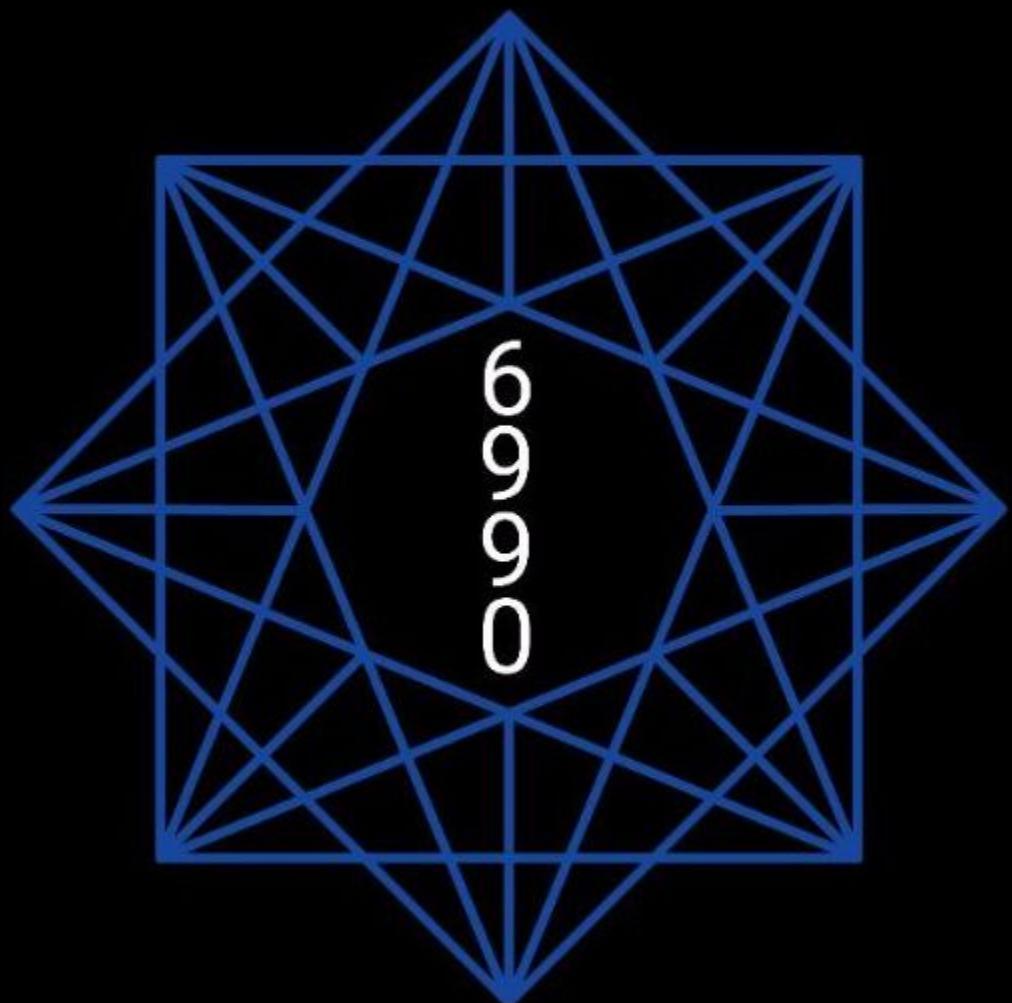


Static Void 6990

2016-2017
FTC Robotics Team

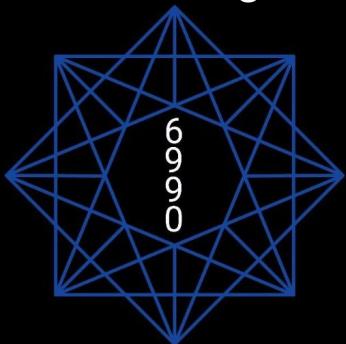


Vista Ridge High School

Summary

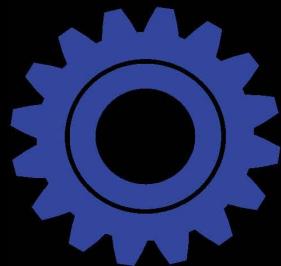
Team 6990, Static Void, is filled with students who are passionate about developing the skills needed to compete with other students at FTC competitions while expanding their understanding of the STEM field. They test their limits and challenge themselves to be inventive.

Team Logo

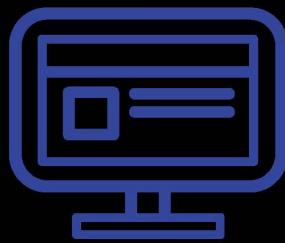


Team Organization

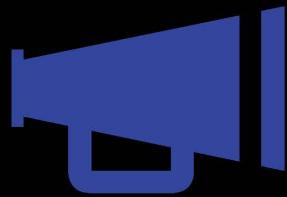
Hardware



Software



Marketing



Each branch of the team is responsible for contributing to the shared goal of creating the best possible robot in terms of function, aesthetic, and presentation. Our project manager, William Smylie, works with each member and department to ensure our productivity, success as a team, and cooperation as a whole. The three departments of our team allow each person explore their interests and strengths within the field of robotics. We strive to create a fun atmosphere where students can further their knowledge in STEM through creating and designing a robot. We would like the judges to consider pages: 36, 37, 54, 55, 83, 84, and 85.

PM: Nick Hemstreet,
advanced to super
regionals as a rookie
team

PM: Chris Charnecki,
advanced to regionals
on the control award

PM: Maria Teleki,
participated in qualifiers

‘13-‘14

Brobots

‘14-‘15

Marvelous Machines

‘15-‘16

Static Void

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Engineering Section

Table of Contents:

Page Number	Title
4-124	Mechanical/ Electrical engineering
125-134	Software Notebook

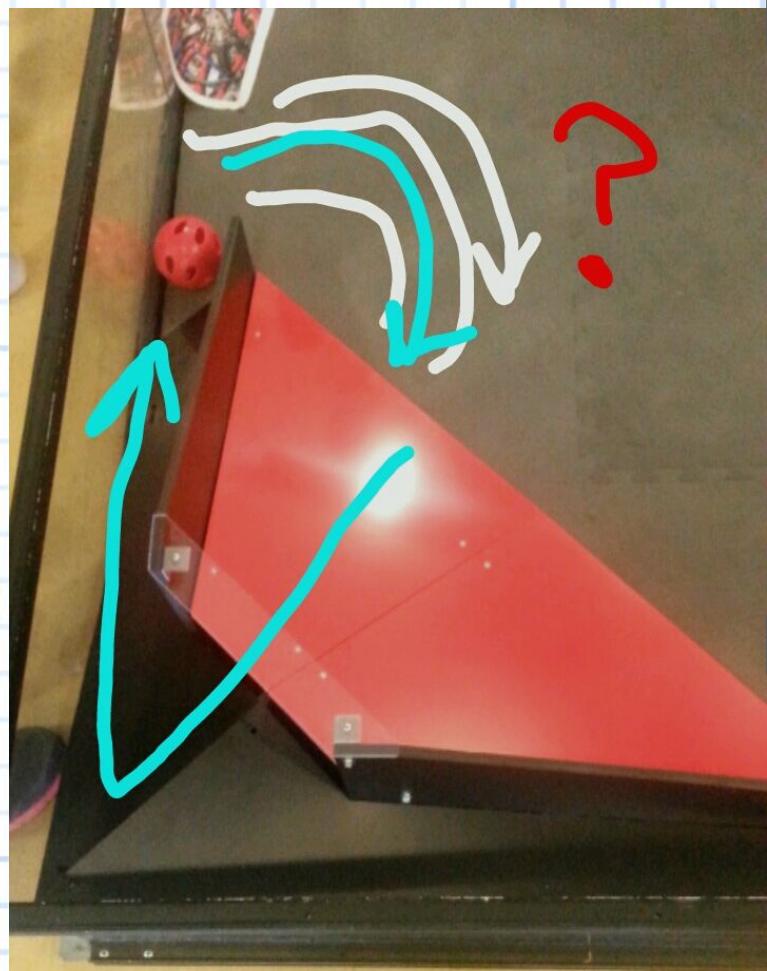
Meeting 9/10/16

Context - Vandegrift Kick-Off

At the date of kick-off, our teams were still being assorted. We ended up just sending the Project Lead, with the plan of doing a full team review once we were organized.

Another consideration in that decision is the time it takes to get all the way across town from Vista Ridge to Vandegrift.

The day ran from 8am to noon.



Already thinking strategy: "If we can cycle these, would it even be worth it at 1 a piece?"

Signed off by:

William
Yehuda Kewang Liu



Everyone getting their first impression of the year's field.



Size comparison: 3.75in ball to PM's hand.



Documenting real world beacon setup with the pictures underneath. Might be worth using.

Meeting 9/22/16

Context - First Full Team Meeting

Meeting start 3:50

- First true meeting, excluding the ranger time meet up to set up communication
- **Prior activities:**
 - Team selection & contracting
 - (PM) attend Vandy Kickoff and Presentations
 - Set up team GroupMe & Remind101
 - Go through Year's game manual and highlight important info
 - Order game field and do other prep work
- **Meeting activities**
 - Introductions
 - Short speech to team about scheduling and planning, to be continued
 - Dismiss hardware to begin brainstorm / organization
 - Give marketing the rundown of FTC and give them an idea of what is going on
 - Build with Slade on the software test bed
 - Missing power distributors / motor controllers damaged from last year?
 - Perhaps basic inventory / reorganization needed

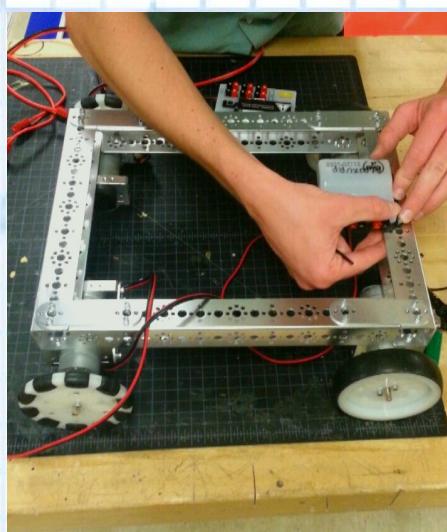
Signed off by:



PM Insights

- Make FULL team meetings more full team focused and more planned out
- Speeches require more planning.
- **To do (for PM)**
 - Set up trello boards
 - Get Ian into communications
 - Set up google drive folder and distribute
 - Get calendar locked down
 - Gantt chart needed for time planning
 - Get confirmed dates of events
 - Set up Google form to log meetings

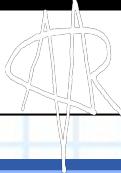
Meeting end 7:00



LEFT: Slade building the software testbed so that we can verify what we have working and what needs to be ordered.

RIGHT: Closet day 1, as it was left at the end of last year. It will need a cleaning / reorganization

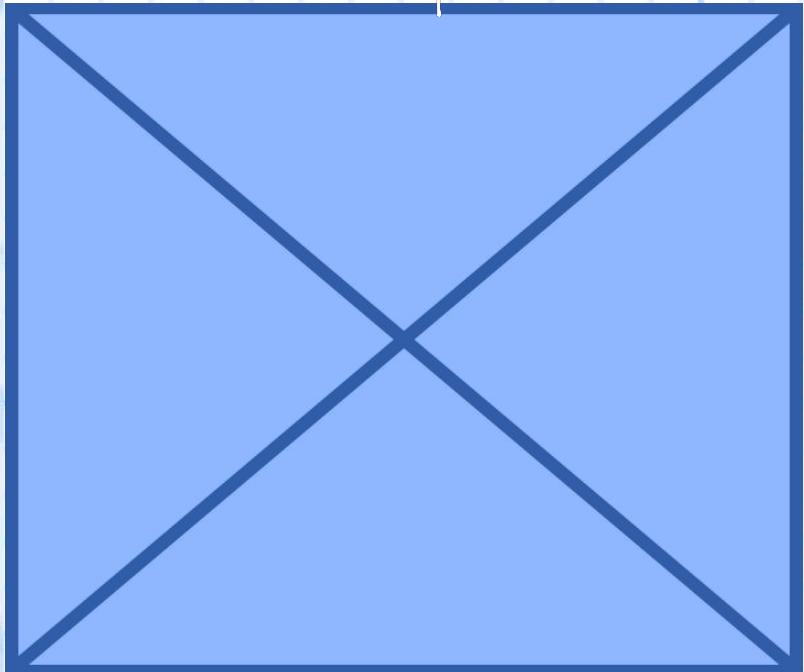
Meeting 9/27/16



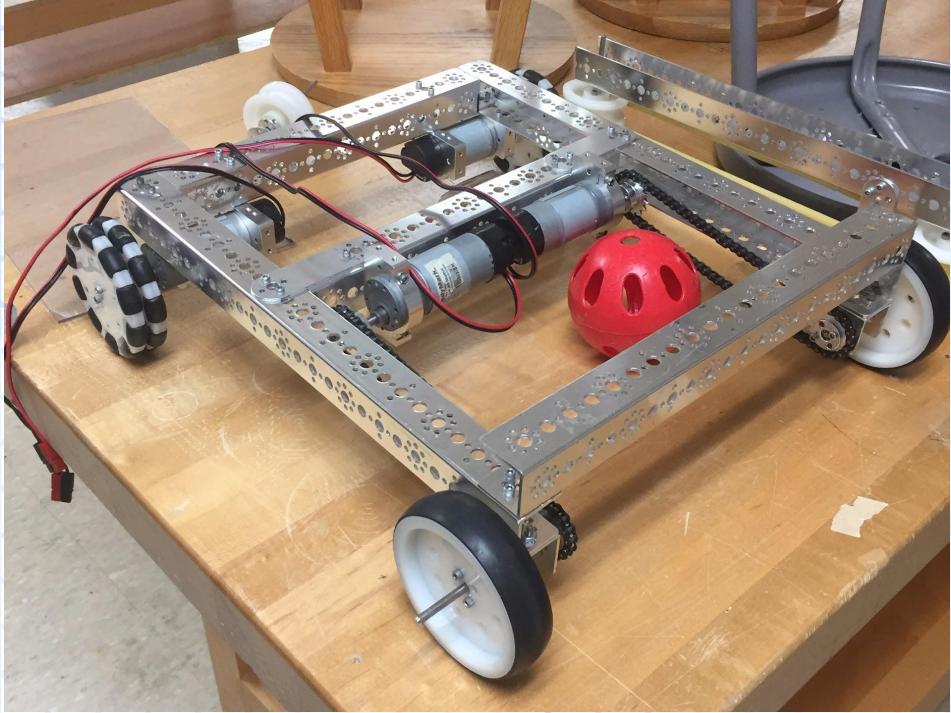
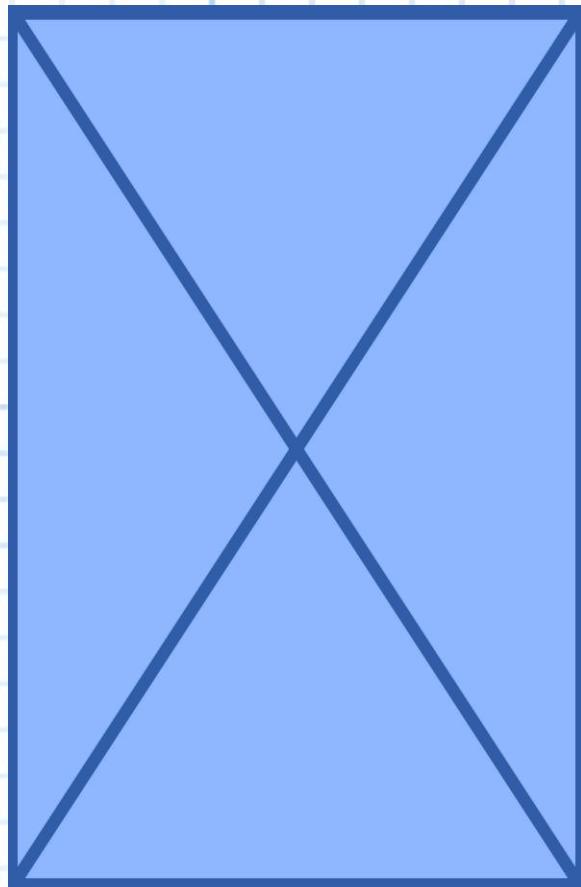
Context - Brainstorming 1

Meeting start 3:50

- This was a short meeting, just to get the gears turning in everyone's heads
- Marketing worked on coming up with a new logo
- Hardware began brainstorming potential chassis and scoring ideas.
- Quick inventory revealed that we need more motor controllers and some other supplies - we'll start an order.
- Trello account set up, first board is the shopping list.
- Discussed dues, looking at something near 40\$ to cover basic team expenses.
 - Includes T-Shirt
 -



Meeting end 5:10



Signed off by:

William
Anglin

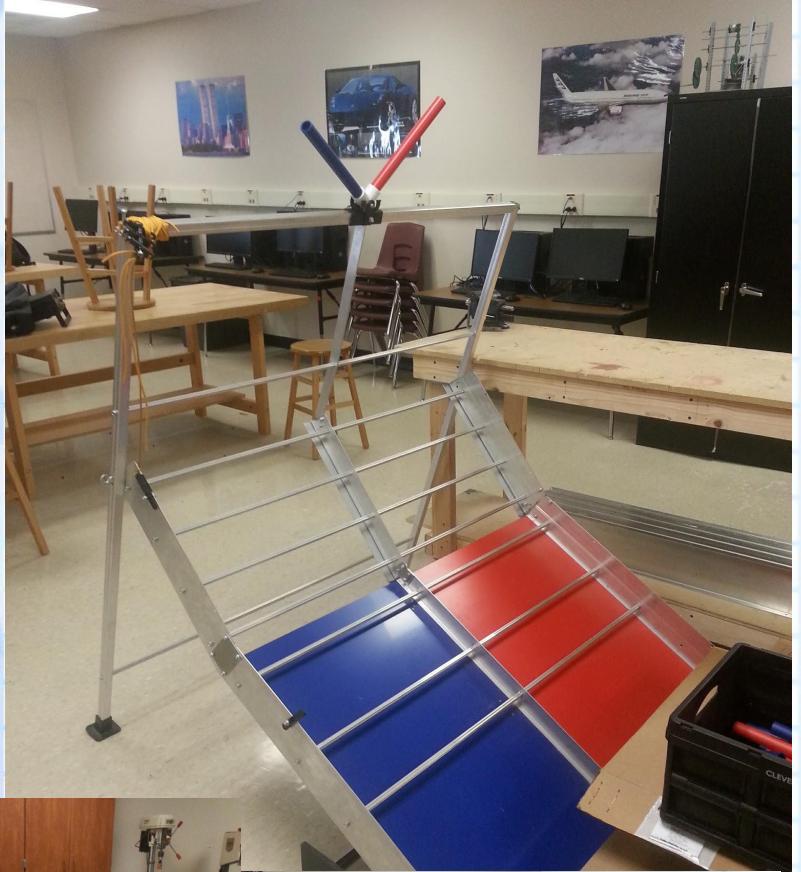
Meeting 9/29/16

Context - Old Field Teardown

Meeting start 3:50

- Today's potential agenda:
 - Tear down old field ramps
 - Look into upgrading the ZTEs to s5s or one of the other options
 - Inventory of closet.
- What we got done:
 - Looked into phone options, decided that unless we start having problems with them, we will stick to the ZTEs.
 - Tore down the old ramps from Res-Q
 - They might be good building/fabrication materials.

Meeting end 6:50



Signed off by:

TOP: fully built ramps from last year

BOTTOM (LEFT & RIGHT) : components that went into the ramps. There are a lot of really nice pieces of sheet metal that might be good for robot construction.

Meeting 9/30/16

Context - Practice Field Building with 7797

Meeting start 11:36

- We worked with team 7797 to build the group field for Velocity Vortex

Meeting break 12:51

Meeting restart 3:50

- Finished building the field that we started earlier.

Meeting end 5:25



Signed off by:

L TO R, TOP TO BOTTOM: the first two images are the very first stages of pulling them out of the box. Megan (PM 7797) is in red, Trey (Software lead 7797) is in black, and Aaron (Software lead 6990) is in grey. The last picture shows the power supplies we put on the centers of the ramps in an attempt to correct their bowing.

Meeting 10/5/16

Context - Brainstorming 2

Meeting start 3:45

- Mingi (7797) had finished up what little was left on field
- Corner ramps need adjustment
- Brainstorming on game theory
 - At least for first competition on the 12th, plan is:
 - 1) autonomous beacons
 - 2) autonomous ball shooting
 - QUESTIONS -
 - Do they spin the middle vortex or is there a start position
 - What is the IR beacon on the middle for?
 - 2.5) autonomous park on ramp / middle
 - 3) in game shooting ball shooting & collecting
- Began brainstorming on major points to prototype
- Chassis:
 - 1) standard 4 wheel drive, possibly 6, with drive
 - Advantages:
 - More torque / speed in a straight direction
 - Likely more stable / robust
 - 2) 4 point omni wheel system
 - Advantages:
 - More quickly transition between beacons in autonomous,
 - Drive in any direction
- Beacon manipulator
 - 2 light sensors on bottom to locate line, one on front.
 - Check one side of beacon, if it's red then the other side HAS to be blue
 - Servos to drop little rods, one each side, in position for beacon
 - Drive into beacon, not swing into - better torque
- Ball intake:
 - More brainstorm needed, though probably a dual wheel like prior years
- Ball launch - 3 builds
 - Compression spring, like the pinball trigger
 - Spring pad (bend a piece of metal and let it snapback)
 - Wheel shooter (think hot wheels)

Signed off by:

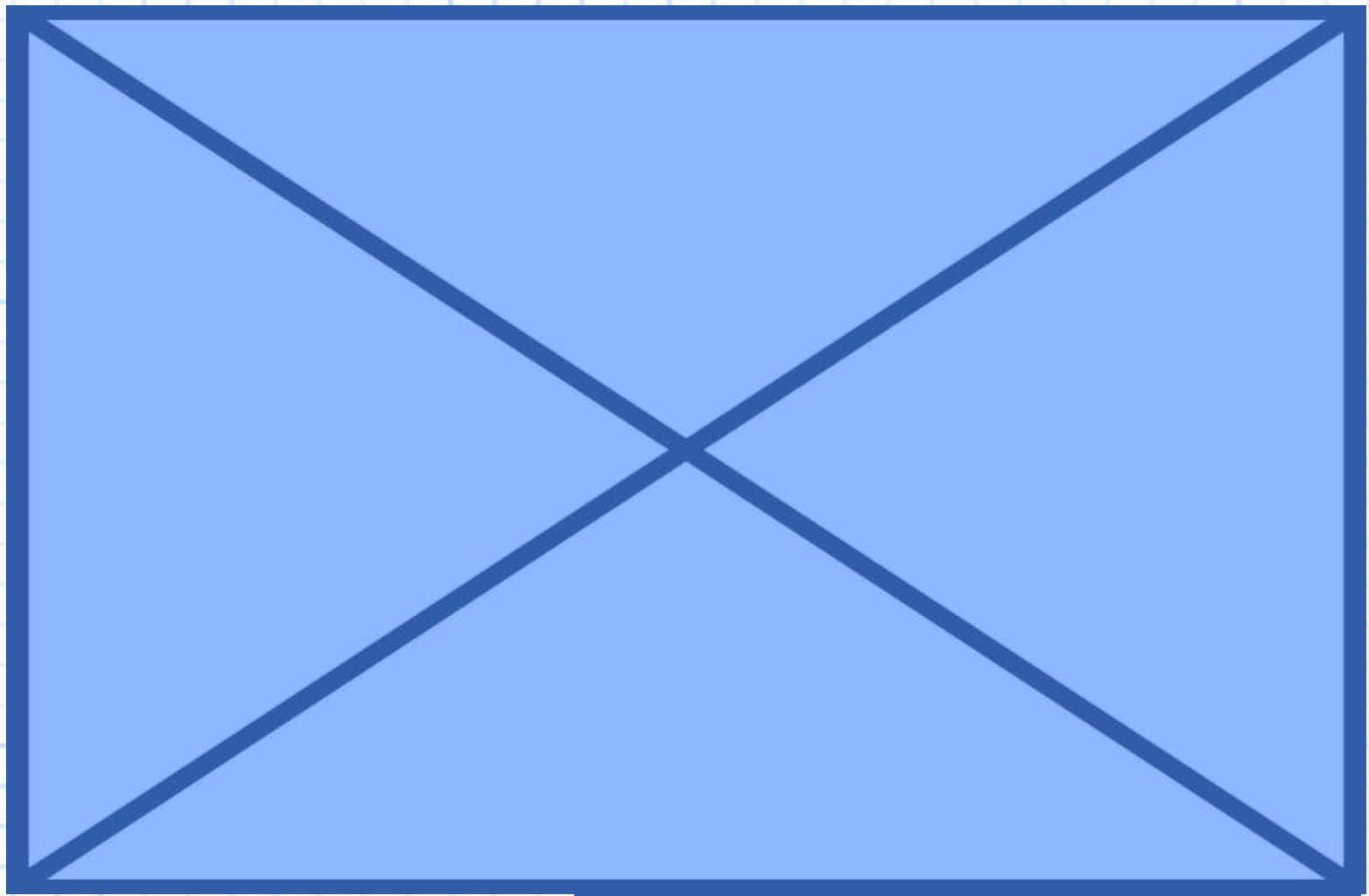
William
Mingi
Mingi

Meeting 10/5/16 (page 2)

Context - Brainstorming 2

- 7797 is already building one, might save time and not have to prototype ourselves.
- Ball ammo / staggering - still needed.
- Scott Smylie arrived at 5:20, and helped us vet ideas as he's an engineer in profession. We also received some management and organization pointers pertaining to distribution of tasks and potential options.

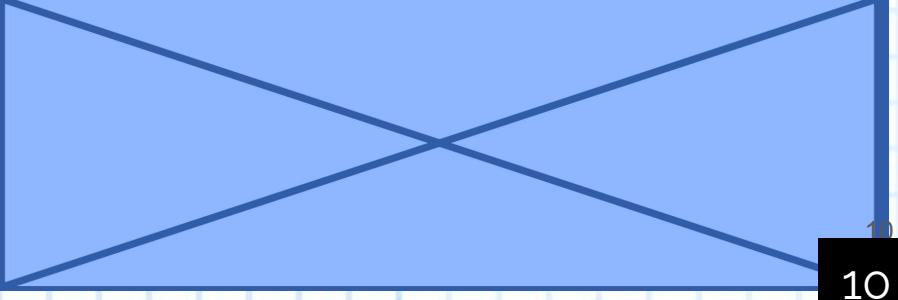
Meeting ended at 5:50



Signed off by:

 Michael Mullin

 William Smylie



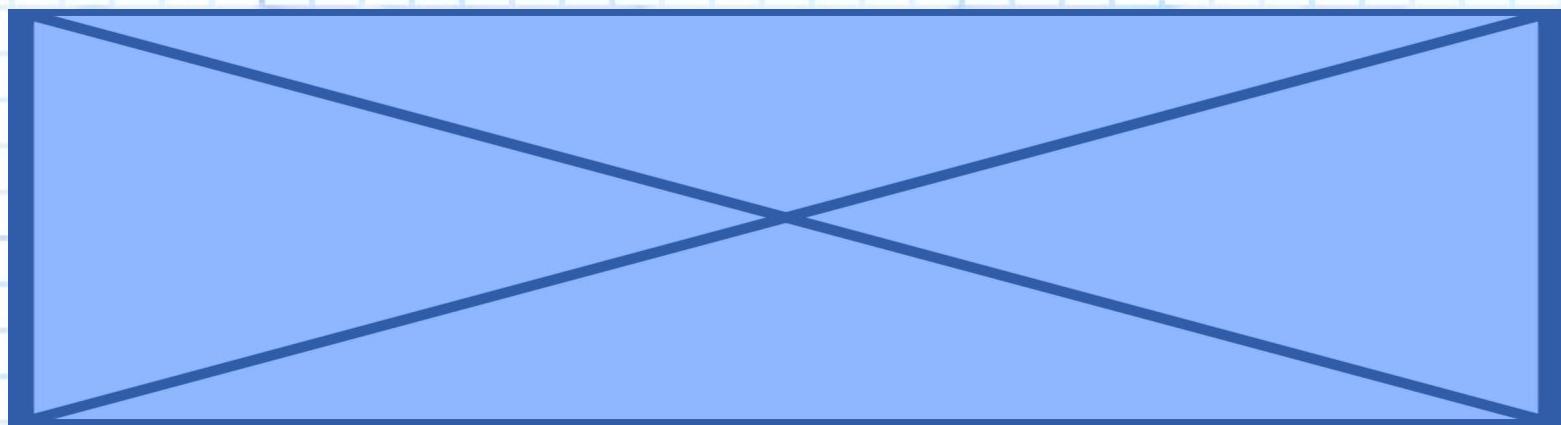
Meeting 10/12/16

Context - Brainstorming 3 / Prototype build 1

Meeting start 4:20

- A little more brainstorming as we move into chassis prototyping:
 - Look at Metrica Wheels VS Omnis in terms of use
 - Metrica have straight sideways, slightly more bulky turning - but also more traction than omnis
- Swapped metrica wheels onto the Software bed for testing
 - Metrica wheels had odd mounting holes, so we bored out the holes to make them work
 - Completed at end of meeting, will do full testing tomorrow.
- Constructed second frame for omni testing, with 4 mid-sides motor mounts
 - Nicola + Minsong
- On-going sketching of prototyping ideas (see next page)
- Found out that we are short on a lot of materials that we know we had last year. Might have lost them at competition???
- Parts distribution between teams is a mess, so the current plan is to just share everything with 7797 and sort it out later.
- Sent order list to Flores, included: Motor collars, Motor mounts, Light sensors, motor controllers, motor crimps
 - Stuff to buy that didn't make the order: Phone chargers.

Meeting ended at 6:30.



Signed off by:

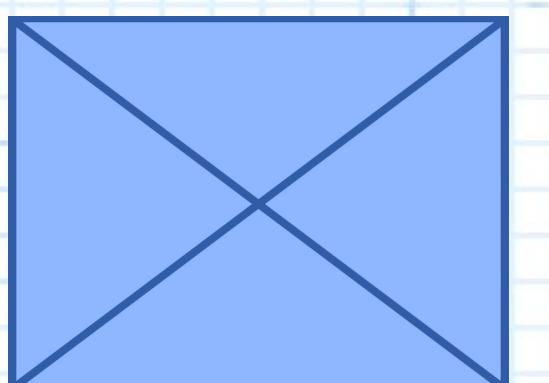
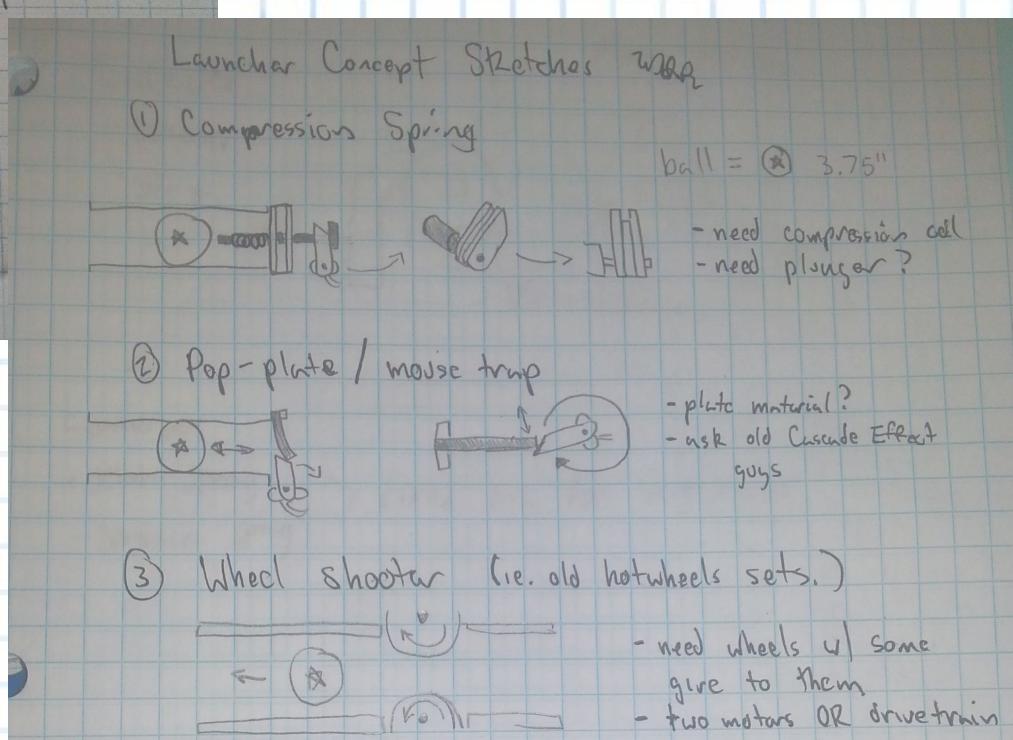
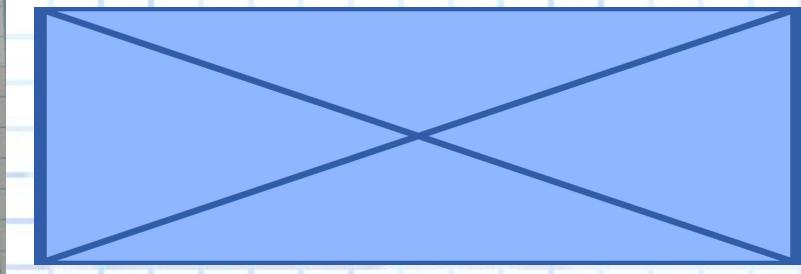
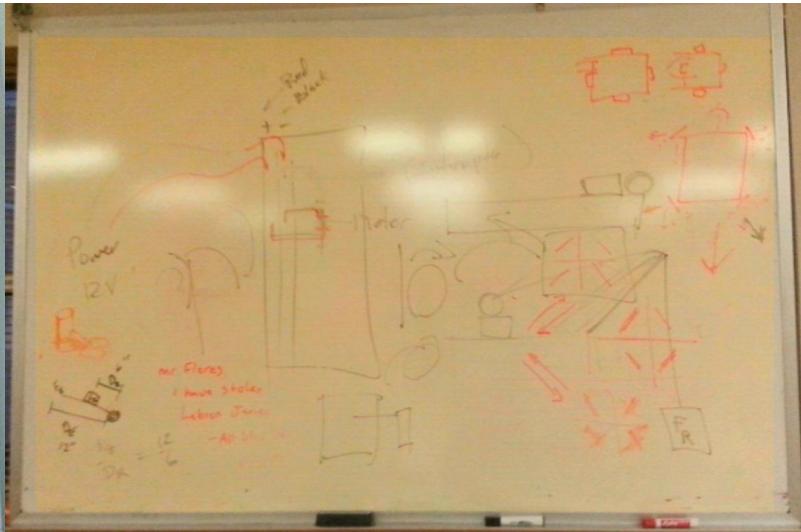
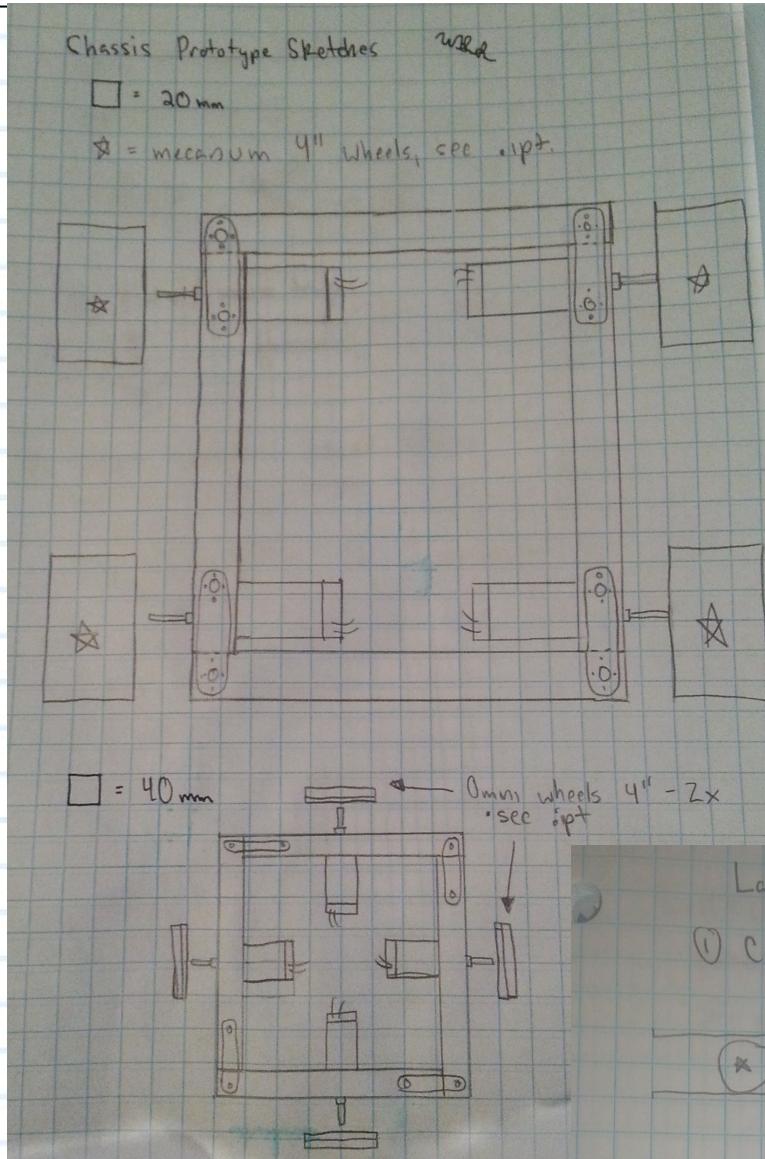
 Nicola

 William

Images on next page of our sketches and whiteboard work.

Meeting 10/12/16 (page 2)

Context - Brainstorming 3 / Prototype build 1



Signed off by:

William Anglin

TALL LEFT: sketches for the two prototype chassis we planned and built

RIGHT TOP: whiteboard sketches of basic ideas

12

BOTTOM RIGHT: potential launcher mechanisms

12

Meeting 10/13/16

Context - Prototype Build 2

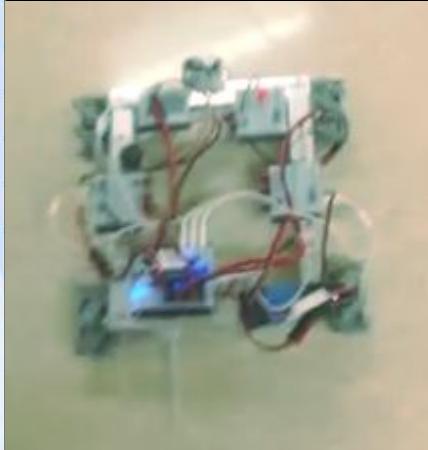
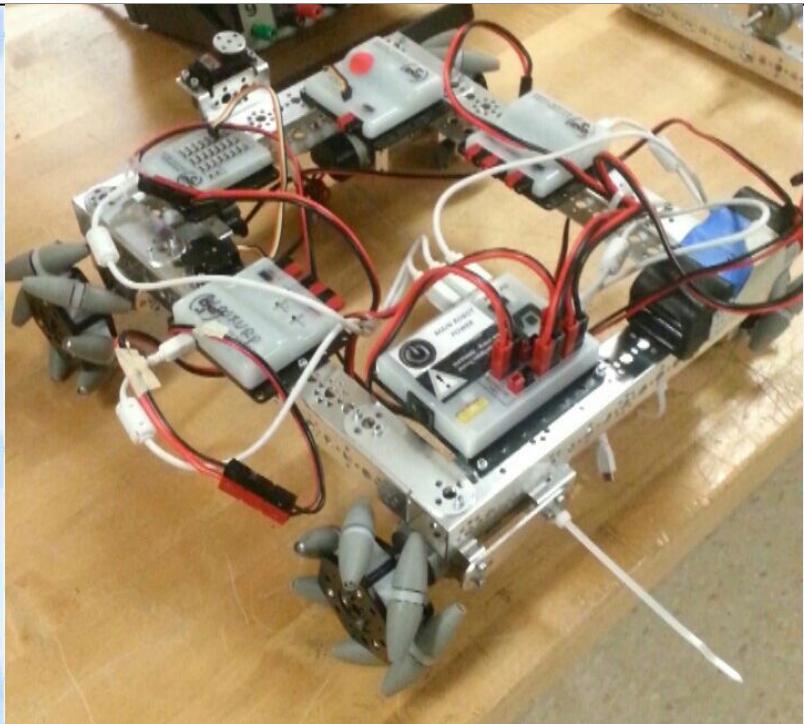
Meeting start 3:50

- Begin testing of mecanum wheel setup that was completed at the end of yesterday.
- Spent until 5:30 working on sideways motion and mapping the movements to motor directions
 - Then we actually googled it, and found out we had the wheels on wrong
 - Adjusted wheels accordingly.
 - Setup works very well, with some hiccups - but these may be caused by a less than 100% frame (there's warping on the front corners due to lack of a motor mount) that causes the wheels to be at odd angles.
- In-short, we tested out the mecanum set-up, and the traction is provides is most likely better than what we'd get out of Omni wheels, and the side-to-side function (with some fine-tuning) should work just as well.
 - Because we're behind schedule, we may not get to prototype out the Omni wheel setup, although we can ask around to get other teams' opinions on it.

Meeting end 7:18

Signed off by:

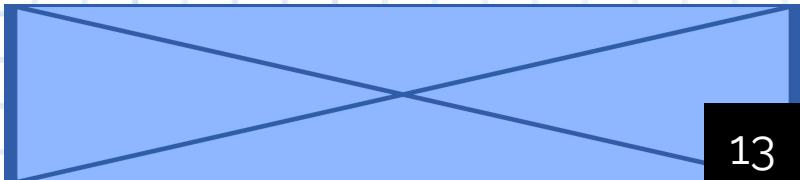

Michael Mullin



TOP: this image is a close-up of the test chassis with mecanum wheels. Due to a shortage of motor mounts, the frame is not as structurally sound as is ideal, but that will be corrected on the main robot.

