low as possible
- 2) Cut Cascade-Effect tube in half longways to use for channel to get balls from elevator-or to shooter (?)
- 3) Add handles to pick up the robot with

What's the Haps?

We moved the wiring panel down so we are able to pick up balls and move them to the flicker quicker. Since we lowered the wiring panel, we had to redo the gate so that it will work properly. We needed a new way to move the ball over to the shooter, so we tried cutting a cascade effect tube to use for the ball channel, but unfortunately this doesn't work as well as we anticipated.

We want to be able to pick up the robot easier since at the last competition we had trouble picking it up and working with the wires. The handle made it where we are able to quickly and efficiently move it around from the pits to the field and on and off the table in our workroom.



Episode 16: We Changed More Than Anticipated...

Monday, December 12, 2016 4:00 PM

Tasks:

- 1) Add more support to frame
- 2) Completely redesign Elev-Gate-Or (ball pickup)
- 3) Merge the new picking up mechanism with the shooting placement
- 4) Figure out the new ramp

What's the Haps?

So the Elev-gate-or design did not work as well as we were hoping that it would, so it's time to come up with a new design. It was sad taking it apart, but we need to be more efficient so we can be competitive. We started to play with parts to see what works best, but we did not pick the design.

Since we are redoing the lift, we had to add more support to the frame. To do this, we added more c-channels to the frame, which made it more structured.

We decided that the new ball pickup would be a motor with a scooper, which will pick up the balls more efficiently. We added cardboard as a ramp to help the scooper pick up the balls. However, we had to face the problem of moving the ball over to the shooter. We decided to add a conveyor with plastic squares that should move the balls over to the shooter.



Episode 17: FIRST World Problems

Tuesday, December 13, 2016 4:00 PM

Tasks:

- 1) Yikes! The chassis design is too compact to fit the particles
- 2) Expand opening horizontally

What's the Haps?

After putting in the conveyor yesterday, we ran into the problem of not having enough space for the balls to move through the robot. To fix this, we moved parts around and created a path for the balls to go through. The opening was a little too small, so we widen the opening for the balls to go through.

We have a detailed drawing of our entire robot at this design stage in our Design Notebook (3rd tab)!



Random photos of us competing against our sister team (Overload) in a finals match in our league



Episode 18: Taking Care Of Infrastructure

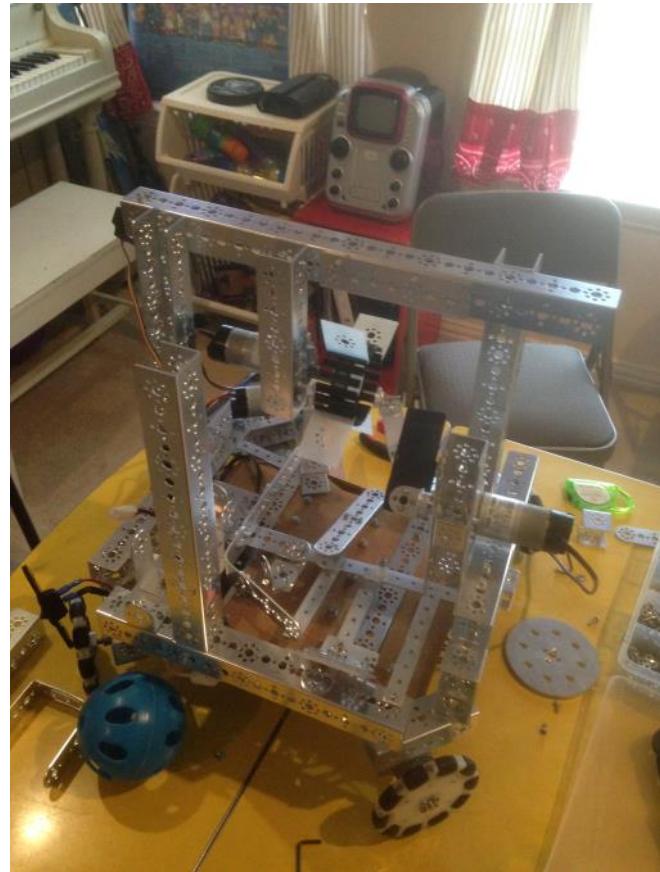
Thursday, December 29, 2016 4:00 PM

Tasks:

- 1) Make the design easier for use
- 2) Add a brace for bottom access

What's the Haps?

We wanted to be able to access the wiring panel easier, so we flipped the wiring panel over, where it would face the bottom. To be able to do this, we had to add something that would be structurally sound. We ended up adding a bar over the top of the robot which works as a handle and a stand.



Episode 19: Central Spinner Adjustment Or CSA For Short

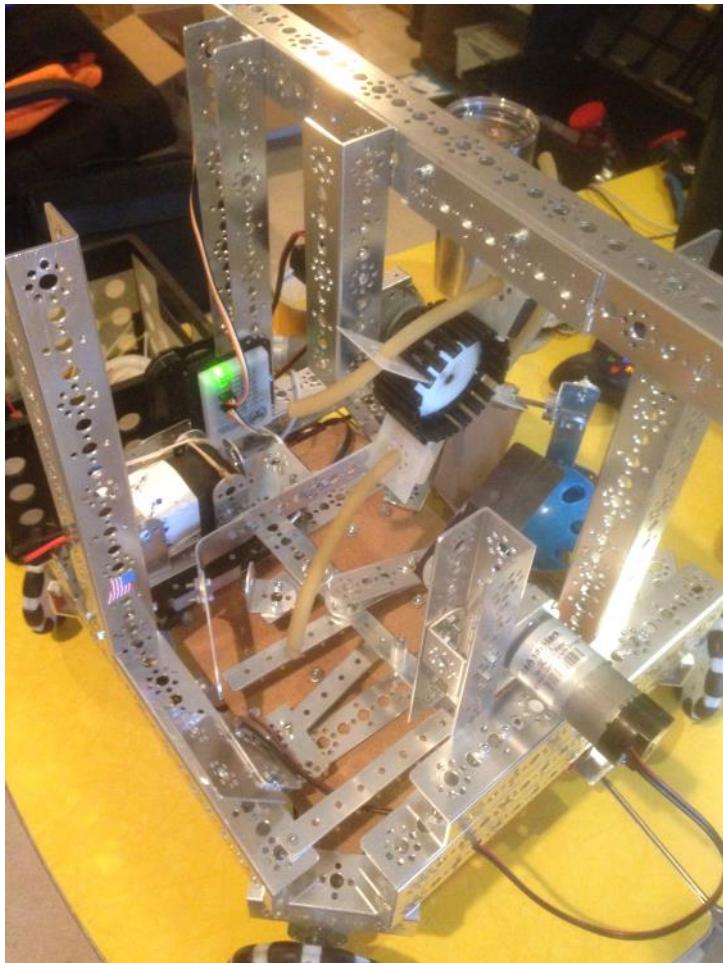
Monday, January 2, 2017 4:00 PM

Tasks:

- 1) Add a crutch so that the particle can reach the shooter quicker and easier
- 2) Identify and fix areas where particle leaves the path

What's the Haps?

The particles are getting stuck, which is really getting on our nerves. We fixed this by adding flat bars to create a more efficient path that will keep the ball from getting stuck. We had to make sure that the bar did not affect the flicker, but still did its job.



Episode 20: We HATE Motor Encoders

Tuesday, January 3, 2017 4:00 PM

Tasks:

- 1) Configure motor encoders for Crab
- 2) Test launching from completed redesign
- 3) Begin re-coding autonomous

What's the Haps?

We faced several problems, such as the motor encoders are not updating position quick enough, they do not work with iterative op-modes, and capping the motor at a max value did nothing. So, we decided to stick with good ol' timing for our autonomous. On the other hand, our launcher is working successfully with our redesign.

There is a lengthy description with illustrations of our frustrating journey today in the Design Notebook; we recommend checking it out if you need a laugh (because in hindsight -- Edit February 14th, 2017 -- we figured out exactly how to "do encoders" and we feel very dumb...).

Now that Crab is finished (for the most part) we need to program autonomous. We had to redo all of our basic op-modes since we changed the robot a lot. Our shooting program is now more accurate, since we are able to know at what power and for what time to set the launcher motor in order to make shots. We were able to redo the shoot-and-park-on-corner-vortex mode, along with the shoot-and-park-on-center-vortex.

We were all too frustrated this meeting to remember to take pictures of anything, but we feel that this lack of proof of our immense time-waste is preferable.

Episode 21: Ramming Is Illegal...

Tuesday, January 10, 2017 4:00 PM

Tasks:

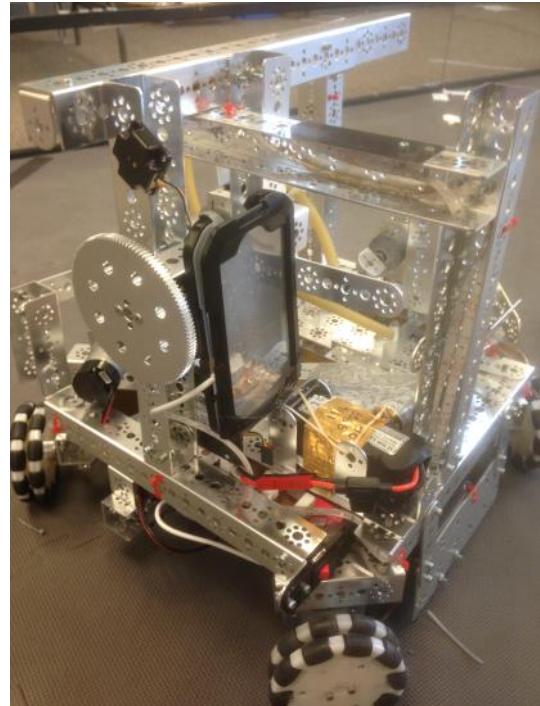
- 1) Design team will work on implementing a button pusher
- 2) Programming team will work on autonomous with color sensor

What's the Haps?

Since the design team was working on the button pusher, we were not able to test our backup programs that we rewrote last week.

The team ended up using a large gear that stuck out from the rest of the robot as the button pusher. The large surface area and structural support with the whole chassis should make it effective at pressing the beacons without ramming into the wall.

For the autonomous, the team decided to stick with one color sensor for now, and we think that the color sensor may be working.



Episode 22: Trial And Error Is Really Annoying But Really Necessary

Wednesday, January 11, 2017 4:00 PM

Tasks:

- 1) Testing backup autonomous programs
- 2) Check out the new clock!

What's the Haps?

Since they finished the button pusher yesterday, we have to test and test everything today. The button pusher worked great during our driving practice, so we are going to be able to use it during the autonomous. Testing the backup autonomous programs went well, we only had a few timing errors that we have to fix next week.



Episode 23: LIGHTS, Camera, Action!