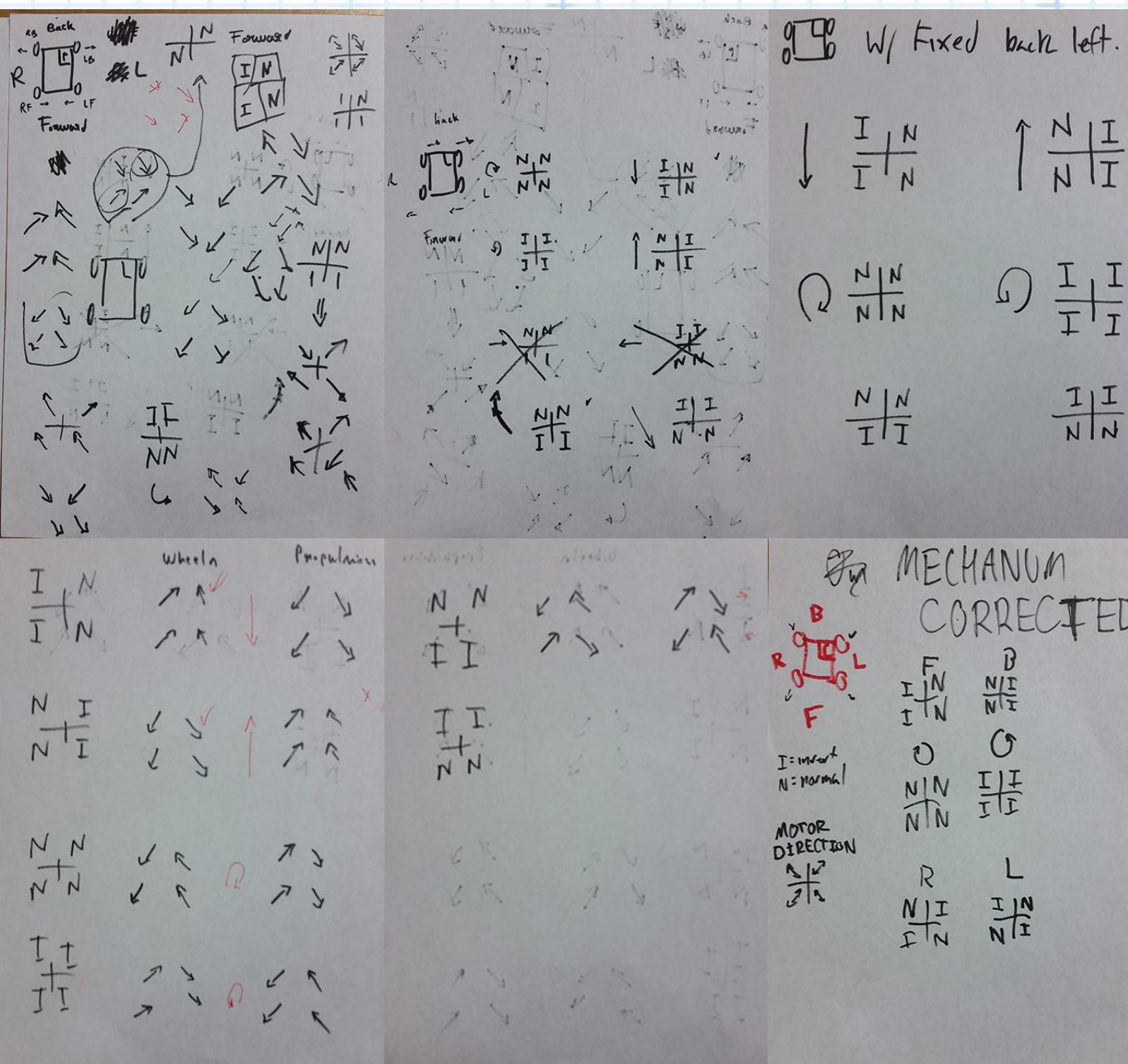
BOTTOM: This is a single frame captured from one of the many videos of the day's tests. These videos can be found on the team YouTube channel.

NEXT PAGE: these images are pages of documentation that chronicle our attempts to solve the mecanum wheels on our own. The biggest lesson we learned was that if you don't know how something works, it is ALWAYS more time efficient to just look it up.



Meeting 10/13/16 (page 2)

Context - Prototype Build 2



Signed off by:

MECANUM CORRECTED: This sheet shows the correct motor polarities AFTER we had googled how to set them up (N = normal, I = inverted)
 ALL OTHER: this was our personal debugging of the wheel system.

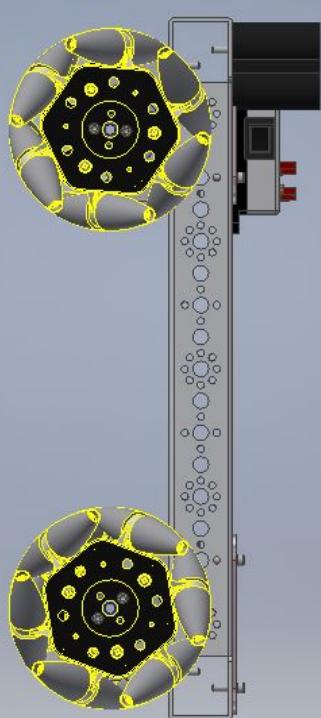
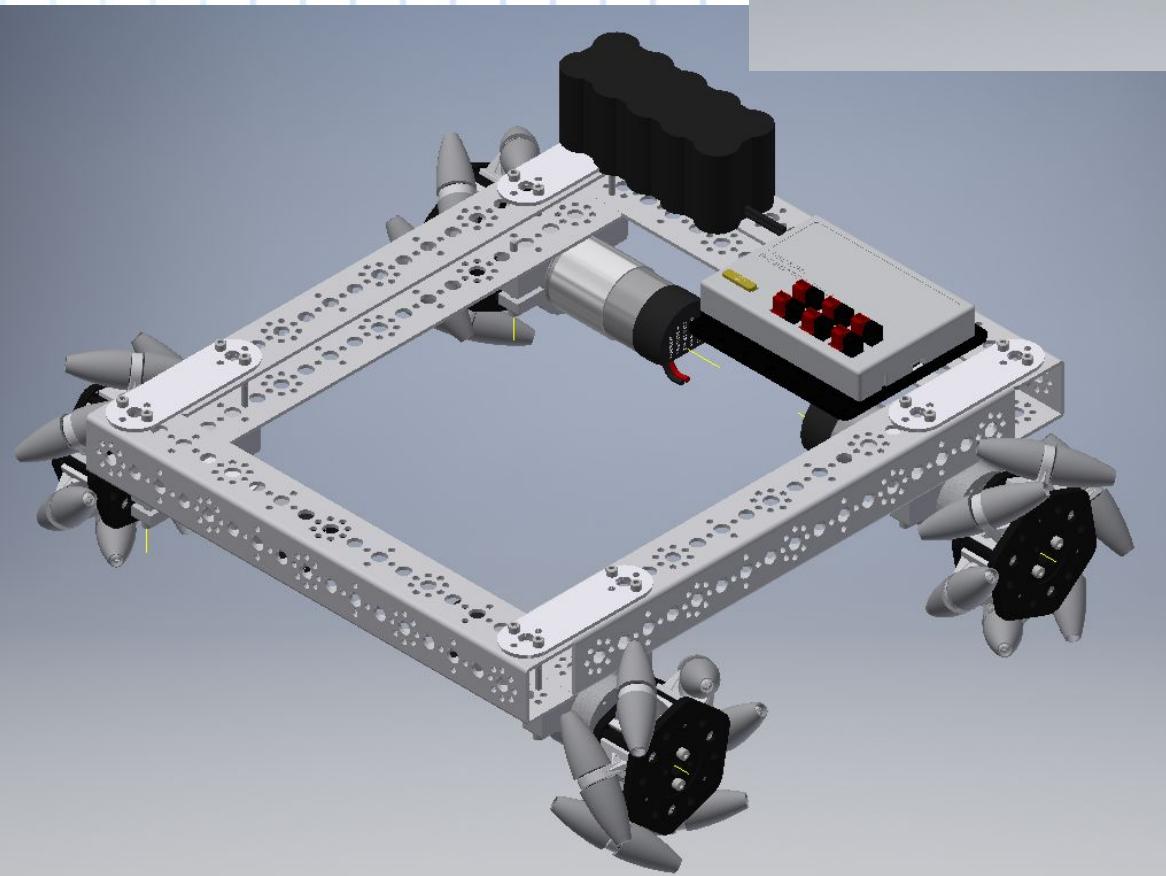
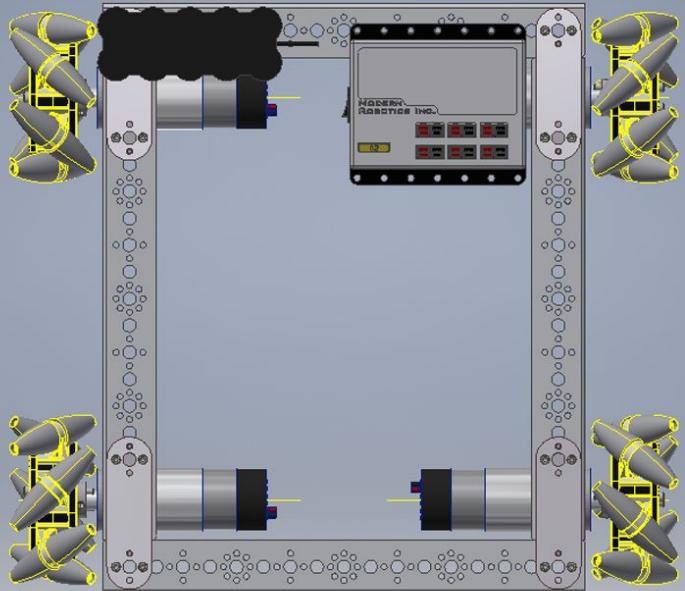
Meeting 10/16/16

Context - At Home Chassis Modeling

Work start 11:00 pm

- Worked on modeling robot current chassis & on sketches
- Shout-out to Vandy for the FTC models, and to Savio Guardian for having the converted files for Mecanum wheels.

End 1:30am



Signed off by:

TOP: top-down view of the chassis model

LEFT: isometric view of chassis from front right corner

RIGHT: side view of the chassis model

Meeting 10/17/16

Context - Manipulator Prototype 1

Meeting start 3:50

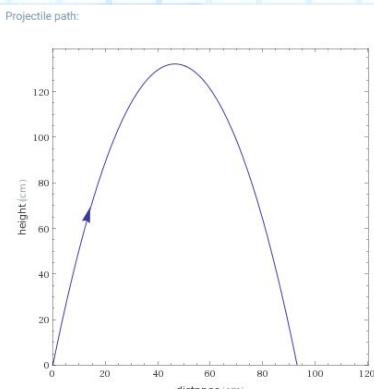
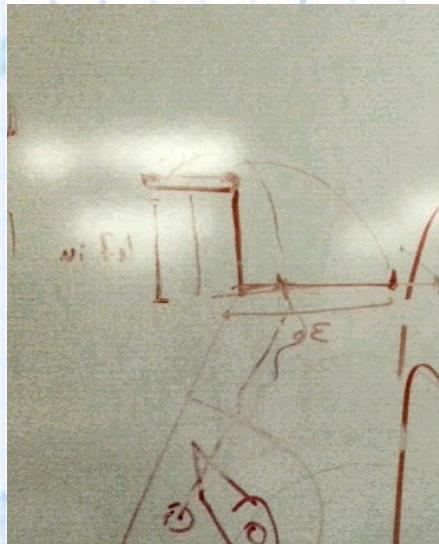
- Discussed the old manipulator ideas, 7797 has tried to build the dual wheel model and decided to scrap it
 - Too much trouble with the gear train, can't get enough speed on the wheels.
 - Not to say it's UNDOABLE, but it would take some serious effort.
- So we're between Pinball-style plunger & snap plate
 - 7797 had a cool idea pulled from Philobots 2 years ago, during cascade
 - Attach the snap plate to the motor and spin the whole contraption.
 - Only worry for me is plate warp and consistency, which Philo had trouble with when they used it.
 - Doing the math on the two builds instead of just jumping in
 - See [The Wolfram Alpha calculations for approximate arc](#)

Signed off by:

William
Yashashchandra
Anglin

- Stats on launch model: - no mass imputed however
 - Initial veloc - 5.1682 m/s (16.956 ft/s)
 - Angle from horizontal - 80*
 - Max height of arc - 1.3208 m (~52 in)
 - Peak over edge of bucket @ ~18in
 - Well inside (not coming out) by ~28 in
 - Gives us ~10 inches of play inside the bucket
- The problem here is how to find force needed without a time element for the contact
 - All of this is being done to give us a force, so we know if the spring or the plate is more realistic.

Meeting end 6:10.



These are some of the arc graphs we were playing with when looking at the optimal way to score the particles.

Meeting 10/19/16

Context - Manipulator Prototype 2

Meeting start 3:50

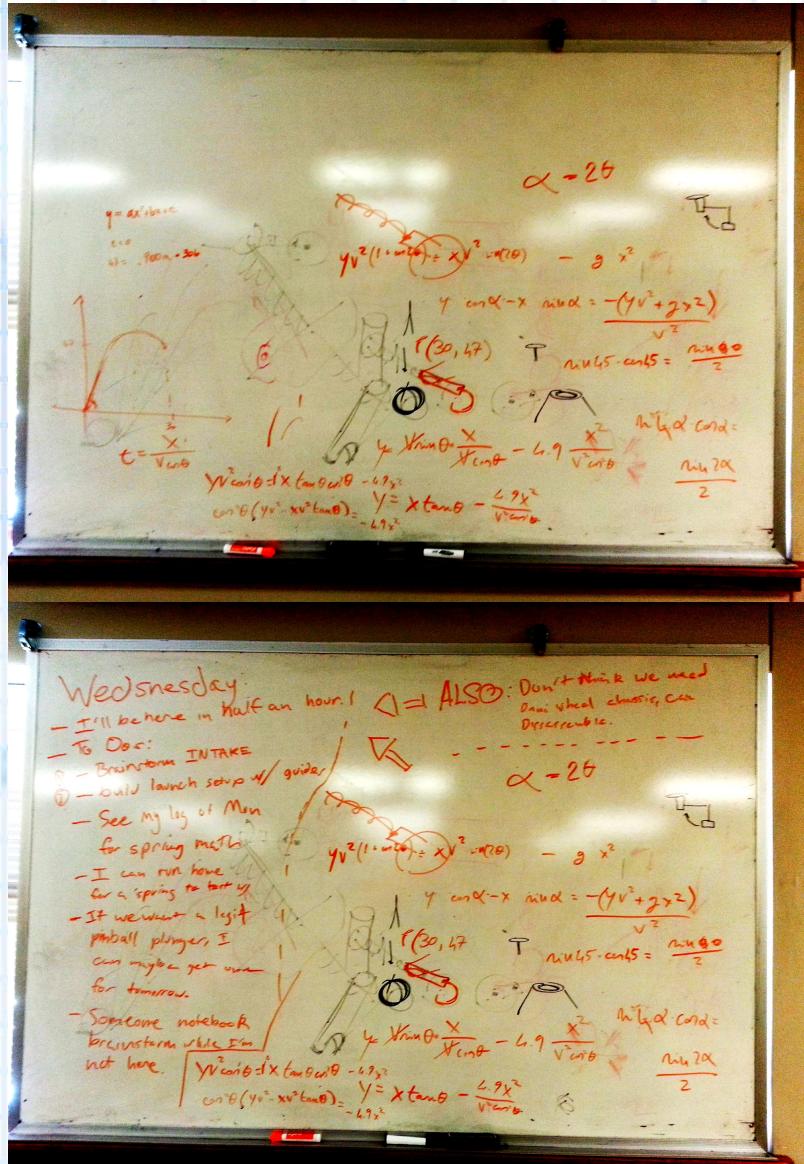
- Slade & I built a frame for the ball launcher, then built a rig for the compression spring.
 - These are likely not the springs we will use at the end, but we needed test springs to find the time of contact with the ball (roughly) so we would be able to do the math on what strength of string we really need.
 - Currently we are using the 4x7/8 spring that comes in the 4 pack from everbilt with a max work load of 24.89 lbs
- The setup is less than optimal
 - The axle is too short, so even at full rest the spring is under compression
 - A proper pull system has not yet been built. (a mock one was rigged up, but it catches on the axle collar we were using to pull the rod back & takes it out of alignment.
 - The spring feels WAY stronger than we need, but due to the sloppy release it still wasn't launching the ball well.

Signed off by:



- Tomorrow hopefully we can get a clean release
- Still need to brainstorm intake & orientation on robot
- Need to build a rig for the spring plate idea, to test that option

Meeting end 8:10

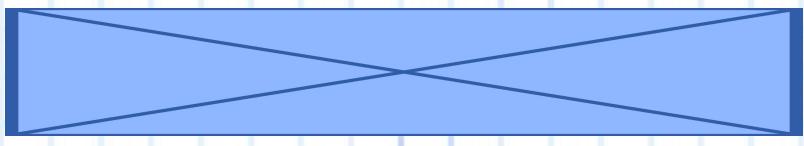
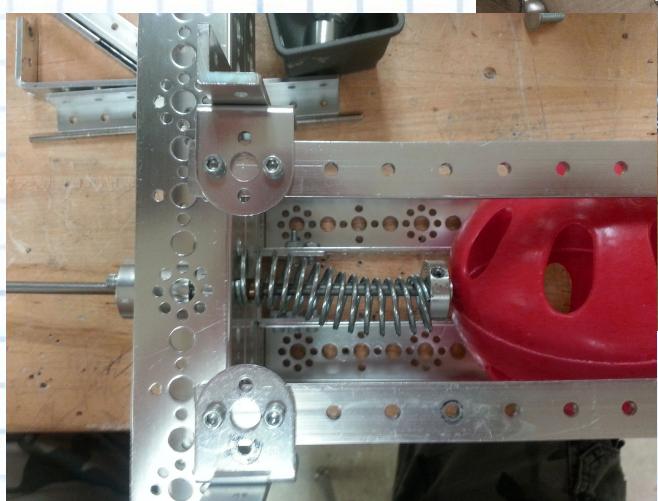
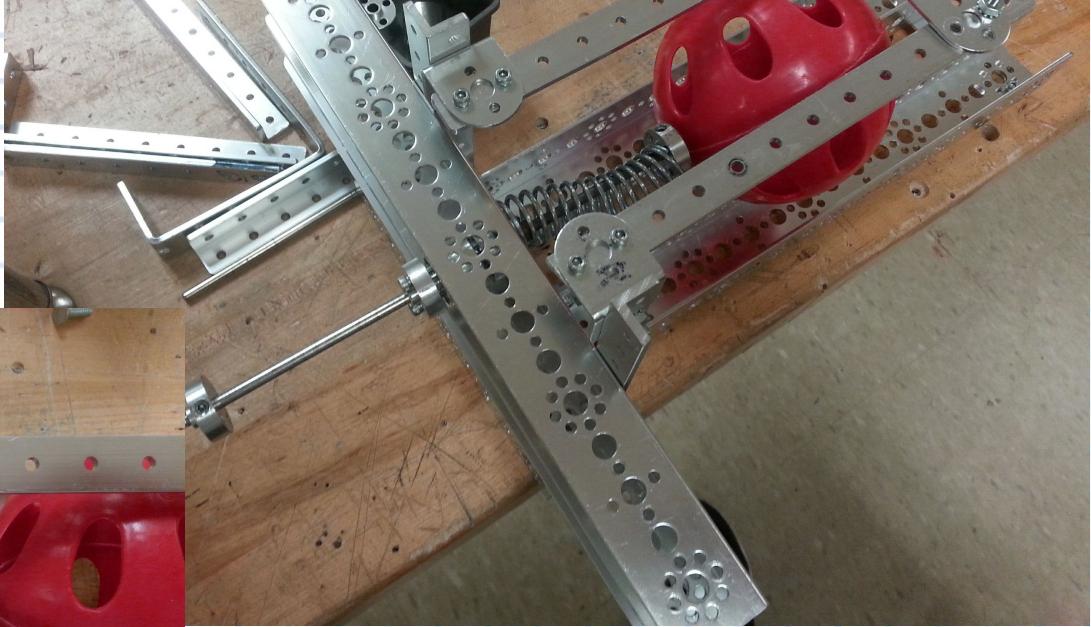
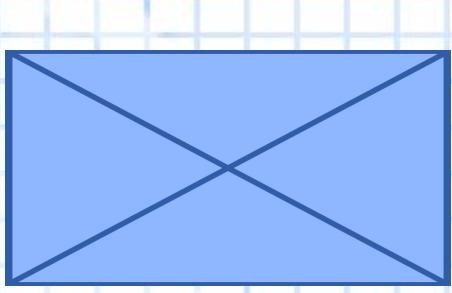
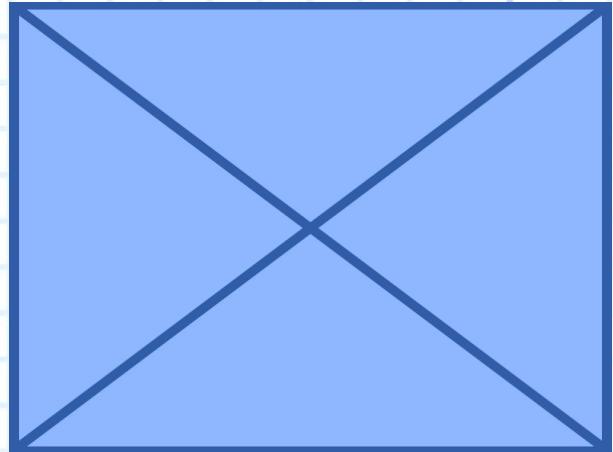


ABOVE: the day's agenda and some formula work for the spring launcher design

NEXT PAGE: the early prototype we built

Meeting 10/19/16 (page 2)

Context - Manipulator Prototype 2



Signed off by:

William
Anglin

Yashashchandra

DESCENDING ORDER:

- View of the rear of the launcher to display the temporary pull solution.
- Wide shot of launcher
- Top-down view to show the spring, which is unable to decompress fully.

Meeting 10/20/16

Context - Manipulator Prototype 2

Meeting start 3:50

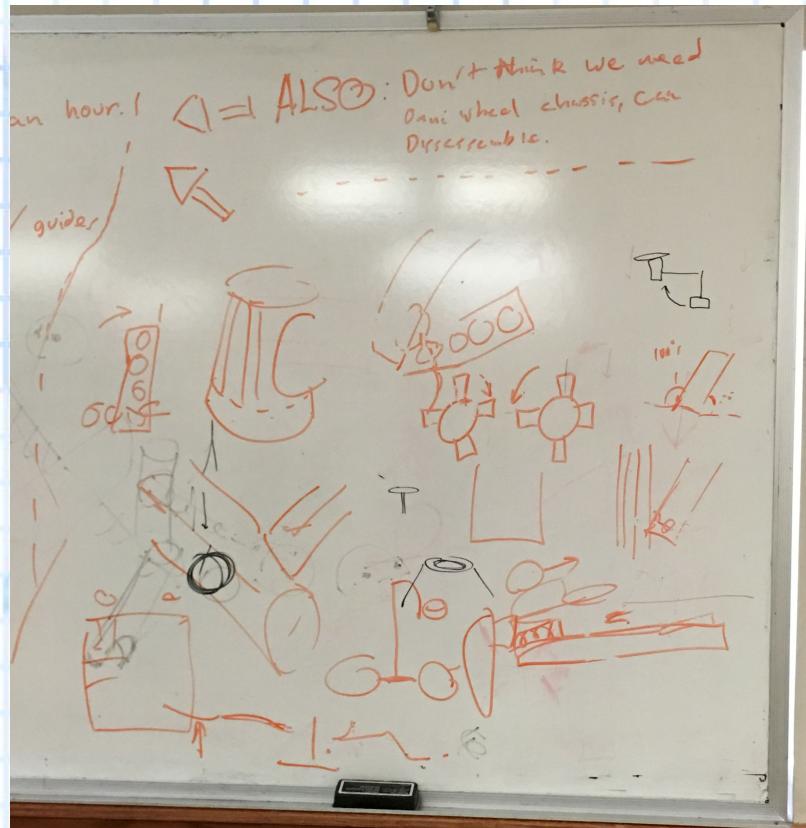
- Figured out spring constant of everbilt 4in steel compression spring that we bought to test with
 - 7.4 mm dist, 25 lbs max load
 - Its 1.5 N/mm
 - So now if we figure out time, we can do the math
 - (edit: did some math, looks like we goofed up measurement. Units are funky, will correct tomorrow.)
 - (more digging, found a physics formula where we may not need time)
- Got launch working w/ wood block to guide spring & change of rod for full compression/extension
 - Can launch all the way across the room - we have enough power
- Brainstormed intake & loading
 - Two elevator options - rising pad (ie. savio last year) or brush elevate
 - Loading systems - load from BENEATH or ABOVE "barrel"
 - Somehow to seal "barrel" and ensure clean launch

- Do we want a queue system?
- MAJOR CONCERN - lots of good ideas, but they take a TON of space.

Other:

- Mentor Scott offer an idea - maybe caulking gun for launch mechanism? It has a similar method

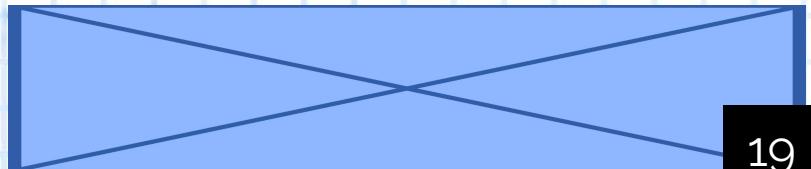
Meeting end 7:10



ABOVE: potential designs for the official launcher/intake

Signed off by:



Meeting 10/24/16

Context - CAD building

- Times: 6-7pm, 8pm-2am
- Modeling the full construction of the robot in CAD
- Engineering decisions:
 - Drive format
 - Considered trying to set the motors vertical & use bevel gears to free up ground level space in the front of the robot
 - Decided just to work around the horizontal motors, because it allows us to avoid extra complexity in the bevel gears and because the size benefits were not exceptional
 - Chassis size
 - Maximized side-to side distance on the base frame to give the most working space for the manipulator to transfer the 3.75in balls
 - Left a little working room on the front/back of robot incase we need to extend outside of the frame for launcher.
 - Intake
 - Used a single vertical slap-wheel instead of two horizontal ones in response to the horizontal size constraints imposed by the motors.
 - Beacon
 - Built a vertical rack to hold the dual servos & color sensor at the right height off of the floor (12.4 in for the buttons) for working with the beacon.
 - Bent bars are needed on the servos to allow a distance between the two bars of +/- 0.25in of 5.3 in (5.3 inches is the distance between the two centers of the buttons, each 0.5in diameter.)
 - This way when the center of the robot (or of the 5.3in between servos) is lined up, the two rods will be correct
- Still to-do: uptake, queueing, and launching.

Signed off by:

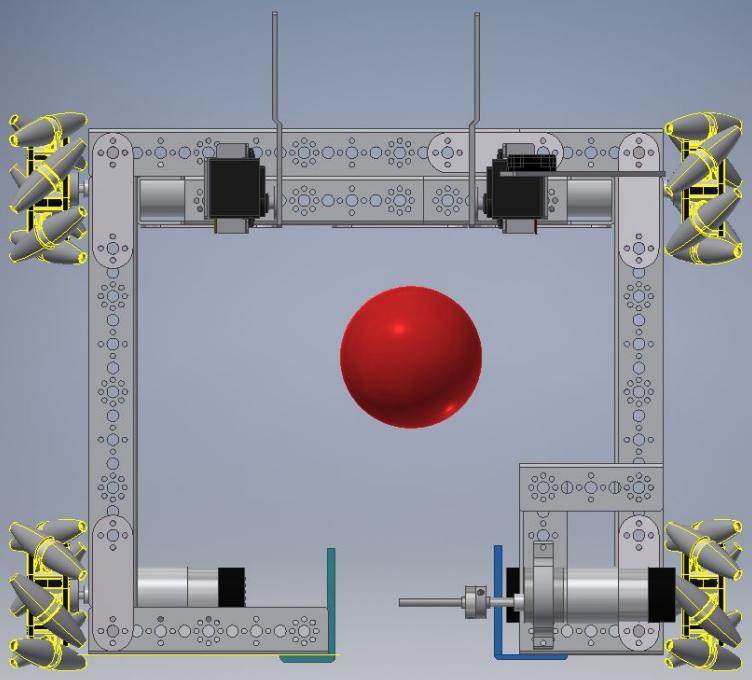
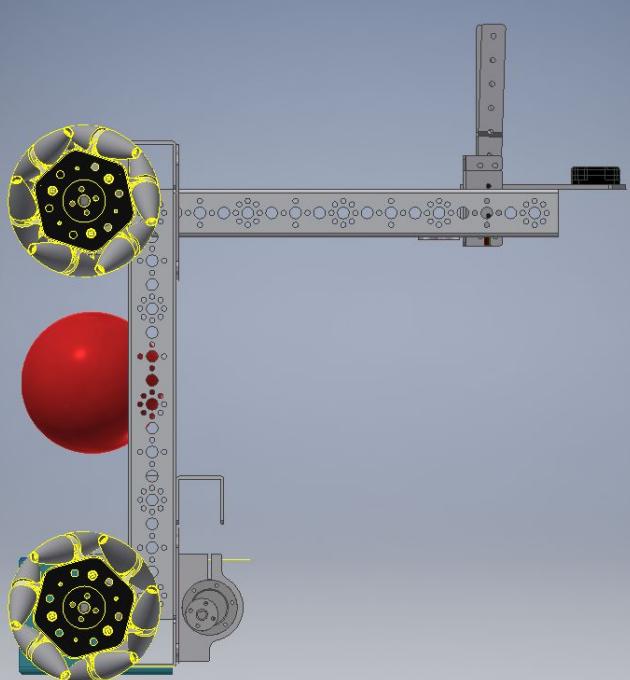
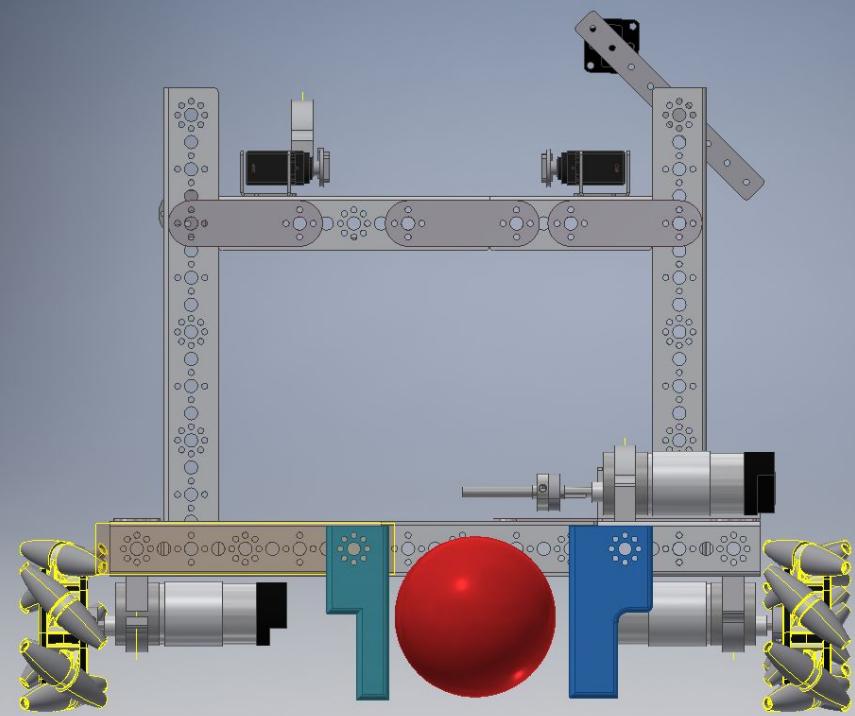
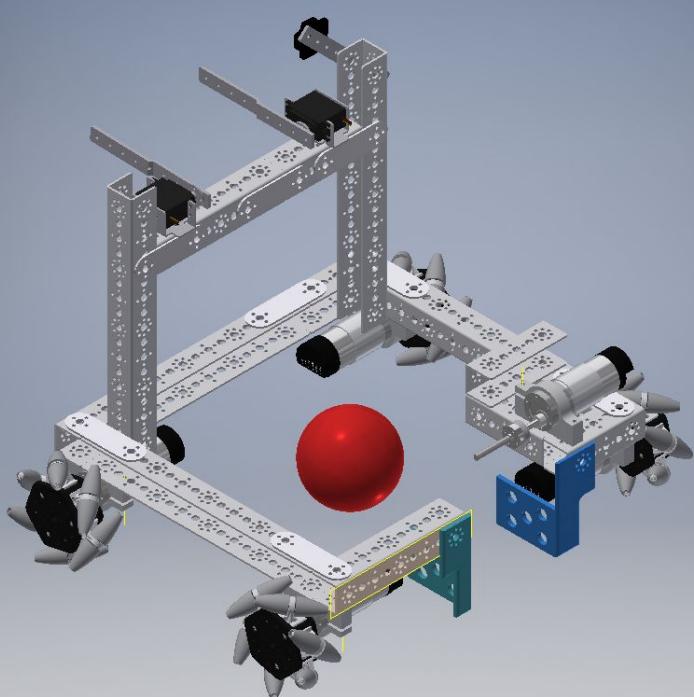
William Anglin
Yaheshayev

Next Page: pictures from the day's CAD model.

These models were early guidelines, and are not exactly the setup that was used on the final robot.

Meeting 10/24/16 (page 2)

Context - CAD building



Signed off by:

William Anglin
Yashashchandra

TOP LEFT: isometric view of the chassis

TOP RIGHT: front view of the robot

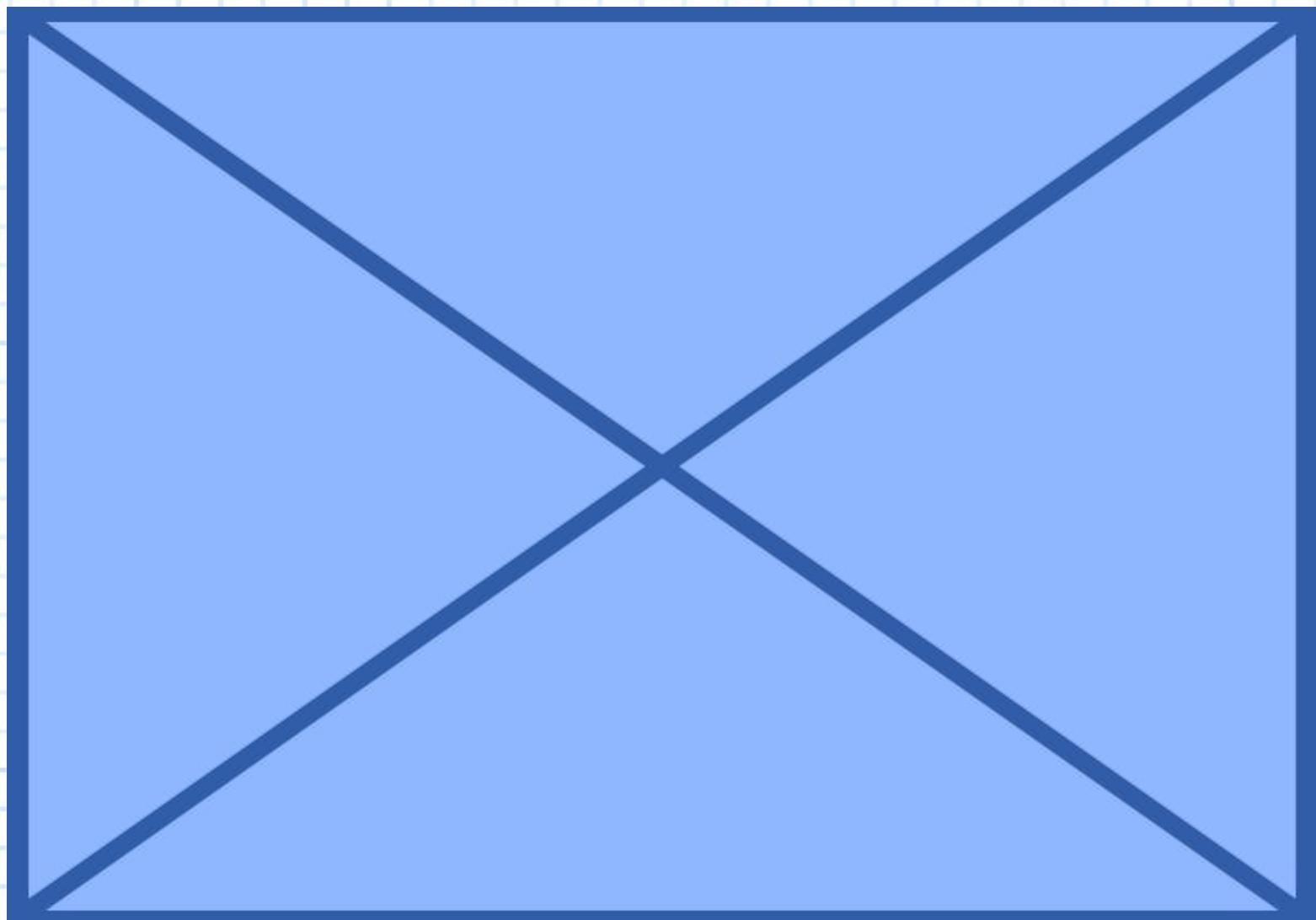
LOWER LEFT: side view of the robot

LOWER RIGHT: top view of robot

Meeting 10/25/16

Context - Chassis building

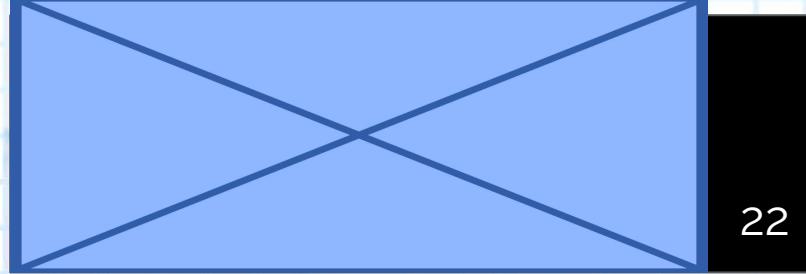
- Start 3:50
 - Built the chassis as predicted by CAD model from 10/24
 - Dismantled prototype launcher
 - Found out Slade and I are foolish, and that the mecanum wheels can be built so that no drilling is required.
 - Looks good!
- End 6:35



Signed off by:


Michael
Mullin


William
Anglin



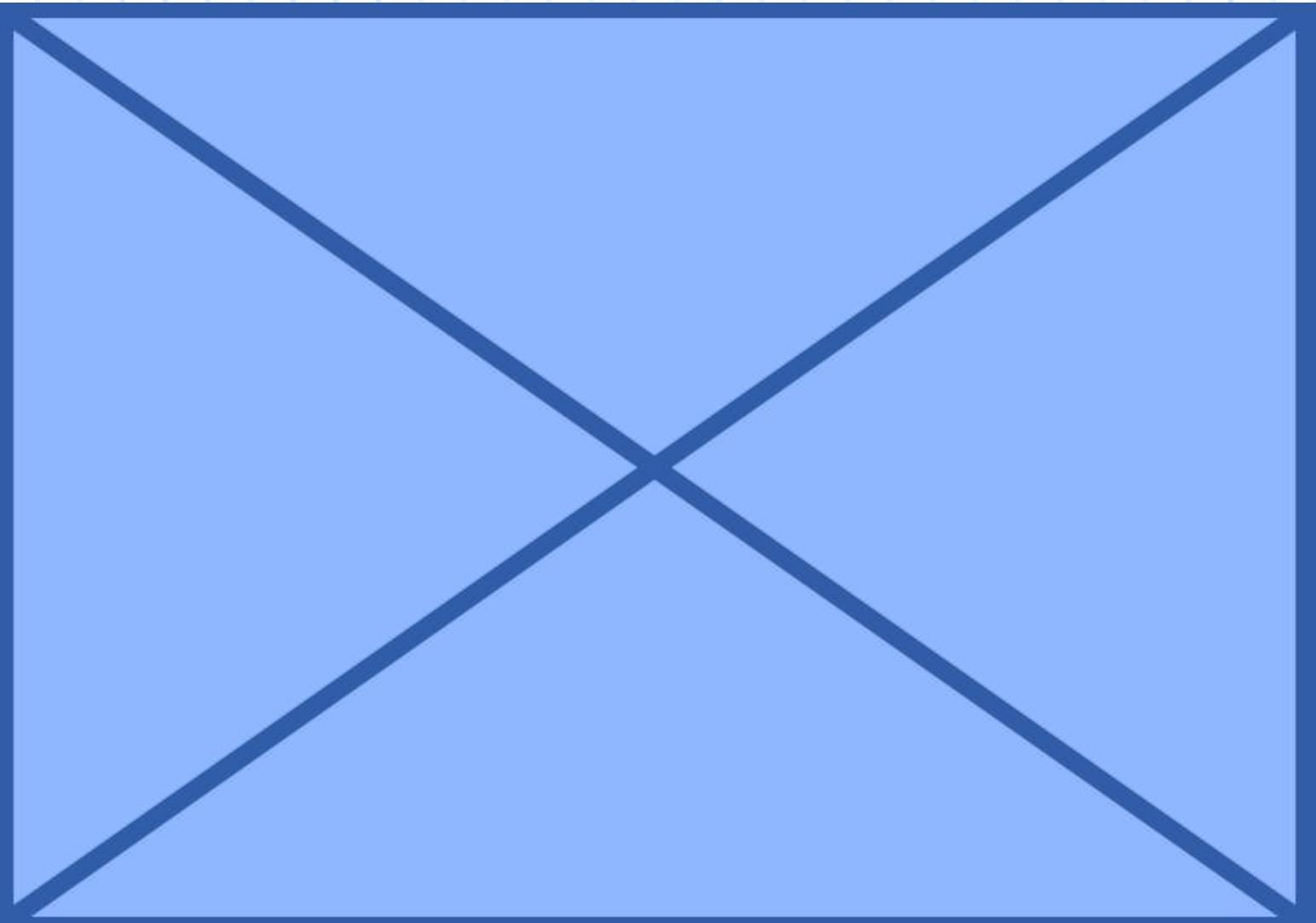
Meeting 10/26/16

Context - Chassis building / trunk'or'treat

Meeting start 1:00pm

- Finished up building chassis from yesterday
- Had to drill press holes through the servo arm bars for pressing beacons so that they could be attached to the servo. Also had to recreate the bend in the physical version that was created in inventor (CAD).

Meeting end 3:00pm



Signed off by:


A handwritten signature in black ink, appearing to read "William Anglin".

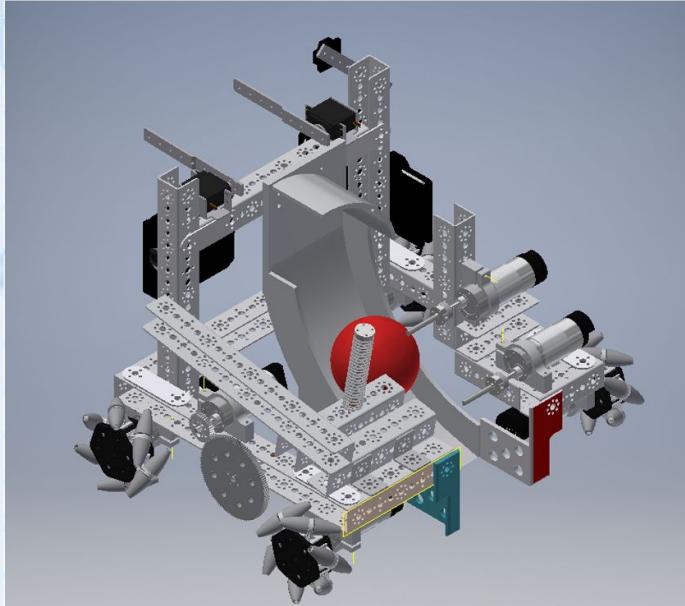
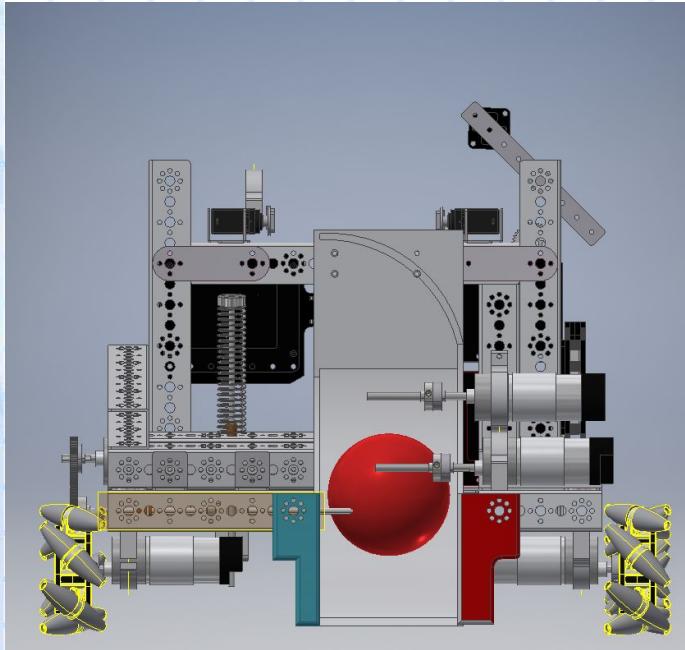
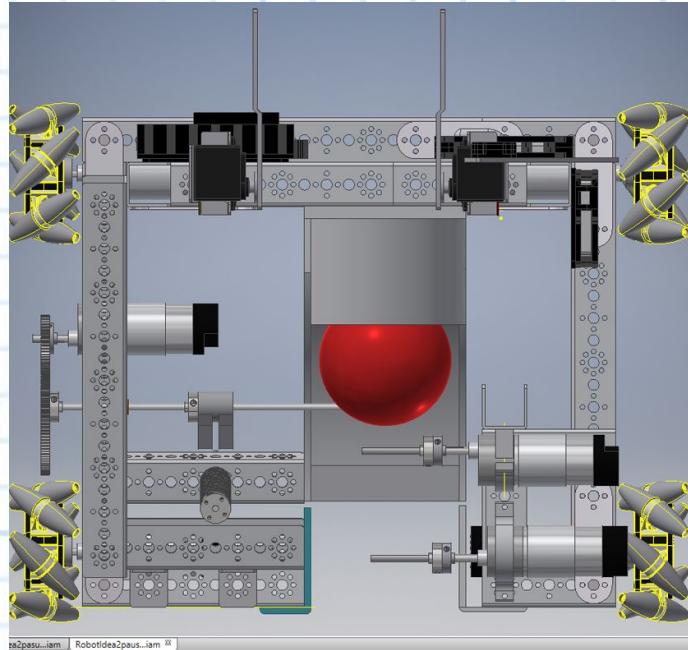
Meeting 10/30/16

Context - Intake building

Meeting start 1:00 am

- Worked on modeling intake & output.
- Modeled plunger set-up and created model for trigger, did placement
- Modeled primary intake stage, created ramp w/ mounts for balls.

Meeting end 6:45am



Signed off by:

Miguel Muniz

William Anglin

TOP LEFT: robot top view

TOP RIGHT: robot front view

BOTTOM LEFT: robot side view

BOTTOM RIGHT: robot isometric view

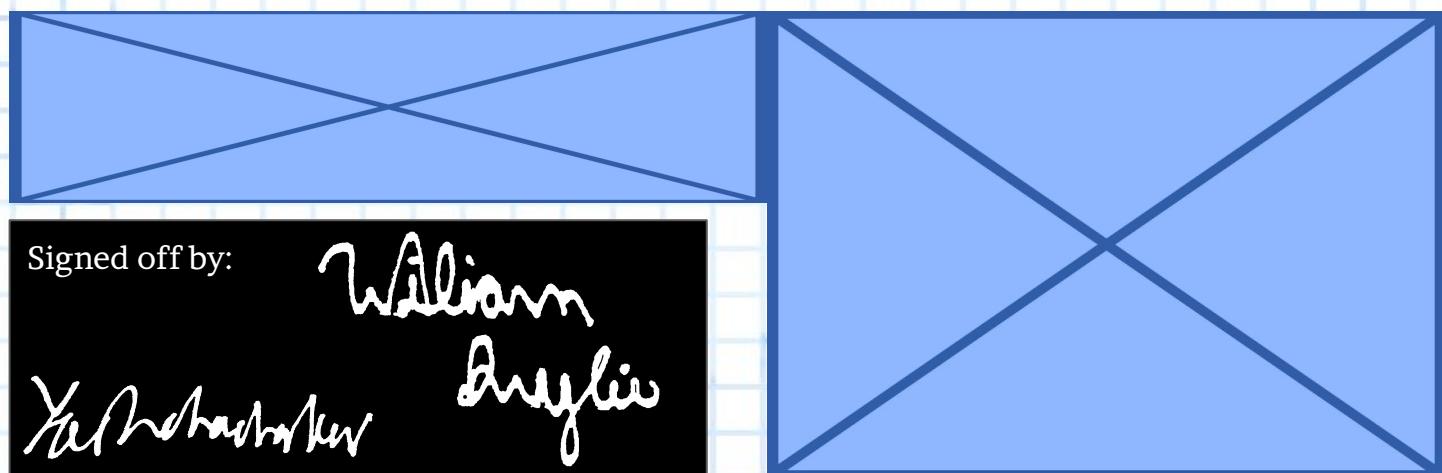
Meeting 11/01/16

Context - Omni wheels

Meeting start 3:45

- Updated robot to match the CAD file, as much as possible. We do need to get the 3d printed parts and some other minor materials.
 - Our 3d printer is basically unusable, so we will have to see if we can get the parts printed elsewhere.
- We looked at the robot and noticed it looked wide - it turns out it was 20 inches wide. We checked the CAD model and we had indeed made the robot 19.5 inches. The frame was only 15" but we failed to account for the full width of the mecanum wheels
 - We figured out that with Omni- wheels instead of mecanum, the robot comes to 17.75" --- as a result we will be using omni wheels instead of mecanum (at least for this competition) so that we can avoid a total chassis redesign (which we no longer have time for, a week and a half out from competition)
- Structure is built, tomorrow will be:
 - hooking up all the electronics
 - potentially fabricating the ramp (instead of printing it).
 - We also need to make the zip-tie wheels.
- Mingi (7797) suggested using chain or gears so that all the ziptie wheels are driven by one motor, instead of two. Only major worry with that is space, but we'll check on it tomorrow.
- Need to order at least one set of two omni wheels (we lost our 4th wheel last year to the tape-measure winch. (ordered, hopefully come in for next week.)
- Need to make sure t-shirts are ordered to be here in time for next week.

Meeting end 6:30



Meeting 11/02/16

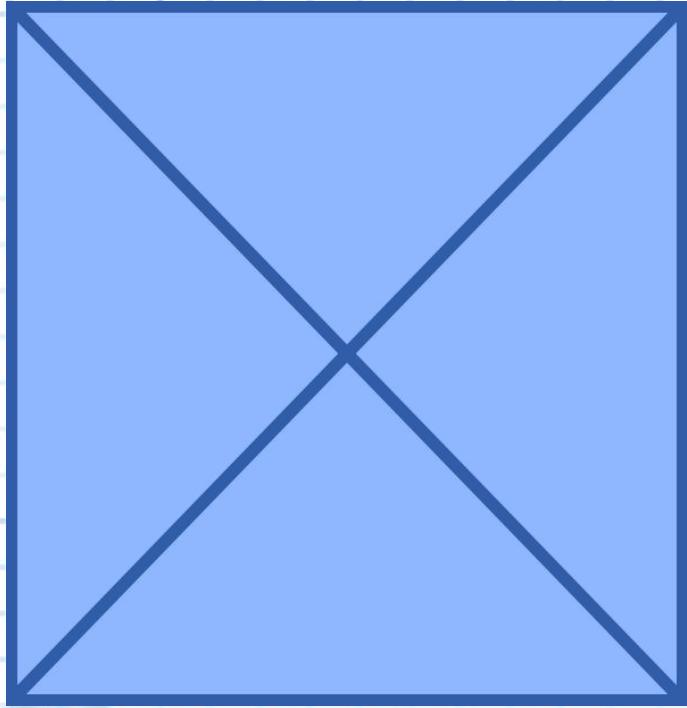
Context - More on Intake

lunch: (sent CAD files to flores to see if they can be printed)

Meeting start 3:50

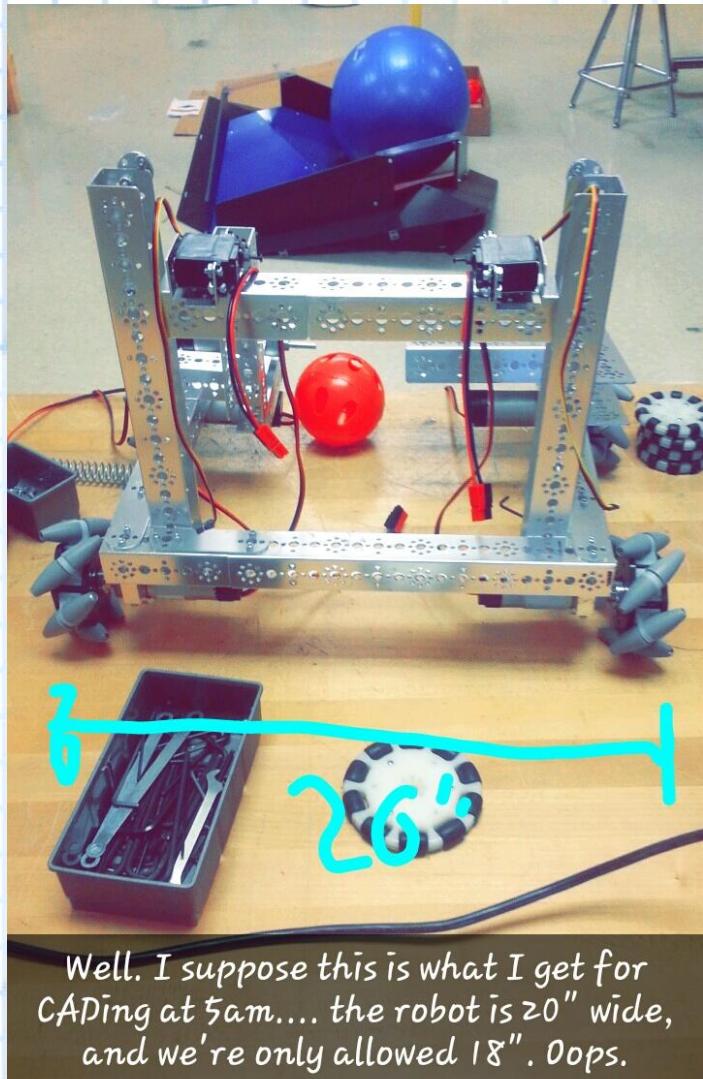
- We discussed ways to add structure to the front of the frame without obstructing the ball's path
- We modeled more of the intake - the only thing needed is the path from ramp to tube & the loading mechanism.
- Marketing finalized t-shirt design, and we sent it to get printed.
- Wheel mounts were rotated to accommodate omni-wheel design, and modifications were made to corner structure to ensure stability.
- Motor controllers, main power switch, etc. were attached to back frame
 - We still should look at getting the protective gear for them printed, but I doubt it will happen before this competition.

Meeting end 7:30



Signed off by:

William
Yancharukayayliu



Well. I suppose this is what I get for
CADing at 5am.... the robot is 20" wide,
and we're only allowed 18". Oops.

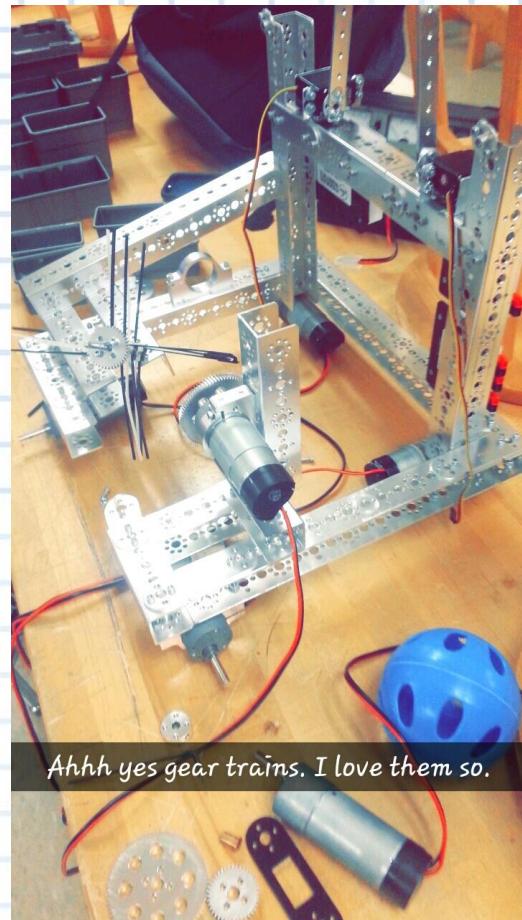
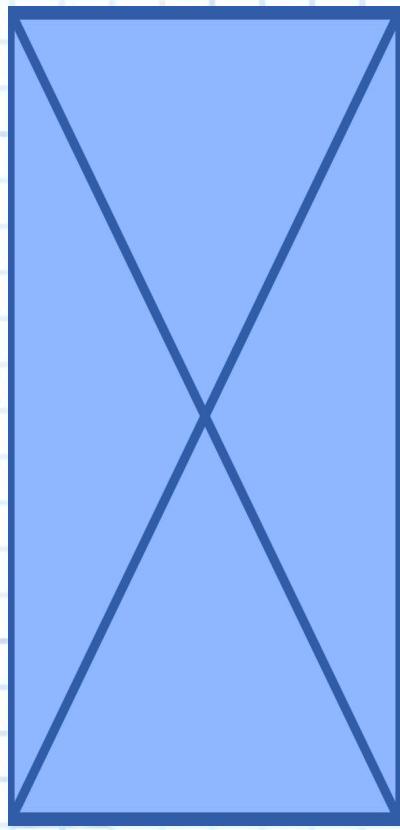
Meeting 11/03/16

Context - Even more on intake

Meeting start - 3:50

- Worked primarily on intake & organization
- Used a pre-existing zip-tie wheel from last year on the front of the robot.
 - Switched drive for intake from two motors to one, via gear train.
 - Still need to build second intake wheel, dependant upon ramp.
- Works well (see video on smylie phone)
 - Also REMINDER - smylie, upload the pictures you've got
- CAD model guards, ramp, and intake system updated to reflect today's work
- re -crimped one of the motors & attached powerpoles.

Meeting end - 7:25



Signed off by:

*Rigoberto
Mula (RMM)*

*William
Smylie*

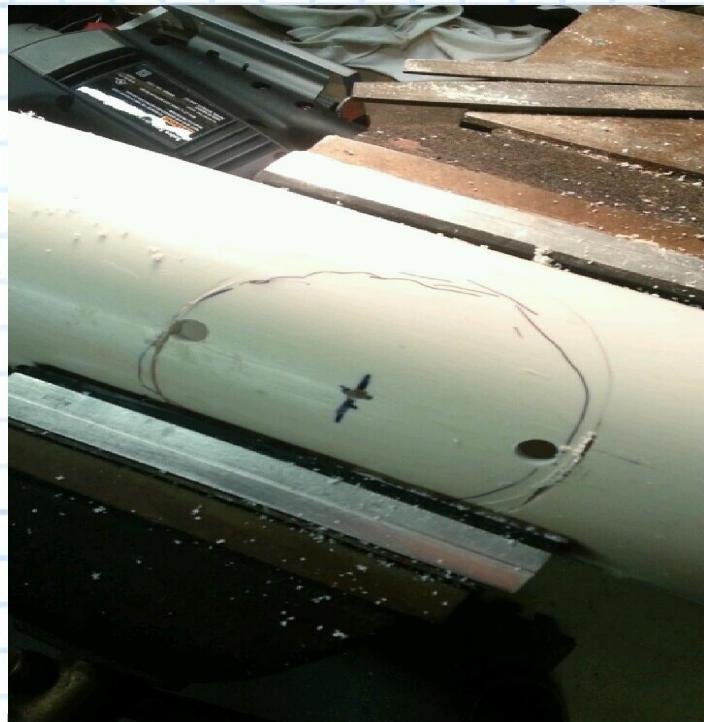
Meeting 11/07/16

Context - Brainstorming

Meeting start 3:50

- Brainstorm on how to construct the ramp
- Logistics of tube mounting and securing
- Coordinated t-shirts, trying to get them printed for friday
- Shipped a part file to the guys at Savio to see if we could buy a print from them, as our printer is OOC.
- Out of screws- need to buy some more
- Mentor Scott came in to bounce ideas off of and give guidance.

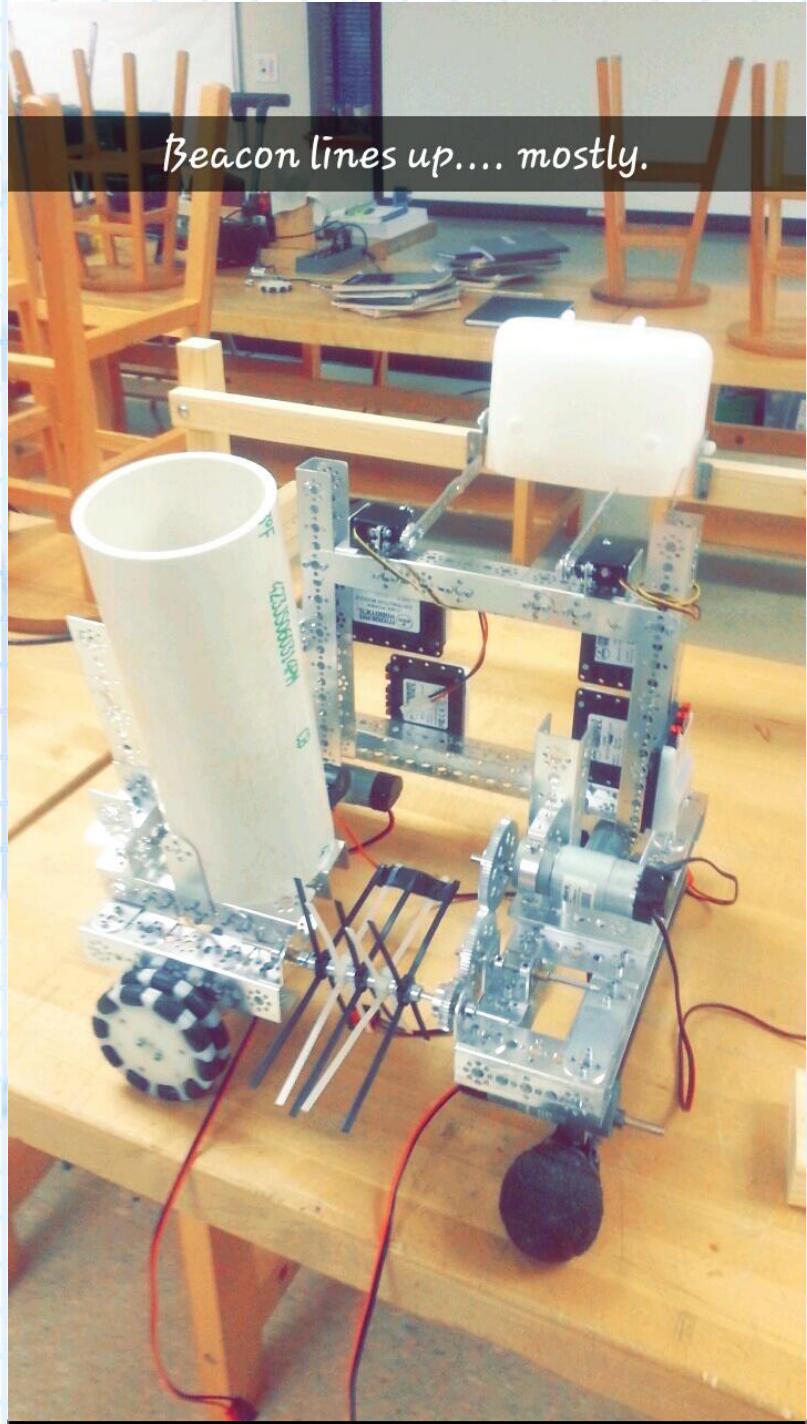
Meeting end 6:20



Signed off by:

Richard Mullin

William Anglin



This is a picture wherein we lined up the constructed beacon mounts with the beacon to test our alignment. We had just mounted the launcher PVC tube.

Meeting 11/08/16

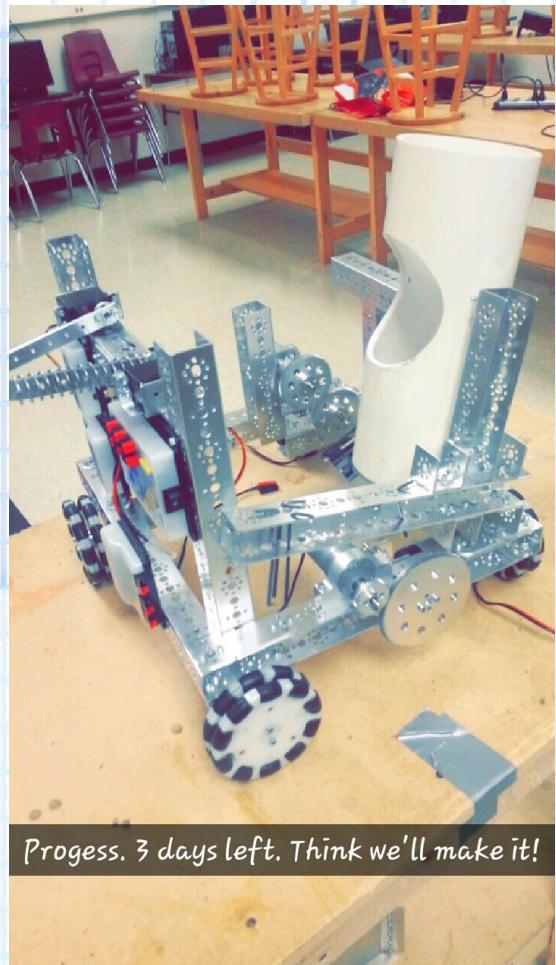
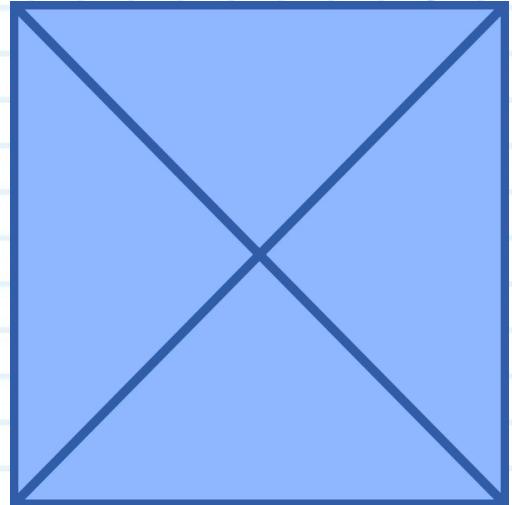
Context - Preparing for competition

Meeting start 3:50

- Feeling the crunch time for competition
- Worked on setting up electronics, finding mount points, software working on scanning all components / confirming working color sensors.
- Cut and molded plexiglass for ramp
 - And managed to break a dremel wheel in the process. Oops
 - Finished back ramp & general shape for walls.
 - Still need to find attachment points & strategy
- Final missing omni wheel came in the mail. So that was attached.
- Figured out mount point for 2nd zip-tie wheel, marked & cut holds to mount a C-channel to far side of tube
 - Also, figured out mounting & spacing of tube, and made that sturdy
 - Ended up using wood cut with a 4" bit on the drill press to space the tube off of the C channels
- Built a semi-cobby support cross on front of robot, necessary because of lack of other forward support. Made the robot much more sturdy, but may be something to make more elegant before next competition --- it'll do for now.

Meeting end 7:50

Signed off by:



Progress. 3 days left. Think we'll make it!

Meeting 11/09/16

Context - A lot of things....

Meeting start 3:50

- LOTS done today
- Wrote up checklist for things needed critically before competition - and then got to work
 - (see pic)
- RAMP MOUNT
 - Figured out general placement via zip ties, although true attachment will be done tomorrow
 - Leaving a gorilla glue experiment to dry overnight, might use that.
 - Cut one ramp wall to size, so that balls roll over it
 - Need to bend top of left wall tomorrow to form curve.
 - Need to watch height, we're approaching 18"
 - Ensured it fit with new 2nd zip-tie wheel
- Zip tie wheel
 - Built the second zip-tie wheel/axle
 - Built the gear train to attach the second wheel to the original drive motor
 - Had to fabricate a custom axle mount to make the train work
 - Fits like a glove
 - Highsight - maybe insert the axle before locking down the structure (that was a challenge to get in)
- trigger/spring construction stalled on part, hopefully it can continue tomorrow.
- Catch up on uploads & engineering notebook.

Meeting end 8:50

Signed off by:



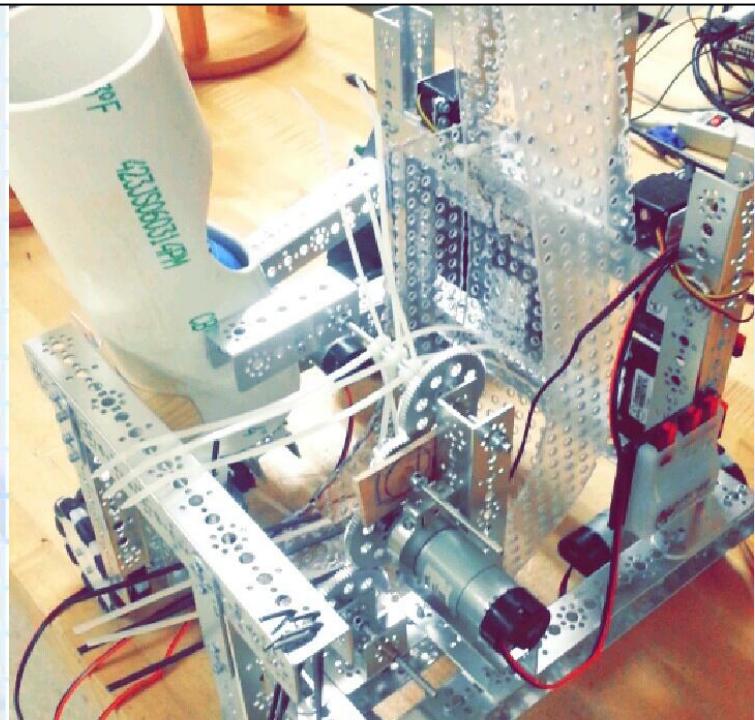
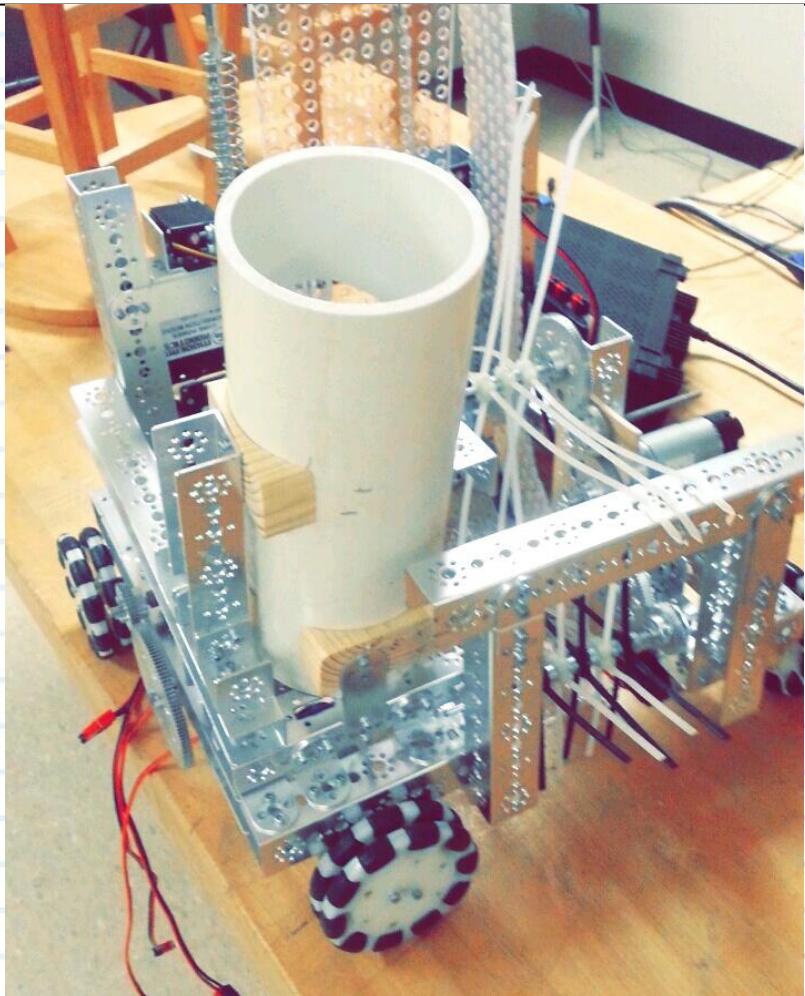
William Anglin

Large Week To Do

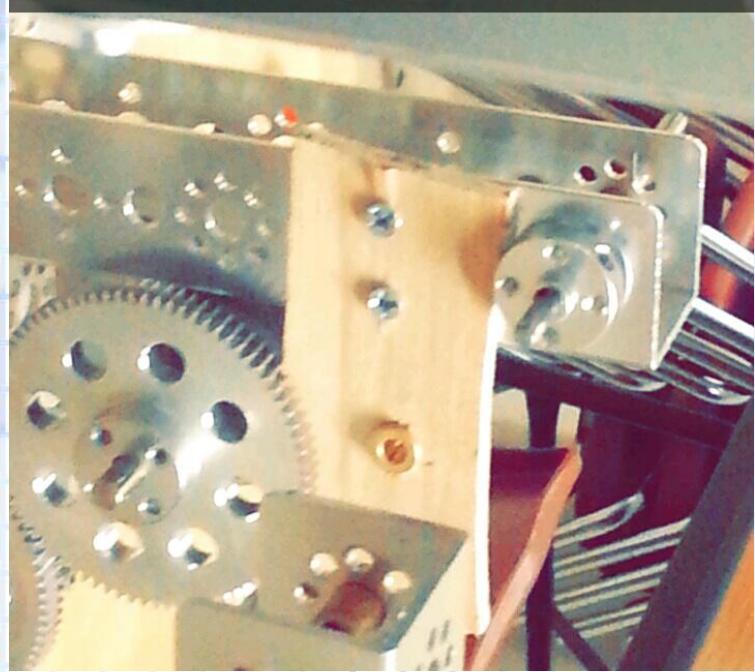
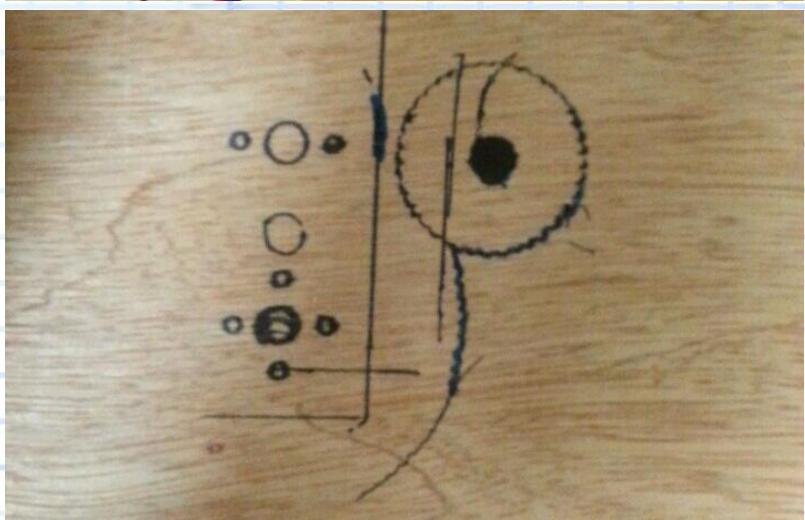
- Mount the ramp
 - structure
 - walls
 - slant @ top
 - cut short
- Trigger/spring construction
- Zip tie wheel 4 gear
- electronics

Meeting 11/09/16 (page 2)

Context - A lot of things....



Not pretty but it works.



Signed off by:


A handwritten signature in white ink on a black background.

TOP LEFT: wooden supports for the tubes
TOP RIGHT: view of ramp & tube
BOTTOM LEFT: sharpie drawing on paper of the structure piece needed for the gear train
BOTTOM RIGHT: wooden piece cut and mounted.

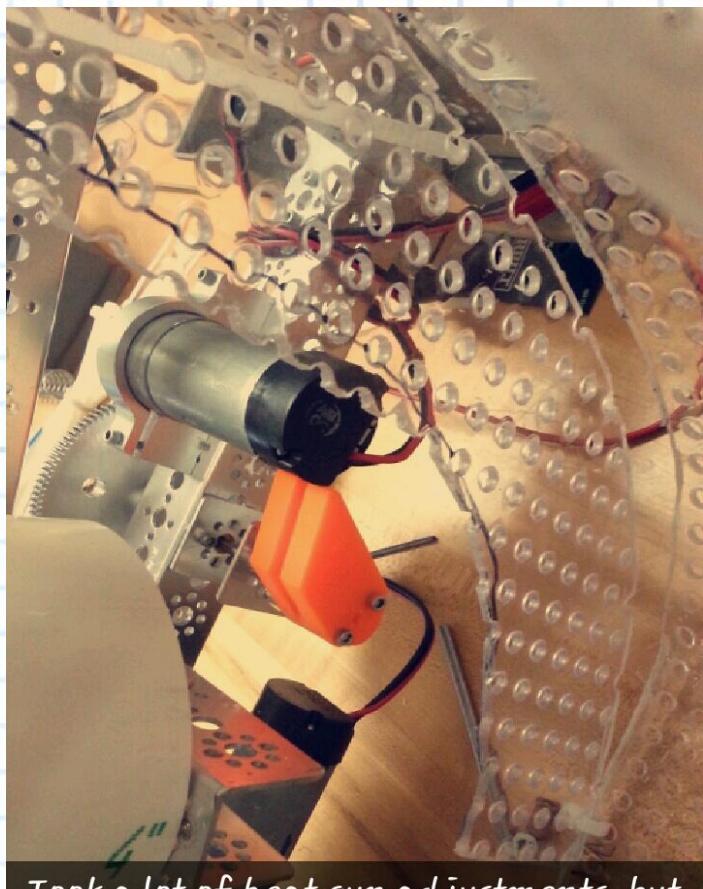
Meeting 11/11/16

Context - Night before competition builds

Meeting start 3:45

- Building the final parts of the robot, and doing wiring and tests
- Launcher gears are coming out of sync under the torque
 - We'll have to add an outside brace to support them
- Some problems with disconnects in the motor controllers - probably due to faulty USB cords.

Meeting end 10:00



Took a lot of heat gun adjustments, but it's on. Fits like a charm.



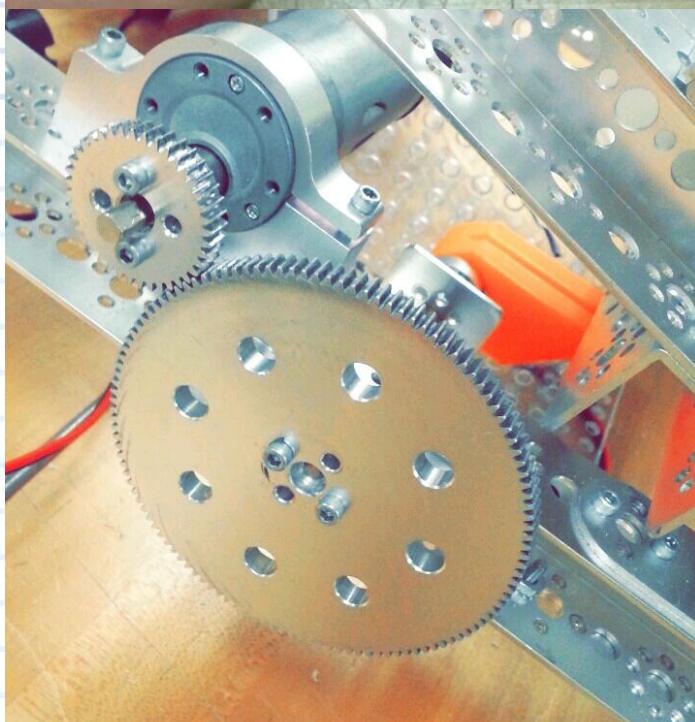
Signed off by:


William Mullins


William Mullins



Final missing part! Thanks for the save
Savio Guardian



Everything is set, but these gears come undone under the torque. Guess I'll figure it out tomorrow.

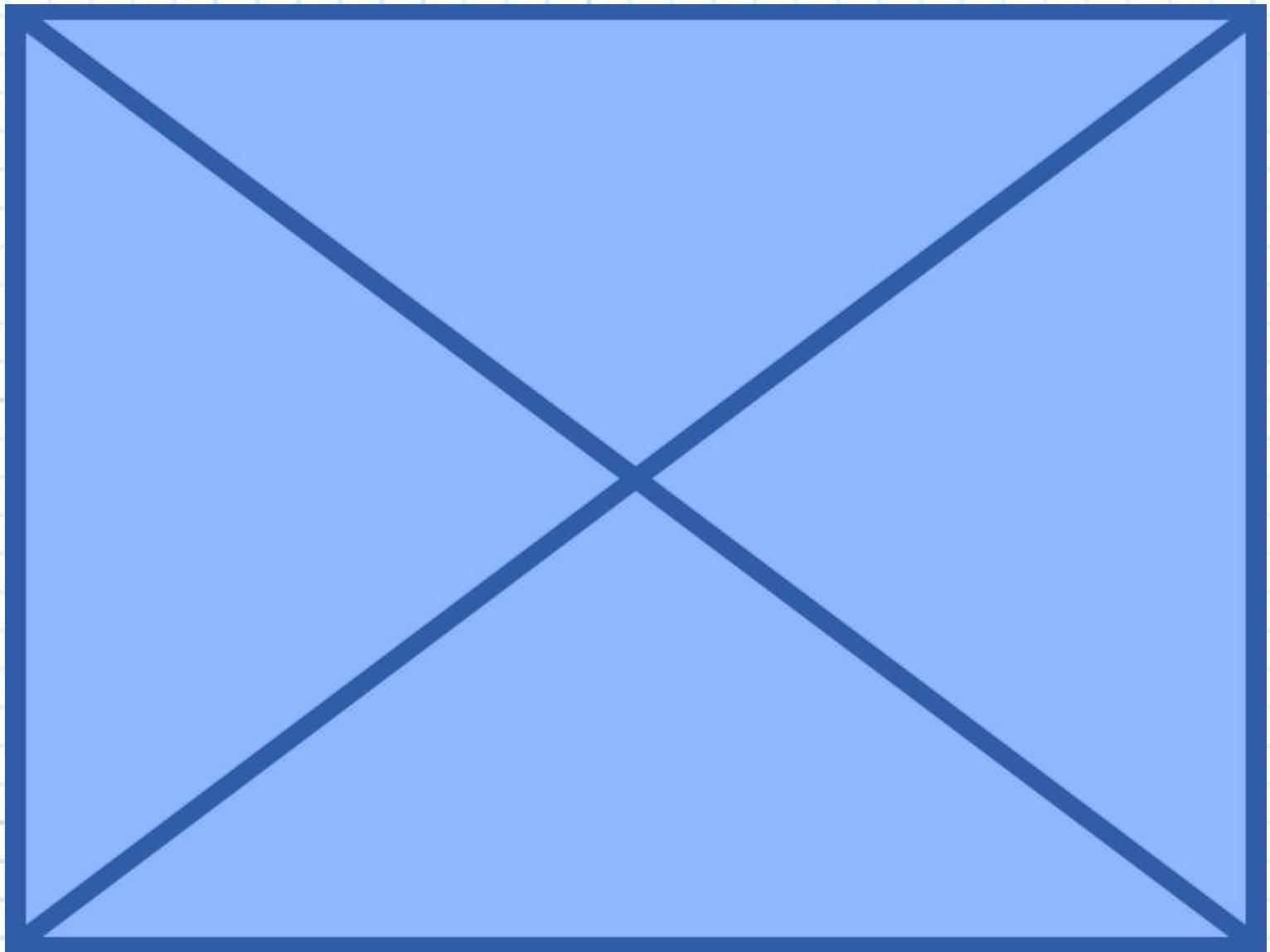
Meeting 11/12/16

Context - Thoughts after 1st competition

- We failed to get through inspection but we were able to watch and learn!