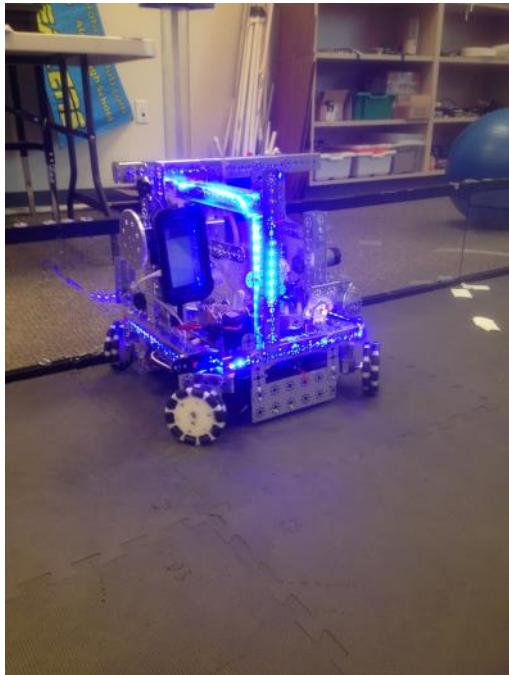
Tuesday, January 17, 2017 4:00 PM

Tasks:

- 1) Funnel LEDs throughout Crab
- 2) Make sure backup autonomous programs are functioning properly

What's the Haps?

We want to make our robot a little more flashy, so we ordered LED lights to give it that little sparkle. We threaded red and blue lights throughout the robot, which will indicate the alliance we are on. We had to fix the timing for the backup programs, which are now fully functioning and running.



•••• AT&T LTE 7:35 PM * 37% 🔋

< Photo ...

aledoroboticsclub

A group photo of five robotics club members standing behind their robot. The robot is glowing with blue lights. The members are holding small trophies. The background shows a brick wall and some equipment.

Heart Comment Share

♥ themiracleworkerz, kevin_number_7 and 10 others

aledoroboticsclub When your robot glows even in pictures! ❤️❤️❤️

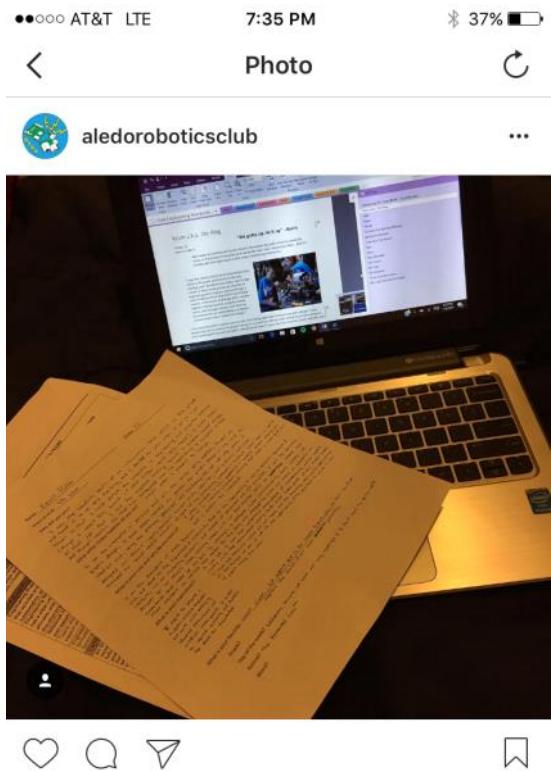
Home Search + Heart Profile

Episode 24 : Wait, Not Cute, Manly!

Wednesday, January 18, 2017 4:00 PM

Tasks:

- 1) Get color sensors to fully load
- 2) Talk to all members about upcoming competition
- 3) Team Bio fill ins



♥ themiracleworkerz, kevin_number_7 and 4 others
aledoroboticsclub Late night engineering notebook work is exhausting but necessary.

3 DAYS AGO



Episode 25: "Look At The Light And Stop Moving!"

Tuesday, January 24, 2017 4:00 PM

Tasks:

- 1) Add to our design notebook
- 2) Work on formatting engineering notebook
- 3) Autonomous, because, well, we have to

What's the Haps?

It is amazing how far our autonomous has come. Color sensors are working "perfectly". We are almost ready for the meet this upcoming Saturday.

Our design notebook is getting some pictures today! We are adding extra comments and cleaning stuff up.

In the engineering notebook we are finalizing and finishing the Programming and Crab section.

Literally, as I (Hebah) was typing this up we all hear Kevin scream while holding Crab up to the beacon. Hence, the title for today's meeting.



Episode 26: "Why Did It Turn?"

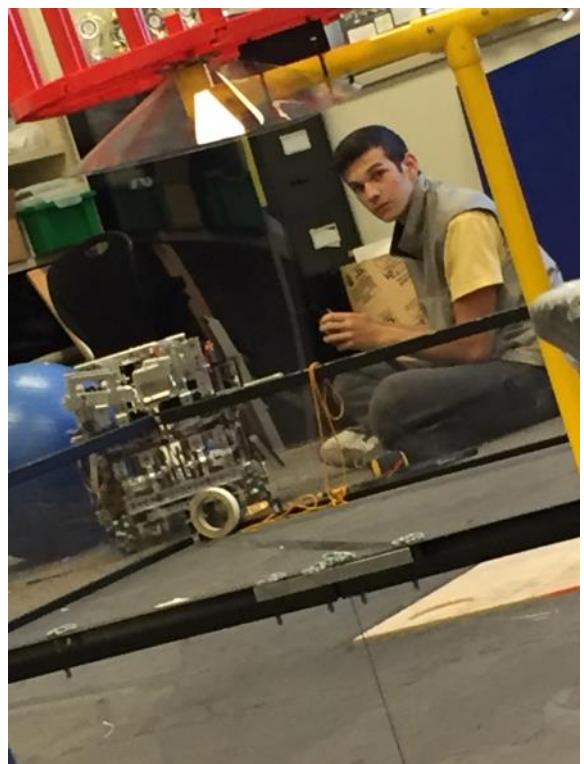
Wednesday, January 25, 2017 4:00 PM

Tasks:

- 1) Work on autonomous
- 2) Take awesome bio photos!
- 3) Work in design notebook

What's the Haps?

Today we took our great photos for our bios, which were really fun trying to show our personalities through the photos! While some of us worked on the design journal, others tried to figure out the autonomous. Every once in a while, our robot will just turn in the middle of the autonomous, hence the name of today's meeting. Other than that, our autonomous is ready for the competition this Saturday... we hope.



Episode 27: You Can't Raise Your Eyebrows And Smile

Friday, January 27, 2017 4:00 PM

Tasks:

- 1) Pack up for the competition
- 2) Final touches to the Engineering Notebook

What's the Haps?

It took us only twenty minutes to pack up (our quickest), which is unusual. We were able to print off and put together our engineering notebook!!!! We are ready for tomorrow!!!!

We were all sitting around (including the Overload team) and Austin mentioned he has a few Raspberry Pi's in his room. Hebah (I who is currently writing this right now) got really excited and they started talking about mechanical ware. Later in the conversation...

Austin: You aren't a programmer unless you've built your own computer.

Paige: HEY! *clear offense on her face*

Austin: Even I've built a computer. *smug face*

Hebah: But you're still not a programmer...

Austin: Lol, it's like the rectangle and the square. A rectangle is a square, but a square isn't a rectangle.
Proud face

Hebah and Paige: OH MY AUSTIN!!!

Austin: What? *shrugged shoulders and confusion*

We also finished up (or as finished you can get in the middle of the season) the notebook and printed it for our meet tomorrow. We are excited, but also lowkey scared.



Finishing up the notebook at breakfast the next morning...

Episode 28: Red Is Just As Important As Blue

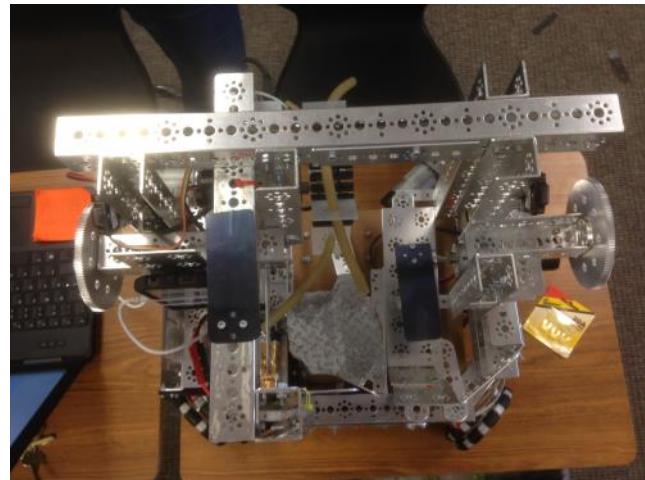
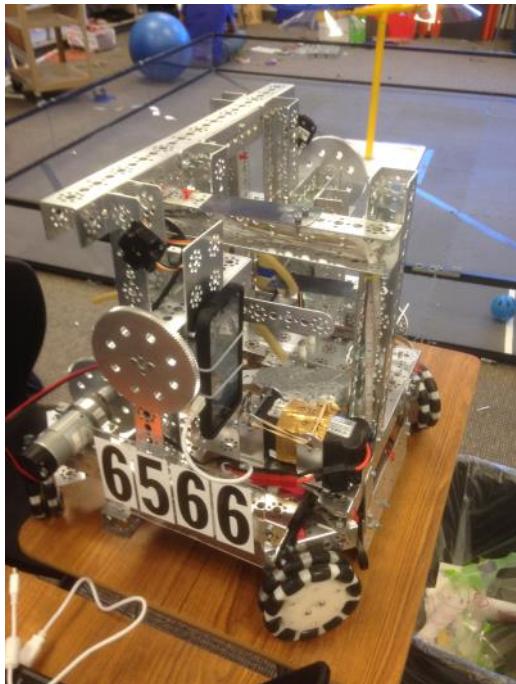
Monday, January 30, 2017 4:00 PM

Tasks:

- 1) Revamp the autonomous for accuracy
- 2) Configure a second autonomous for red side

What's the Haps?

In red side autonomous Crab has to perform a 180 degree rotation in order to be lined up with the color sensor. Since we made the decision to not use motor encoders (see We HATE Motor Encoders section in design notebook or Episode 20), the turn is not accurate and often times skews out run. In solution we have decided to add a beacon pusher onto the other side of Crab. It simplifies things. Personally I (Hebah) like to think of the two gears as Crab's eyes. I mean they are color sensors...