Observations:

- Lift ball off the ground by ramming it to the walls(genius!)
- many teams seem to be using catapult mechanism for their launchers but not sure
- many teams are pressing the buttons/stations by ramming to the walls, I feel like ours is too small to easily hit the beacons.



Signed off by:





Meeting 11/14/16

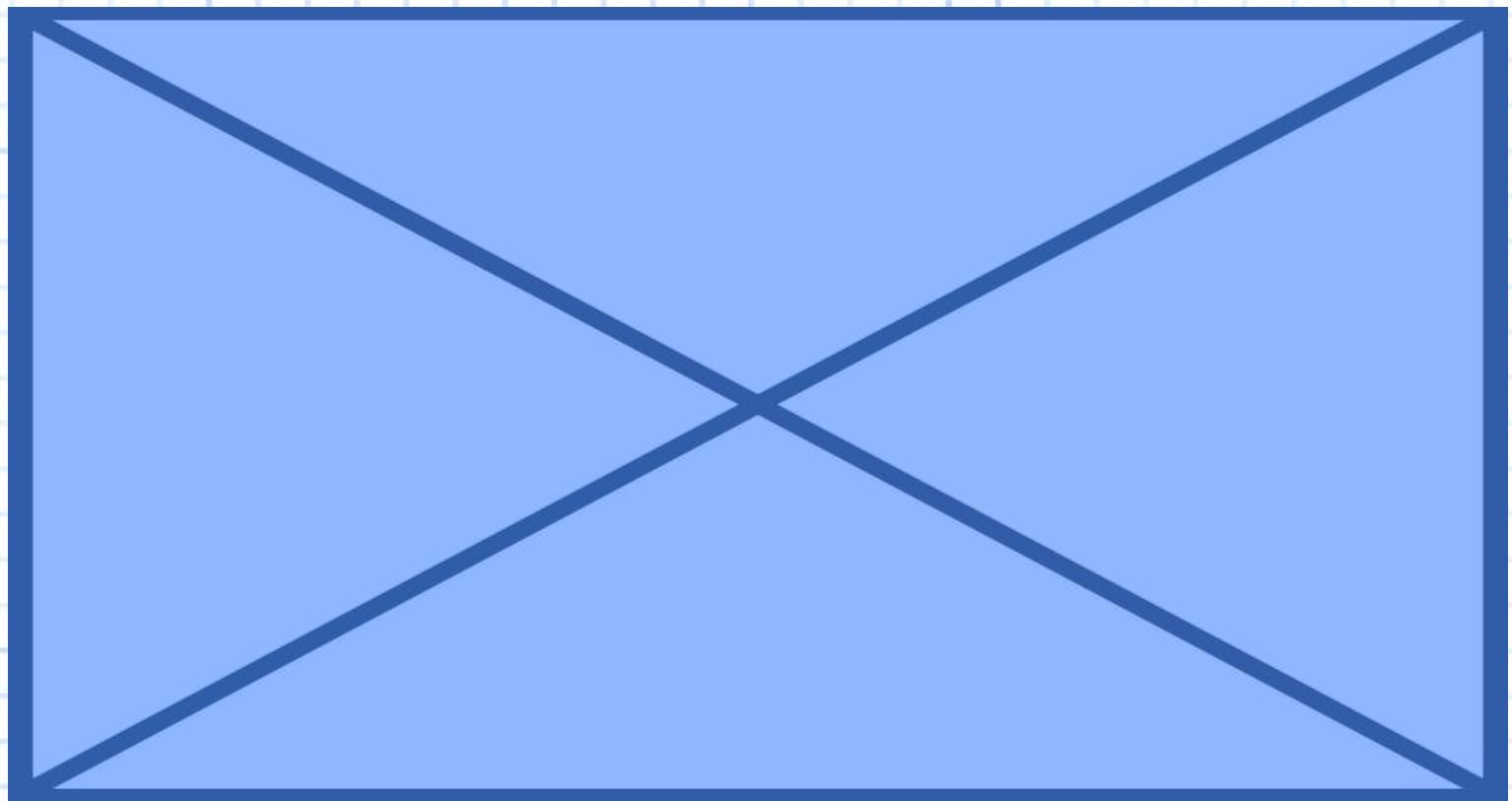
Context - Spring

Everyone is recharging from competition, so meetings tended to be ~ an hour each this week.

Spent monday & wednesday brainstorming and going over ideas & observations from saturday

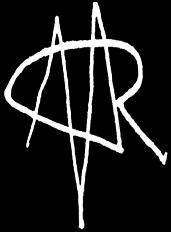
Game plan moving forward -

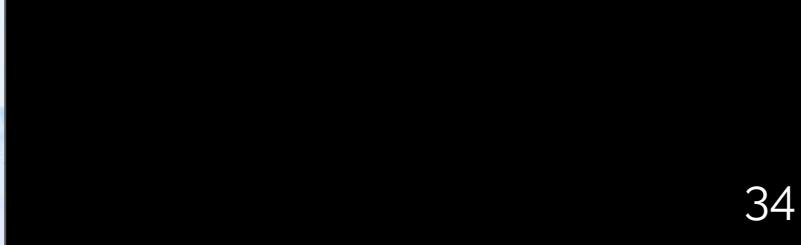
- Put 2 more hours into spring, if you can get it working, great, if not - scrap it
- If we scrap spring, we'll go toward what most of the competition was using
 - A flexible plexiglass plate on wheel with a slight bend just before contact
 - Potential downsides - some teams were having trouble with consistency
 - But considering no one had any trouble with power, it might be a good solution.
- Also shopping for new phones, thinking Samsung S5 for swappable battery.



Signed off by:

 Michael Mullin

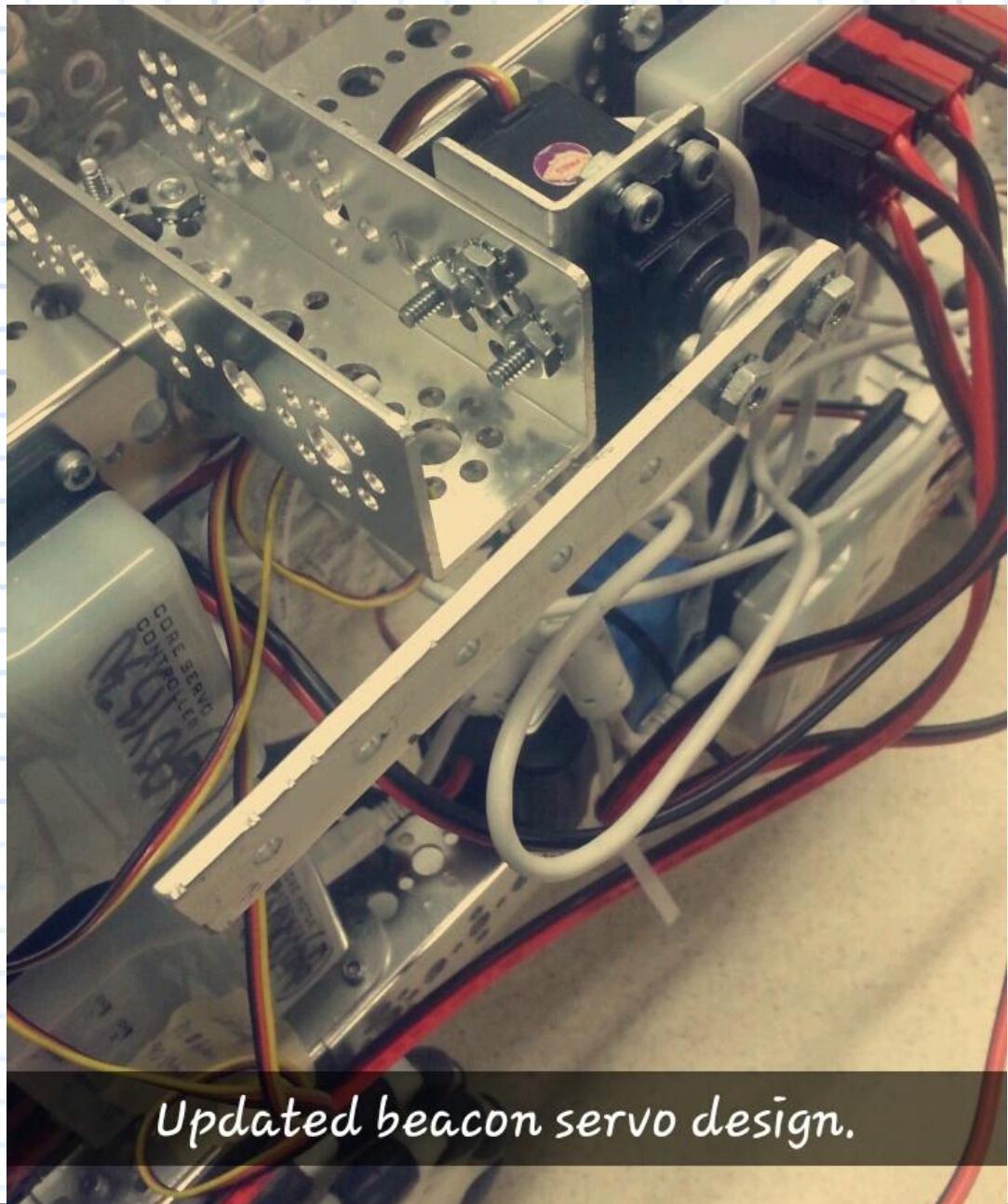
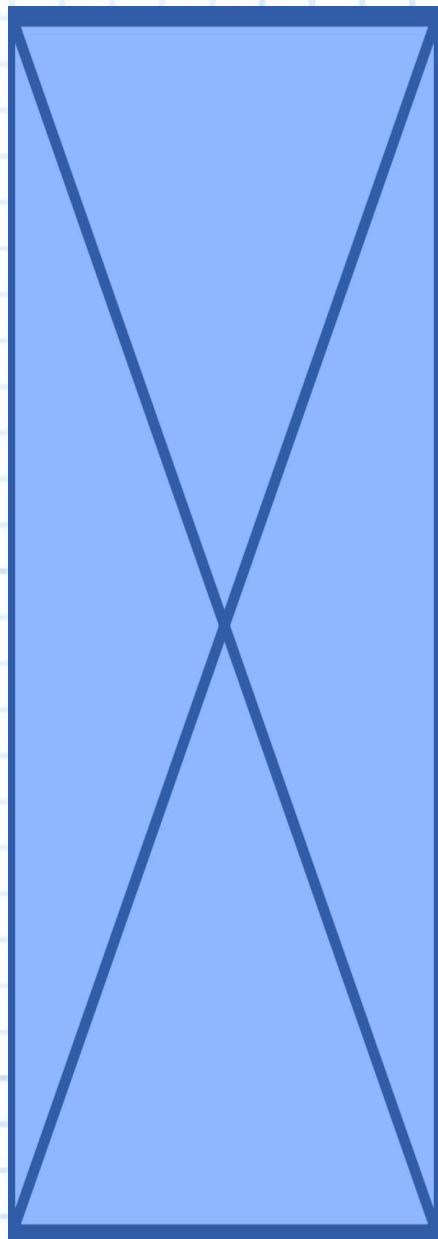
 AMR



Meeting 11/23/16

Context - Servo redesign

- The beacon with post might be a bad idea based on what we saw at competition, so we decided to swap to a plate.
- This also allows us to use just one servo instead of two.
- See the designs below



Signed off by:

William
Yashashchandra
Anujie

Meeting 11/25/16 to 11/27/16

Context - After the break

Meeting Starts 5:00pm, 7:00pm, 1pm

Meeting ends 10:00pm, 1:00am, 4:00pm

Over break Mentor Scott advised William as he worked on rebuilding and stabilizing the launcher.

- Problems identified before break:
 - The launcher has a massive amount of sideways force
 - The bolts/nuts are coming loose and causing loss of power in launch
 - The collar at the bottom of the pull-rod is coming off due to repeated slams into the bottom of the mechanism after each launch
 - Potential collision with front wheel motor
- Solutions
 - Drill a small hole through the pull rod and insert a locking pin to prevent slippage.
 - Put a dampening spring on the mechanism, provided it does not interfere with pull mechanic (rebound spring)
 - Fabricate a more robust structure for the underside of the launcher and collar holding.
 - Grind down excess on the pull plate at the bottom of the pull rod
- Found issues:
 - Shattered the top of one of the bronze collars in the upper assembly (inside of tube, on top of plate) due to sideways impacts
 - Plastic pull no longer lines up with axle after structure modifications
 - Large amounts of fluctuation in the frame during launch to accommodate the sideways force

Signed off by:

William
Anthony



Hopefully a fix

This shows the pin in the axle to add support.

Meeting 11/25/16 to 11/27/16

Context - After the break continued

- UNKNOWN - if we make the construction rigid, will it break something elsewhere to gain its flexibility.
 - With reconstitution of JUST wood, without collars, pull rod is under no friction and can turn away from the plastic pull.
 - Rebound spring options tend to interfere with pull mechanism
- Round 2 solutions
- Redesign the wooden restructure of the pull area with the ability to hold the bronze collars, thus providing friction sufficient to reduce turning of the pull rod
 - Scrap the rebound spring idea, and reinforce the structure to handle the impacts
 - Realign plastic pull to fit with adjusted pull rod position
- Other stuff
- Added a structure bar across the front of the intake, which servers two purposes:
 - One: provides needed structure to the front of the robot
 - Two: causes the intake zip ties to slap the ball inward and prevents them from expelling it.

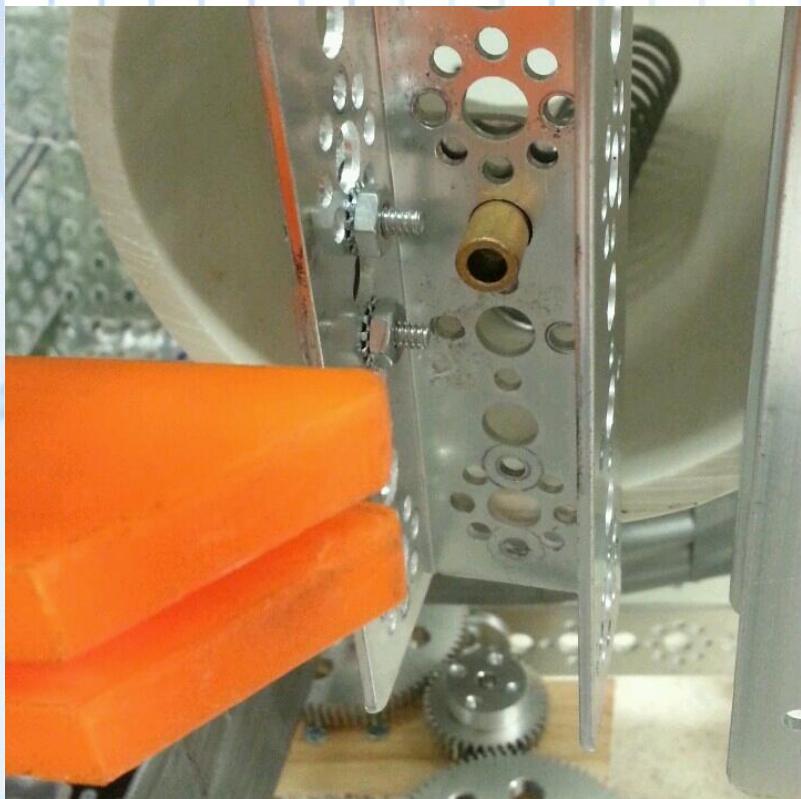


The spring mechanism broke the bronze float. It actually shattered it.

Signed off by:

William
Anglin

Yashashchuk



The above is a view of the old underside of the launch mechanism. The new version will mount the bronze collars in a wooden block to add rigidity and to protect them.

Meeting 11/28/16

Context - Testing before competition

Meeting start: 3:45pm

Meeting end: 5:40pm

- Plan out general course for week,
- Catch up on notebook
- Test turning and servo commands, having issues. Will continue tomorrow
- Looked into money and orders - phones (SG S5) coming in on wednesday.
- Worked on getting the team all registered and began basic prep for this weekend's competition
- Cut and attached temporary beacon pushing pad to beacon servo arm.

Work start 8:30pm

Work end 10:00pm

- Finished the rebuild of the launch mechanism
- Realigned the plastic pull to fit with the new pull rod position, as this alignment changed during restructure
- Added a metal plate support to the C-Channel underneath the tube, through which the pull rod runs, so that the C-Channel moves considerably less
 - The hope is that this takes out some of the variance and wear & tear involved in shooting the ball.
- Tested full new system via direct drive - worked like a charm.
 - Actually has more power (vertically) than any prior configuration, hopefully because the force is now not being sent into the frame as badly.
 - The central wood block, countersunk for the bronze collars, replaced the metal braces that were previously in place due to failures repeatedly occurring in those components.
- With all major building now complete, the ideal schedule would be to work out software issues tomorrow and then move into driver practice and checklist items for the final two-three days of the week.

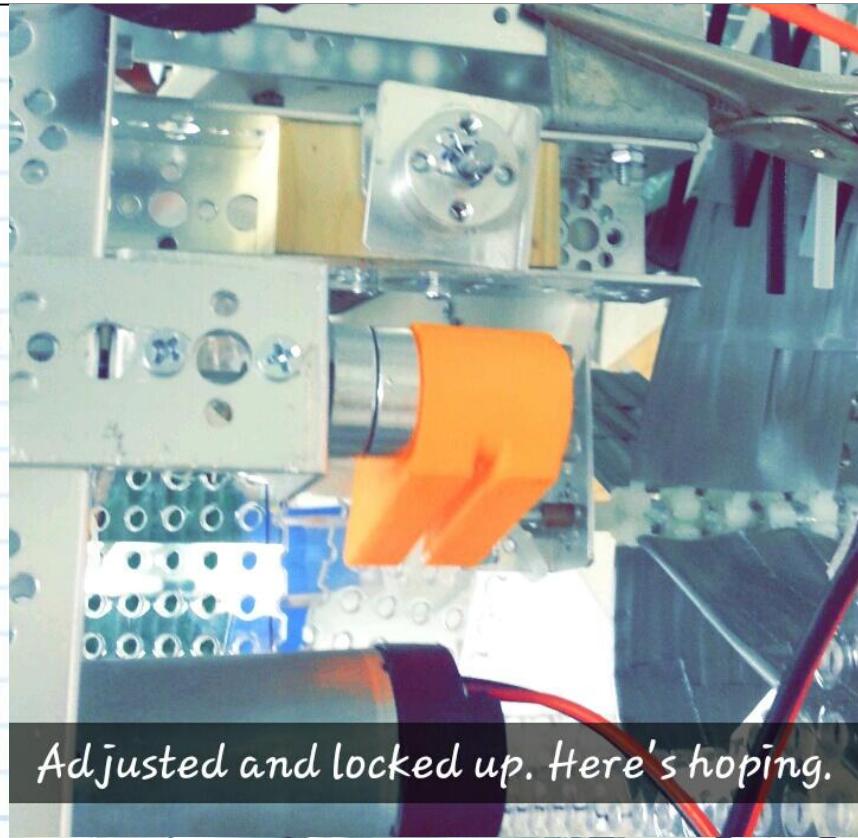
Signed off by:



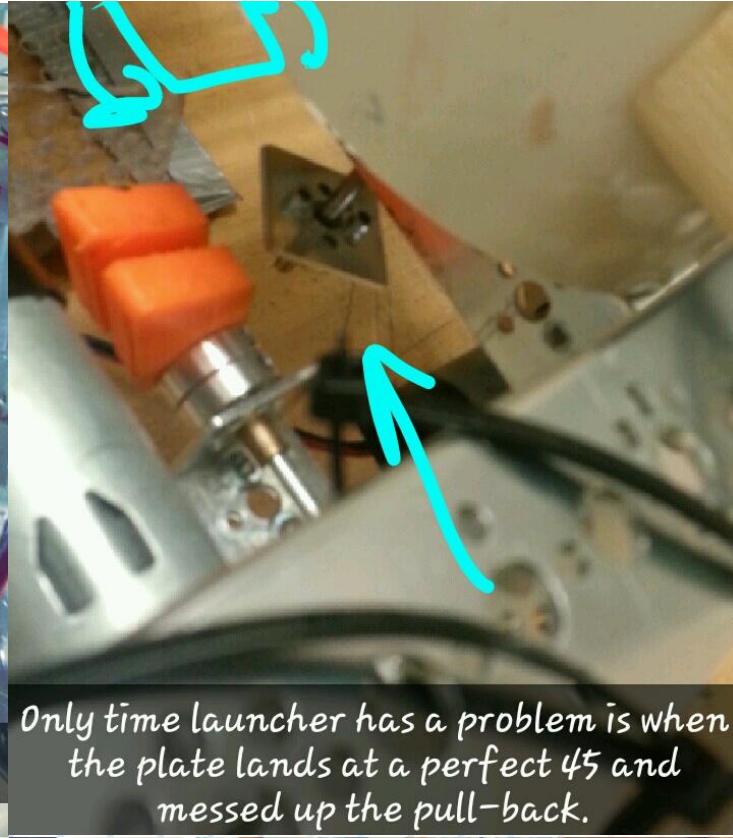
Pictures of the day's edits can be found on the next page.

Meeting 11/28/16 (page 2)

Context - Testing before competition



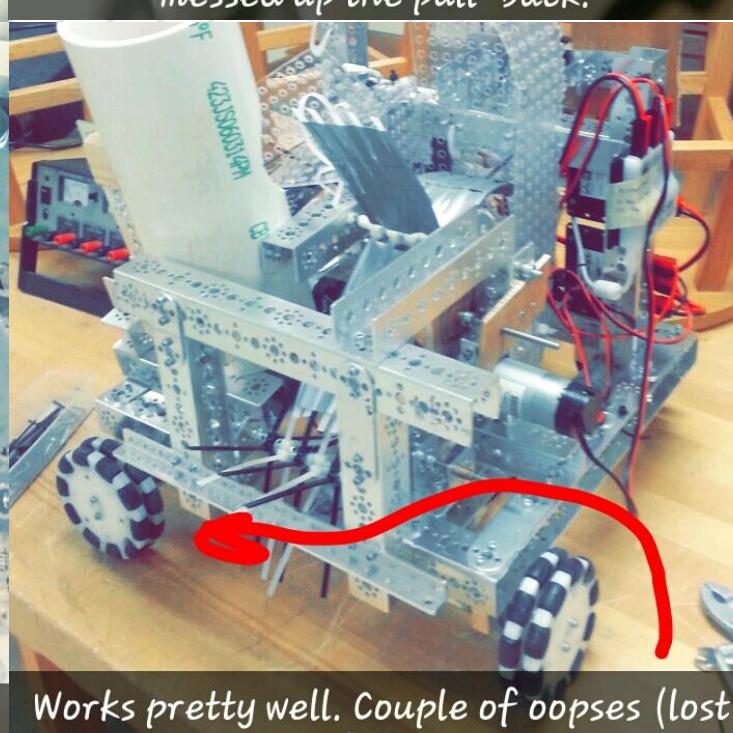
Adjusted and locked up. Here's hoping.



Only time launcher has a problem is when the plate lands at a perfect 45 and messed up the pull-back.



Moved motor to open up path of pull



Works pretty well. Couple of oopses (lost a wheel once) but 95% there.

Signed off by:

Michael
Mullin

William
Anglin

Meeting 11/29/16

Context - Testing before competition

Meeting start 3:45

- AGENDA:
 - All hands on deck to help test software, get that down so we can begin driver practice and smooth the path for autonomous
 - ASAP model phone mount so we can send the model to the savio guys (hopefully they can still print it all in time)
 - Marketing work on notebook team section
 - Begin work on checklist things (labels, #s, etc)
- What we did :
 - Tested driver control software
 - Had problems with wheels falling off - will look into
 - Turn command not working
 - Beacon servo not working
 - Intake not working / going backwards
 - Debugging
 - Turn command is throwing an error and ending the program
 - Intake is acting really strange, not sure if the problem is software or in the electronics
 - Beacon servo unresponsive. Button being registered but no movement
 - Have to head out for today, will continue work tomorrow

Meeting end 6:00 pm

Work start 4:00am

- Picked up a samsung S5 sales model phone from costco (earlier in the night) to take measurements from, since the location of the features on the back of the phone are not available online
- Modeled the mount (top & bottom sections) for the S5s on the robot, with structure to protect the USB port from stress.
- Saved the file, exported as STL to be printed
 - Shoutout to Savio Guardian for helping us out with this

Work end 6:30 am

Signed off by:

 Michael

 William

40

Meeting 12/02/16

Context - Testing before competition

Meeting start 3:45

- We started out by looking at what needed to be done:
 - Test driver software
 - Driver practice / robot endurance testing.
 - Specifically watching intake gear train / wheels / launch gear train
 - Autonomous
 - Tighten EVERYTHING
 - Labels and numbers
 - Check for sharp edges
 - Charge batteries
 - Construct a beacon to test with
- Attached warning labels to servos & main core power switch label
- Attached a single thick bar across front of intake
 - Provides much needed structure to front of robot
 - Gives the 1st zip tie wheel a snapping action as it swings down → improved ball intake.
- Loaded the most recent version of the software and began testing
 - Intake was running backward - quick software fix
 - Testing went fairly well
 - Nicola is running chassis while I run manipulator
 - Once he got the drive system down, things went fairly smoothly.
 - It's hard to see what you're doing when the ball is on the far side of the robot, makes intake hard
 - Shooting distance is approximately 1.5 - 2 feet, and it tends to shoot a hair left of center.
 - Looks pretty good over all
 - No wheels losses, all the gear trains have held up

--- pizza & drink break at ~6:00 ---

Signed off by:

William
Yeshua Parker Angel 41
Yeshua Parker Angel

Meeting 12/02/16 (page 2)

Context - Testing before competition

- Added a legacy color sensor & a (possibly) working modern robotics color sensor to try to do autonomous
 - This required adding both a legacy module and a sensor input module.
 - Having trouble getting any reading from either sensor.
 - Slade, who was doing the programming, had to leave at 9:30 for his SAT the next day
 - Scrap autonomous for this competition
- More driver practice
 - Robot is creating a large amount of static - enough to give us a little shock when we touch it.
 - Probable cause is a frayed/damaged wire or the cluster of wires all in one place causing interference
 - Restarting the robot and rearranging wires fixed the problem, so we think we're good for competition.
 - Problem might have come from the sensors we added, since they were the change that prompted it.
- Around 11, we started packing up the software bag and tool chest for tomorrow

Meeting end 11:30 pm

Work start 12:00pm

- Still need numbers on the robot.
- Decided to print black on blue, "laminate" with packing tape, and back with fiberboard
- Found correct sizing, debated design, printed & attached
 - One on front bar above intake, other on back of ramp

Work end 2:00am

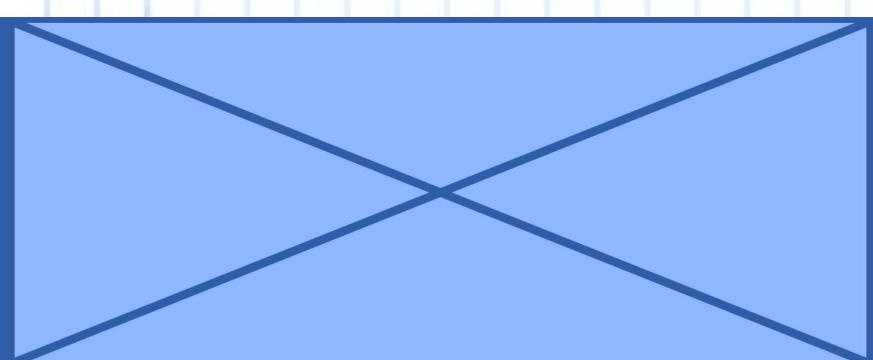
Signed off by:

William
Alylie
Yashashwini

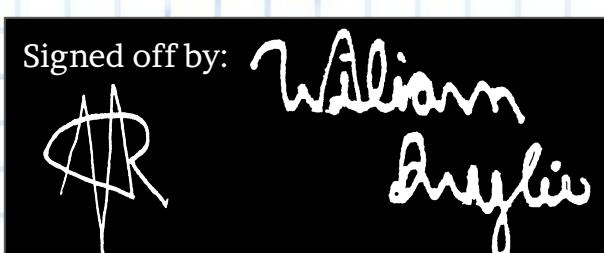
Meeting 12/03/16

Context - 2nd competition report

- Meet at Vista backlot at 7:00am to carpool down to WestRidge
- Arrive at competition around 8:00 and unload in the rain. Towel over the robot
- Organize team in cafeteria & lay out the day's plan
- Break to begin check-in & help set up play fields
 - Check-in went MUCH more smoothly, other than a slight stutter of connections during field test everything seemed smooth.
- Move robot & gear to pits, prep for competition
 - Driver meeting & match schedule distributed at 9:50
 - Matches start around 10:10am
 - We lent a legacy controller to someone, might have been blue sabers 5764
- MATCHES
 - Match one: **6990+5628 (Tao)** vs **11918+9875**
 - Match went ok, although as soon as we started tele-op we lost connection with one of our motor controllers and lost the whole right side of the drive-train, rendering us essentially immobile. I believe we still made one of the two balls were were holding.
 - Scramble in between matches to find and fix the issue with our motor controller, swapped with one of 6210's spares,
 - Match 2: **6990 + 6210** vs 3708 + 9875
 - This match went much better, the motor controller held out until the end of the match. This time the one that failed was the manipulator motor controller, which stills allowed us to focus on beacons while 6210 went for cap ball in the endgame.
 - Spent the time in-between matches trying to debug motor controllers, figured out that if we started up the robot with the driver station already initialized and it didn't throw us an error after about 8 seconds, it was ok. Still temperamental, but we had a decent work-around.



Signed off by:

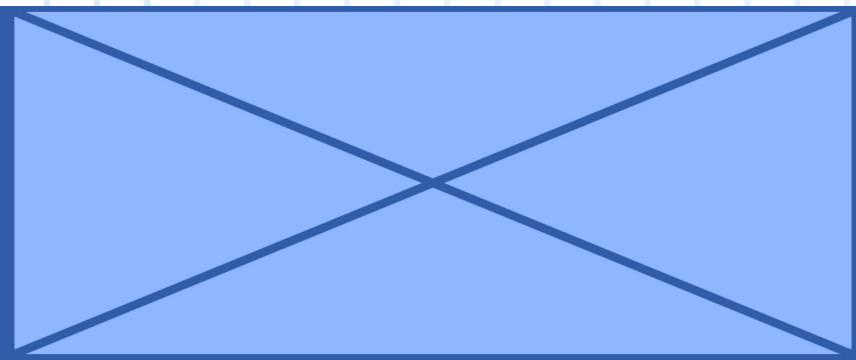


WR

Meeting 12/03/16 (page 2)

Context - 2nd competition report (continued)

- Match 3: **6990 + 11404** vs 11093 + 11019
 - This match started out well
 - Launched our two starting balls, made both, grabbed 2 more balls, and went to shoot → one of them made it, one missed
 - Then the pull-pad on the launcher axle fell out onto the play floor
 - After the match we found out that the collar had sheared clean through both sides of the metal pin through the axle, leaving the metal in the middle.
 - Went for beacons after that, still did well.
 - Spent time between matches doing more debug of motor controller & putting a spare pin through the axle
 - Really an annoying problem to have, because it broke roughly 8 shots into the competition instead of during the 50+ we did the day before. However, these things happen.
 - LESSON: always put a new pin in the axle the morning of competition.
- Match 4: **6990+11093** vs 11090 (chaos monkeys) + 6272 (IE. Prime)
 - Decent match, but Chaos Monkeys and Prime were just on fire this match - we got dominated. Good to them, however.
 - Had to watch the battery between these matches - we kept everything powered on, because if we powered off we risked losing the motor controller again. Luckily, the batteries limped through.
 - As long as we kept the robot and phones ON after a successful start-up, we didn't get the error until after we had turned it off & on again.



Signed off by:



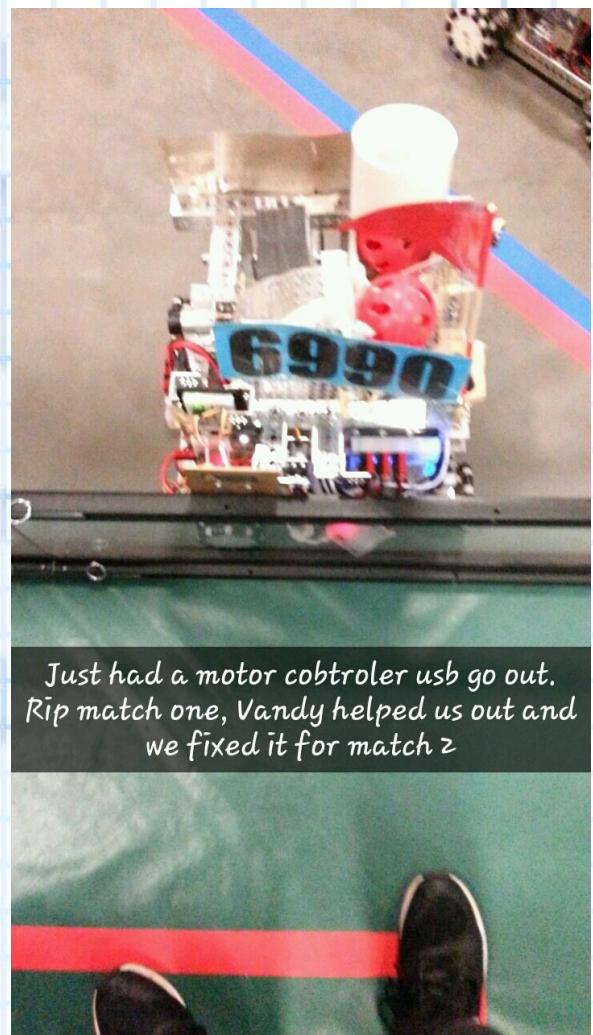
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Meeting 12/03/16 (page 3)

Context - 2nd competition report (continued)

- Match 5: **6990 + 11090 (C.M.)** vs 5628 (Tao) +6710(sigma)
 - Not a terrible match, but had a few unfortunate things happen:
 - Sigma (chasing a ball) rammed us and got disabled, pinning us against the beacon we were going for and lodging a ball deep in the robot's chassis, for which we received 60 points of penalty because we could not remove the ball for 11 seconds..
 - 11090 had disconnect issues, just unlucky.
- On the whole, we went L/W/W/L/L (2-3) and ended 8th in our set. Not bad, considering our issues.
- Match results for our group:

#		8886	11090	6210	11019
Q-1	150 - 50	8886	11090	6210	11019
Q-2	80 - 50	11404	11093	6710	3708
Q-3	40 - 25	9875	11918	5628	6990
Q-4	90 - 95	6272	8886	11090	11404
Q-5	90 - 30	6990	6210	3708	9875
Q-6	50 - 80	11019	5628	6272	11093
Q-7	35 - 120	11918	3708	6710	11090
Q-8	10 - 145	9875*	5628	8886*	11404
Q-9	90 - 155	11918*	6710	6210	6272
Q-10	21 - 55	11093	11019	6990	11404
Q-11	90 - 20	6210	3708	11918	5628
Q-12	85 - 80	6710	9875	11019	8886
Q-13	110 - 25	11090	6272	11093	6990
Q-14	55 - 20	11019	11404	6210	11918
Q-15	105 - 155	3708	6272	8886	9875
Q-16	60 - 125	6990	11090	5628	6710
Q-17	45 - 75	11093	9875	8886	11918

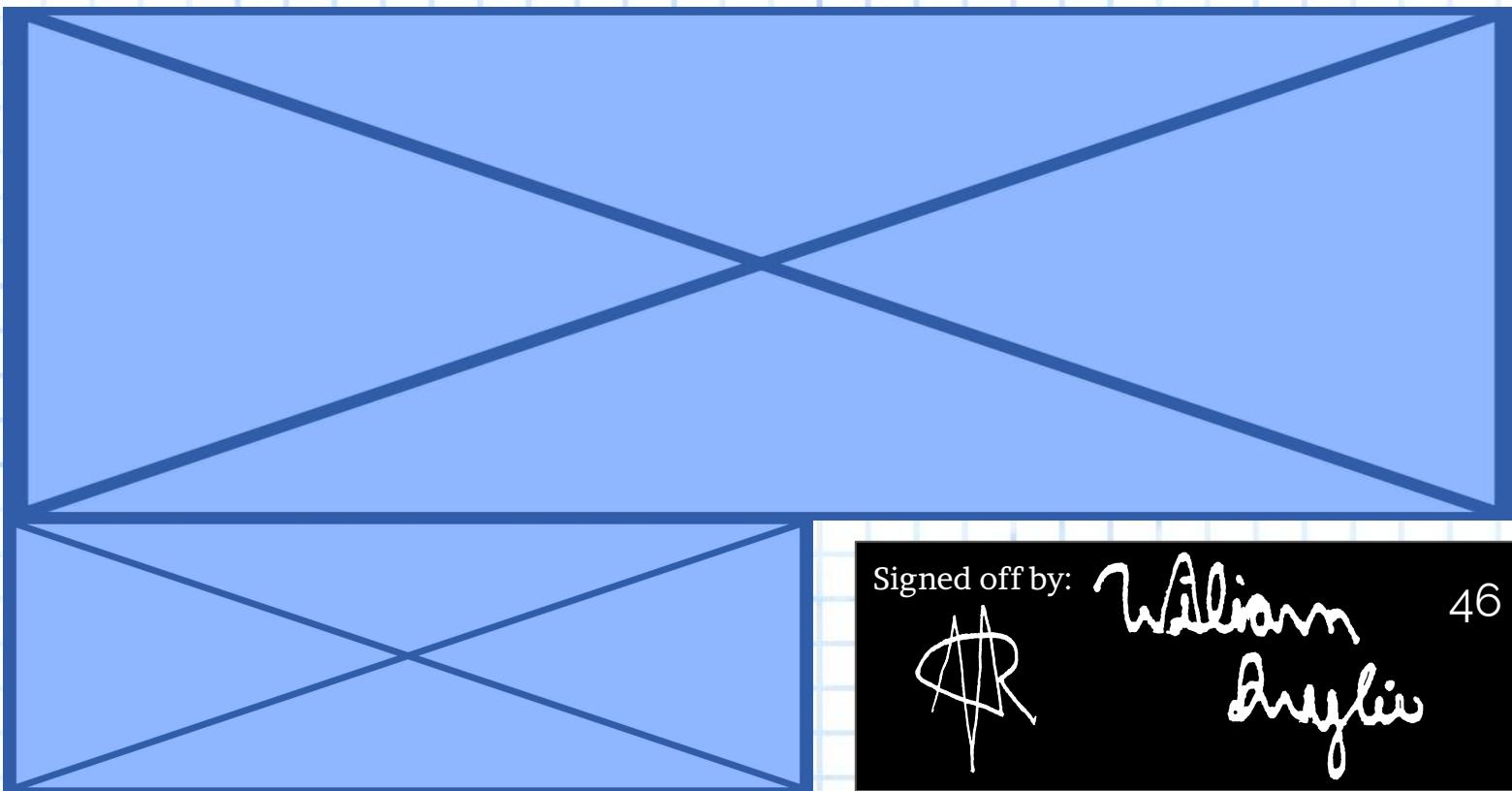


Signed off by:

Meeting 12/03/16 (page 4)

Context - 2nd competition report (continued)

- Following our competition (morning) wrap up, we moved the robot & gear out to the car and went to fuddruckers for lunch.
- Afterwards we headed back to competition to watch & cheer 7797, QuadX, Guardian, Silver Bolt, and others.
- Watching notes:
 - QuadX either gets nothing in autonomous or they get 60 pts, 2 balls, and win the game outright.
 - Guardian shattered their Lexand launch plate in match 3, and were just a beacon bot for matches 4 & 5,
 - 7797 did well, the autonomous they wrote the morning of the competition worked well aside from the one time it sent them into the other side of the field.
 - The showdown of Silverbolts + Guardian vs QuadX + Hydra was awesome to watch, and all 4 teams did well.
 - Returned the phones & motor controller we had borrowed from 6210 Strike.
 - We helped pack up and headed home. It was great meeting members of the other teams and being in the competition atmosphere.
- Day end 7:00pm

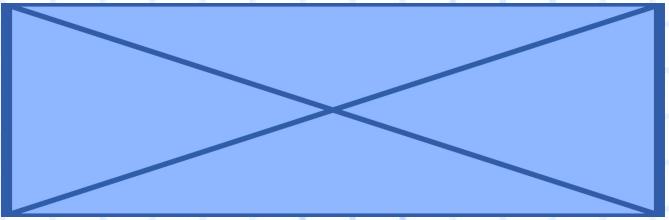
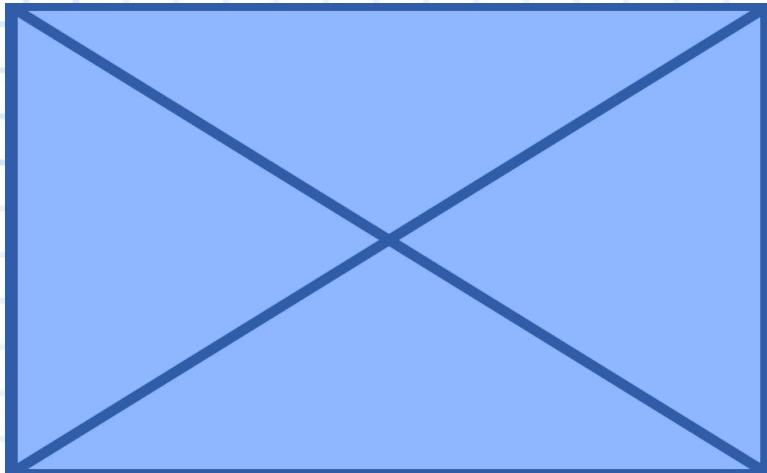


Meeting 12/08/16

Context - Post competition to do list

Start 3:50

- Meeting intro from smylie with discussion points & plan for next 3 weeks
- Planning for going forward
 - HARDWARE TO DO
 - FIXES FROM SAT:
 - Intake low point - jamming
 - Means taking the ramp out and reforming/replacing.
 - intake/side guard to prevent balls getting stuck under
 - Potential “ramp” into middle for intake
 - Add a front beacon pad for tel-op
 - WHEELS falling off - sand groove in axle
 - Sheared cotter pin replacement
 - Potentially acetylene tip cleaner rod.
 - Other:
 - Testing & practice
 - Consider rebuild of queue ramp, as the current ziptie + plexiglass setup is less than ideal (though it works, it wasn't meant to be permanent.)
 - Software todo
 - Reverse intake
 - Autonomous
 - Optional rewire?
 - Marketing to do
 - Notebook things: business plan updates, layout & setup, team page.