Episode 29: Paige Is Really Happy, Almost Too Happy

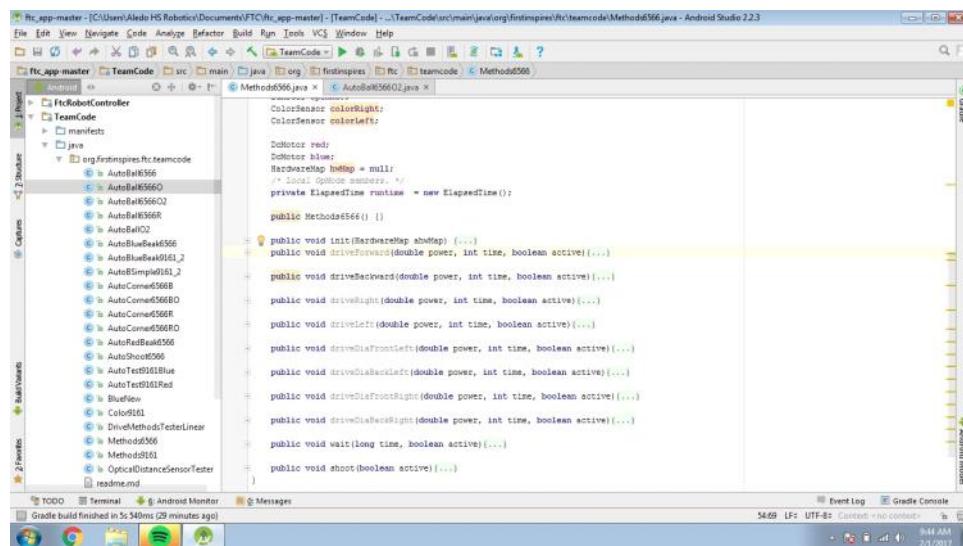
Tuesday, January 31, 2017 4:00 PM

Tasks:

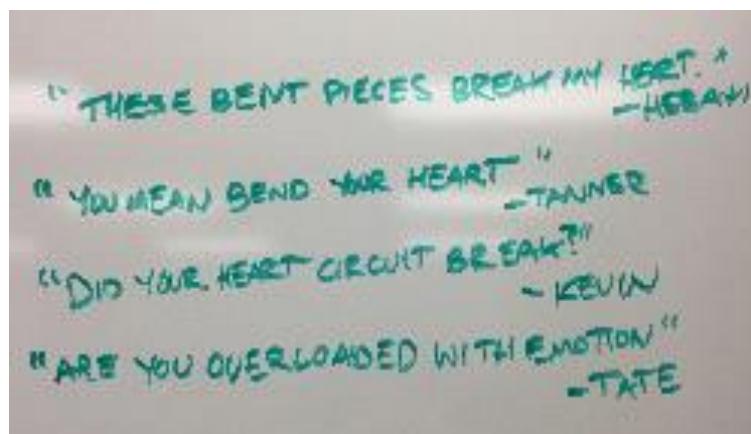
- 1) Clean up our code
- 2) Redo our wheels so the hubs are between the double omni-wheels

What's the Haps?

In order to make all our lives easier Paige, our head programmer, has decided to compile all our basic code into methods. It's a smart adjustment and makes our code much more concise. Changes are detailed in the Programming section.



A screenshot of the Android Studio interface. The project navigation bar shows 'ftc.app-master' and 'TeamCode'. The code editor displays two files: 'Methods0566.java' and 'Auto056602.java'. The code in 'Methods0566.java' includes imports for ColorSensors and DC Motors, and defines several methods like 'driveForward', 'driveBackward', 'driveRight', 'driveLeft', 'driveDiaFrontLeft', 'driveDiaBackLeft', 'driveDiaFrontRight', and 'driveDiaBackRight'. The code in 'Auto056602.java' includes imports for HardwareMap and various sensor and motor classes, and defines a constructor and several drive methods. The bottom status bar shows the build was successful in 52 seconds.



Episode 30: Perfect Pickup Precisely Picks Particles

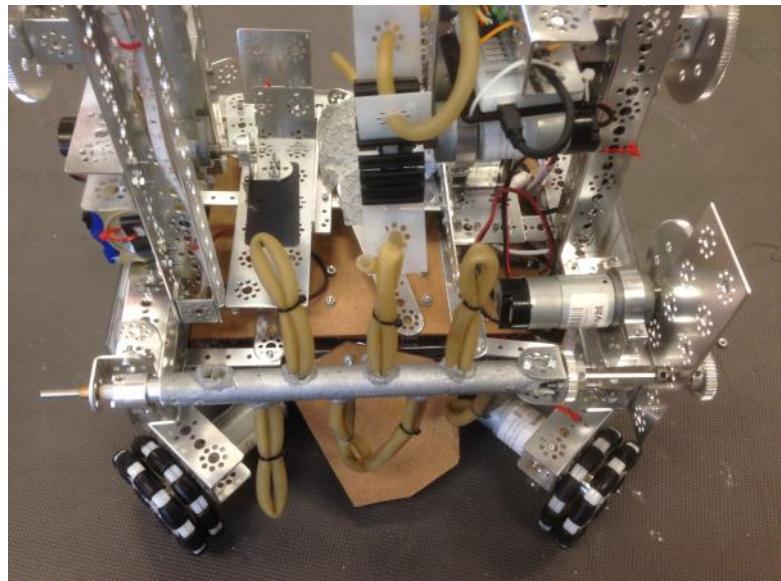
Wednesday, February 1, 2017 10:40 PM

Tasks:

- 1) Change the pickup mechanism on Crab

What's the Haps?

A major design change we have incorporated would be the new pickup mechanism we have installed. We've had constant problems so we are hoping this'll be the last adjustment. We've changed the arm to a continuously spinning shaft that run along the front of our robot. To see more on it check our section Crab and our corresponding date in the design notebook.



Episode 31: Just One Of Those Slow Meetings

Thursday, February 2, 2017 4:00 PM

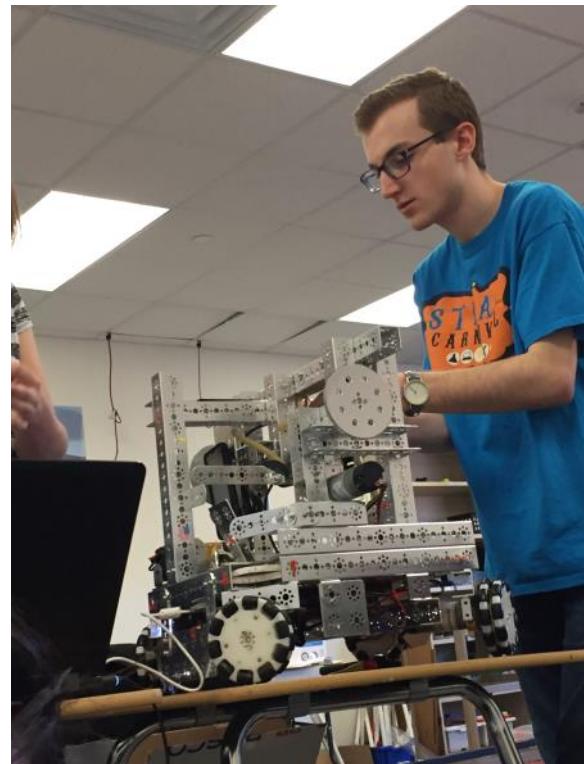
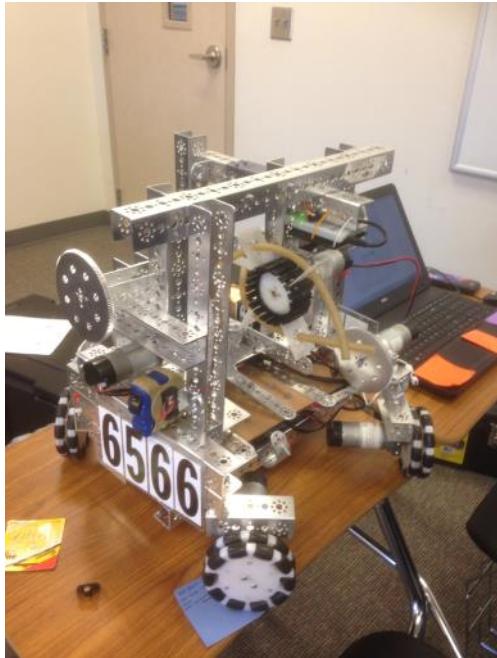
Tasks:

- 1) Finish anything left of the autonomous
- 2) Continue testing

What's the Haps?

This close to the competition our only focus has been improving what we already have and making sure it's all solid. Today only a small group of people met. It was mainly just all the officers. We accomplished a solid autonomous that should good for the upcoming meet.

Other than work, we also talked about future summer and outreach plans. Getting a head start on planning is always a good idea.

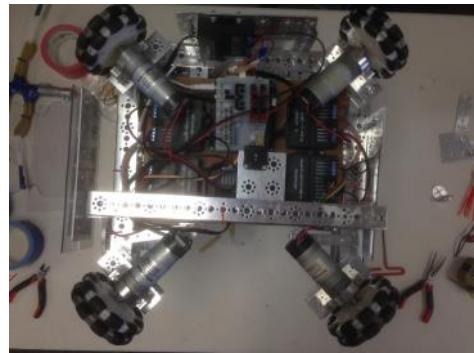


Episode 32: Vufor-eka!

Wednesday, February 8, 2017 4:00 PM

Tasks:

- 1) Cut plexiglass for new ball lift ramp
- 2) Shape plexiglass with heat gun (or try to...)
- 3) Attach our new color, gyro, and range sensors
- 4) Attempt to get Vuforia working for autonomous

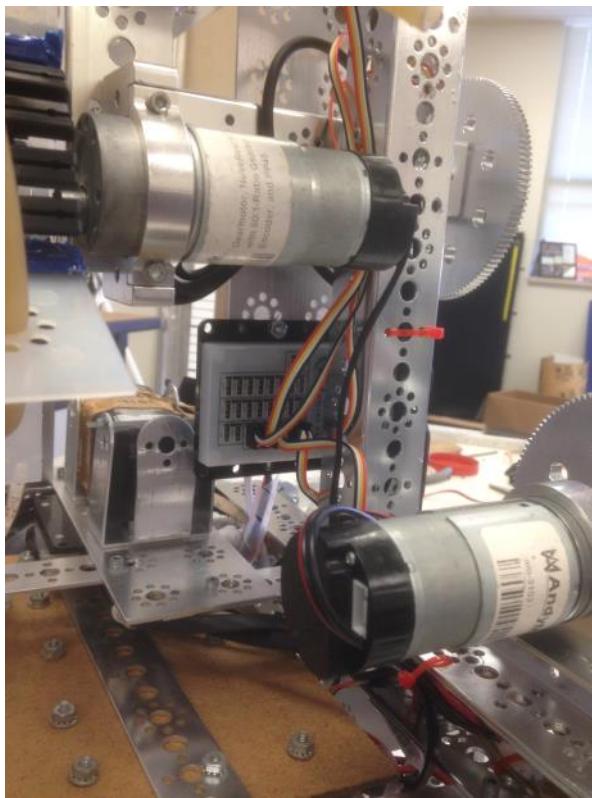


What's the Haps?

During our last meet, we were faced with the problem of our ramp not being able to efficiently pick up the particles. We ended up having to duct tape the entire opening to provide a smooth transition from the floor to the ground. Today we planned to make permanent changes with our ramp by using some cut plexiglass to shape an efficient opening.

Instead of going out and buying new plexiglass we chose to destroy the center structure for Cascade Effect and use that. (We lowkey don't think it's actually plexiglass, but it works...)

It was our usually Wednesday meeting and our belt sander happen to break. We asked Chapin, our mentor, to see if he could figure out what went wrong. This is where it gets weird. Chapin just pulls out a belt sander wheel and replaces it right then and there. HE JUST HAPPENED TO HAVE ONE WITH HIM. It was replaced and then we went on with our day.