Signed off by:

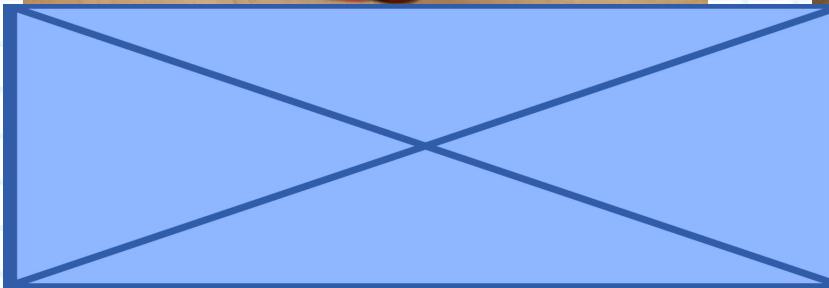
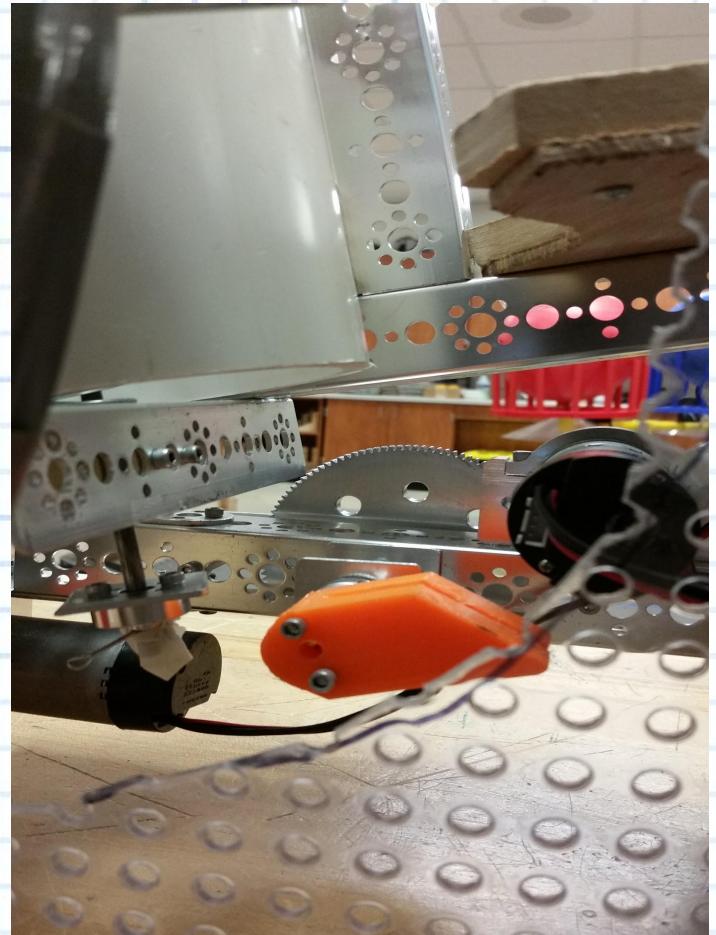
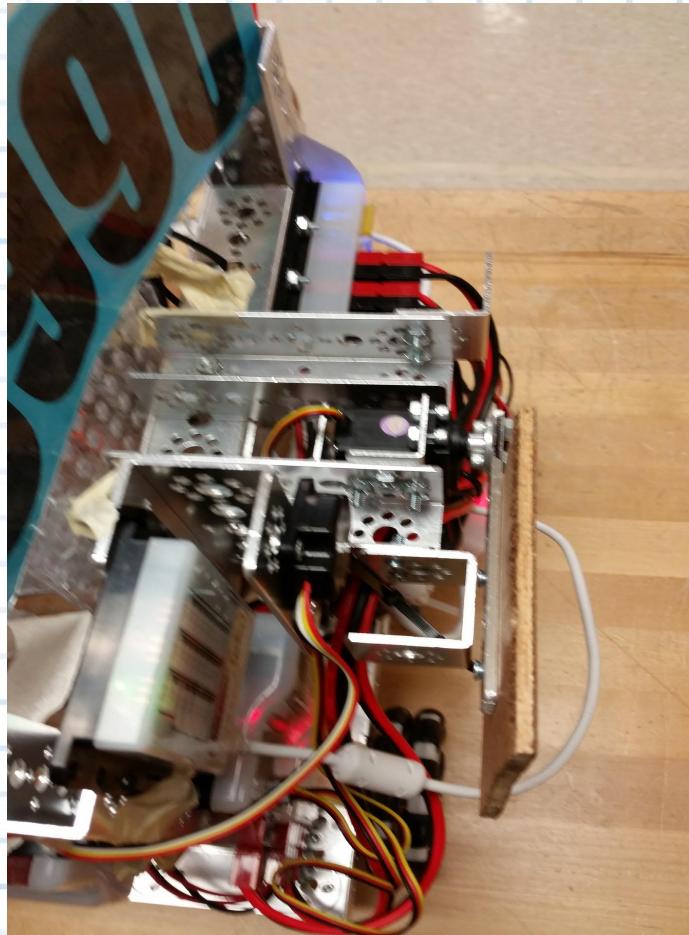
Meeting 12/08/16 (page 2)

Context - Post competition to do list

What we did today after planning

- Samsung s5s came in, so we configured those, labeled them with team name, and set them up to run the robot
 - Problems - we can't make android studio mount the s5. It connects to the computer, but android studio won't recognise it. Potential causes are:
 - Missing drivers that we can't install on the school computers
 - Outdated version of android studio that does not recognise the newer phones.
 - Phones on wrong OS? If android studio is looking for the FTC 4.4.1 that could be our problem.

Meeting end: 6:20pm



Signed off by:

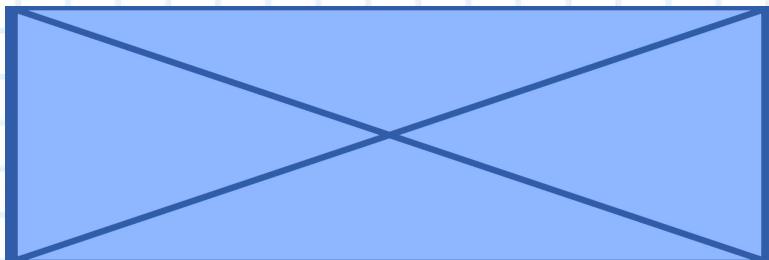
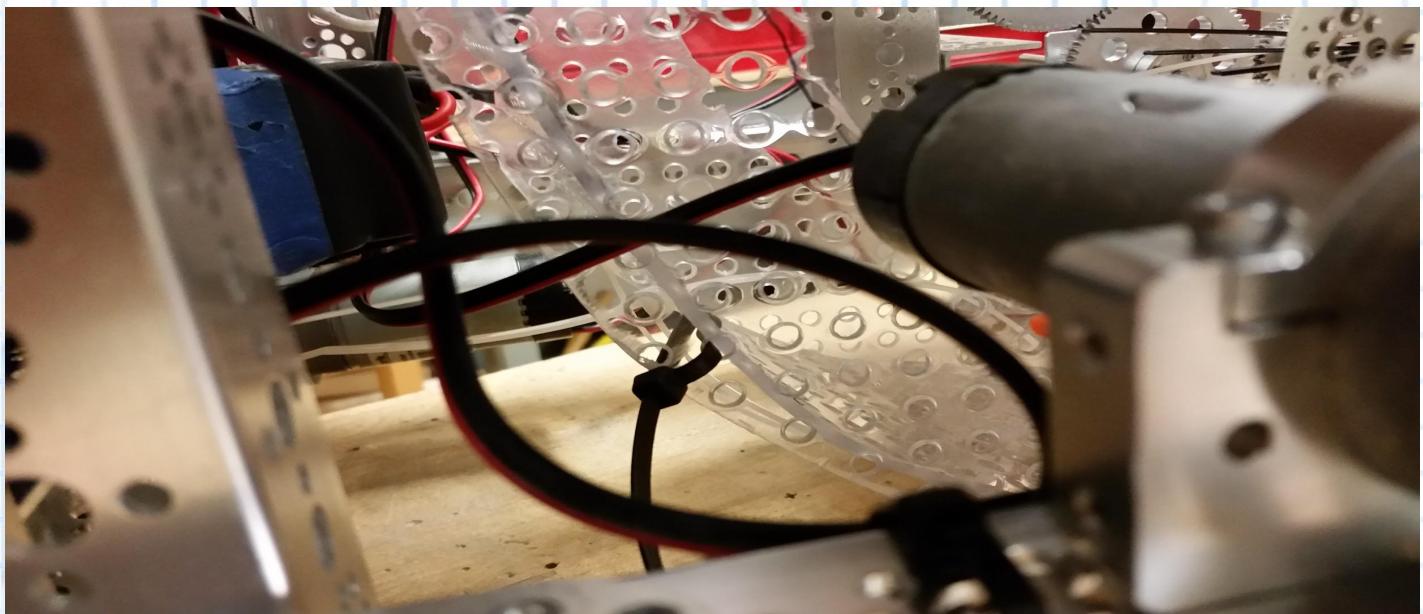
Meeting 12/12/16

Context - Ramp fix

Meeting start 3:45

- Todo today is just reshape the ramp and reattach it, to prep for handing the robot off to software over the break.
- Needed to bend the ramp forwards, so I taped it up between the floor and table to help reshape while we heated the plexiglass.
 - Also used this to hold it while it cooled.

Meeting end 5:45



Signed off by:


Yael Shachar-Kew



Meeting 01/02/17

Context - Ramp fix

Meeting start 3:45

- today's to-do list includes
 - the side panels to guard from balls coming underneath the robot
 - anything making sure that our front on the wheel does not keep falling off
 - will probably switch the motor collar
 - also we will be working on getting the autonomous finalized that we've been working on over Christmas break
 - we need to attach a second color sensor and a gyro sensor
 - we are also still working on getting the Samsung S5 to register with the Lenovo laptop and Android Studio which we hope to have resolved today
 - marketing will be working on the notebook and set up for the text to go in from the Google Drive and setting up for the team page
 - the last thing of note on the hardware agenda is the intake ramp which is stalling out in the middle
 - there are a couple of zip tie quick fixes we might be able to try.
- we ended up trying zip ties perpendicular to the ramp to get the ball up and into range of getting grabbed by the upper wheel
 - that didn't work so we ran to zip tie rails long ways, in parallel with the ramp direction, and that gave the ball enough boost to get grabbed by the upper wheel without stopping the first wheel from in-taking the ball in the first place ---> problem solved.
 - we switched the motor collar in the wheel that kept falling off of the front of the robot.
 - the collar is too small for the axle by just a hair so we will have to file it down just a little bit to make it fit
 - However, the tight collar is a much nicer fit than the damaged collar we had on there before
- Meeting end 5:45



Signed off by:



50

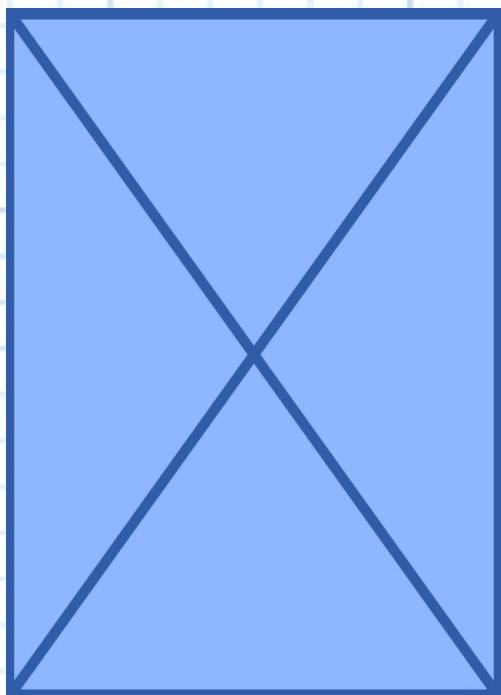
Meeting 01/02/17 (page 2)

Context - Ramp fix



ABOVE: this is the front pad we added to stop balls from getting stuck under the front of the robot

RIGHT: this is a top-down view of the zip-ties we used to fix the ramp.



Signed off by:

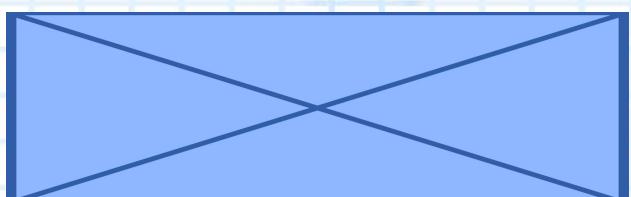
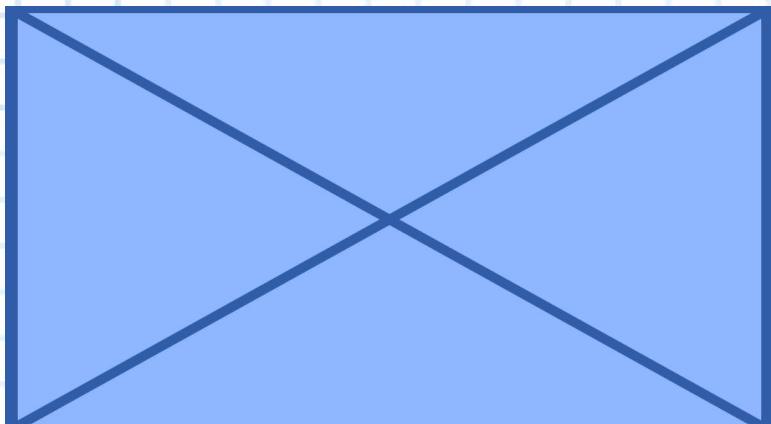
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Meeting 01/03/17

Context - Phone debug & Misc builds

Meeting start 3:45

- Today's major goals are to complete our hardware todo list, and to debug the phone issue.
- Hardware:
 - We had a 5" circular piece of wood. We shifted the team number on the front of the robot so that we could attach the circle as a front-beacon bumper
 - Before this, we technically had to drive in reverse to hit beacons during teleop.
 - Mounted on front right of robot (see pic)
 - Attached the wheel that we had to file the collar of, it fits snug. Time will tell if we have the same issue with it falling off
- Debug:
 - The problem is that the computer sometimes will not connect to the phones at all, and when it will, android studio does not recognise them at all.
 - The old ZTE still works with android studio, as another piece of debug knowledge.
 - Luckily, Trey from 7797 has he's s5s working fine with his PC, so we have a debug machine.
 - The first thing we tried was a true data cable, instead of the standard micro usb. This helped with the computer connections, but not with the android studio.
 - We then tried plugging the phone into trey's computer - instantly the phone was prompted with a request for access - something we'd never gotten on another machine.
 - My machine wasn't prompting because android studio wasn't installed.
 - So - looking like Slade's PC is the problem.



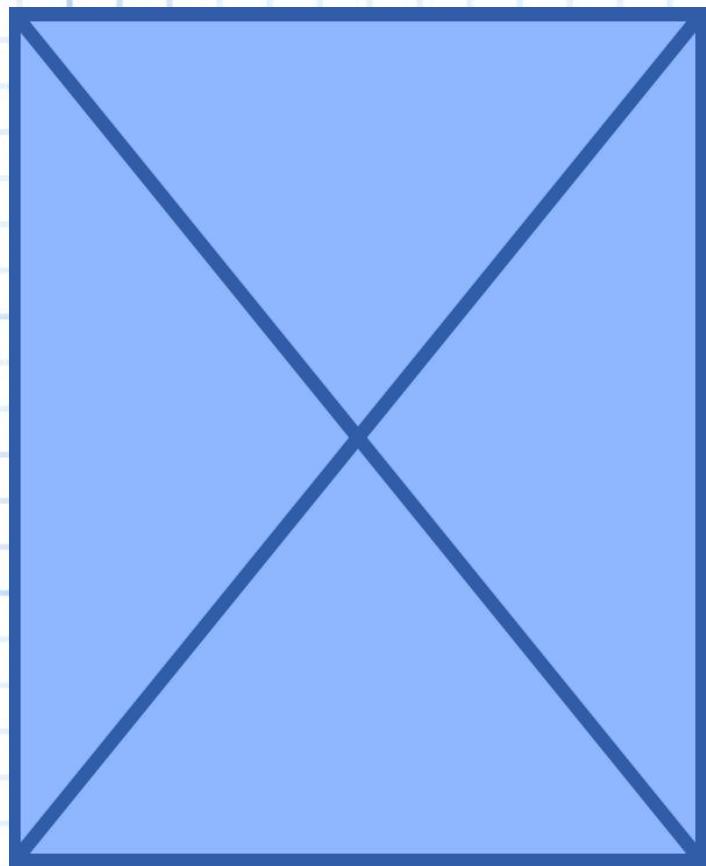
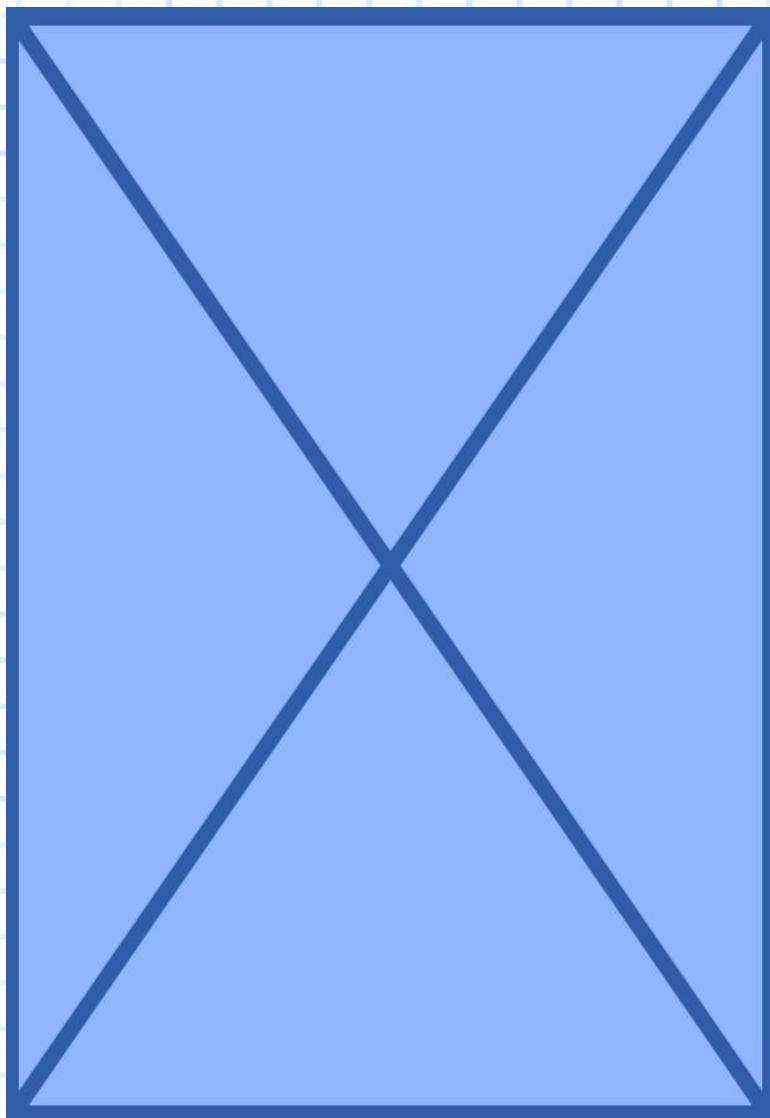
Signed off by:

Meeting 01/03/17 (page 2)

Context - Phone debug & Misc builds

- We then checked that conclusion by plugging Trey's phone into Slade's computer - sure enough, still nothing.
- After a little digging, we think the problem is that Slade's PC somehow filled itself up with android studio data he doesn't need, and as a result he cannot download the needed interface drivers and updates to communicate with the 6.0.1 android S5. This also explains why the ZTE works fine - it's on a much older OS.
- We will try to resolve that later.
- Also worked with the other team on a control issue they're having where the motor never returns to true "0" and makes a humming noise after the first robot movement. We believe it's probably a software error somewhere, but again that will have to be checked tomorrow.

Meeting end 7:45



Signed off by:

William
Yashashree Bapna

Meeting 01/05/17

Context - Wiring debug and rewire

System debug:

- Motor controllers.
 - We're getting the problem from last competition now, where we lose motor controllers.
 - After determining that it was only two of them, serials ending in RX and 81.
 - To check if it was their fault, we swapped them out for brands new ones.
 - Sure enough, getting the same issue.
 - It's likely from the bad bending in our wiring, or the USB ports on the core distrib. To check, we'll pull everything off of the robot and test it in ideal conditions.
 - SUCCESS - that fixed our motor controllers, which indicated that the problem stems from the bending of the cords. That will have to be addressed when we rewire the robot.
- Color sensors
 - We're having an issue where neither of the color sensors will feed us any values.
 - We can see the gyro working, which tells us that the issue is either A) the color sensors, B) the code*, or C) the ports on the device interface.
 - The next step was to check the gyro in the ports of the color sensor, to rule out the ports.
 - Gyro still works, so it isn't those.
 - Then, we ran official Modern Robotics code, to confirm that code wasn't our issue.
 - Still nothing - this means it probably isn't the code.
 - The same sensor was WORKING with this code running as recently as Saturday - very strange
 - So now the only things not ruled out are: A) the color sensors [one brand new, one old] and B) the connection somewhere in the USBs / phone

Signed off by:

 Michael Mullin

 William Anglin

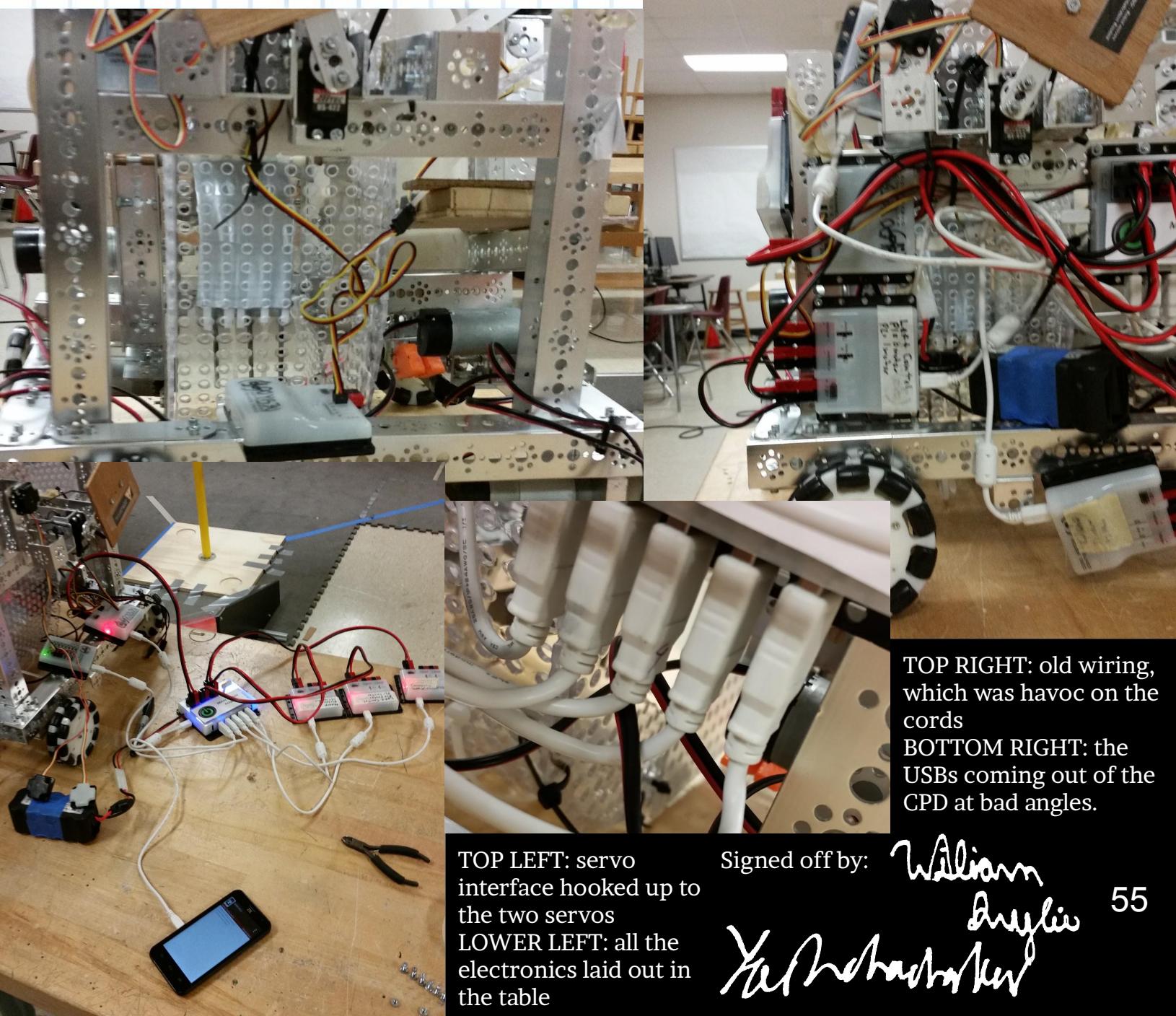
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Meeting 01/05/17 (page 2)

Context - Wiring debug and rewire

- Our debug was interrupted by the phones suddenly not connecting. The network is ACTIVE and they are connected via wifi direct, but the RC app says “Network: active, disconnected”
 - After an hour of digging and trying things, forgetting all of the remembered groups on the ZTE (and then restarting both phones clean) fixed the issue.
- Back to color sensor debug
 - Time to do some research! (and ask Vandy!)

Meeting end 10:45



Meeting 01/06/17

Context - Wiring debug and rewire

Meeting start 3:45

- Today is the day before the 3rd league meet
- Mentor Scott is in to oversee and give advice, especially with the re-wire as he's an electrical engineer
- Agenda:
 - Get color sensors working
 - We did some research & heard from Vandy, apparently the color sensors are all on the same address, so we moved it to 0x3a and 0x3b using the core device controller software from modern robotics
 - THIS is a good thing to remember that we have, super useful software
 - Rewire robot
 - Pre competition stuff
 - Put the numbers back on
 - Put it through the paces
 - Fill out checklists and gather paper work.
- Working:
 - We started working, but Slade had to leave and come back
 - Used the downtime to install the software and keep doing research
 - Nicola set up our youtube and uploaded recent videos
 - Got the software running and swapped the addresses -
 - Sur enough, fixing the addresses to 0x3a and 0x3b worked - our sensors are alive again.
 - Rewire begins
 - We are now mounting the s5 on the top of the robot, on the backside, because we are using the phone's camera to check the beacon.
 - Software and autonomous
 - Had to readjust for routing through Trey's computer and for phone camera.

Signed off by:

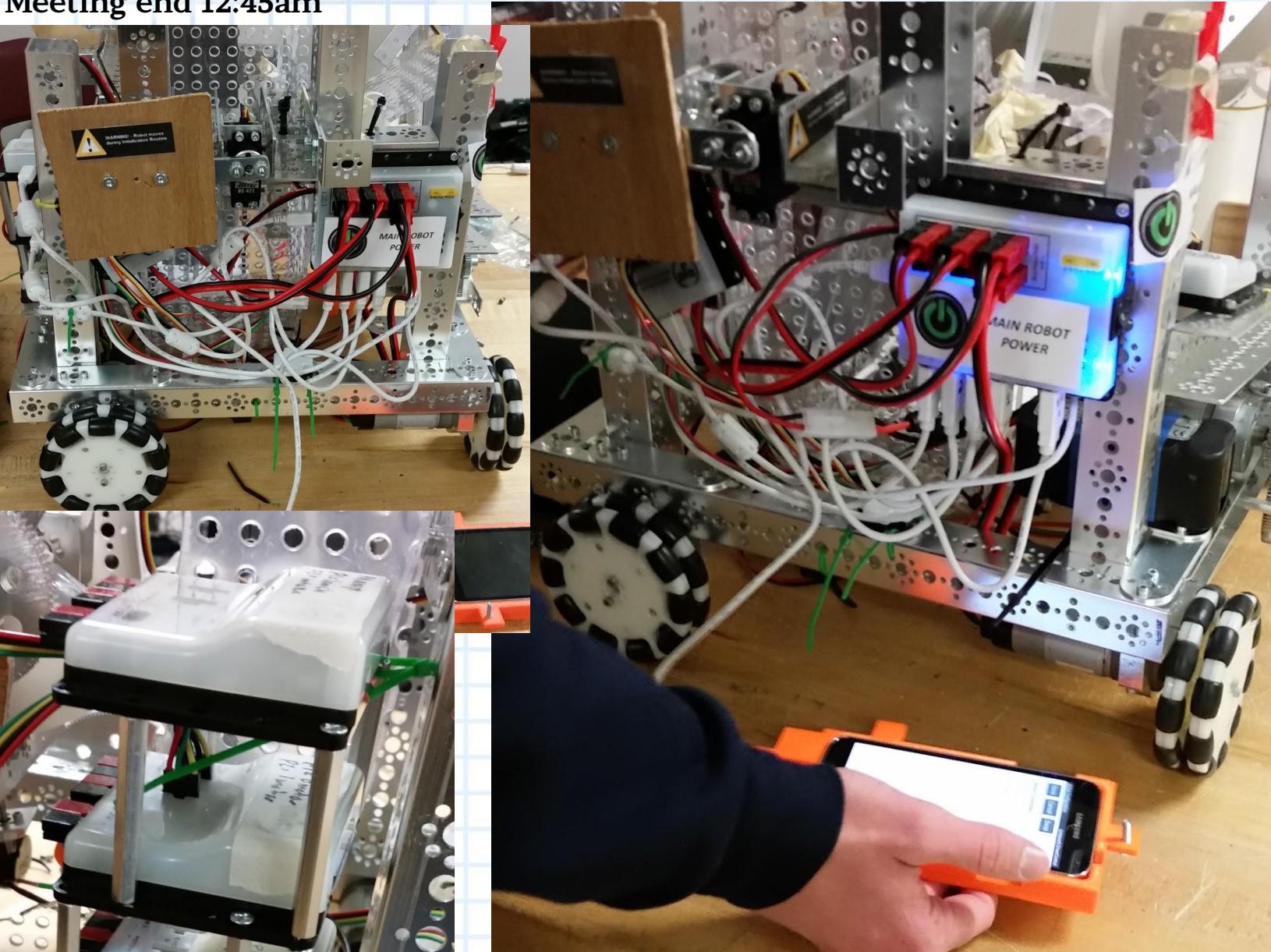


Meeting 01/06/17 (page 2)

Context - Wiring debug and rewire

- Basic debug of rewire
 - Found some bad wires that were disconnecting one of the motor controllers, swapped that out (usb labeled "4" and "5")
 - Put the robot through it's paces - everything looks good.
- Software - for tomorrow, we're just doing a simple shooting autonomous. We ran out of time to get data on the sensor to calibrate with

Meeting end 12:45am



T-L: new back wiring
T-R: new wiring all powered up
B-L: stack of motor controllers.

Signed off by:

 57

Meeting 01/07/17

Context - 3rd league meet

Arrived at competition at 10:30 to watch some morning matches.

Helped 7797 out with a spare controller.

Check in went smoothly at 11:30ish

Competition matches and observations

- 6710 has a SUPER impressive autonomous, it worked beautifully in the round they were our alliance partner
- Our autonomous, simple as it was, worked pretty well. I think we missed 2/10.
 - One of those misses was when we had to set up from an odd angle
 - There should probably 5-6 programs, just to compensate for our alliance partner's positioning.
- 6210 was good to work with as always, though their autonomous flopped when they were our alliance partner
 - Apparently if they leave the modern robotics gyro in initializing for too long, it bugs out. Something to know for Slade's programing.
- Vandygrift Venom was ON FIRE in the morning matches
- CONNOR, KAYLIN, and YASH have video from our matches that we can pull frames from for marketing work
- We have trouble getting balls out of corners - maybe a short spike on that front corner would solve the issue?
 - Allow us to "fling" the balls out of the corner, and separate two balls (if they are of different colors and we don't want to risk picking up the wrong one.
- 7797's ball lift looked like it was working well
 - A LOT more ball lifts this time
- Some really high scores, especially from Venom and QuadX.
- WE CAN'T DRIVE ON THE WOODEN AREA> the wheels won't do it.
- Our scores for the day below.
- There were a lot of replayed matches due to beacons going out.
- Surprising amount of disconnect issues, including 2 of our teammates (notably lasa murphy.)

T-L: new back wiring
T-R: new wiring all powered up
B-L: stack of motor controllers.

Signed off by:

William 58
Yashashree Anjali

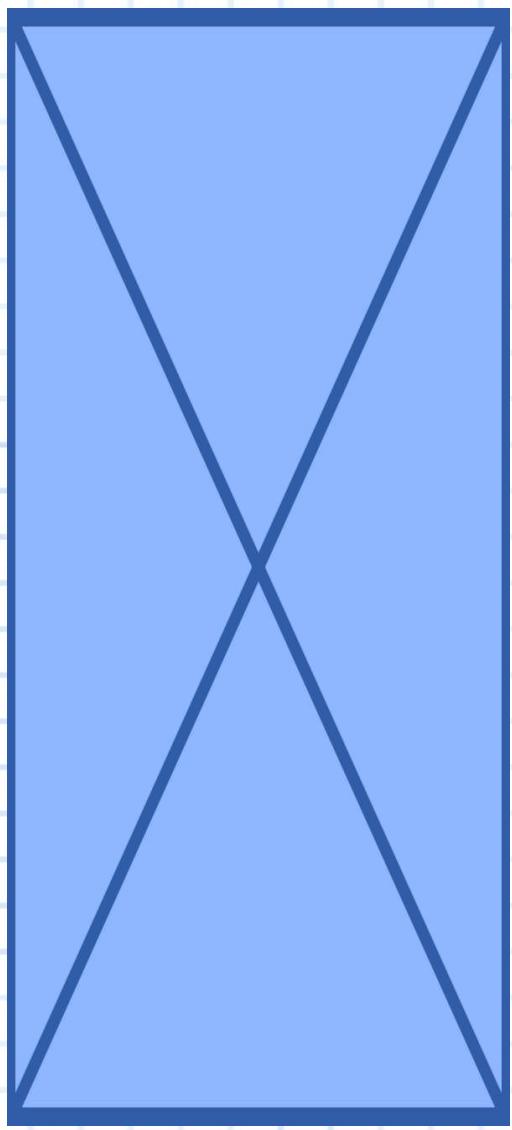
Meeting 01/07/17 (page 2)

Context - 3rd league meet

- Broke our launcher in our very last match of the day, but with LASA disabled it was near impossible to win anyway.
- Score on the day was 2/1/2 win/tie/lose

Day was a wrap at around 6:00pm.

Q-1	190 - 145	8886 Saber Robotics	1st	6210 ViperBots Stryke	7th	11090 Chaos Monkeyz	5th	9875 LASA MurPhy	11th
Q-2	70 - 20	6990 Static Void	8th	3708 Iron Eagles Optimus	9th	11093 MegaKnytes	13th	11019 RRock^3	12th
		Auto 30	Teleop 40	Endgame 0	Penalties 0	Auto 10	Teleop 10	Endgame 0	Penalties 0
Q-3	65 - 55	11918 Grizzly Bots	4th	6272 Iron Eagles Prime	3rd	11404 Ballistic Botz	10th	6710 Sigmas	2nd
Q-4	70 - 60	5628 The Tau Manifesto	6th	9875 LASA MurPhy	11th	11093 MegaKnytes	13th	6990 Static Void	8th
		Auto 20	Teleop 30	Endgame 20	Penalties 0	Auto 30	Teleop 30	Endgame 0	Penalties 0
Q-5	50 - 150	11019 RRock^3	12th	6210 ViperBots Stryke	7th	6272 Iron Eagles Prime	3rd	11404 Ballistic Botz	10th
Q-6	25 - 135	5628 The Tau Manifesto	6th	3708 Iron Eagles Optimus	9th	11090 Chaos Monkeyz	5th	11918 Grizzly Bots	4th
Q-7	140 - 85	6710 Sigmas	2nd	6990 Static Void	8th	8886 Saber Robotics	1st	11404 Ballistic Botz	10th
		Auto 105	Teleop 35	Endgame 0	Penalties 0	Auto 45	Teleop 20	Endgame 20	Penalties 0
Q-8	36 - 125	9875 LASA MurPhy	11th	11093 MegaKnytes	13th	6210 ViperBots Stryke	7th	11918 Grizzly Bots	4th
Q-9	85 - 120	5628 The Tau Manifesto	6th	6272 Iron Eagles Prime	3rd	3708 Iron Eagles Optimus	9th	8886 Saber Robotics	1st
Q-10	180 - 25	6710 Sigmas	2nd	11090 Chaos Monkeyz	5th	11019 RRock^3	12th	9875 LASA MurPhy	11th
Q-11	75 - 75	11918 Grizzly Bots	4th	3708 Iron Eagles Optimus	9th	6210 ViperBots Stryke	7th	6990 Static Void	8th
		Auto 15	Teleop 60	Endgame 0	Penalties 0	Auto 20	Teleop 15	Endgame 40	Penalties 0
Q-12	77 - 120	11090 Chaos Monkeyz	5th	11093 MegaKnytes	13th	6710 Sigmas	2nd	6272 Iron Eagles Prime	3rd
Q-13	60 - 135	11019 RRock^3	12th	11404 Ballistic Botz	10th	5628 The Tau Manifesto	6th	8886 Saber Robotics	1st
Q-14	110 - 35	6272 Iron Eagles Prime	3rd	11090 Chaos Monkeyz	5th	9875 LASA MurPhy	11th	6990 Static Void	8th
		Auto 60	Teleop 50	Endgame 0	Penalties 0	Auto 15	Teleop 20	Endgame 0	Penalties 0
Q-15	160 - 48	11019 RRock^3	12th	8886 Saber Robotics	1st	11918 Grizzly Bots	4th	11093 MegaKnytes	13th
Q-11	75 - 75	11918 Grizzly Bots	4th	5700 Iron Eagles Optimus	9th	6210 ViperBots Stryke	7th	6990 Static Void	8th
		Auto 15	Teleop 60	Endgame 0	Penalties 0	Auto 20	Teleop 15	Endgame 40	Penalties 0
Q-12	77 - 120	11090 Chaos Monkeyz	5th	11093 MegaKnytes	13th	6710 Sigmas	2nd	6272 Iron Eagles Prime	3rd
Q-13	60 - 135	11019 RRock^3	12th	11404 Ballistic Botz	10th	5628 The Tau Manifesto	6th	8886 Saber Robotics	1st
Q-14	110 - 35	6272 Iron Eagles Prime	3rd	11090 Chaos Monkeyz	5th	9875 LASA MurPhy	11th	6990 Static Void	8th
		Auto 60	Teleop 50	Endgame 0	Penalties 0	Auto 15	Teleop 20	Endgame 0	Penalties 0
Q-15	160 - 48	11019 RRock^3	12th	8886 Saber Robotics	1st	11918 Grizzly Bots	4th	11093 MegaKnytes	13th
Q-16	60 - 140	3708 Iron Eagles Optimus	9th	6210 ViperBots Stryke	7th	6710 Sigmas	2nd	5628 The Tau Manifesto	6th
Q-17	190 - 26	11404 Ballistic Botz	10th	11090 * Chaos Monkeyz	5th	9875 * LASA MurPhy	11th	11093 * MegaKnytes	13th
		Auto 80	Teleop 70	Endgame 0	Penalties 40	Auto 5	Teleop 21	Endgame 0	Penalties 0



AT RIGHT: the matches from the 3rd competition

Signed off by: *William 59*
Yanicka Parker *Angie*

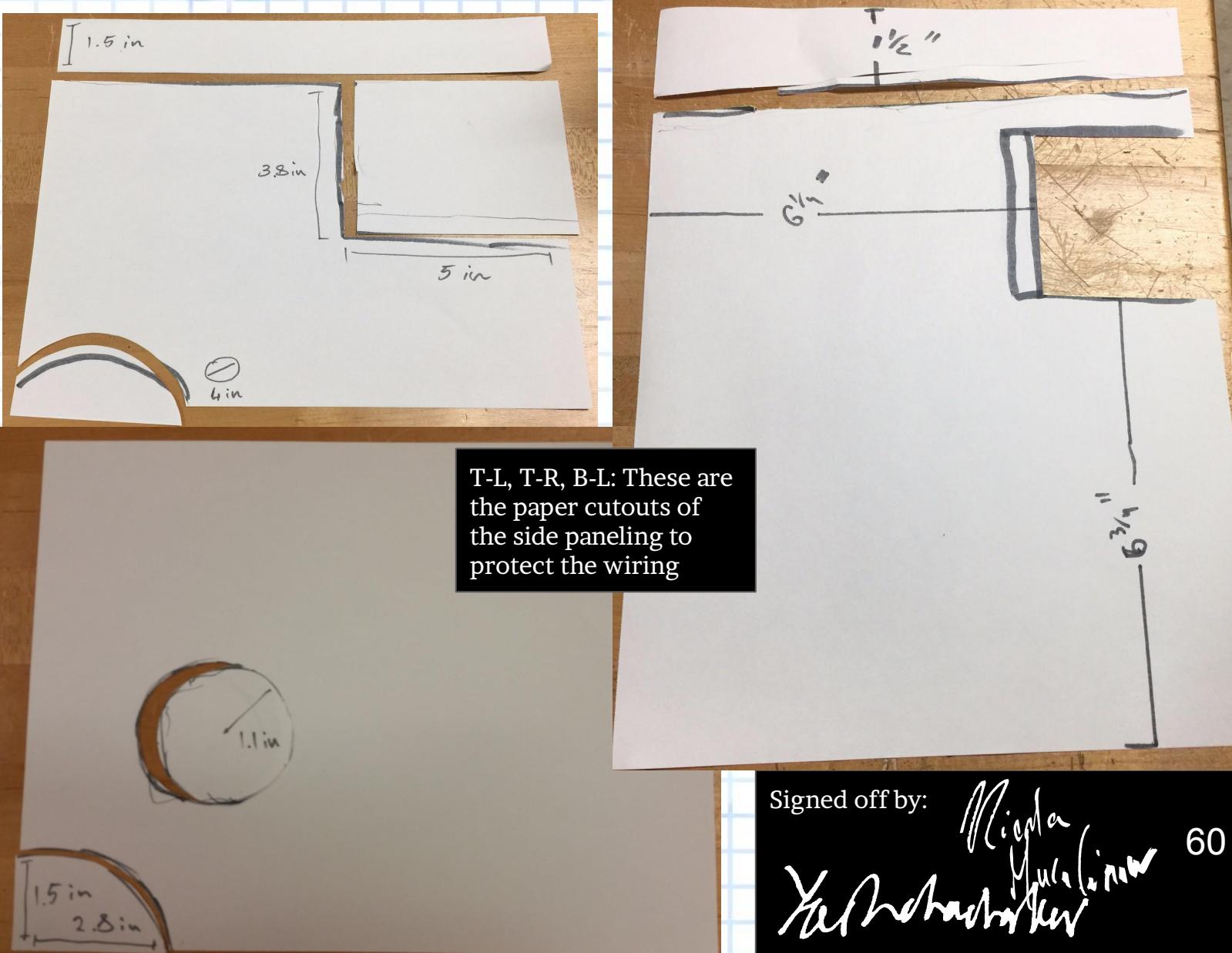
Meeting 01/11/17

Context - robot shielding 1

Meeting start 3:55

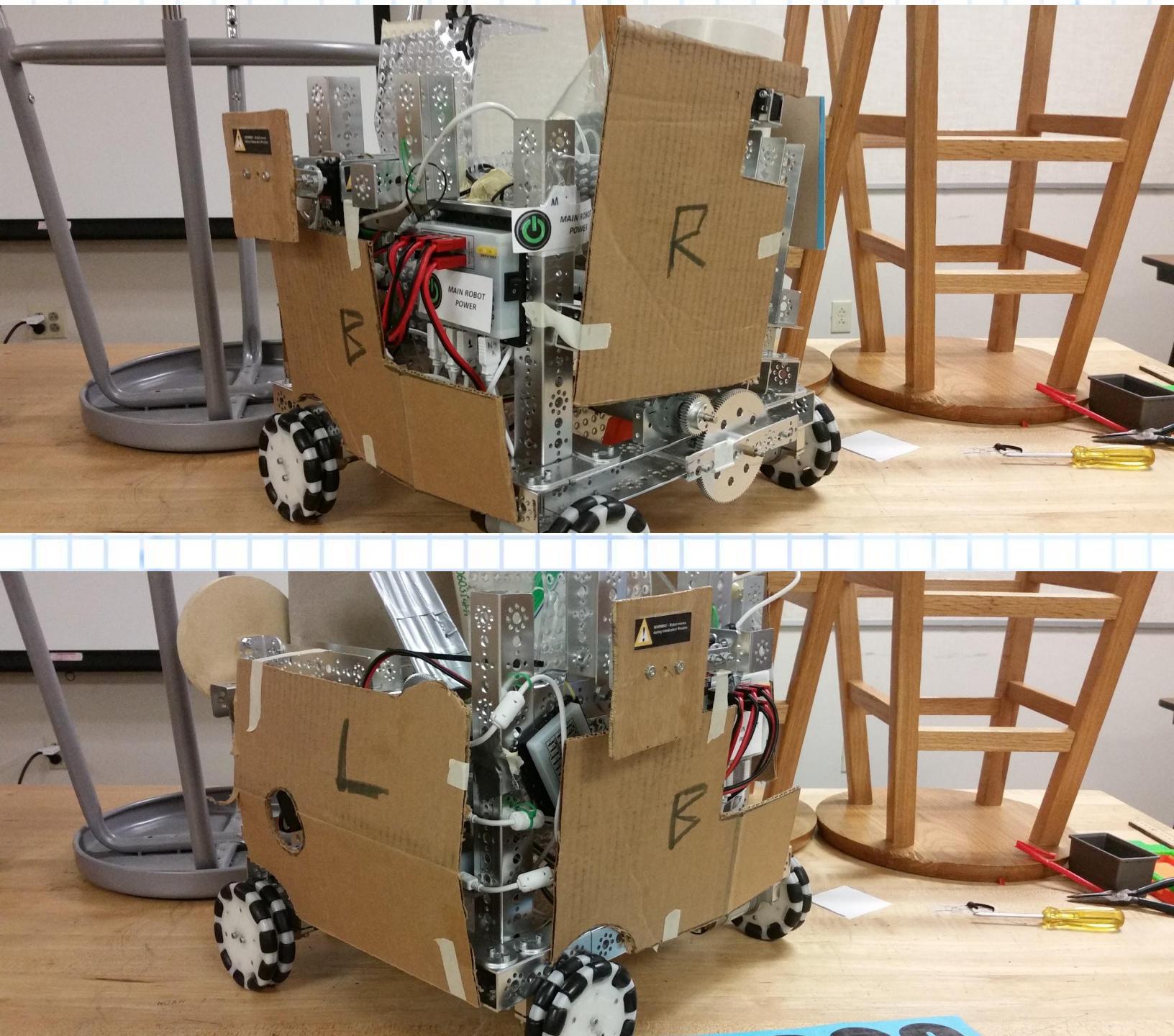
- Today's agenda is to keep working on transferring the notebook & to begin work again on autonomous and shielding.
- Building panels
 - Decided the best way to do it was use sketchbook paper to get the outline, then cardboard, and finally plexiglass if we were happy
 - Drew them out on paper, cut it out afterwards
 - Traced it onto cardboard and cut again
 - The cardboard fits well, so tomorrow we'll cut them out of plexiglass & figure out mounting

End 7:00



Meeting 01/11/17 (page 2)

Context - robot shielding 1



TOP: back and right plates of the robot in cardboard.