Episode 33: Building A Bigger, Better Battery Box

Friday, February 10, 2017 12:23 PM

Tasks:

- 1) Find a suitable container for storing all of our robot battery chargers and phone chargers
- 2) Construct inner shelf to hold batteries w/ charger cords hidden
- 3) Drill out holes for power strip and ventilation
- 4) Also fix our beacons with our new electronics kits

What's the Haps?

I have always thought about making a battering charging station for our robot batteries and phone. At our last contest, we saw another team using a Tetrix box for charging all their batteries. After seeing this, we finally decided to put in the time required to make one.

We have been using our Stanley box for transporting our batteries already, so we decided to convert it to our charging station. The box has a deep lower section with wheels that attaches to the upper section via latches. We cut a hole in the lower section for the cord for a power strip and built a shelf out of PVC pipe and polyboard. We then cut vertical slits in the back for airflow and plugged in 5 robot battery chargers and another power strip with a long cord into the power strip in the bottom. We then cut a hole into the bottom of the upper box, so that we may run the cord for the second power strip into it. We then constructed another shelf out of PVC and polyboard. We plugged in 5 phone chargers and an extension cord with the drill battery charger on the end. The whole system can easily be closed for transport, and the vents can be covered with duct tape in the event of rain during transport.

This will hopefully prevent any more events of chargers or technology going missing, as we will not lose anything and other teams should not mistake any of our cords for theirs.



Episode 34: "Turn The Heat Gun On And Shut Up"

Tuesday, February 14, 2017 9:25 PM

Tasks:

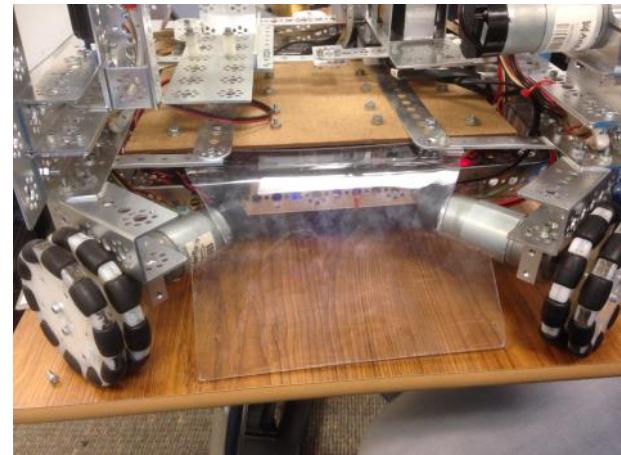
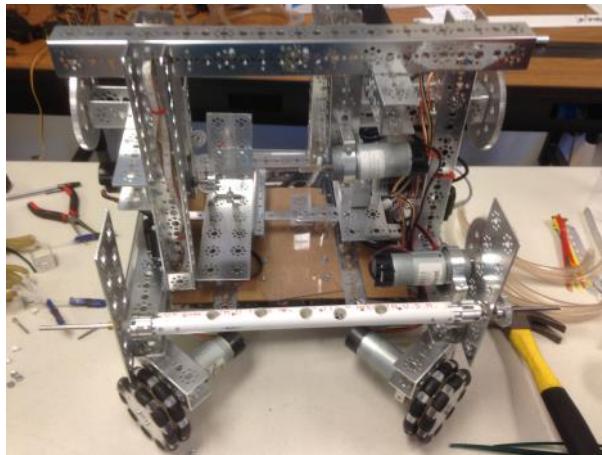
- 1) Get interviewed for the community news about our club!
- 2) Begin assembly of new pickup using vinyl tubing and thick clothesline wire
- 3) Bend/Shape plexiglass for ramp using Chapin's mega heat gun
- 4) Finally get motor encoders put on all our drive motors
- 5) Figure out why one of our new drive motors is slower than the others



What's the Haps?

Today an interviewer from the local newspaper spied in on us during our meeting. She took a ton of pictures and talked to different members about what we do. We are super excited to see our faces in the upcoming paper!

At our previous meeting we were having trouble heating our "plexiglass," so Chapin brought his mega heat gun so we could properly shape our plexiglass. It worked! We can now proceed with our plans to test the pickup components, but we need to figure out the problem we've been having with one of our drive motors... it looks like our drive train won't be functioning until a new motor we ordered arrives.



Episode 35: Working With Macaroni... Constantly

Wednesday, February 15, 2017

4:00 PM

Tasks:

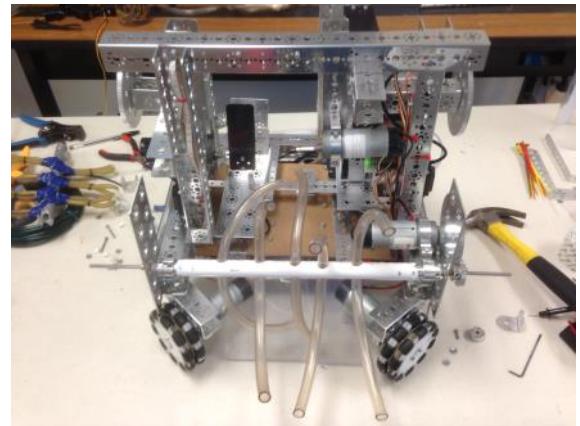
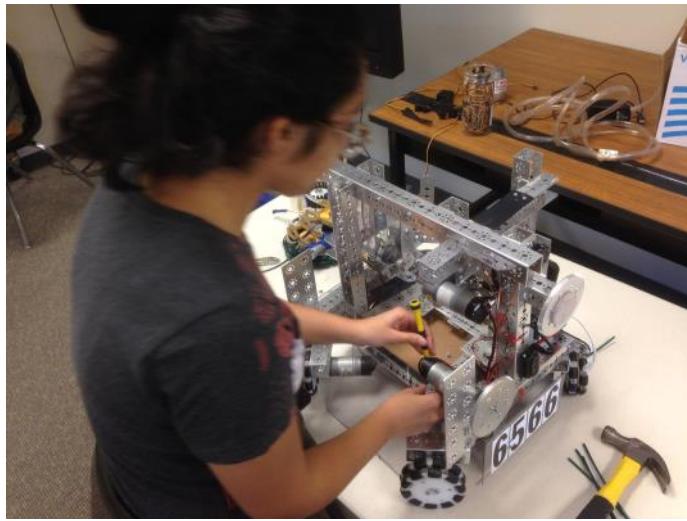
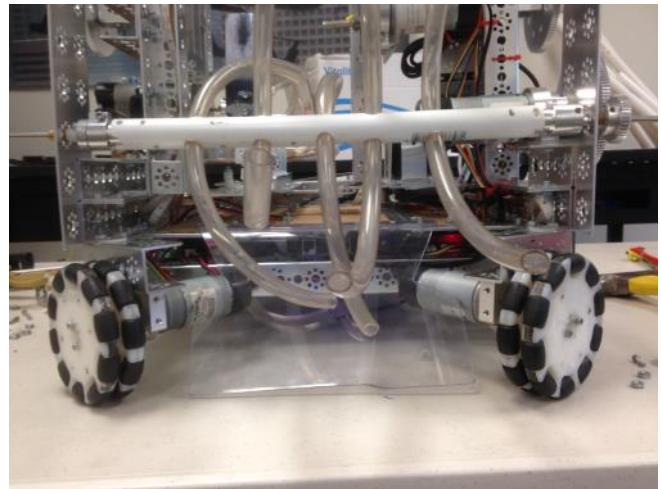
- 1) Get our sensors' memory addresses added to the configuration
- 2) Begin setting up motor encoders
- 3) Replace and clean up design of new particle lift

What's The Haps?

In setting up our new particle lift we are trying out a stiffer (vinyl) tubing in order to add more grip to our pickup.

Motor encoders are being added to our drive wheels to help with accuracy and to make the autonomous work a little better in competition.

Also, our sensors' memory addresses have not yet been set and Paige has been working relentlessly to get them working with our code.



Episode 36: "It's Not Ghetto, It's Engineering"

Monday, February 20, 2017 11:21 AM

Tasks:

- 1) Complete pickup component using PVC, vinyl tubing, surgical/latex tubing, clothesline wire, E-6000, electrical tape, duct tape, and a whole lot of engineering!
- 2) Switch back to 60:1 motors to get gyro sensor and motor encoders working
- 3) Finish molding plexiglass ball track
- 4) Reattach central spinner and test ball-shoot autonomous

What's the Haps?

Today is President's Day! You know what that means? It's a teacher workday, and we don't have school (but of course we convince the school to let us work in the robotics room for the equivalent of an entire school day on top of our couple usual after-school hours!) What this means is we had a REALLY LONG MEETING and got a lot of items finally semi-checked off our list.

When we switched our motors over to the 60:1 ratios, we realized we were having the same problem we had with the faster 40:1s, and that the motors may not be the problem. Using extensive voltmeter and ammeter tests, we posited that the motor encoder or some part of the power distribution was malfunctioning. Unable to really solve this issue, we went ahead with coding our autonomous using motor encoders and the integrating gyro sensor, and for no sensible reason, the motors now can all successfully run the same speed without one slowing down and causing unwanted turns in the robot. We aren't sure why this works, but we sure are glad it happened with enough time left for us to recode our autonomous op-modes before Regionals!

We finished building our new idea for the ball pickup mechanism, and....*drumroll*... it doesn't work! The surgical tubing can't pick the balls up the ramp as well as we expected, and there isn't really enough room between the vinyl tubing and the ramp for the particles to fit through comfortably... We plan to fix this by adding a servo and using chain and sprockets to allow the actual pickup spinner to fall farther away from the ramp upon initialization, outside the 18", allowing for more room for the particles. We believe this will solve most, if not all, of our problems with the pickup.

In order to weave the surgical tubing through the vinyl tubing, we had to come up with a very "ghetto" solution which involved poking holes with a screwdriver, twisting a paperclip through, and then pulling it through with a spare length of wire.



Episode 37: "It Looks Like An Angry Rabbit!"

Tuesday, February 21, 2017 9:02 PM

Tasks:

- 1) Get our full autonomous working for both blue and red
- 2) Set up our new retractable banners
- 3) Redesign ball pickup
- 4) Rework the threshold for red-side color sensor

What's The Haps?

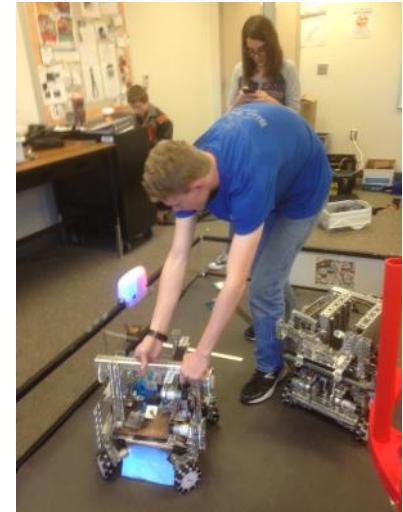


We have built new components since yesterday's meeting for our pickup mechanism which will be a shorter distance from the ground and reach farther out from our robot, however we have yet to attach them to Crab and actually test it in action.

We've been having continuous problems with our beacons. They've been overheating, and their wires have been coming loose. So John and Paige spent some time trying to fix them and get our beacons working again so we can go back to testing autonomous.

Also, we figured out that the tables we had directly next to our field were causing an issue with the beacon's light values being read, so we moved back the tables to the wall and there is no longer a shadow upon the beacons, so our color sensor is behaving normally, as it does on the blue side.

Wait, HOLD UP! What's the meaning of our meeting log name today? Overload's robot is very robust and holds a *little* too much weight. And during autonomous it always malfunctions some way or another. Today it rammed into the field wall and ended up startling Hebah. She screamed, "Austin! Your robot! It looks like an angry rabbit!" Kevin instantly determined that this would be the perfect clickbait-y title for today's meeting log, and thus it became.



Episode 38: FIRST Unified Theory

Wednesday, February 22, 2017

9:30 PM

Tasks:

- 1) Get all of our sensors working together with Vuforia to perfect autonomous
- 2) Work on fixing pickup mechanism
- 3) Redo all of our autonomous op-modes to use motor encoders instead of timing
- 4) Test possibility of using Vuforia during tele-op to press beacons when we have poor visibility

What's The Haps?

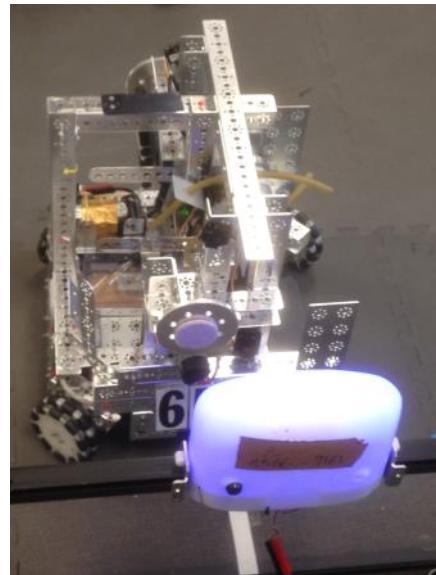
Color sensors have been a continuous problem throughout this season. It seems that for each individual color sensor, the threshold between colors as well as the total value of inputs are vastly different. Our original color sensor, which is on the left side of our robot and is used for our blue team autonomous, reads values out of 12 for red and blue, and generally >2 is a solid threshold. Our newer color sensor, which is on the right-side, reads values seemingly out of 255, and is incredibly unreliable, almost always showing blue as much higher than red even when positioned directly in front of the red side of the beacon...

We finally decided to just avoid trying to set the correct threshold on the right-side color sensor and added a 180 degree turn (using the gyro sensor) back in on the red side autonomous to use the left-side color sensor, which we know works. Our attempts to figure out the values the right-side sensor was outputting are shown to the right...

Right		turn other way
B	R	
50.55	5	Th
22	22	Auto
21.22	36	Tele
26	25	
11	32	Game
70	0	Pick
		Move

On a less frustrating note, since we added motor encoders to replace timing in our autonomous, we have been redoing them steadily, and are on the mission of testing all of our op-modes today. Obvious benefits of using encoders: minimized unequal power distribution, shortened the interval of our placement during movements, and is overall a more stable option.

Additionally, we played around with the idea of having pre-coded autonomous portions which we can execute via the gamepad during the tele-op period. Our example was having a method which uses Vuforia or perhaps the bottom color sensor to automatically position the bot directly in front of the beacon and press the button, and then terminate and return to driver-control. We believe this type of ingenuity could allow for a simple solution to the issue of trying to press beacons we can barely see from an impossible angle during tele-op, and it would be an interesting coding challenge to pull off... We will work on it some more tomorrow to try and get a preliminary mode operational for Regionals this Saturday.



Episode 39: "Mmmmm, Shoe"

Thursday, February 23, 2017 6:12 PM

Tasks:

- 1) Complete new particle pickup mechanism and attach to robot
- 2) Add structure to eliminate internal problems where particles get stuck or fly out
- 3) Finish testing all autonomous op-modes
- 4) Run drills with picking up and shooting particles quickly

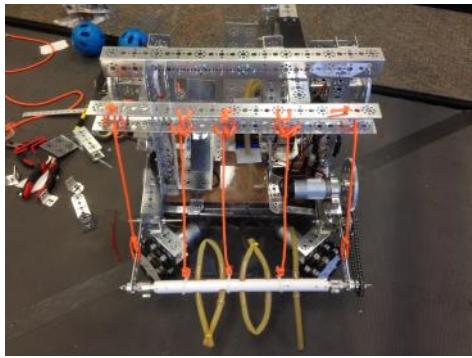
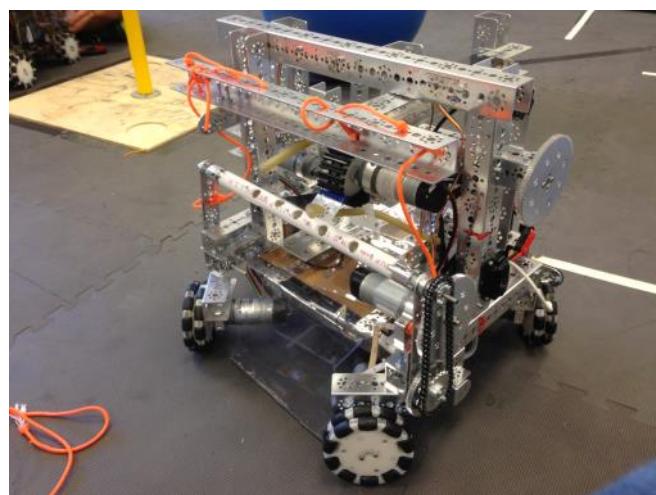
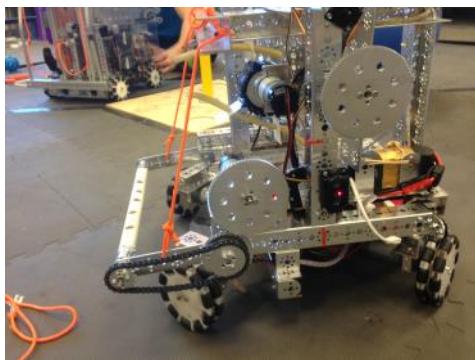
What's The Haps?

Autonomous is finished and working pretty well. Sadly, our beacons broke again and as of right now we aren't sure if our "quickly moving our one beacon" will suffice for a two beacon autonomous. In theory we should be fine, but it's engineering. Theory is NEVER FINE.

Particle pickup is pretty much complete. All we are doing now is drills and small adjustments when needed to account for minor previous oversights and design flaws.

In order to simulate real competition environments, we run drills (usually one minute long) of our tele-op strategy. We often go one on one with our sister team which is useful because they have a vortex spinner on their robot, so we get practice for even the most intense competition.

Speaking of Overload's vortex spinner, some of their members were debating the best material to use for pressing up against the center pole with a single point of contact and successfully spinning the whole structure, when Austin has the idea to use the friction-y soles of his running shoes. After we lost interest and resumed working we heard a confident "Mmmmm, shoe..." from Austin, indicating that he had confirmed his theory concerning the sole of his shoe. After asking if he was really willing to cut apart his shoe for this minor improvement to his robot he softly sighed and carried on work on their autonomous...



Episode 40: STOP DROP CONTROL

Wednesday, March 1, 2017 11:11 PM

Tasks:

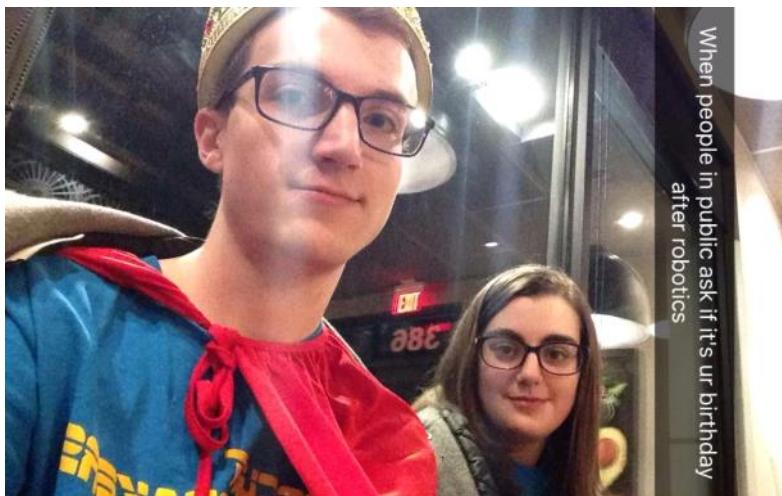
- 1) Dedicated "Safety Dance" as the official club theme song
- 2) Discussed our first-ever advancement to Super Regionals!
- 3) Configured and updated our new Motorola G6 phones to replace our old ZTE Speed's
- 4) Replaced our drive motors with 40:1s and began redoing our autonomous op-modes with new timings

What's the Haps?

At the North Texas Regional Championship, we won the Control Award, so you can imagine how excited we were on Monday when we found out we were advancing due to so many overlaps with higher-up awards. It's been a crazy week, and we are beginning to get Crab worthy of Super Regionals!

On the bus on the way to Regionals, we were discussing safety with Ethan, our Safety Captain (captain of safety and safety management), as we tend to do, and Safety Dance came up on our Spotify playlist, so of course the coincidence meant it was fate, and our team theme song it became!

While discussing our plans and schedule for the next month, we got some tasks out of the way we've been meaning to do for weeks, like replacing the drive motors with faster ones and setting up the new phones we got a month ago.



••••• T-Mobile 3:34 PM 94%



Liked by cobberronis, sam.manning and 10 others

aledoroboticsclub "Hebah won't let me hold the trophy, she's so CONTROL-ing!"

FEBRUARY 25



Episode 41: Twenty-One Pounds of Circuit Boards

Friday, March 3, 2017 3:35 PM

Tasks:

- 1) Look at teams' booths from Super Regionals last year to get some idea of what we can expect and what level our booth needs to be at
- 2) Work out logistics of our trip to Georgia

What's the Haps?

We talked about ideas for our booth in the pits, and some of our members actually had some great ideas:

- Tate suggested cutting our team number into the side of an old PC tower case he has and filling it with LEDs!
- John brought back the notion of us having an inflatable couch from Regionals last year and we are actually considering it!
- Kevin thought it would be cool to have broken pieces of circuit boards hanging from our booth, and then proceeded to buy 21 pounds of scrap boards from a sketchy eBay page... Guess we're doing that!
- Mrs. Reynolds is trying to get us one of those sports canopy things like soccer teams have, but they all seem to be 10' squares, and we are pretty sure we only get 9' for our pit...



Hi Kevin - Order confirmed. eBay will update you when your order ships to 109 Georgetown Ct

PAID : \$55.39 with PayPal

[View order details](#)



21 lbs of Circuit Boards, Gold Fingers etc for Scrap GOLD+other RECOVERY LOT# 1

Estimated delivery: Tue, Mar. 14

Item Id: 401270485180

Transaction Id 615681176027

Quantity: 1

Hebah has a sheet of plyboard lying around in her house for no apparent reason, and Mr. Robbirds offered to turn it into a safe shipping box for Crab!