BOTTOM: left and back plates of the robot in cardboard.

Signed off by:

Richa Mukundan 61
Yashashwini

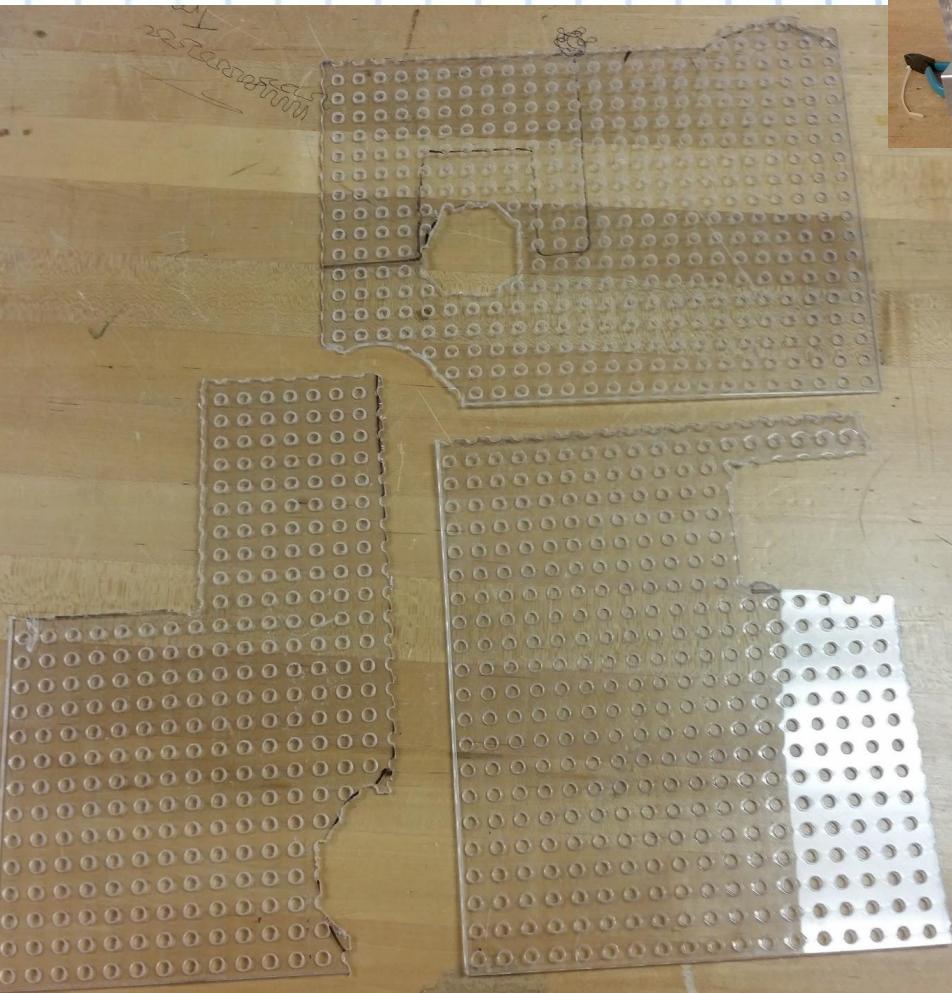
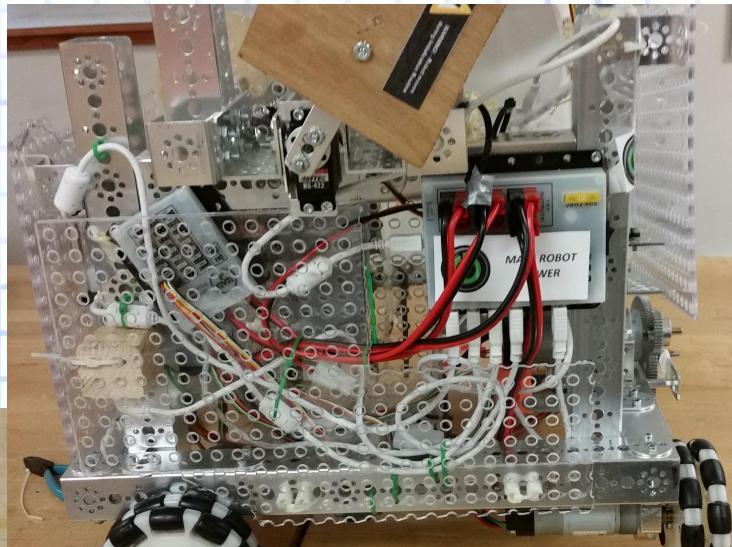
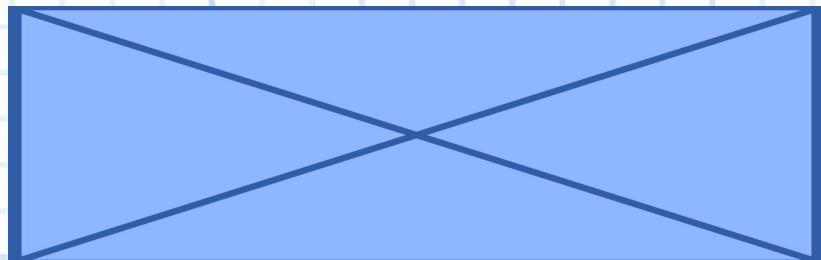
Meeting 01/12/17

Context - robot shielding 2

Meeting Start 3:45

- Today we plan to cut and mount covers we traced out yesterday
- Traced cardboard versions on the plexiglass and cut with dremel plastic bit
- Mounted the plates on the robot with spacers and zip tie
 - Used zip ties because they allow for quick removal if we need to get to a part inside the robot in between rounds.
- Everything fit really nicely - the cardboard versions were accurate
- This siding did create some new places that balls COULD get stuck, which we will have to address w/ extra paneling.

Meeting end 7:00



LEFT: the plexiglass versions of the panels laid out

ABOVE: the back panel on the robot

Signed off by:

Micah Yarchock 62

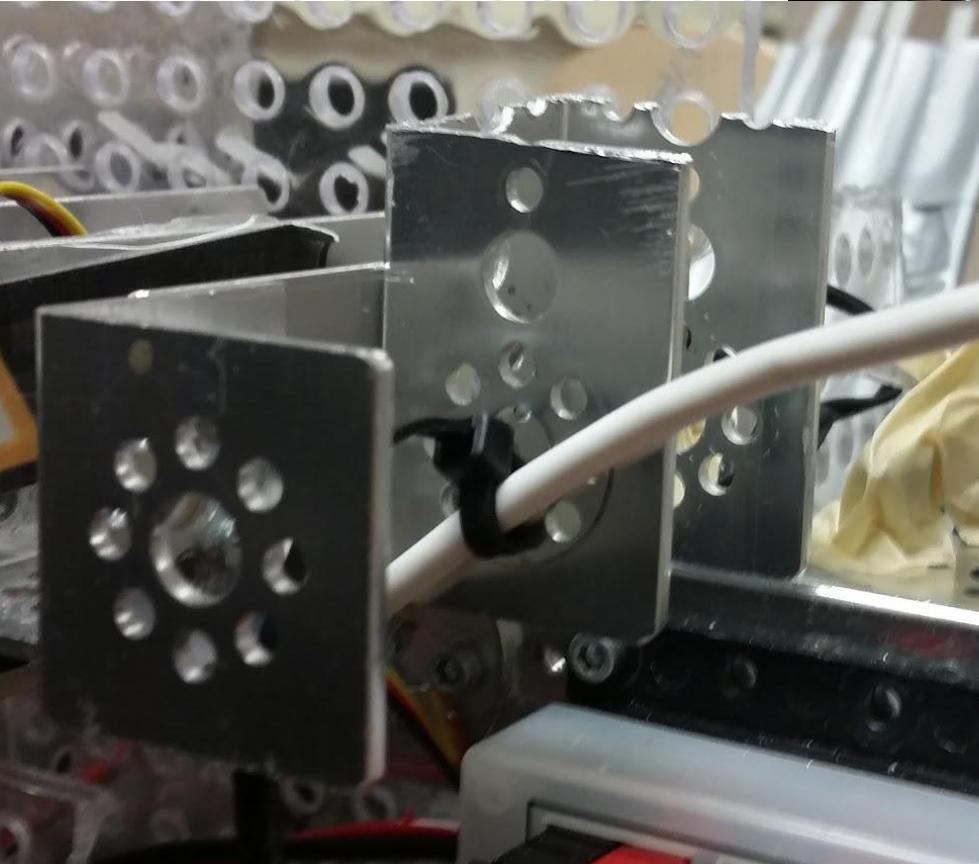
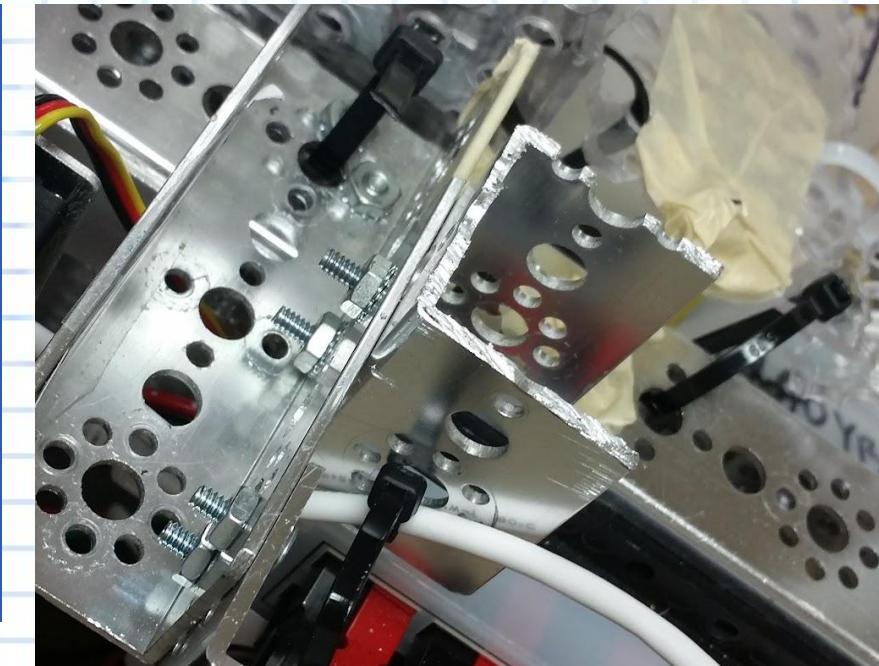
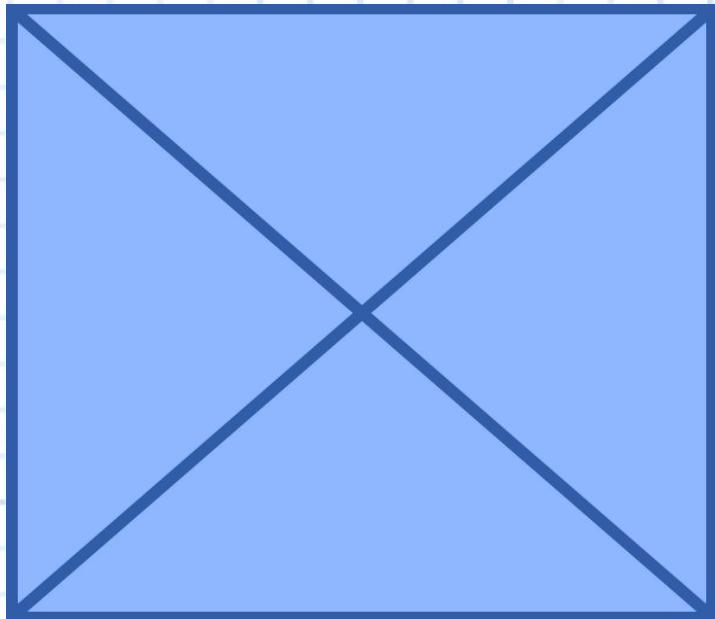
Meeting 01/17/17

Context - software debug and minor mods

Meeting start 3:45

- Spent the entire meeting:
 - discussing the upcoming weekend with 7797
 - Installing all the necessary software for android studio on Will's laptop

Meeting end 8:00



LEFT: side view of the
chopped-off C channel

ABOVE: above view of
the area

Signed off by: *William* 63
Yashashtha *Angus*

Meeting 01/18/17

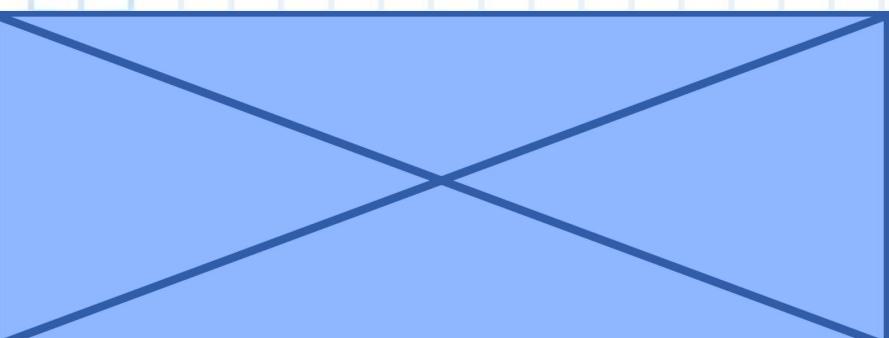
Context - testing a new launcher pin

Meeting start 3:45

- The agenda for today is driver practice & testing the new launcher pin
 - The standard pins we had been using tend to shear off around 60 launches, so we rounded up some alternatives to try
 - One of these is the welding tip cleaners, as they're fairly stout - that is what we plan to test today
- First task we realized we had forgot was putting velcro on the battery to attach it, so we resolved that
- We spent from 4:10 to 5:30 doing driver practice and discussing ball movement techniques
 - We've found that you can use our clock/counter-clock turns to kick the ball away
- We then spent from 5:30 to 7 testing the pin exclusively..
 - We figured the break point would be near the 100 shot range, similar to the standard pins
 - We started keeping tally of the shots we did, marking what was missed from a fixed position
 - The misses then were caused ONLY by inconsistency in the launcher
 - We just fed the machine balls and relaunched them
 - See time lapse footage.
 - We ended up calling it quits at 321 shots, with the welding tip cleaner still intact.
 - Hopefully it will break in the next two days, so that we know its limits.
 - We also have to be careful that we don't wear out some other part of the robot while testing these
 - Ie. if we break the plastic launch trigger, we're pretty sunk,

Meeting end 7:00

Signed off by:

  64

Meeting 01/18/17 (page 2)

Context - testing a new launcher pin

Whole
Cleaner 20 + 3 dry +

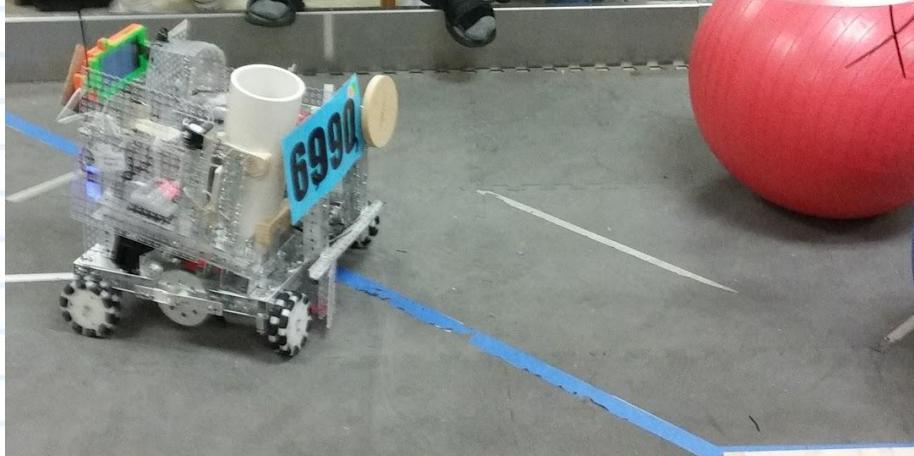
- Spring pre-shot determines power/shock
 - if it's off we can go left or right

230
321 not wrote



LEFT:logging all 300+
of the launches with
which ones we missed

RIGHT: one of the shots in midair



Signed off by:

Ricardo
Mukarabin

William 65
Angus

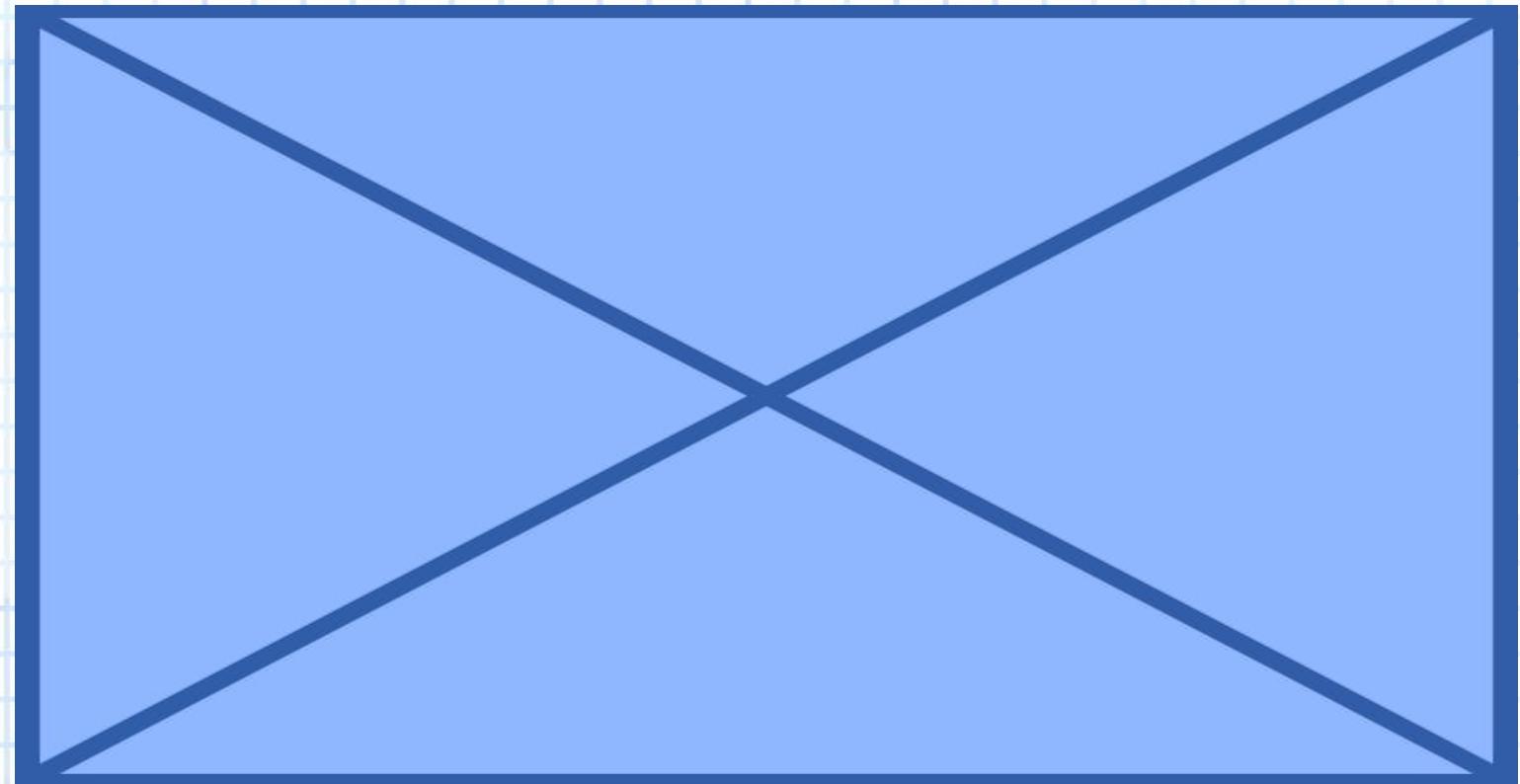
Meeting 01/20/17

Context - prep for final competition

Meeting start 3:45

- Today is finalize the notebook and get autonomous working
- Since we fixed the light sensor yesterday, we should be good to go!
- Debugging autonomous
 - Having trouble with wheels not gripping
 - Might be from motors being rotated in their mounts
 - Or from ramp dragging on ground
 - Rotated the wheels, didn't fix it
 - Then we cut the lowest corner off of the ramp
 - Solved the issue!
- Can't wait for tomorrow!

Meeting end 7:00



Signed off by:

Miguel Muniz 66
Yashashchandra

Meeting 01/21/17

Context - Championship Meet

Day start: 8:00 am

- Start of the day at vandegrift!
- Arrived, checked in, and got our stickers
- Still iterating on the beacon autonomous - it's not quite ready
- Went to judging
 - Order was PM, A-PM, Nicola, Slade, Chloe, and then Kailee.
 - Judges seemed to like the design & unique points
 - Pointed out some of the seeming lack of marketing, but understood the "rebuilding the team" situation.
 - Went pretty well! Might want to explain drive software a little more clearly next time.
- Matches
 - *First match*, the 2nd gear in the intake drivetrain came out of sequence.
 - The axle slid towards the ramp, freeing the gear
 - In between matches, we secured the back of the axle so that it could not free itself
 - *Match 2* - intake breaks differently
 - This time the gear just came off of the axle, rendering us without an intake for yet another round
 - Also got a penalty this round due to the broken intake & a ball landing on us.
 - *Match 3* - back to back with match 2, so all we had time to do was swap batteries.
 - *Match 4* - unremarkable, everything worked but still a loss.
 - *Match 5* - loss to rank 3 and 4, both from WestLake.
 - Connelly did have an interesting, if reckless, strategy: if the other alliance is assumed to be good enough to grab both of their own beacons, then all we have to do is sprint across the field and hit one of them - by virtue of it changing color, it MUST be toggled to us.
 - Obviously, this strategy fails if the other alliance doesn't get their beacon (OR if you go too soon and just run into them.)
- Ended up moving on via R.C. Innovate award
For the launcher and omniwheels. Super exciting moment and glad we get to move on to WC.

Signed off by:

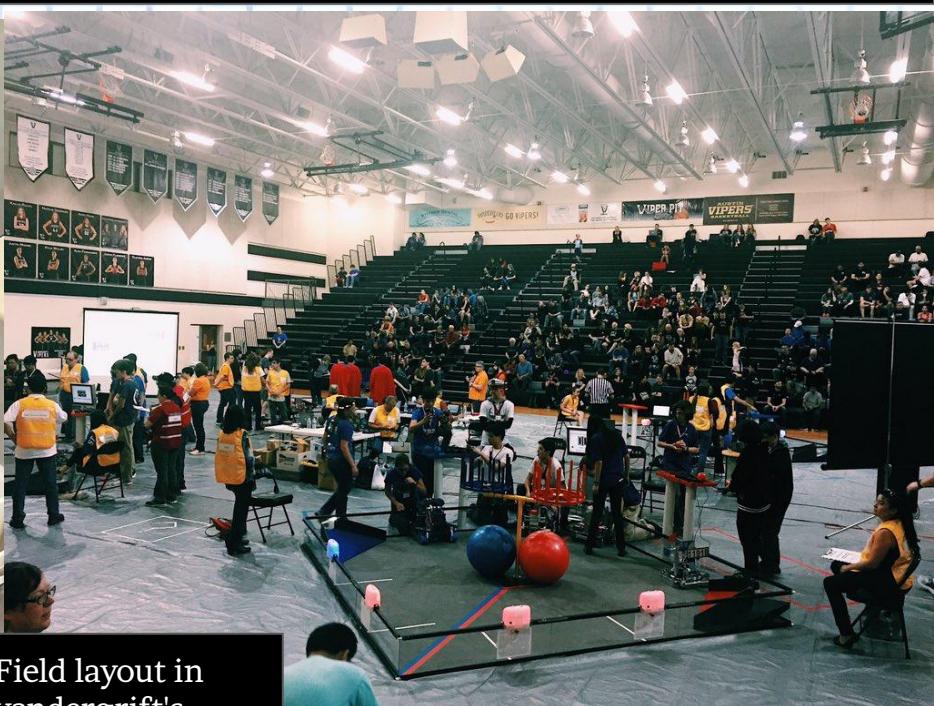
M. Connelly 67
Yashashchandra

Meeting 01/21/17 (page 2)

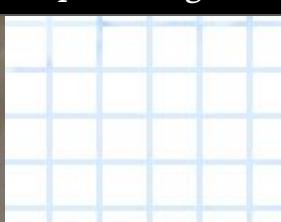
Context - Championship Meet

- We get to redesign and plan for 3 weeks, to compete on the 18th in San Antonio.
- Take aways from the day:
 - Judging went really well - do exactly what we did over again.
 - If possible, have more people there so that marketing is not relegated to the pit all day to wait for judges.
 - Have EVERYTHING - looking at you, autonomous - done before we leave home.
 - This probably is a symptom of bad planning, which will be improved.
 - Phone facing inward is a major concern with checkin - might have to turn it around so screen faces outward
 - Van works well for transporting everything.
 - Awesome talking to other teams about ideas and design, especially 6210, 8814, LASA, and others.
 - Lasa transfers phone code over a server - saves pulling the phone off between every iteration - would be a huge asset.

All pictures below are images from the competition, including unique design and other ideas.



Field layout in
vandergrift's
competition gm.

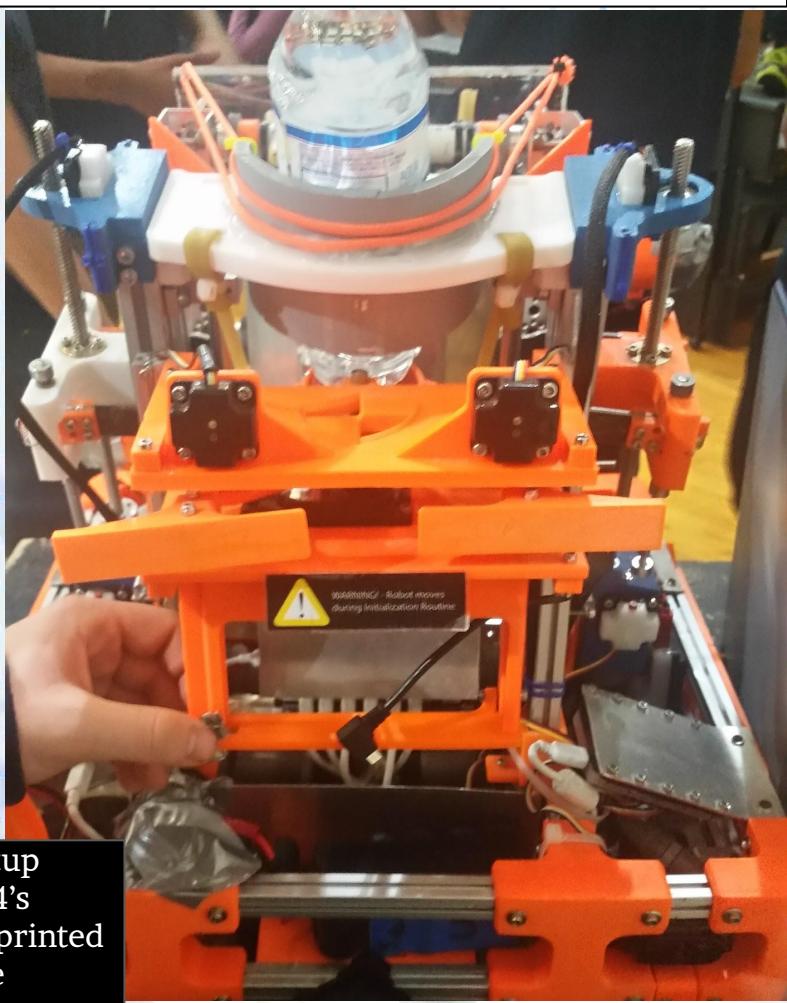


Signed off by:

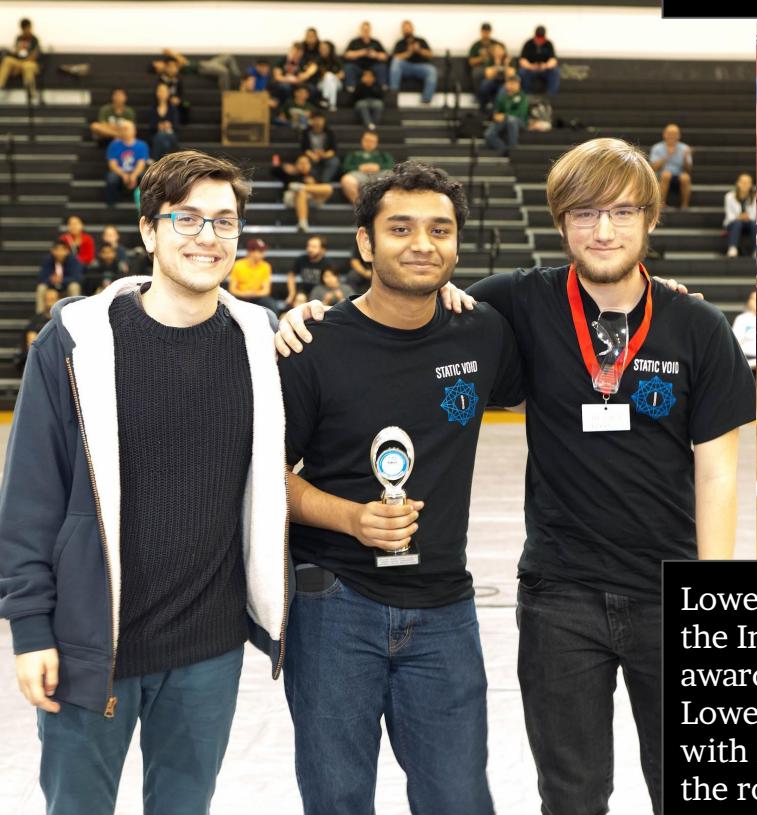
*Michael
Machinew
Yash Chacharikar*

Meeting 01/21/17

Context - Championship Meet



Top: Pit setup
Top 2: 8814's
mostly 3D printed
bot, unique
launcher



Lower: receiving
the Innovate
award
Lower 2: team
with Flores and
the robot

Signed off by:

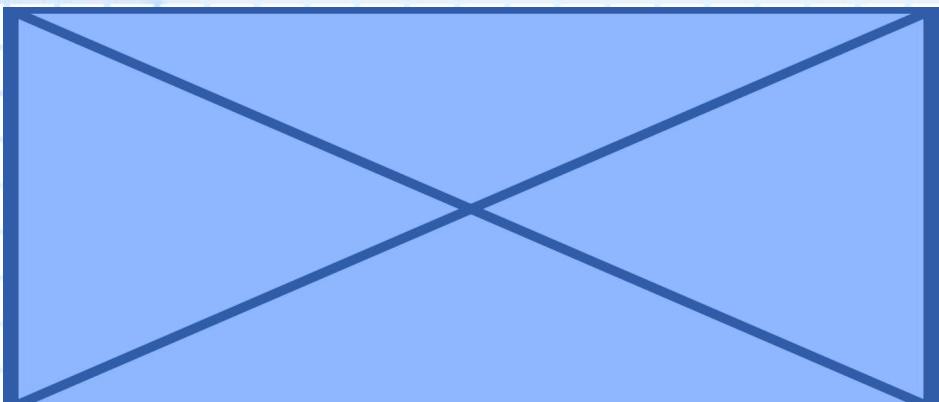
Richard Flores
Yash Chacharkar

Meeting 01/24/17

Context - First Day after championship - planning the next 3 weeks

Meeting Start 3:50pm

- The agenda for today:
 - Deciding on plan for next 3 weeks, and give every task a time share
 - Clean up and repack after the chaos of Saturday.
- PLANNING
 - Laid out a list of thing we COULD do in the next 3 weeks, then ranked them by timeshare required and by perceived importance.
 - DESIGN - while we think the current build is a good idea, we saw a lot of really cool designs at competition on saturday
 - Discussed a full rebuild in the next 3 weeks.
 - Decided we want to KEEP the omni wheel chassis - best point of the robot
 - Decided we might NEED cap ball at the next level
 - Decided that the intake needs to go more vertical in the next iteration: ours is taking up way too much space.
 - **FINAL DECISION:** build something similar to bots we saw at competition, but with an omni wheel chassis and revamped beacon detection/pressing
 - Key inspirations from 7797 (organization, intake, launch) and 7079 (cap ball)
 - **WHY:** we really like their electrical system, intake, and cap-ball system.
 - **WHAT WE WANT TO REDESIGN:** drivetrain and chassis, beacon handling, and some aspects of the launcher
- Pictures of the planning process found on next page:

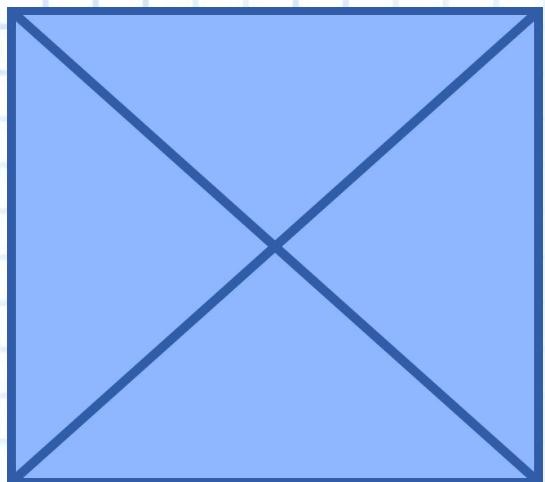
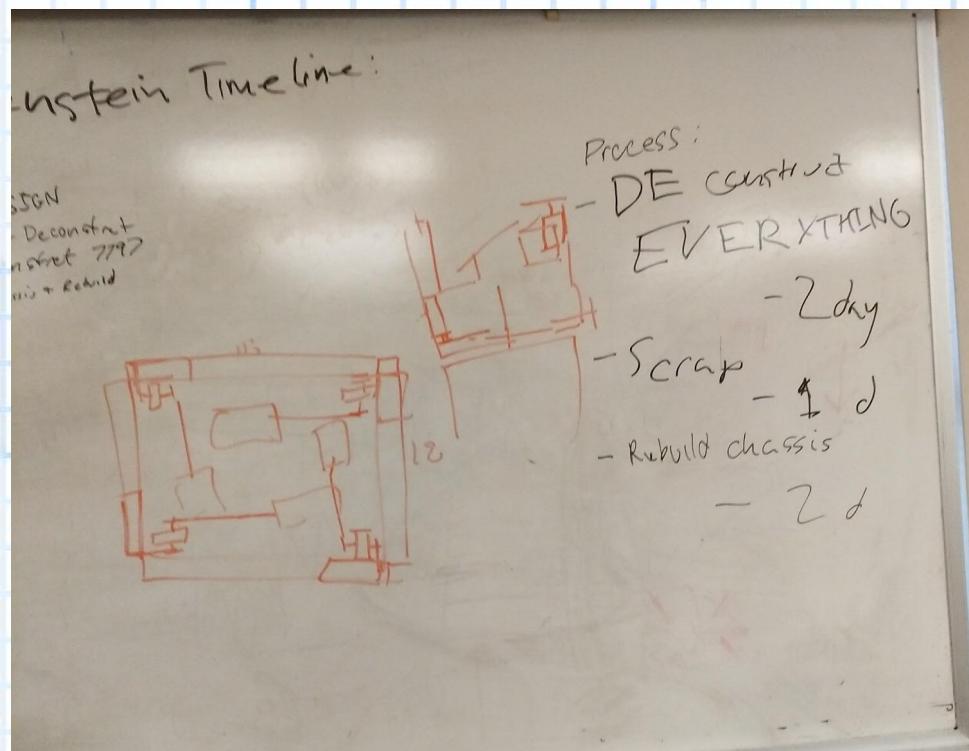
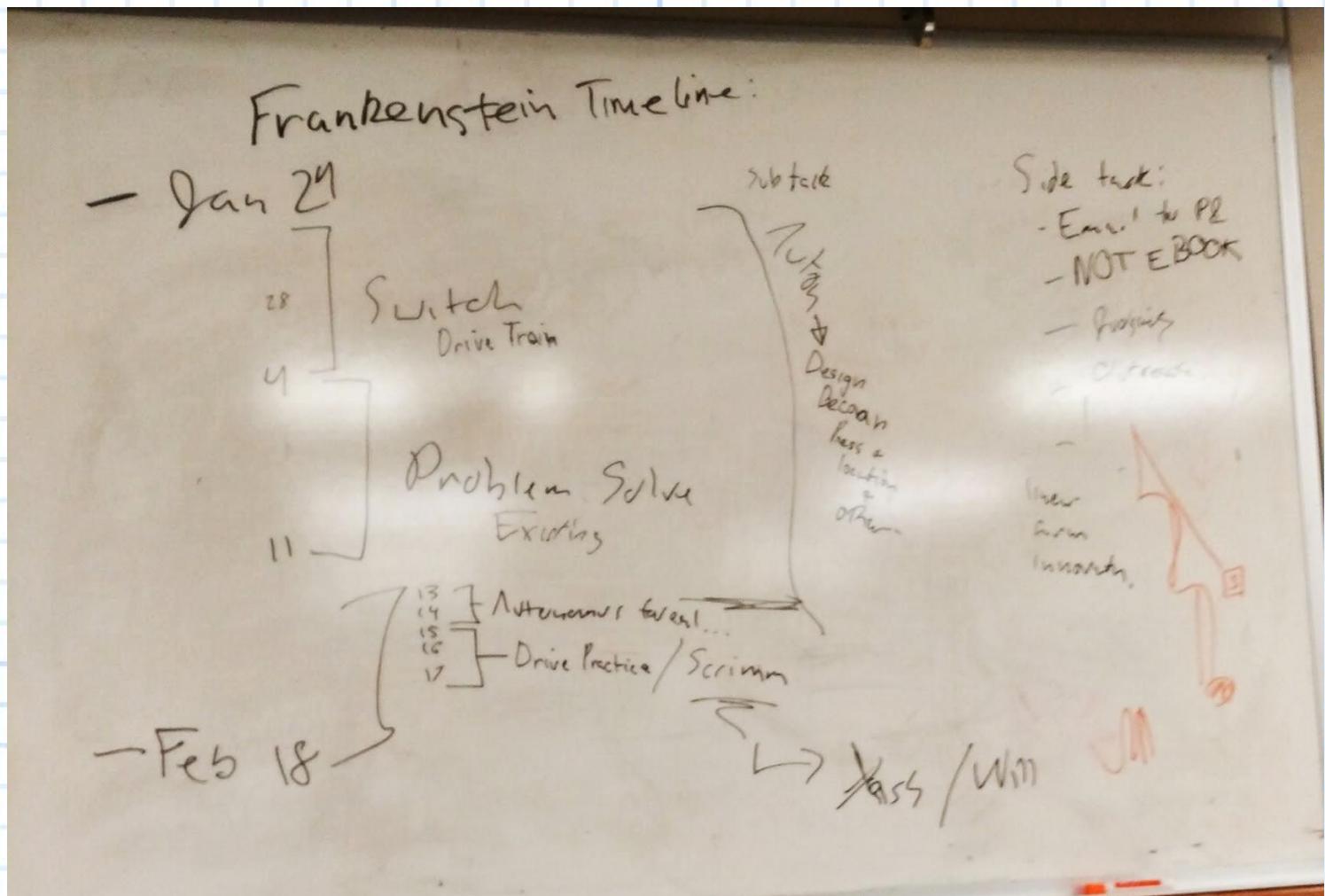


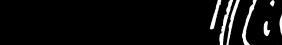
Signed off by:

Miguel Muñiz 70
Yashashchandra

Meeting 01/24/17 (page 2)

Context - First Day after championship - planning the next 3 weeks

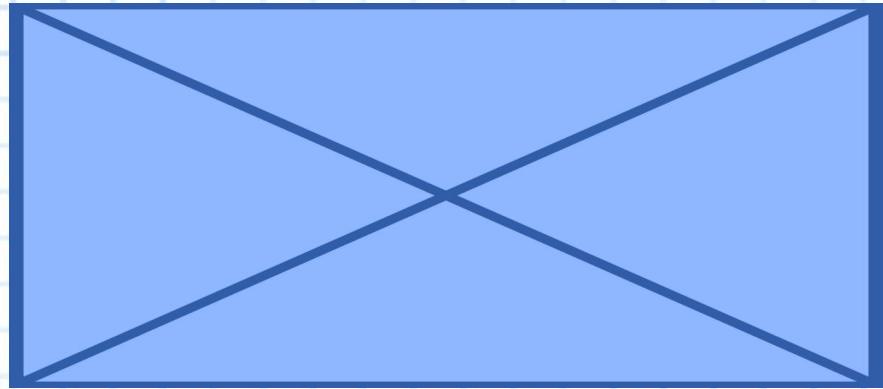
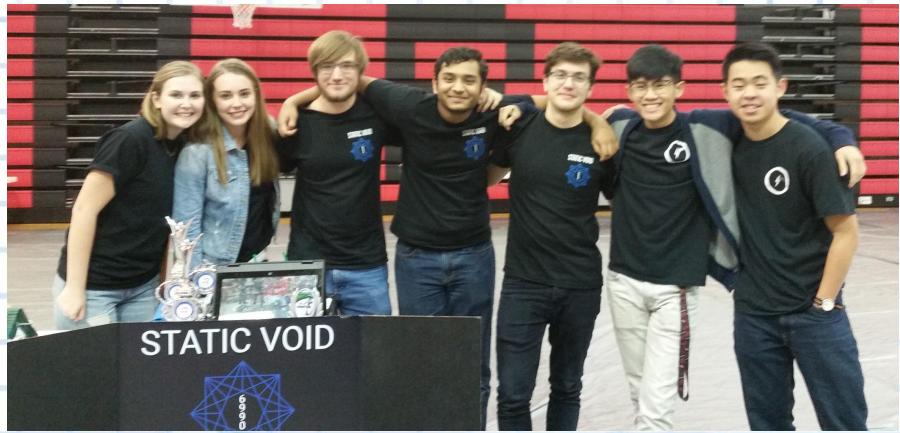


Signed off by: 
Michael Mullin 71


Meeting 01/25/17

Context - 8th grade parent night

- Went to the competition gym, set up a small pit display, and spent the night talking to parents and incoming students about the engineering classes at Vista, the Engineering Club, UIL- Computer Science, and FTC Robotics.
- Met lots of interesting people, hopefully we see some of them next year.
- Nicola and Yash took the robot for walks around the gym, interacting with the crowd - a good time for all.
- For more pictures, see the Outreach Section of the notebook.