Speaking of shipping Crab, we were totally unable to come up with a feasible way to get him to Georgia with us, since we're flying, but the Prototypes (Team 8626) offered to take him with their stuff! Thanks, Prototypes!

We also got invited to a big robotics hangout with a bunch of other teams over spring break hosted by the Prototypes! We are sure that nothing but fun can ensue with dozens of robotics dorks playing ultimate frisbee!

Episode 42: "It's all Vuforia, everything is just Vuforia"

Tuesday, March 7, 2017 9:52 AM

Tasks:

- 1) Continue redoing autonomous op-modes
- 2) Integrate Vuforia into full beacon auton
- 3) Begin packing for trip to Super Regionals



What's the Haps?

We decided that for our trip to Georgia, we are just going to pack everything except the robot in suitcases to check on the plane during our flight. We brought two up to the room today and managed to wrap all our trophies in spare t-shirts over the years and fit them all into one case, and in the other were able to fit our electronics box and small tool chest.

We also finally unpacked our box of extra parts that we took to Regionals, and began sorting and deciding which parts we are taking with us to Georgia.

Since we can't work on our beacon-pressing autonomous without functioning beacons (which we are still waiting to ship...), we used the knowledge we gained from using Vuforia during tele-op to pathfind to the picture under each beacon in order to set up this functionality for our beacon autonomous. We are experimenting with using this in conjunction with range sensors to make sure the robot doesn't hit a beacon button before finishing with Vuforia and switching to color-sensor mode.

Also, Kevin likes to describe all usage of Crab's sensors as "Vuforia", but John makes sure to correct him every time that Vuforia is only used for the Robot Controller phone's image pattern recognition and our subsequent pathfinding code.



Episode 43: Comic Sans Is Life

Thursday, March 9, 2017 7:09 PM

Tasks:

- 1) Get buttons, patches, and team hats ordered
- 2) Finish packing for Spring Break and Super Regionals
- 3) Work on Vuforia autonomous
- 4) Remove spring steel launcher

What's the Haps?



It's been a recurring theme that at info expos, interviews, and general conversation about robotics with anyone anywhere that everyone seems to bring up Battle Bots, the TV show where we assume robots fight or something of the like (None of us actually watch or have seen Battle Bots). Anyways, since we felt we needed something to bring the team together, we ordered custom hats which simply read "its not battlebots" in white text across the front. In our heated debate concerning the font of said text, Ethan suggested Comic Sans, the most unanimously hated font in history, which was met with resounding agreement, and thus it was so.

We managed to fit everything we need for practicing over Spring Break as well as for our trip to Georgia in 6 check-bag items for the plane, and we got all of this from the room to the parking lot in one trip, which impressed even us. Tate worked on making his new idea for the mascot costume, which is a knight (to match the King) whose armor is made out of parts from an old Dell PC tower. We are really excited about how it will turn out!

Since making our team buttons/pins last year was literally the worst, this time around we just ordered custom pre-made ones in bulk, so our booth at Super Regionals should be set! We also finally ordered our custom UIL State patches from ResQ last summer that one of our members designed for us in July, so our letter jackets are going to be all decked out in *FIRST*!

Sadly, our launcher has been bent beyond repair from using it for the past months, so we need to quickly make a replacement and a backup before we leave for Georgia! :(

We made a backup last time but the original broke very quickly so we've been on the only backup for this whole time basically...



Our launcher before it broke...

Episode 44: Goodness Gracious Professionalism

Monday, March 13, 2017 6:33 PM

Tasks:

- 1) Attend Irving's FRC Regionals to get pits booth ideas and experience the FRC challenge
- 2) Hang out and bond with The Prototypes (Team 8626)
- 3) Play lots of Ultimate Frisbee
- 4) Work on getting our autonomous functioning
- 5) Figure out how to get a new spring steel launcher ASAP to replace our broken one
- 6) Replace one of our (broken?) drive motors
- 7) Get the chassis all tightened together so it stops wobbling

What's the Haps?

It's Spring Break, so what does that mean? No school, so robotics meetings all day every day! We went to the FRC Regionals on Saturday, then to Fort Worth to hang out with another FTC team, The Prototypes, who showed us the true meaning of Ultimate Frisbee (the official sport of robotics), and then Monday through Friday we met in Kevin's garage where we set up the field to work on all kinds of stuff in preparation for Super Regionals.



When Kevin's garage is cold...

Michelle: "I'm cooooold..."

Stephen: "Well you know what creates a lot of heat! Fir—"

Kevin: "CAMARADERIE"

Tate: "Gracious Professionalism!"

A week ago, Crab was working perfectly, and then in the past few days he has totally fallen apart, with his particle launcher suddenly bending beyond repair from months of use, his drive train motors failing one after another with no explanation from telemetry or the forums, and with our packages never arriving in time to be useful. His chassis was barely being held together after having lost so many screws and nuts, but after struggling for mounting holes we at least solved this issue... It's been a long week but we may have finally gotten his driving operational again; now to figure out how to fix Vuforia and the color sensors before it's too late!

We also started on some ideas we had for our booth in the pits in Georgia and discussed some larger scale ideas for UIL State or Worlds (if we make it there). This includes some informational trifolds as well as some brochures and a mini-center-vortex structure for our table which will hold our team buttons! We are very excited about this last one and have already spray-painted the pieces we will need!



Episode 45: "Stuff"

Thursday, March 16, 2017 9:29 PM

Tasks:

- 1) Get our first vlog edited and uploaded to YouTube!
- 2) Finally get a replacement launcher attached and working
- 3) Finish testing autonomous op-modes with pseudo lights (since we still have no working beacons)
- 4) Finish getting Vuforia working for our Beacon autonomous paths
- 5) Play a lot of Ultimate Frisbee during our frustration breaks
- 6) Create a manifest of everything we are taking to Super Regionals while packing (so we don't forget anything and leave it there...)
- 7) (Almost) Finish making our mini-Center-Vortex-button-holder for our booth in the pits

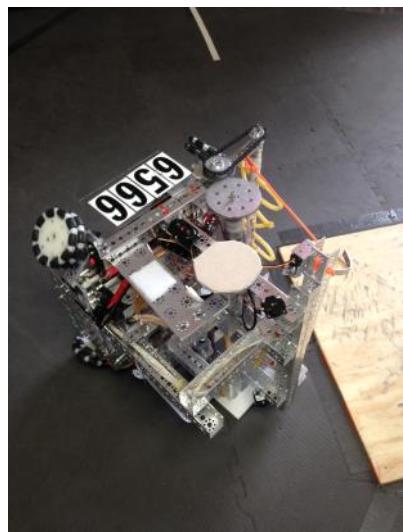


What's the Haps?

Basically a lot of the things we got done are pretty simple and covered by their task descriptions. While getting the vlog up we watched it maybe 5 times, laughing hysterically at things only we would find funny in the 11 and a half minute video. In it, John did a room tour, during which he said "stuff" and "random crap" a noticeable amount of times, so Hebah edited in a text overlay every time either phrase was said. We found it funnier than most people probably would, but then again we're the dorks who are in it...

In more... relevant,,, news, we realized that not only does Crab's infrastructure enable us to put him totally upside down, we can also set him on any of his sides (except the pickup side...), so that's another cool/helpful convenience. Speaking of infrastructure, in order to let the RC phone see the vision targets under the beacons better for Vuforia pathfinding, we moved the phone mount out and flipped it upside down, so the camera has easy, on-level line of sight.

Also, Chapin helped us to make four more particle flickers! We should be set for the rest of the season.

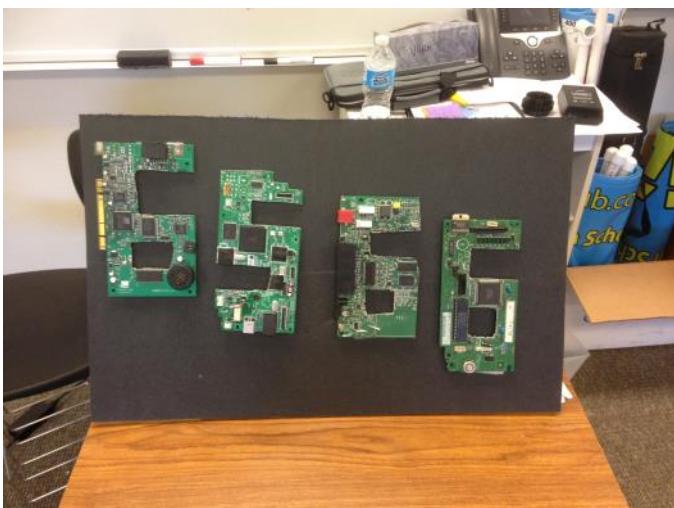


Episode 46: Circuits Really Are Broken (C.R.A.B.)

Tuesday, March 21, 2017 10:56 PM

Tasks:

- 1) Break all the circuit boards!
- 2) Team bonding!
- 3) Final touches to mini-center-vortex-button-holder
- 4) Finalize our plans for our booth in the pits
- 5) Practice setting up our easy-up canopy that will go over our booth



Episode 47: "It's Not Robotics If It's Not Broken"

Wednesday, March 29, 2017 10:04 AM

Tasks:

- 1) SUPER REGIONALS
- 2) Unpack, organize room
- 3) Plan for WORLDS
- 4) Plan upcoming STEAM Carnival booth
- 5) Set a date for senior banquet and officer elections for next year
- 6) Discuss summer camp dates/activities
- 7) Finally finish taking apart the ResQ ramps from last year's challenge...
- 8) Discuss upcoming field trip to Bell Helicopter



What's the Haps?

We got back from Super Regionals in Georgia, and spent a whole meeting unpacking and planning for the rest of the year with our sister team.

Before we left for Georgia, our last backup 40:1 motor broke, so while there, our only four working motors were on our drive train. Halfway through qualifying rounds, one of these broke, so luckily we were able to swap it out at the AndyMark booth for free and were able to compete in the subsequent rounds. "It's not robotics if it's not broken!"

We also got a bit carried away making Super Regionals memes...



Episode 48: Gear In The Headlights

Wednesday, April 5, 2017 7:40 PM

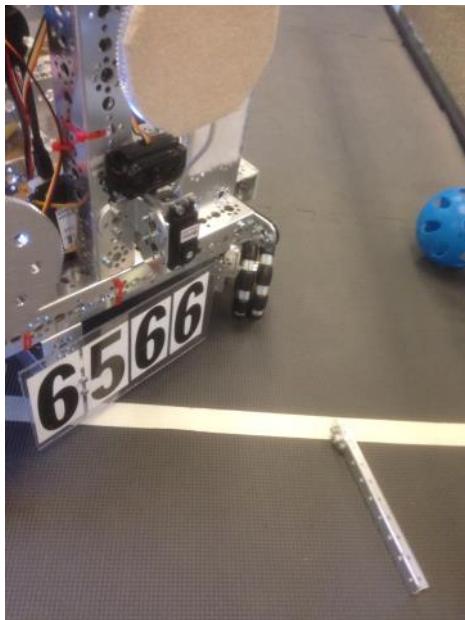
Tasks:

- 1) Continue planning rest of year
- 2) Completely clean and organize room
- 3) Test all autonomous with new op-mode menu system
- 4) Create formula for setting gyro turn values
- 5) Order new shirts for Worlds
- 6) Make more circuit pins
- 7) Work on adding particle-sweeper to Crab
- 8) Interview for Community News

What's the Haps?

Our main problem during autonomous at Super Regionals was when we successfully pathed to the beacon and picked the right side, but then couldn't hit the button because a particle got stuck between Crab and the wall, which completely threw him off course. We worked on adding a simple servo that will hopefully solve this problem by sweeping particles out of the way before they can get trapped and mess us up.

We added a menu system for our Autonomous op-modes so that we won't have an insane number of op-modes in the same folder for all of our different paths. This proved to be super great for maneuvering the driver station while we were testing everything today!



The Modern Robotics Integrating Gyro sensor has proven to be an asset, but a fickle one. The turn values are very accurate in the first quadrant, but when turning more than 90 degrees, the gyro strays progressively more off track, so much that we have to put in totally different values to get certain turns that we want. To make this simpler, we found the inputted and actual turn values for around twenty separate degree values, and used a scatterplot graph to figure out a formula for estimating the correct turn degrees to achieve the turn that we want. It turned out to be a simple linear regression with our input needing to be multiplied by 1.0365 to find what the actual turn will be! Thanks, algebra class, for teaching us how to use scatterplots to do math! (And who said algebra has no "Real World" application!?)

12C April 5, 2017 ALL ABOUT KIDS NEWS.COM

Circuit Breakers head to world championship

Robotics team taking robot named "Crab"
By Jennifer Hellman

The Aldo High School robotics team "Circuit Breakers" is set to compete in the world championships for the first time in the program's history, they are advancing to the world championships.

The competition will take place April 20-21 in Houston, and the team members say they are ready for another opportunity to strut their robot's stuff.

This year, Tate Shattuck and Kevin Robb. "We usually lose at regionals so this is a first time for all of us."

Robb and the other members of the team are no strangers to competition though. This year, Robb said, just six different teams

"We were a lot more willing to redesign this year, and work on changing our strategies," he said.

The Circuit Breakers' team includes Michael Riser, Tate Shattuck, Hebrew Goderya, Kevin Robb, Ben Oaks and John Miller.

14C APRIL 7, 2017

ROBOTICS

from page 13

Ben Oaks, John Miller, Paige Klima and Kevin Robb

Traveling halfway across the country with Crab, the team competed in March at the Super Regionals and took third place in The Control Award category, good enough to advance.

Sponsor Julia Reynolds estimates there will be about one hundred teams at the meet, representing southern and western portions of the county and some international teams.

"It's actually terrifying," Goderya said. "But we are prepared, and next year we expect to go even farther."

Episode 49: Working On Stuff Backwards

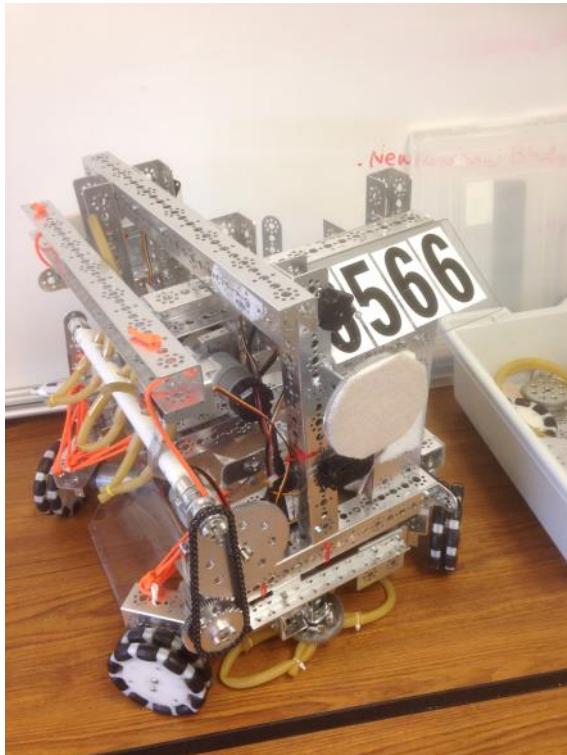
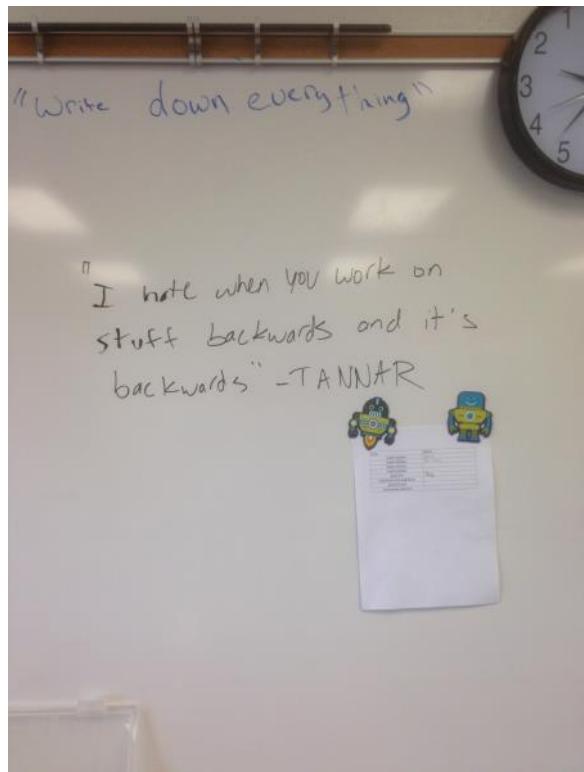
Wednesday, April 12, 2017 9:41 AM

Tasks:

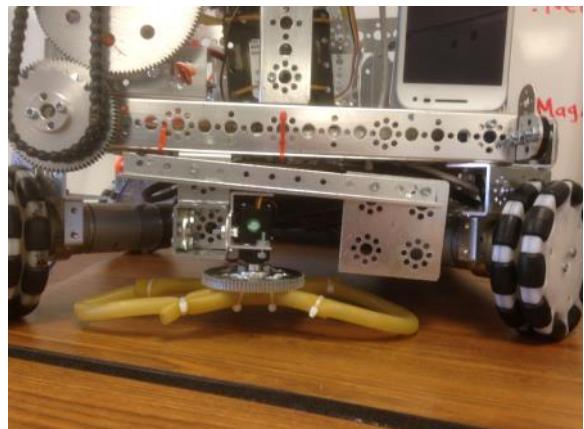
- 1) Cut more circuit board pins
- 2) Discuss food plan for Worlds
- 3) Build and test particle sweeper
- 4) Finish testing and fixing autonomous
- 5) Begin packing for Worlds

What's the Haps?

We corrected our particle-during-autonomous issue by creating a particle "sweeper" using a continuous rotation servo and latex surgical tubing. We set it to begin spinning when Vuforia starts running, and turn off when Vuforia is done. We have had about a 50% success rate and can't feasibly make the changes that would be necessary to improve this rate, so we are settling for this, since it's better than not having it at all.



We made a list of food items for people to bring and had everyone sign up for something.



We also moved our left-side team number panel to be on a slant above our phone mount, since it was in the way of the particle sweeper, and there's nowhere else on the side where it wouldn't be blocking a sensor or the phone, or hitting a gear or wheel.

Episode 50: First WORLDS Problems

Wednesday, April 19, 2017 10:47 PM

Tasks:

- 1) GO TO WORLDS
- 2) Maximize pit space
- 3) Team Bonding
- 4) Have a blast
- 5) Collect ALL THE BUTTONS and redo board in room when we get back
- 6) Pack and unpack



Episode 51: "Stop Touching My Foot!"

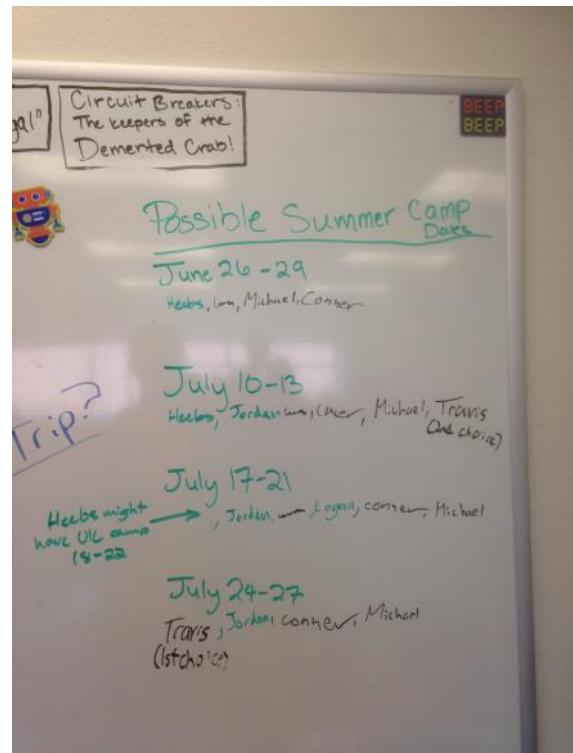
Wednesday, April 26, 2017 10:48 PM

Tasks:

- 1) Discuss Worlds
- 2) Recap rest of season's schedule
- 3) Receive our invite to UIL State!
- 4) Finish planning for tomorrow's STEAM Carnival
- 5) Deconstruct and reconstruct right-side structure to allow for space to add a cap lift
- 6) Get launcher working again in new orientation

What's the Haps?

We got back from Worlds and saw that while we were gone, our sister team had modified their robot to add a far more space-efficient cap ball lift, which inspired us to finally attempt the redesign we had planned to allow the addition of our own lift. So, our first meeting after our return, we disassembled the entire right side of our bot, removing most of the redundant structure, and simplifying the carrying handle. We also had to remove and reposition the launcher, so we spent a long time testing and adjusting the motor until we were able to make shots again, though from a slightly different location. We will have to modify the timings on our autonomous programs slightly...

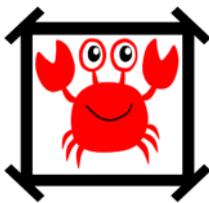


For the community STEAM Carnival, we had the large corner area in the gym allocated for us, so we set up three tables in addition to the full game field to showcase Aledo High School Robotics! We created a safe set of op-modes that don't allow some of the more complex controls and make the launcher safer, where it cannot get stuck in the bent position. Using these op-modes, we let kids drive our robot on the actual game field and attempt picking up and scoring particles into the center vortex (they were more successful than we expected), while other members talked to their parents about signing up their kids for our summer camp. We also recorded lots of video for our post-Worlds vlog (whenever Hebah gets around to it...).