Signed off by: *Nicola* *Yash* *Yash* *Yash* 72

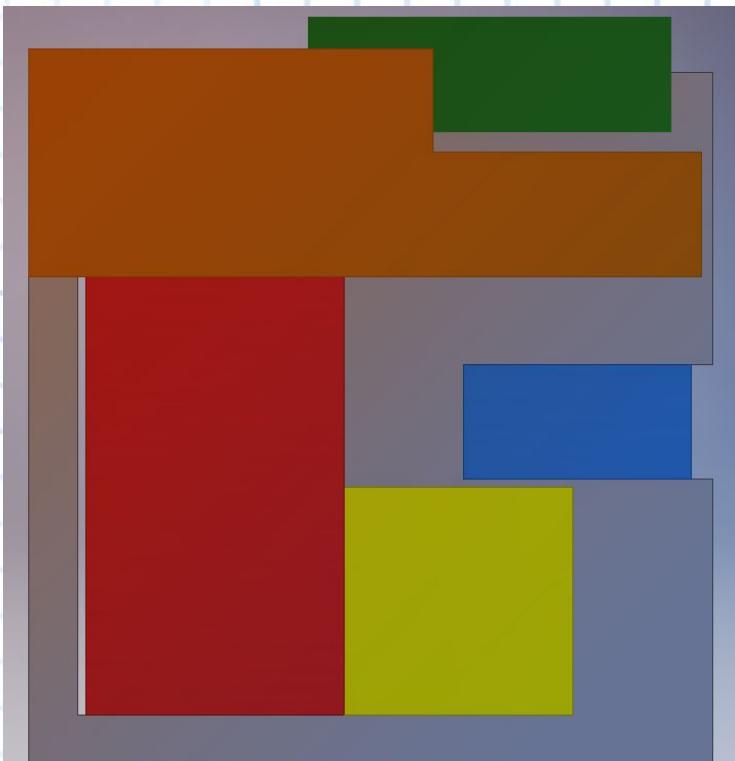
Meeting 01/26/17

Context - Day one of build

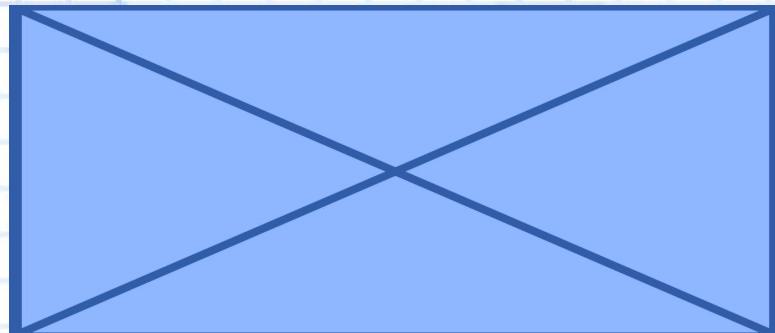
Meeting Start 3:50

- According to the plan made on tuesday, today is the first day of building a new chassis!
 - We will be pulling ideas from robots we saw at competition along with the knowledge of what we need on it.
 - Drawing up the chassis plan
 - Similar to last one, with a few key differences:
 - Make one side OPEN for intake
 - Motor chained to wheel to open space
 - Compress everything, so that we have room
 - Make sure there's structure in the middle
 - Need a cut for linear slides for cap ball
 - Need a vertical area for wiring
 - Need structure at beacon height for pressing
 - How can we compress launch / intake?
 - Do vertical intake (cues from 7797, 6210, and 5998 (Last year))
 - Put launcher above intake
 - since plexiglass flick plate isn't much vertical space

Meeting end 7:00



This is the floor plan for the chassis. Orange is launcher, green is beacon, intake is red, blue is linear slides, and yellow is electronics



Signed off by: *William* 73
Yahya *Angus*
Yahya *Angus*

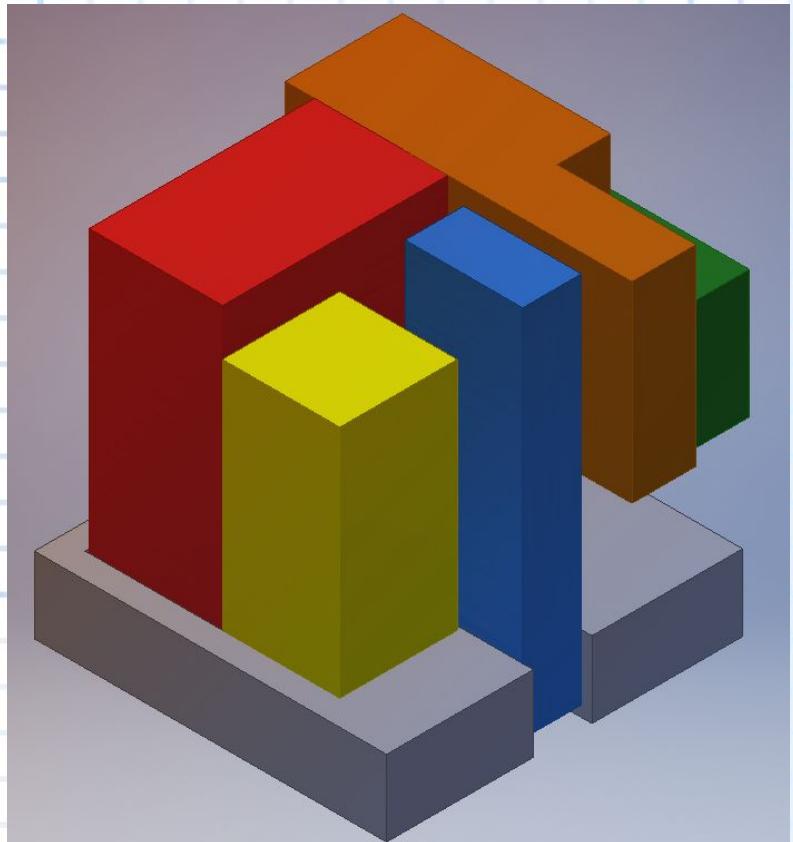
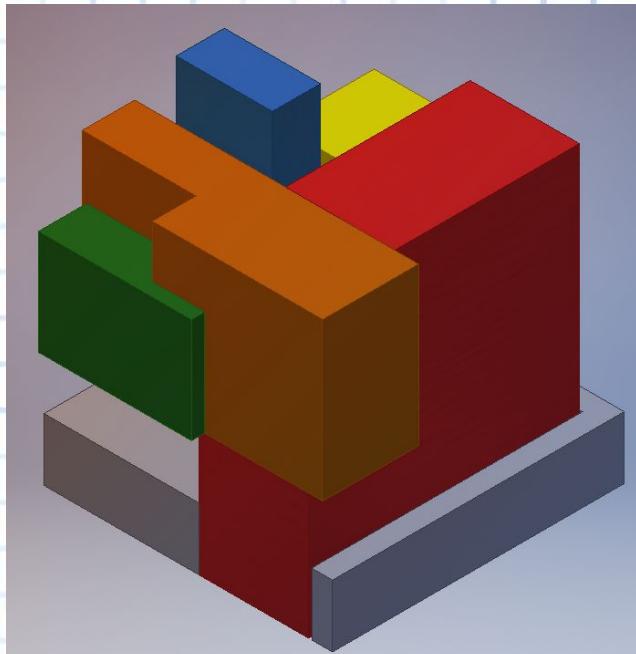
Meeting 01/27/17

Context - Day 2 of build

Meeting Start 3:45

- Finished up drawing plans for the robot chassis, and designed some of the upright structure
 - Going to need a sort of L shape for the intake
 - Then the launcher can sit above
 - Gives us whole back half of robot for beacon, wiring, and cap ball
- Began building frame & making according CAD model

Meeting end 7:15



T-L: isometric view of the sizing model
B-L: top view of the sizing model
T-R: isometric view of the sizing model

Beacon
Electrical
Launcher
Cap ball
Intake
Chassis

Signed off by:

William Anglin 74
Yashashchandra
Kumar

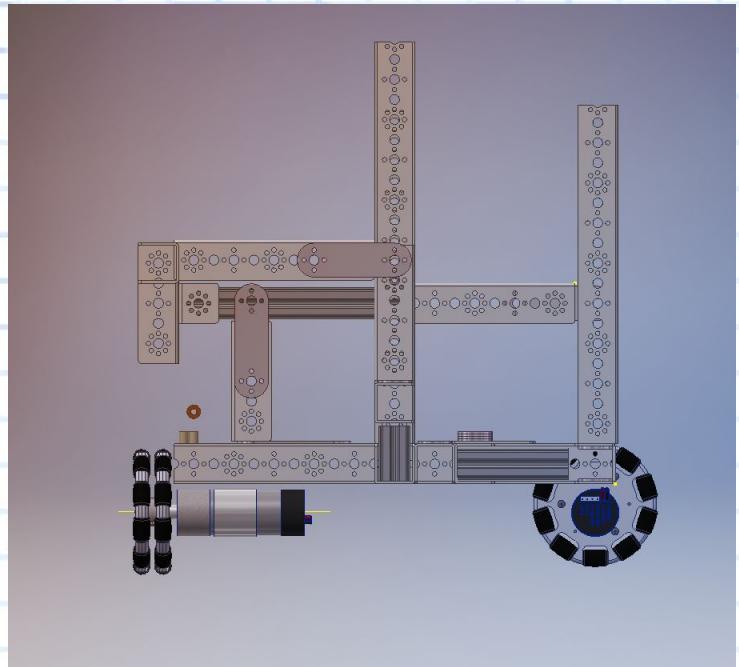
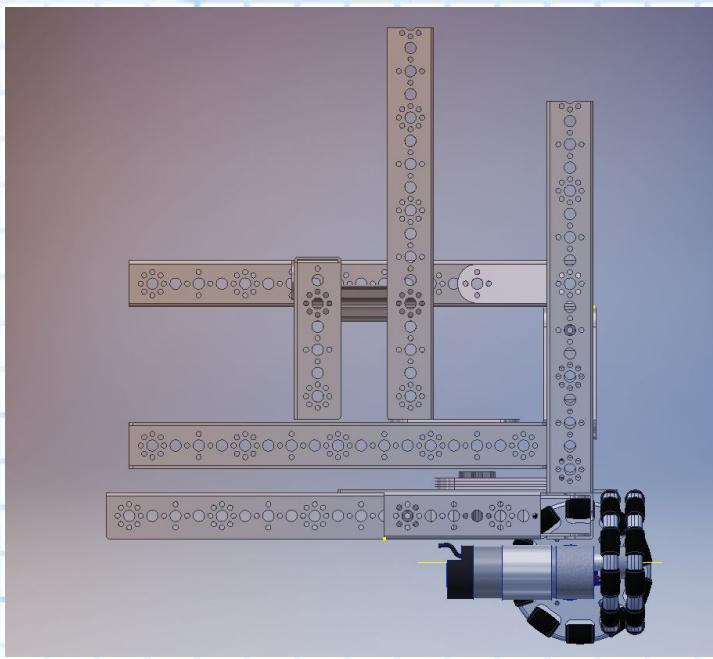
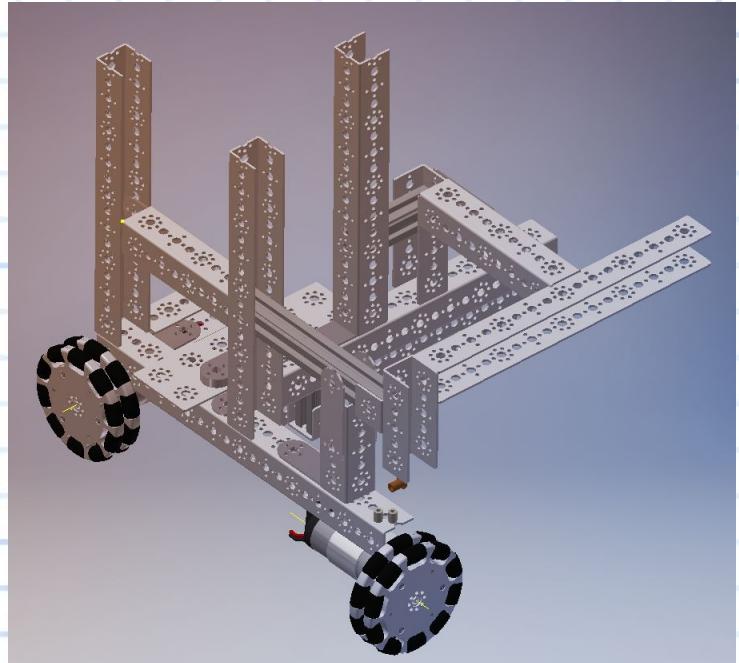
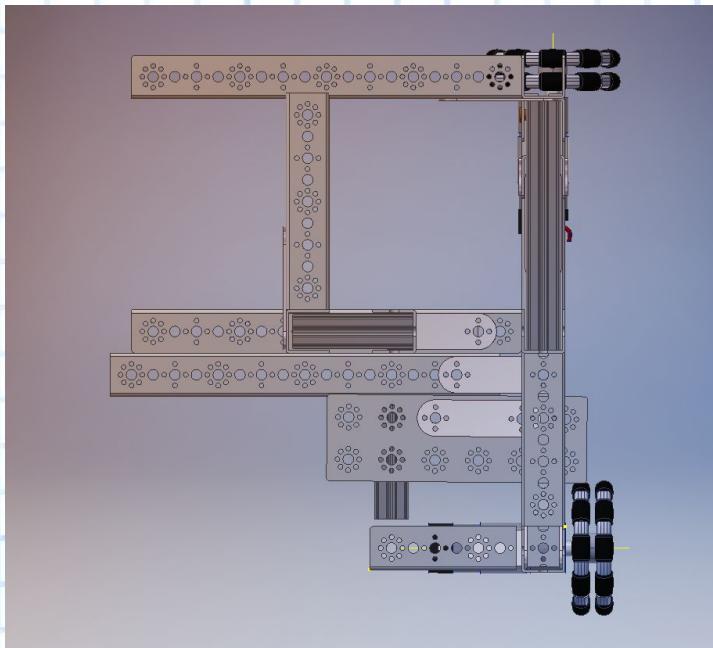
Meeting 01/30/17

Context - Day 3 of build / start of testing

Meeting start 3:55

- Continued building base chassis from Thurs/Fri plans
 - Not many problems, getting a little low on screws.

End 6:00



T-L: top view of 1/2 of the chassis (what we have modeled so far)

T-R: isometric view

B-L: back view of chassis

B-R: right side view of chassis

Signed off by:

William Rieger
Angie Mullin

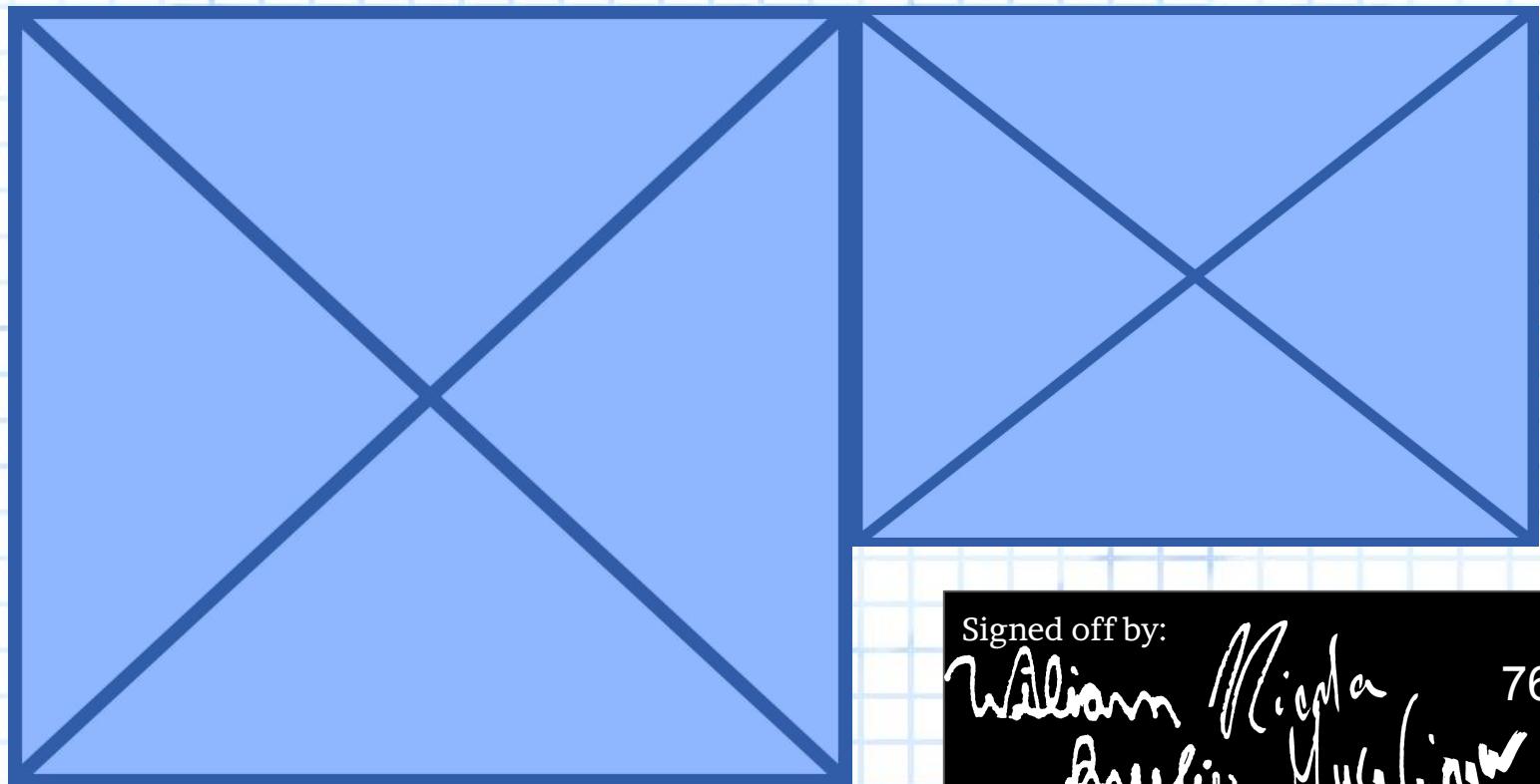
Meeting 01/31/17

Context - Day 3 of build / start of testing

Meeting Start 3:45

- Finish chassis build! Wheels are on
 - Direct drive with CPM - all seems to work well
- Began planning upper layer:
 - Intake is mostly figured out, aside from material. We know how we want to funnel (see sketches)
 - Intake takes up 7.5in on the front of the robot
 - Gives us room to intake the 3.75in ball with 3+ inches of ramp and lift.
 - Linear slides
 - We're using the Mini 80-20s from Rev Robotics
 - They're 5/8in thick, and each can be roughly 15in tall, so we're giving the linear slides a 6in cut in the robot to achieve the needed height to score the cap ball (with a little extra)
 - Wiring column needs to be roughly 5x5in
 - We probably want the battery to also be in this stack
 - Beacon pad is pretty small, so that can be placed last.

Meeting end 7:45



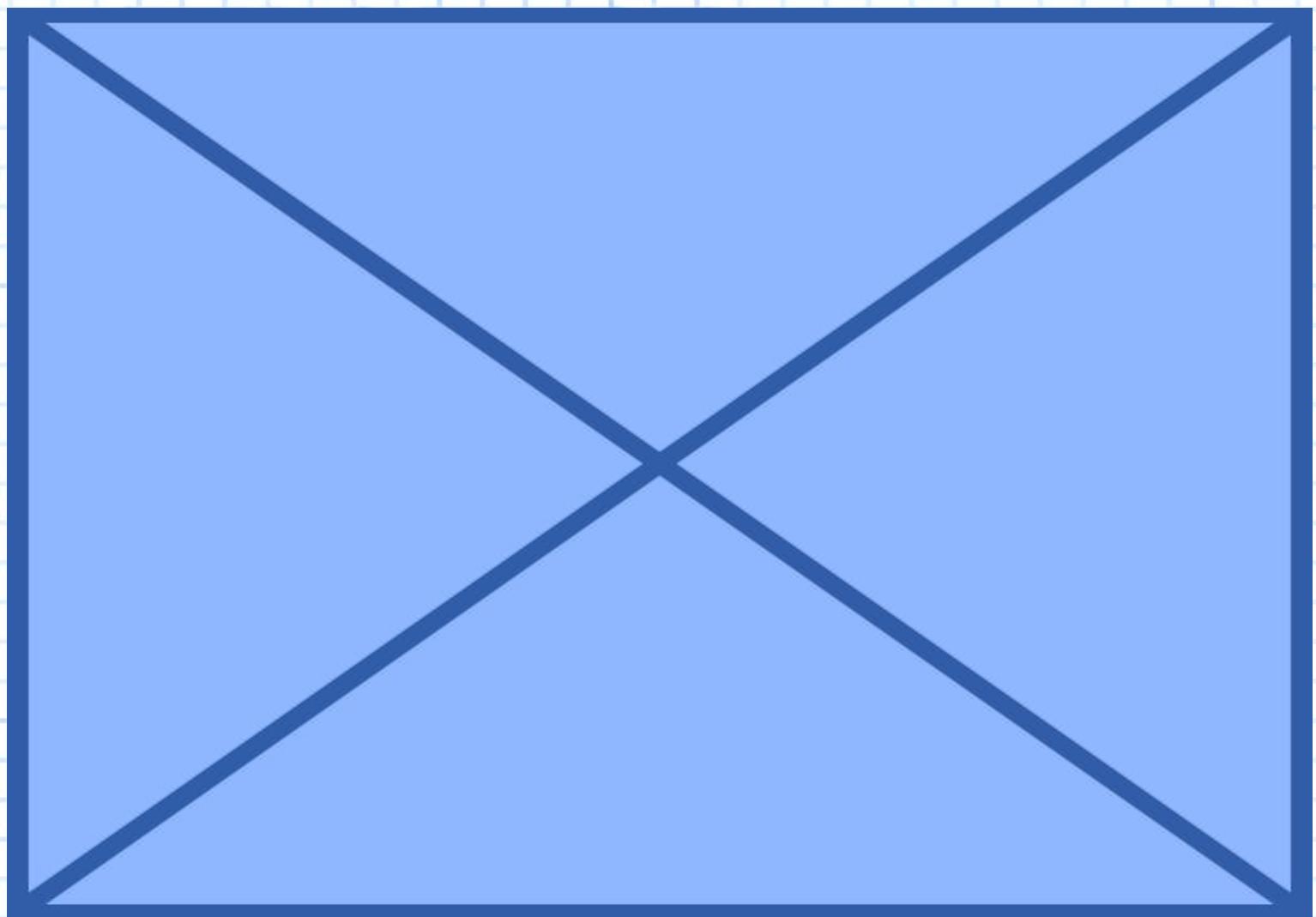
Meeting 02/01/17

Context - SuperStructure building day 1

Meeting Start 3:50

- We started building the planned structure on the top.
- Because it's the quickest and most iterable material we have, we will be making the intake ramps out of plexiglass
 - Started doing potential forms for that
- Good progress so far!

Meeting end 7:00



Signed off by:

William Michael
Angie Mulinick

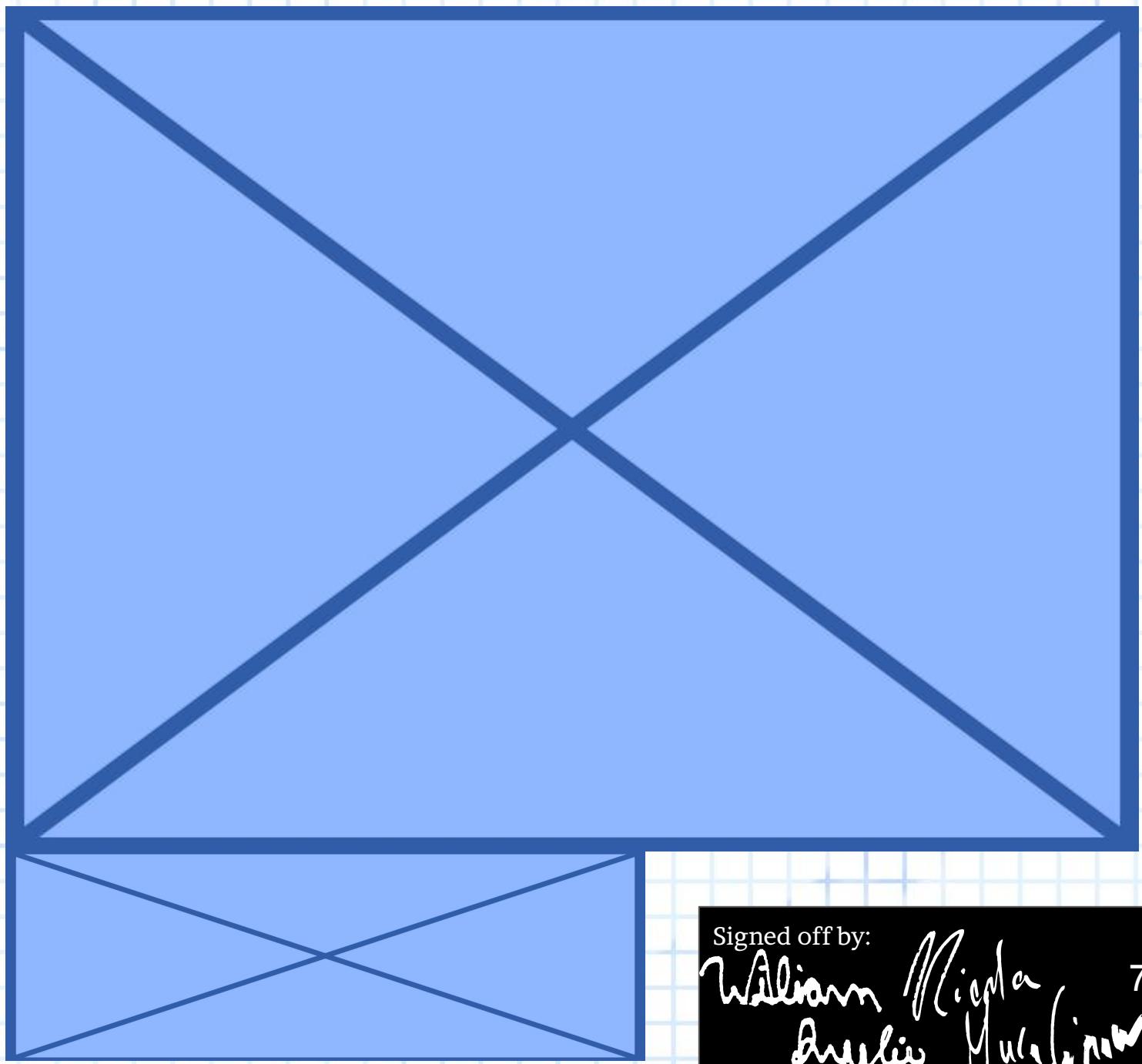
Meeting 02/02/17

Context - SuperStructure building day 2

Meeting Start 3:45

- Continued building upper front structure that was started yesterday
- Called in the expertise of Joel and Eric from 7797 to help us out with the linear slide setup
 - Those are under construction, but should be done by the end of the week.

Meeting end 7:20



Signed off by:

William Michael
Angie Mulinick

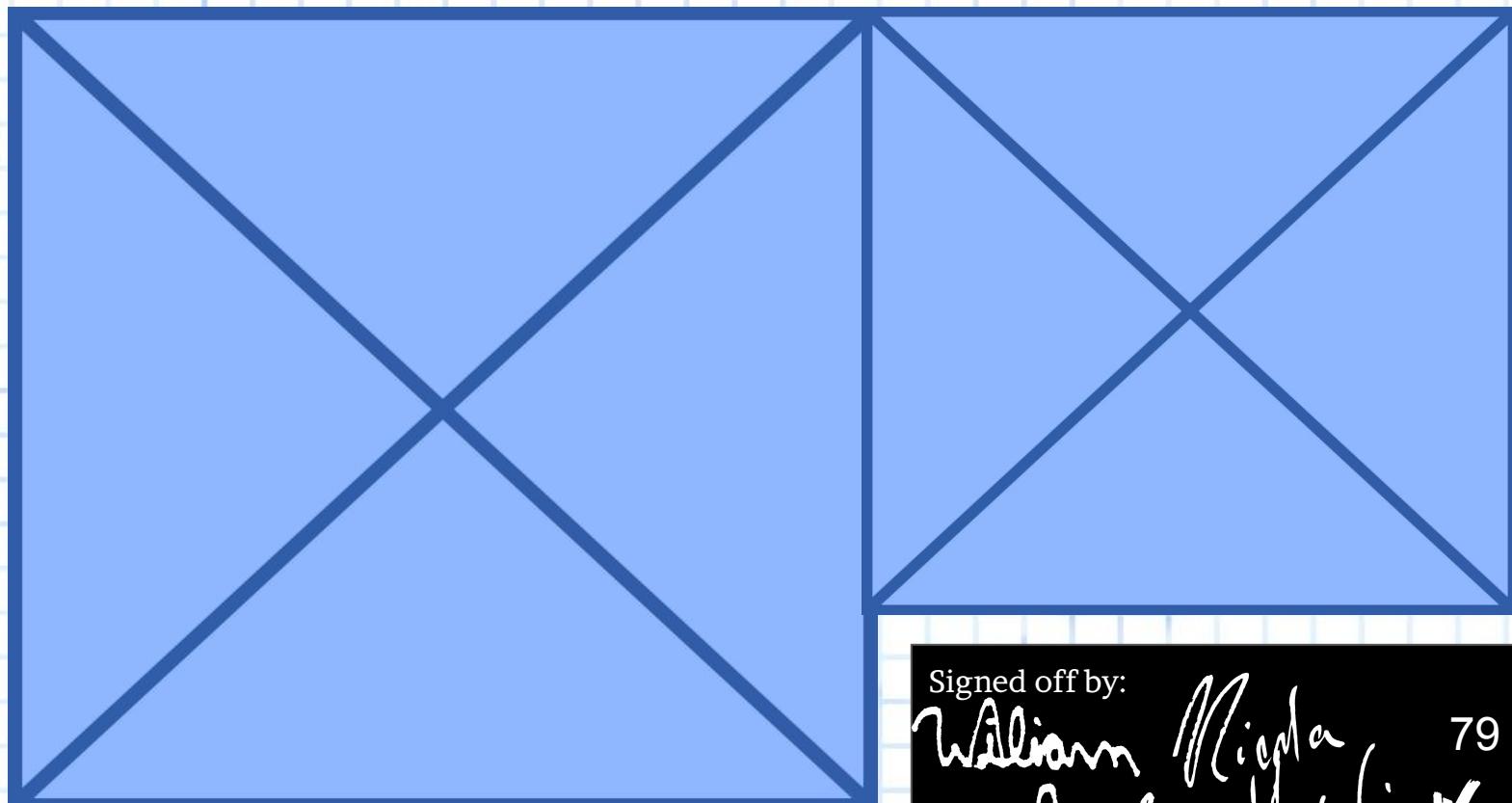
Meeting 02/03/17

Context - SuperStructure building day 3

Meeting Start 3:55

- We wrapped up the front structure, and began discussing intake materials and drive system
 - We want the fewest number of motors possible, for simplicity
 - Since size is close, we probably want to use a chain and bring the motor drive in from elsewhere.
 - Zipties worked well enough on the old robot
 - Based on what we saw at competition, covering them in surgical tubing might give the extra kick needed.
 - We'll have to test that
 - Discussed implementing a gate servo like we had on the old robot, but decided against it - we can more easily hold balls in the intake for this design.
- Also looked at the placement of the flick-launcher
 - Should fit nicely above the launcher, and allow us to use gravity to feed the balls in

Meeting end 7:55



Signed off by:

William Michael
Angus Mullain

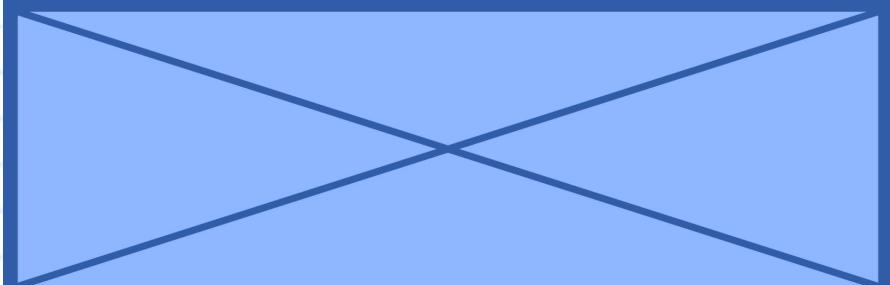
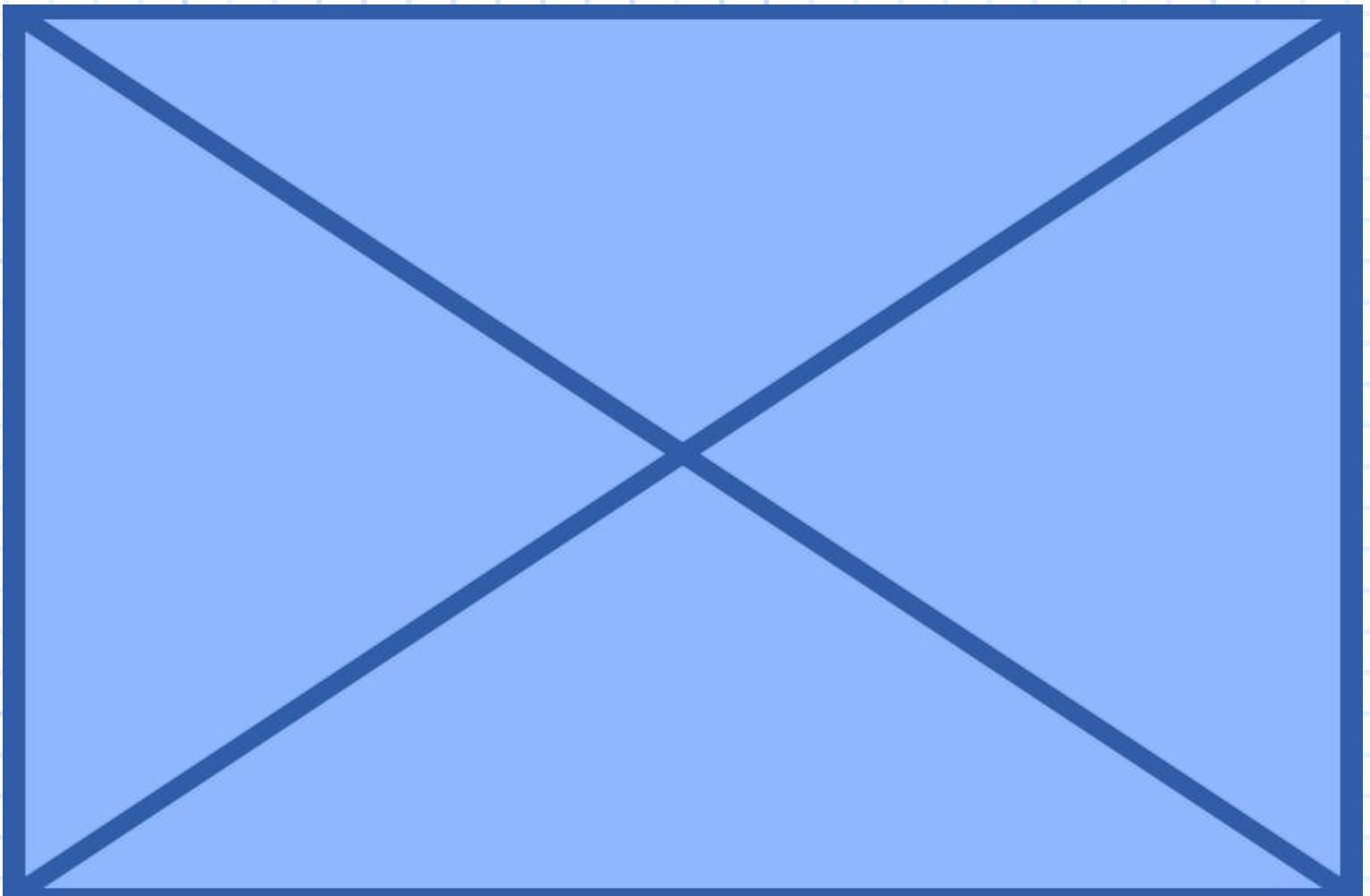
Meeting 02/04/17

Context - SuperStructure building day 4 - intake

Meeting Start 1:00pm

- Began build of the intake
- Plexiglass shapes that we had prepared need slight tweaks, but they seem to fit well.
- Mounted the linear slides, will need a base plate to hold them, but it's not a hard addition
- Almost got the intake done today - needs some support structures and a little fine tuning.