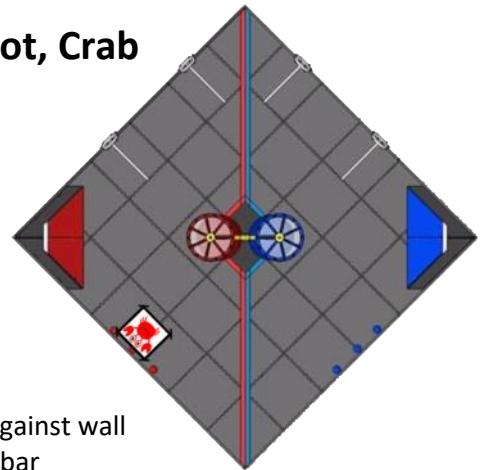
6566 Circuit Breakers - Red Autonomous

Beacon - 100 Points

- Starts at "inside" position
- Shoots 2 particles into center
- Hits both beacons
- Parks on center, moves ball



= our robot, Crab



All except Beacon path have variable delay of 0, 5, 10, or 15 seconds

Ball (inside) - 40 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on center, moves ball

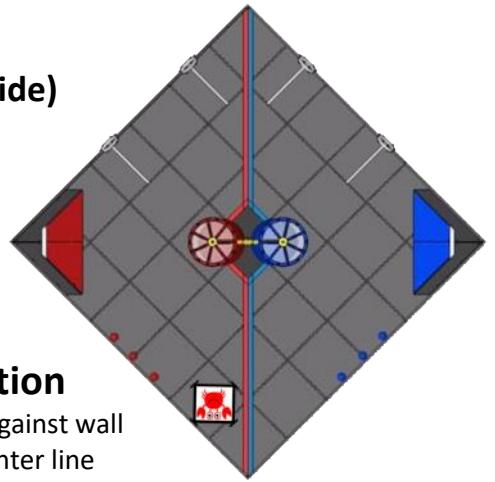
"inside" position

- Both front wheels against wall
- Perpendicular crossbar directly over tile border

Corner (inside) - 35 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on corner

("Front" = Ball Pickup side)



Ball (outside) - 40 points

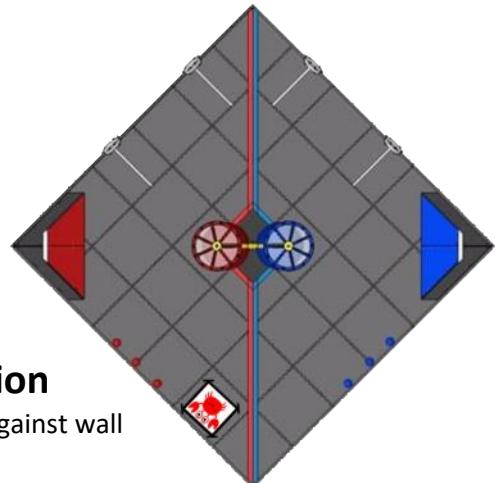
- Starts at "outside-W" position
- Shoots 2 particles into center
- Parks on center, moves ball

"outside-W" position

- Front-Right wheel against wall
- Left side 2" from center line

Corner (outside) - 35 points

- Starts at "outside-C" position
- Shoots 2 particles into center
- Parks on corner



Shoot - 30 points

- Starts at "inside" position
- Shoots 2 particles into center

Driver-Controlled

- Min. 6-8 particles into center
- Keep beacons pressed
- No capping in end
- Can push ball onto corner

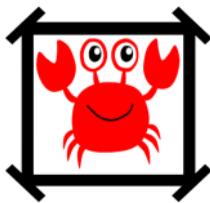
"outside-C" position

- Both front wheels against wall
- In center of tile

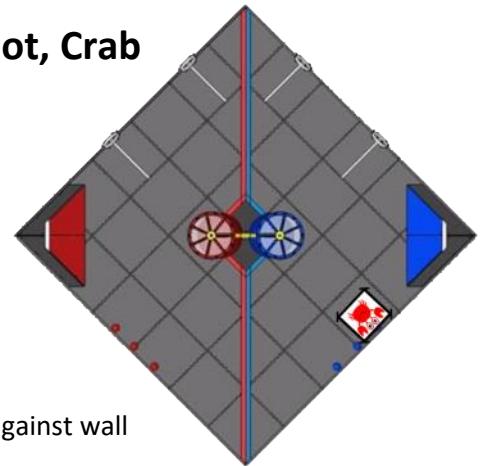
6566 Circuit Breakers - Blue Autonomous

Beacon - 100 Points

- Starts at "inside" position
- Shoots 2 particles into center
- Hits both beacons
- Parks on center, moves ball



= our robot, Crab



**All except Beacon path
have variable delay of
0, 5, 10, or 15 seconds**

Ball (inside) - 40 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on center, moves ball

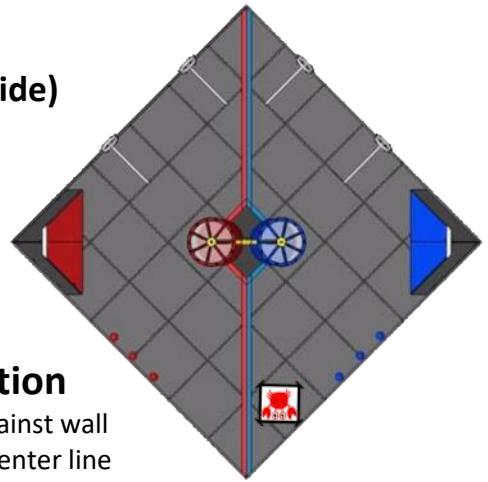
"inside" position

- Both front wheels against wall
- In center of tile

Corner (inside) - 35 points

- Starts at "inside" position
- Shoots 2 particles into center
- Parks on corner

("Front" = Ball Pickup side)



Ball (outside) - 40 points

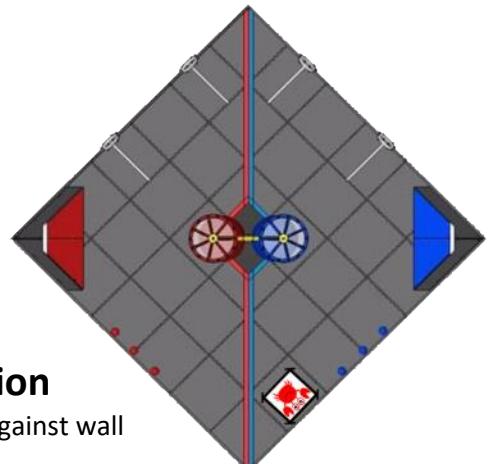
- Starts at "outside-W" position
- Shoots 2 particles into center
- Parks on center, moves ball

"outside-W" position

- Front-Left wheel against wall
- Right side 6" from center line

Corner (outside) - 35 points

- Starts at "outside-C" position
- Shoots 2 particles into center
- Parks on corner



Shoot - 30 points

- Starts at "inside" position
- Shoots 2 particles into center

Driver-Controlled

- **Min. 6-8 particles into center**
- **Keep beacons pressed**
- **No capping in end**
- **Can push ball onto corner**

"outside-C" position

- Both front wheels against wall
- In center of tile

GAME SPREAD 2/4/17

MATCH NUMBER: _____

RED ALLIANCE: _____

BLUE ALLIANCE: _____

AUTONOMOUS (0:30)

RED

Particles scored in:

Center Vortex: _____ (15)

Corner Vortex: _____ (5)

Claimed Beacons: _____ (30)

Cap Ball in contact with Floor: _____ (5)

Parking:

Partially on Center Vortex: _____ (5)

Fully on Center Vortex: _____ (10)

Partially on Corner Vortex: _____ (5)

Fully on Corner Vortex: _____ (10)

BLUE

Particles scored in:

Center Vortex: _____ (15)

Corner Vortex: _____ (5)

Claimed Beacons: _____ (30)

Cap Ball in contact with Floor: _____ (5)

Parking:

Partially on Center Vortex: _____ (5)

Fully on Center Vortex: _____ (10)

Partially on Corner Vortex: _____ (5)

Fully on Corner Vortex: _____ (10)

NOTES:

NOTES:

DRIVER CONTROL (2:00)

RED

Particles scored in:

Center Vortex: _____ (5)

Corner Vortex: _____ (1)

BLUE

Particles scored in:

Center Vortex: _____ (5)

Corner Vortex: _____ (1)

END GAME (LAST 0:30 OF DC)

RED

Claimed Beacons: _____ (10)

BLUE

Claimed Beacons: _____ (10)

Cap Ball:

Off floor and above 30 in (76 cm) _____ (10)

Raised above 30 in (76 cm) _____ (20)

Scored in Center Vortex _____ (40)

Cap Ball:

Off floor and above 30 in (76 cm) _____ (10)

Raised above 30 in (76 cm) _____ (20)

Scored in Center Vortex _____ (40)

NOTES:

NOTES:

TOTALS

RED ALLIANCE: _____

BLUE ALLIANCE: _____

SCOUTING 2/4/17

TEAM NUMBER: _____

TEAM NAME: _____

AUTONOMOUS?

How many particles can you score? _____
Center or Corner? _____

How many beacons can you claim? _____

Do you release the Cap Ball? _____

Can you park?
Where (Center or Corner)? _____
Partially or Fully? _____

DRIVER CONTROL/ END GAME?

Can you score particles?
Where (Center or Corner)? _____
About how many per game? _____

Do you do anything with the Cap Ball?
How far up do you raise it? _____
Can you score the Cap Ball? _____

NOTES:

TEAM NUMBER: _____

TEAM NAME: _____

AUTONOMOUS?

How many particles can you score?
Center or Corner? _____

How many beacons can you claim? _____

Do you release the Cap Ball? _____

Can you park?
Where (Center or Corner)? _____
Partially or Fully? _____

DRIVER CONTROL/ END GAME?

Can you score particles?
Where (Center or Corner)? _____
About how many per game? _____

Do you do anything with the Cap Ball?
How far up do you raise it? _____
Can you score the Cap Ball? _____

NOTES:

Misc ideas

Friday, March 17, 2017 11:55 PM

"overlord"

Better Team Names:

Soldering iron = slaughtering iron

Copyright Infringement

"my car, my quarter" --john

TYPE II Dielectrics

Kevin can't park / John take the wheel

"Smells like someone has a gatorade.... *sniffs self* nope nevermind that's my jacket" --Ethan

Meeting Log Names:

Rust in Pieces

"Your gravy is so much warmer than mine... I feel ripped off" --Ethan

"There's parmesan everywhere! This is a parmesan disaster!" --Conner

Paige: "If you had to open a business, what type of business would you open?"

Reynolds: "mmmm.... I don't really have any useful skills but probably ferrets"

John: "I want the aisle seat. I have leg room."

Kevin: "TANNER Legroom"

"Safety Dance is exclusive to the Safety Captain" --Ethan

"Whoa, I didn't even hear the 'stuff', it's like you have the hearing for 'stuff'" --Ethan

"That felt like a Tate" --Ethan

"Oh my toast!— I mean my poptarts are done!" --Ethan

Teen Kamen

"Yeah I love the crown, but not as much as Tanner Levs Gold" --Kevin

We Lev Robotics

"Daughters should be called moons and children astral bodies" --Ethan

"If Mudrehk is the god of computer science then I'm an atheist" --Ethan