Meeting end 8:30pm



Signed off by:

William Miguel
Angie Mula

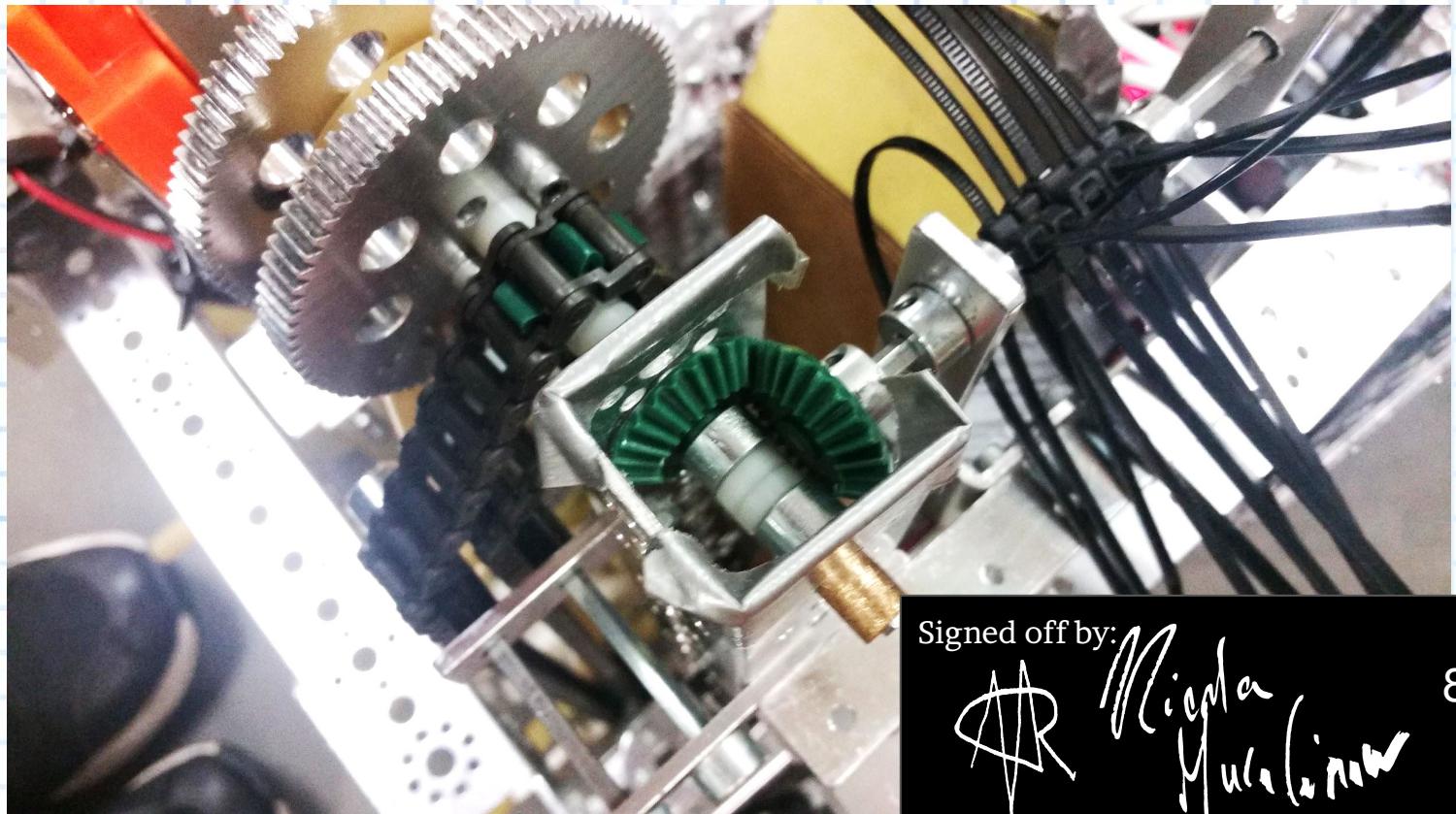
Meeting 02/08/17

Context - SuperStructure building day 5 - intake and launch

Meeting Start 3:50

- Today's agenda is to wrap up intake and build launcher
- Plan for this week is to add wiring tomorrow and then begin driver practice + beacon construction, so that we can hand it off to software for autonomous mid next week.
- Finished intake and launcher
 - Launcher is simple, needed a little more structure to be consistent.
 - Ramp in front of it is probably most important support
 - Intake required a small zip tie spinwheel running perpendicular to the intake to prevent balls getting stuck at the top.
 - Had to use VEX bevel gears to accomplish the turn without adding a motor
 - Used the surgical tubing for the cord that propels the ball upward as well as on the zip tie wheels to increase grip.
 - Positioned motor for launcher in front and ran it with a chain to save space in the center column of the robot

Meeting end 8:00



Signed off by:

 Michael Mullin

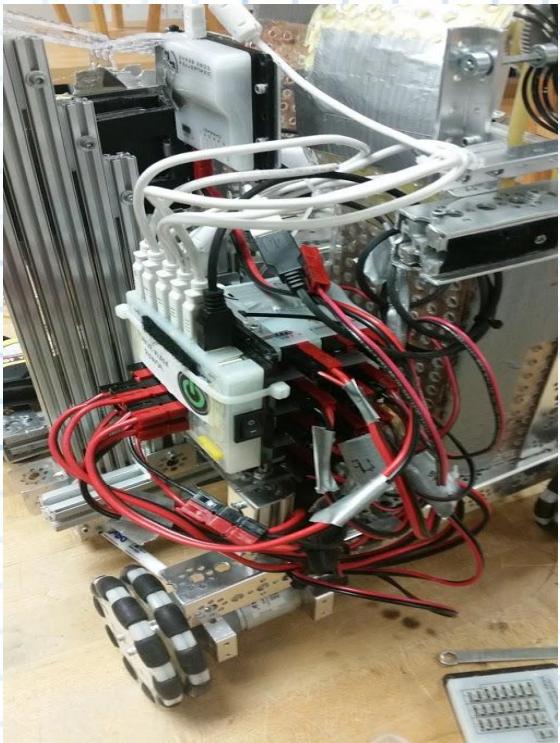
Meeting 02/09/17

Context - Wiring

Meeting Start 3:45

- Today's adventure is wiring!
- We plan to use a stack of motor controllers, just like on the old robot, as it is the most space efficient. The CPD and other modules may need to be more accessible, so they won't be in the stack proper.
- Diagrammed out the current wiring, and will have to make a final copy once all the sensors are attached
- Speaking of sensors, started brainstorm for the beacon press.
 - Old robot had a good idea, just poor execution
 - Plan is to run a paddle back and forth across a plate to support it
 - Key differences
 - Servo will be below the paddle, not in the middle, so we won't be relying upon the full 180 degrees of motion.
 - Plate will extend ALL the way through so that there are no edges to get caught on
 - Full support - block of 2x4 is probably best option.
 - We have a good space for this in the back right corner of the robot, due to the fact that it's a thin mechanism. (3.5in tops.)

Meeting end 7:45



Signed off by:

William Michael
Angie Mulinix

Meeting 02/10/17

Context - Beacon Press and Cap Ball Claw

Meeting Start 3:50

- Today's agenda is to finish design and measurements for beacon press and to build the cap ball grabber
- Beacon presser sketches *found on next page* - took the material home to band-saw & countersink
 - The skid plate will be aluminum, with the support being 2x4 that will need to be thinned down a hair ($\frac{1}{4}$ in.)
 - More accuracy allows us a smaller beacon pad, which is easier to work with
 - Still going to be wooden, just like the old one
 - Color sensor will likely look over one "shoulder" of the plate, and will check just it's side.
 - The mount point for the color sensor on the floor still needs to be determined.
- The cap ball claw will be modeled off of some of the folding claws we've seen (see 6209 Venom) with the outer beams run by servos
 - This allows small form factor
 - To get the needed strength, we'll be using the quarter scale continuous servos to run the side arms
 - There will be one normal servo on top to hold the ball on until we want to dump it
- The servos have been more of a headache than anticipated. We almost have them figured out thanks to some help from the vandegrift teams - a piece of that *conversation can be found on next page*.

Meeting end 9:30pm

Work 10pm

- Worked on the bandsaw to cut the aluminum and wood to size, then used 3 different metal bits in the drill press to countersink the aluminum plate so that the bolts won't interfere with the sliding

End 12:00pm

Signed off by:



Meeting 02/10/17 (page 2)

Context - Beacon Press and Cap Ball Claw

Hey guys, does anyone know how to program for the continuous servos? It's the hi-technic hs-785hv servo. Thanks!

We need an example to work from.

Feb 10, 7:15 PM



Maybe it's configured wrong

Arib · Fri 8:19 PM



Are you sure the servo is a continuous servo?

Justin · Fri 8:19 PM



Well the program wouldn't run properly if it wasn't configured correctly I think

Spencer · Fri 8:19 PM

It's configured correctly. The servo physically stops at about 720 degrees.

Fri 8:24 PM



Oh then there's something wrong with the servo

A CRServo should never stop like that

It's probably broken or something

Spencer · Fri 8:25 PM



Wait a CR WITH stop?

Arib · Fri 8:25 PM



Nah quarter scale cr servos have a stop

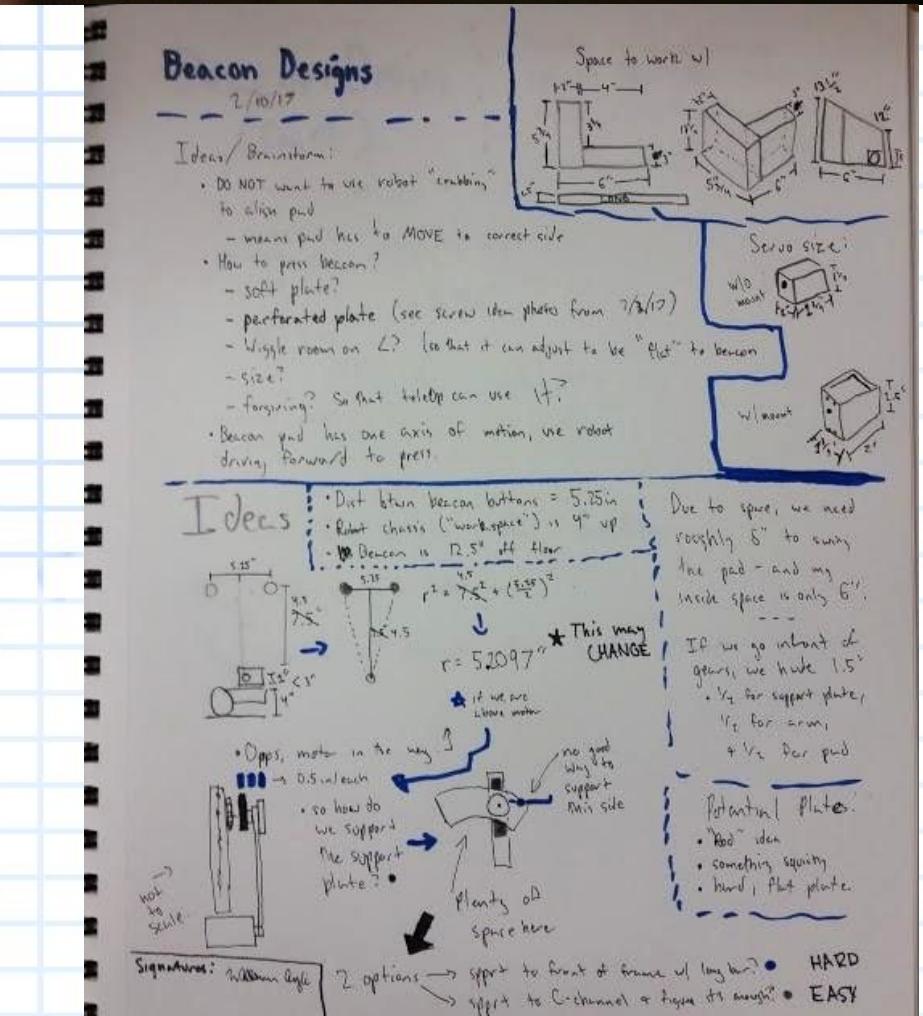
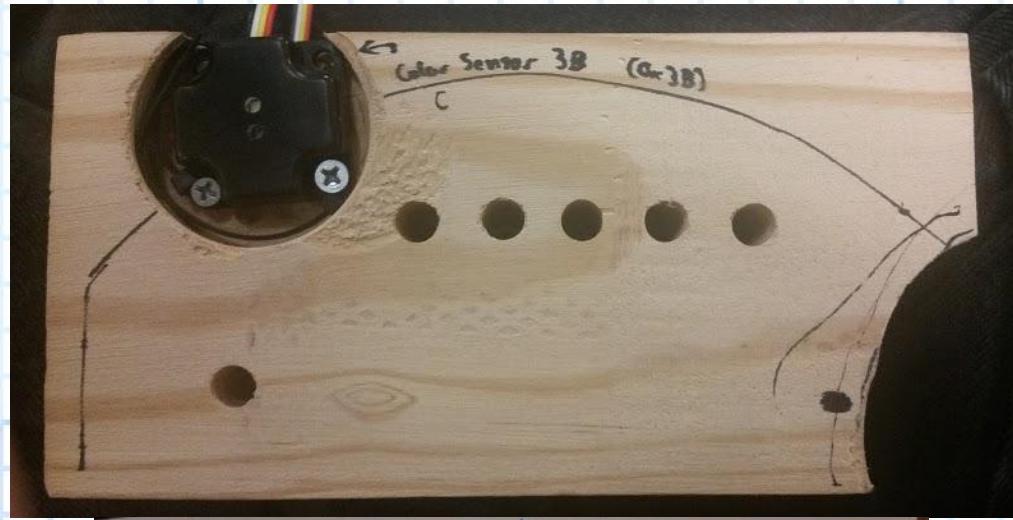
I think it's supposed to be roughly 3.5 rotations?

James · Fri 8:26 PM



Didn't know that

Arib · Fri 8:26 PM



Signed off by:

84

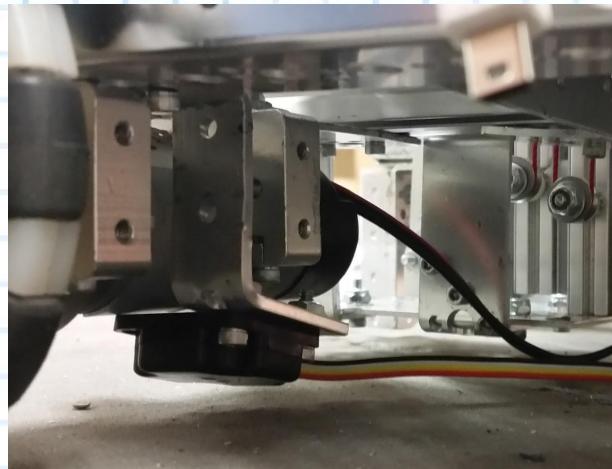
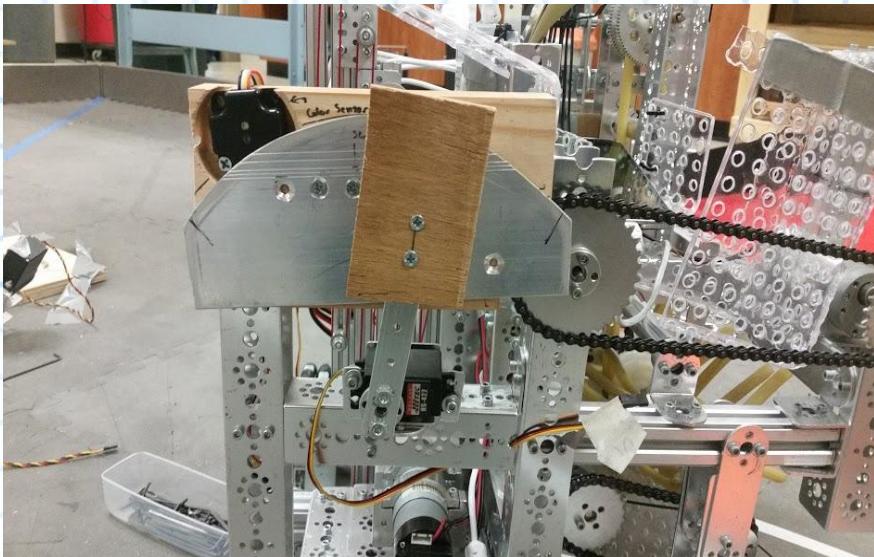
Meeting 02/13/17

Context - Beacon Press and Cap Ball Claw

Meeting Start 3:45

- Today: attach beacon setup and finish up the robot!
- Beacon setup
 - Went to attach the setup - 2 bolts are blocking it
 - Drill pressed the holes needed -- fits great
 - Drew out where the edge of the metal plate sits so that we know where the color sensor can see from
 - Then we used a hole bit on the drill press & a chisel to make a space in the 2x4 to hold the color sensor
 - Drilled two more holes to stop the servo from running off of the plate, and mounted everything up
 - Went straight down from the middle of the servo to find the location of our ground servo.
 - Unfortunately, a motor mount is sort of in the way.
 - We can build around it to mount the color sensor
 - PROBLEM : the color sensor wires are too short, and we don't have extensions
 - Solution: we'll have to solder in extensions tomorrow
- Cap ball claw is still being finicky, so we're punting on that for now - autonomous is more important.
- Attached gyro sensor & plugged it in

Meeting end 7:15



Signed off by:

85

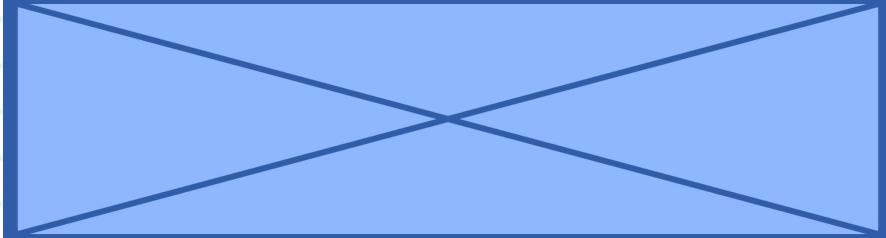
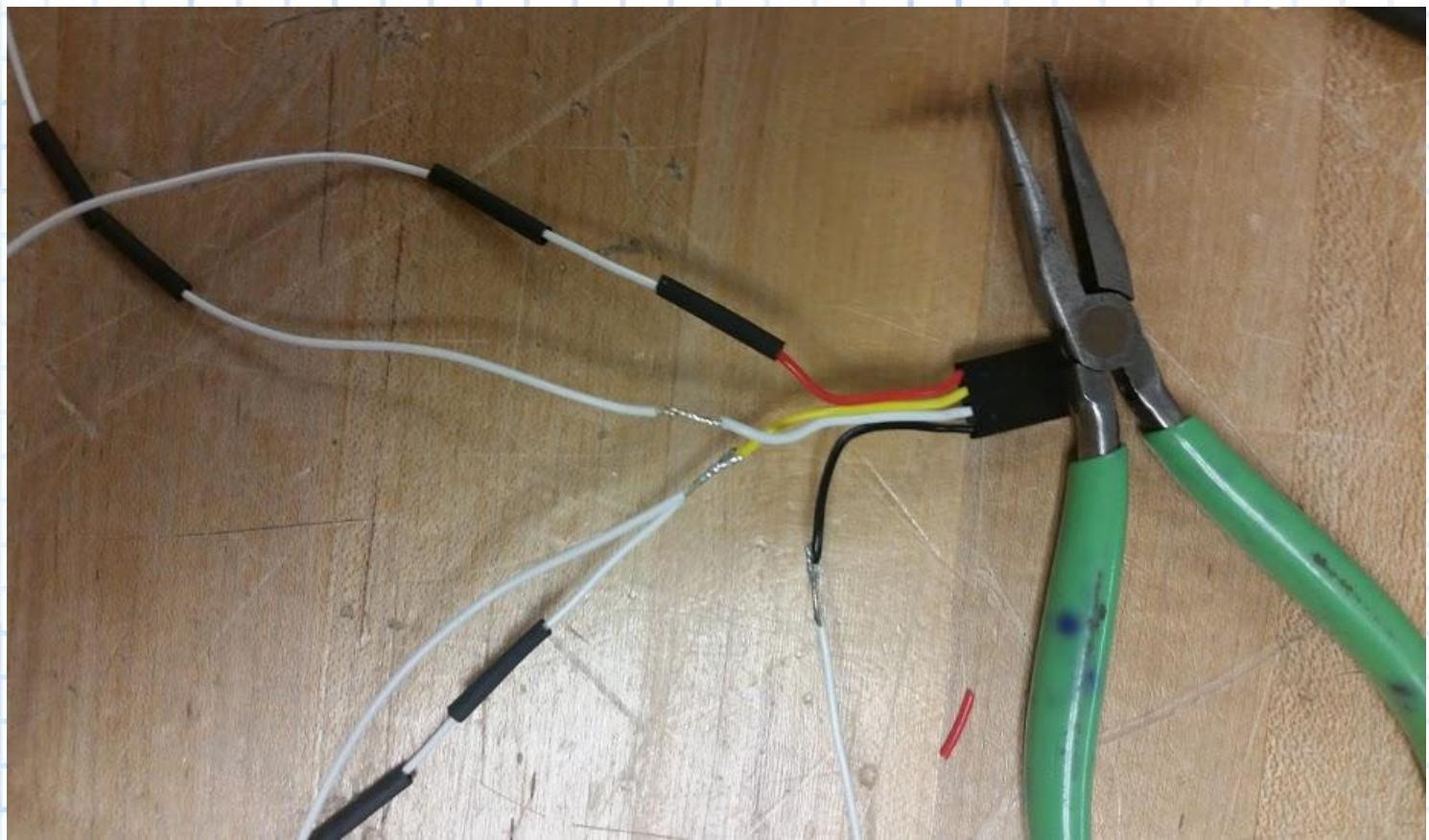
Meeting 02/14/17

Context - Sensor Work

Meeting Start 3:50

- Today: begin programming and finish sensors
- Sensors:
 - We brought in a soldering kit, measured the length of extension we needed for both, cut the cords, and soldered in extensions, then sealed them with heat shrink
 - Worked well, they're now all the correct length and working
- Updated driver software for the new chassis
 - Still a work in progress, but almost there
 - Gave intake control to the chassis drive this time around, to simplify things.

Meeting end 7:20



Signed off by:

William Michael
Angie Mula

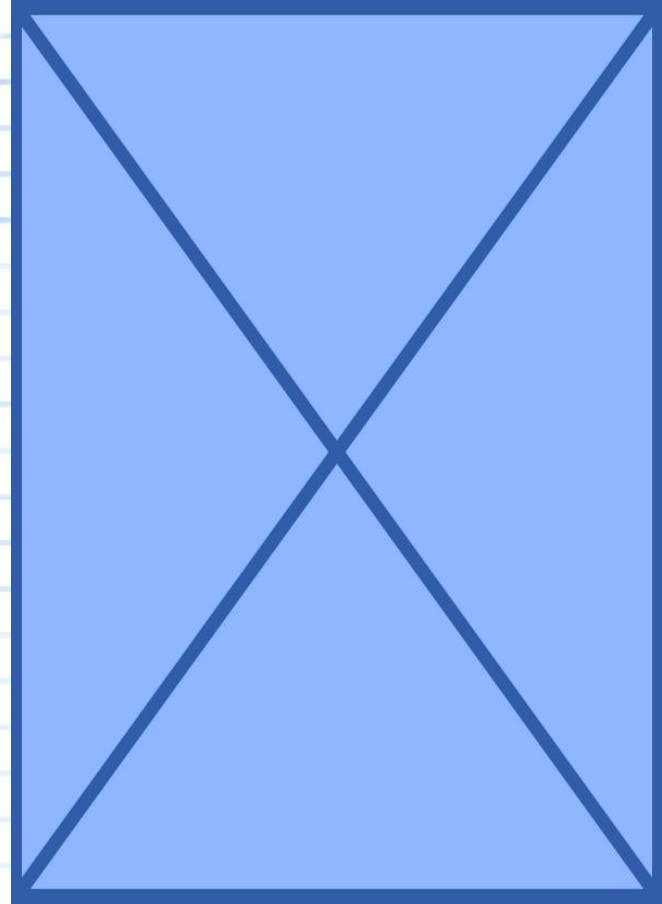
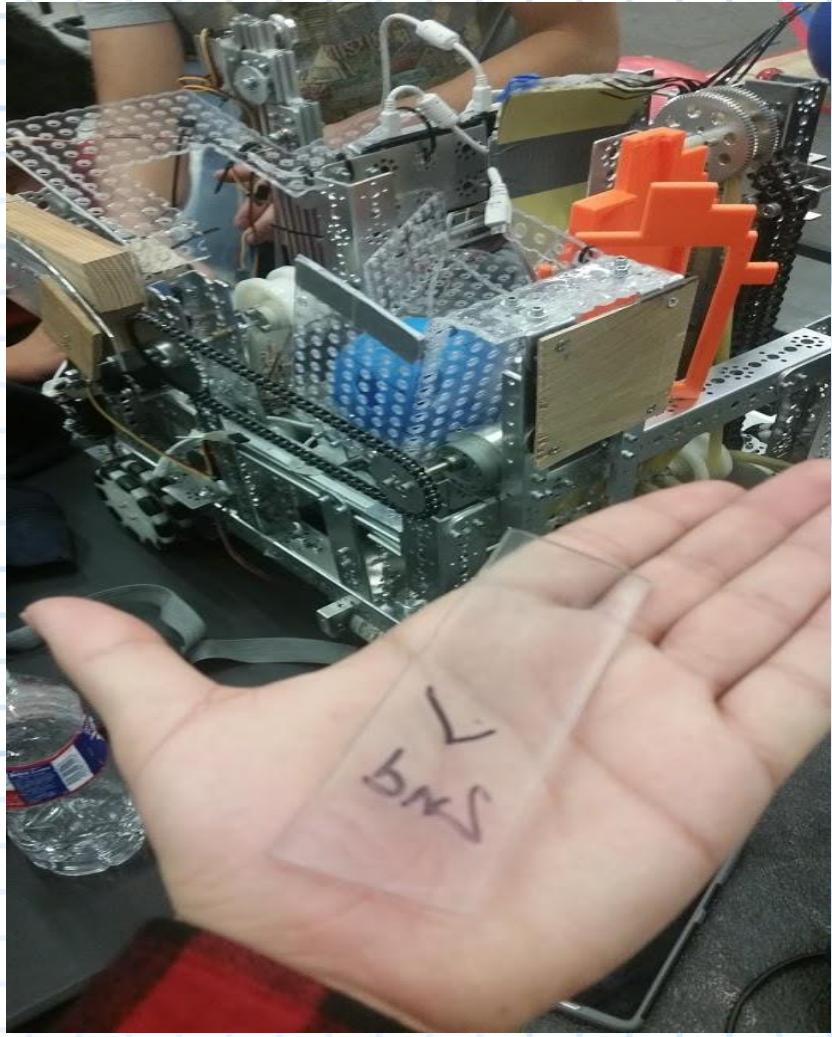
Meeting 02/15/17

Context - Scrimmage and troubleshooting

Meeting Start 3:50

- Today: scrim at vandy!
- We jumped in the van and drove down to vandegrift to participate in a scrimmage they were hosting.
 - Arrived at 4:40, spent half an hour fixing our driver control, and then did a few matches
 - Great talking to the Vandy guys, they had some good advice on software and the atmosphere over there is always great
 - During our last round, we shattered the plexiglass flick plate
 - We had spares, but they weren't trimmed.
- Left at 6:00 and drove home
- Unpacked van at 7:00pm

Meeting end 7:00



Signed off by:

William Migna
Angie Mullin

87

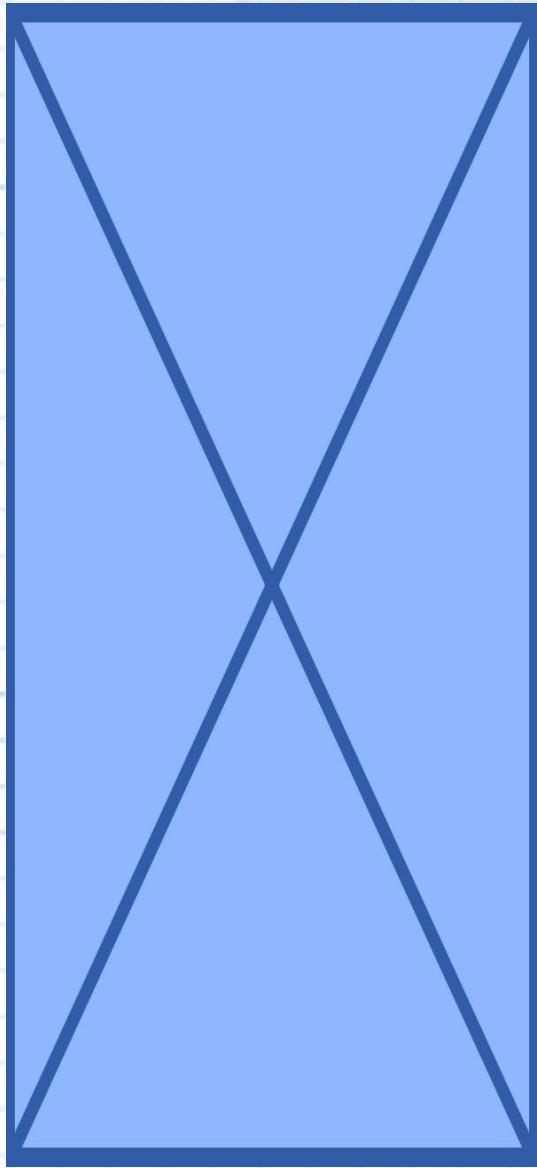
Meeting 02/16/17

Context - Preparation for competition

Meeting Start 3:50

- Today: AUTONOMOUS & looking ahead
- Slade & Yash worked autonomous while the rest looked at the teams who will be at the competition
 - We also had to fit another flick plate, since we broke one yesterday.
- We were able to shoot two balls in autonomous by the end of day, and we started on the system to shoot three (if our ally can't manipulate balls)
- Also had hardware working on a redesigned claw that will get us around the continuous servos, which are still giving us trouble.

Meeting end 8:30pm



Signed off by:

 Michael Mullin

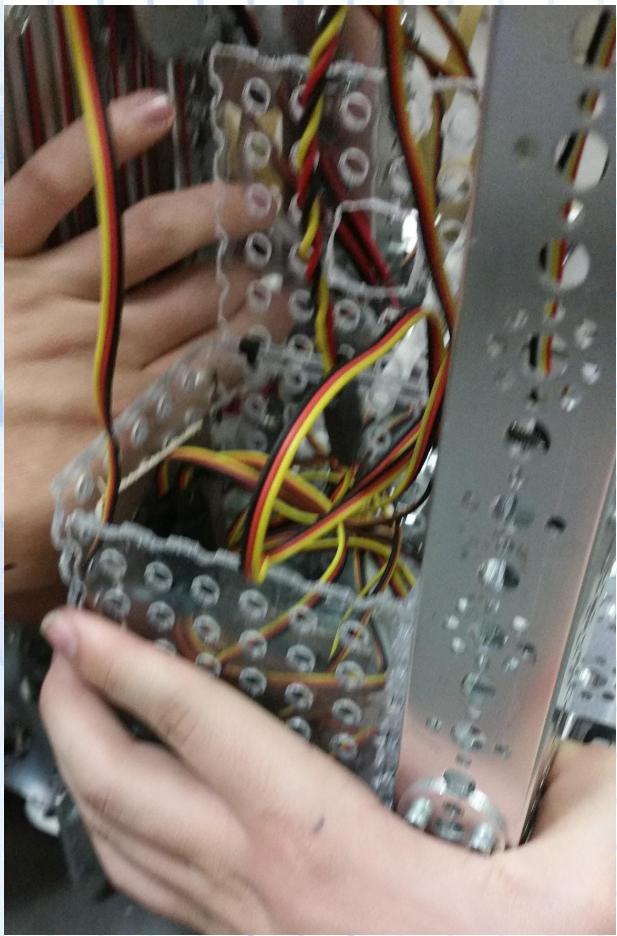
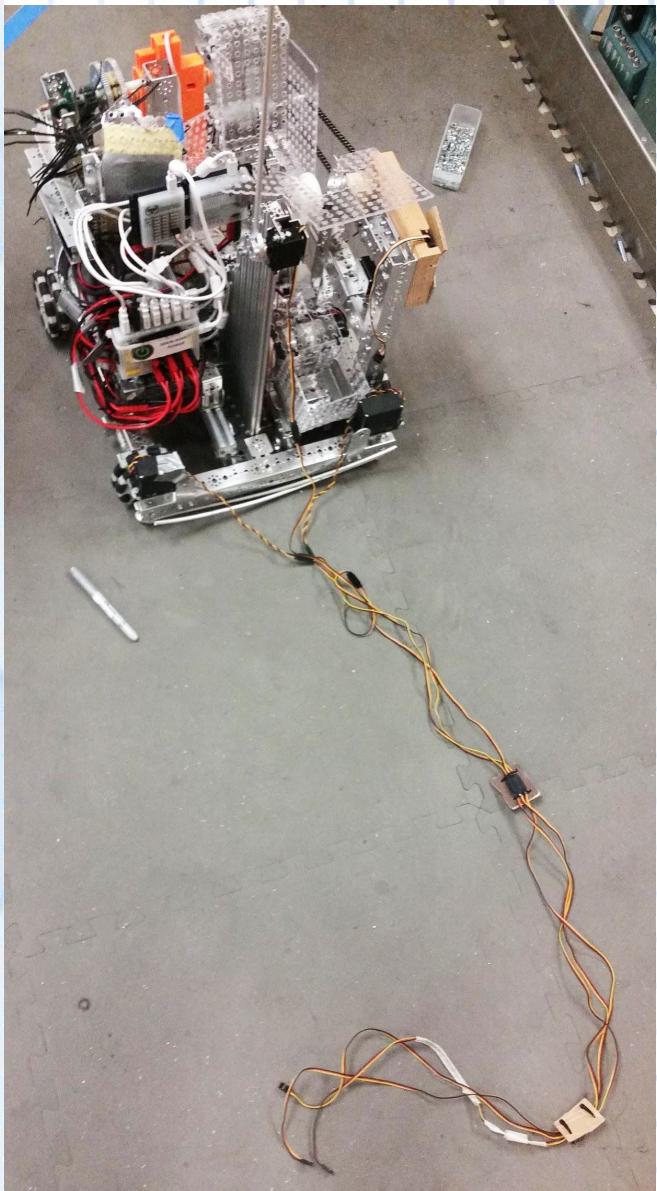
Meeting 02/17/17

Context - Preparation for competition

Meeting Start 3:40

- Today: finish autonomous and notebook and do driver practice, practice judging speech, and prep for tomorrow
- Tomorrow's departure time is 5:30am, so we'll have to get done relatively early tonight
- Working on autonomous (see software section) and potential cap-ball repairs
 - Added a plexiglass "box" to hold the servo wires before we send the arm up
 - They won't be re-spooling, so we cannot bring the arm all the way down during a match or we run the risk of driving over them
 - Autonomous is nearly done - see software section for details

Meeting end 10:20pm



Signed off by:
William Michaela
Angie Mullinix 89

Meeting 02/18/17

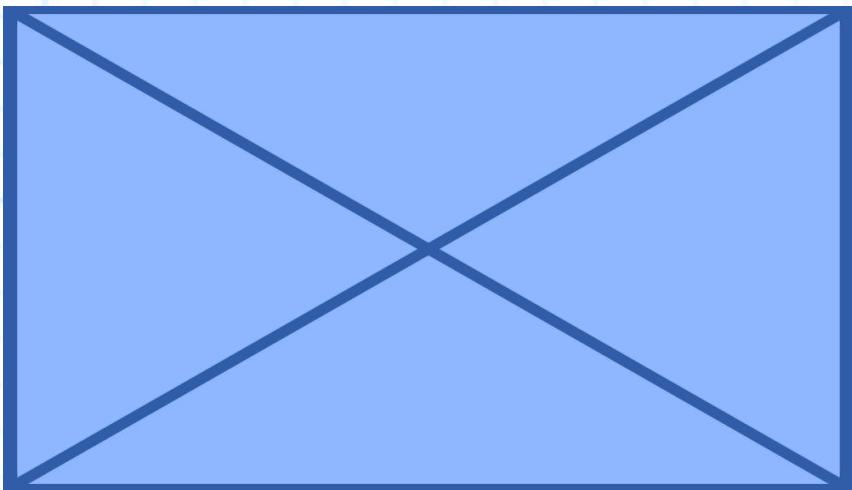
Context - WildCard Day!

Day Start 5:00am

- Off loaded into the bus and began our journey!
- Arrived at competition at 7:55am
- Did our judging - went ok, not as well as at championship
- Went through check-in → barely fit in 18in cube, had to do a little trimming
- Lunch
- Matches:
 - First match was rough - not enough driver practice
 - Second match was w/ 4545 Orobos from Vandegrift - both teams had problems and didn't quite function as intended.
 - Third - fifth matches went really well, cap ball worked like a dream
- Alliance Selection - we were selected for the 1st alliance with Orobos and Venom (4545 and 6209)
 - Our first match was rough - apparently there's a "TURBO" button on the controller we had never hit before that scrambles the controls
 - Moved into finals
 - Won finals, sealing it with a 240 to 65 point match.
- Awards
 - Won another first place Innovate Award !
- Headed home, with dinner on the way

(pictures can be found on the next page)

Day end 10:00pm

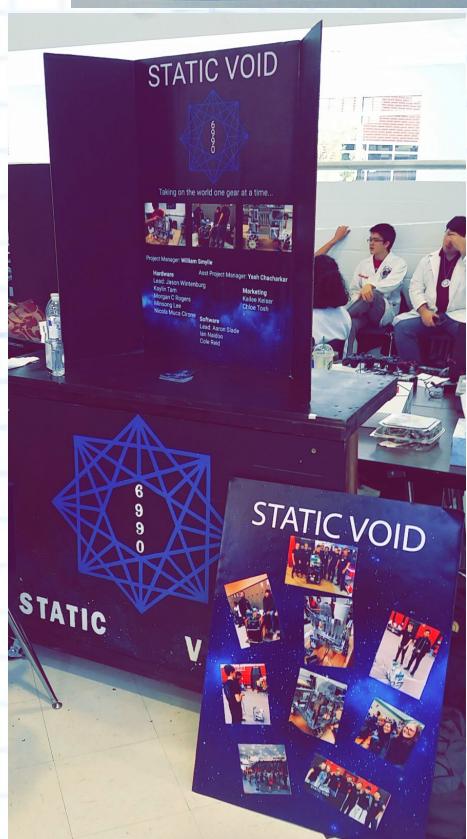


Signed off by:
William Michael
Angie Mullin 90

Meeting 02/18/17 (page 2)

Context - WildCard Day!

Qualification Matches				
Number	Red 1	Red 2	Blue 1	Blue 2
1	11645	3033	11446	5998
2	11152	12436	7197	10632
3	6209	6041	11074	11151
4	8493	4545	5815	8639
5	9547	6990	11549	11782
6	8557	12285	10840	9053
7	5628	8295	8424	10782
8	8627	11446	6504	11782
9	9547	8493	11074	10632
10	5998	11151	11152	10782
11	9053	6504	8639	5628
12	10840	7197	8295	8627
13	5815	6041	8557	12436
14	12285	11645	4545	6990
15	3033	8424	11549	6209
16	5628*	10840	5998*	10632
17	8639	6990	8295	11152
18	10782	8557	11782	3033
19	11446	7197	6041	12285
20	11549	8627	8493	9053
21	5815	11074	11645	6504
22	8424	12436	4545	11151
23	9547	9053	6209	11446
24	5628	11152	11645	6041
25	12436	3033	11074	12285
26	10782	4545	9547	8627
27	5998	8557	8639	11549
28	8295	10632	6504	11151
29	11782	6209	8493	10840
30	7197	5815	8424	6990
31	10632	8639	3033	8627
32	8295	5998	12436	9547
33	11151	11549	11446	5628
34	11782	11645	8424	9053
35	11152	11074	4545	8557
36	6504	6041	10840	6990
37	6209	12285	10782	5815
38	8493	5628	7197	5998



Signed off by:
 William Migala
 Angie Mula (in) 91

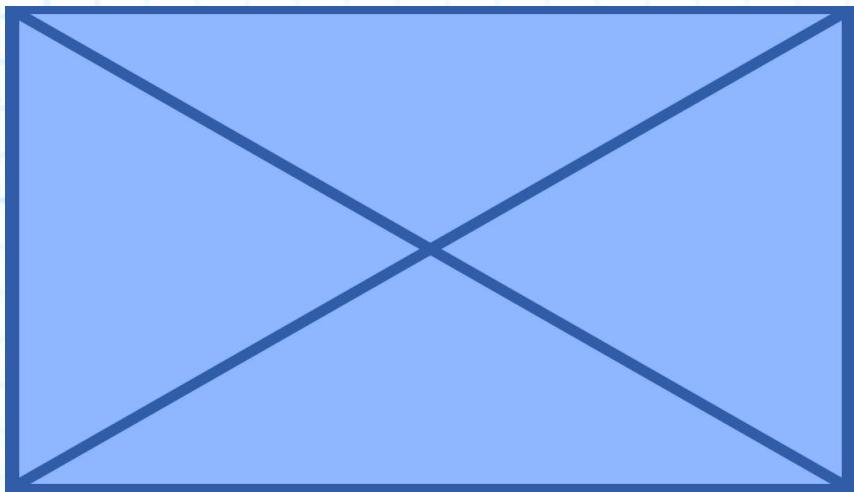
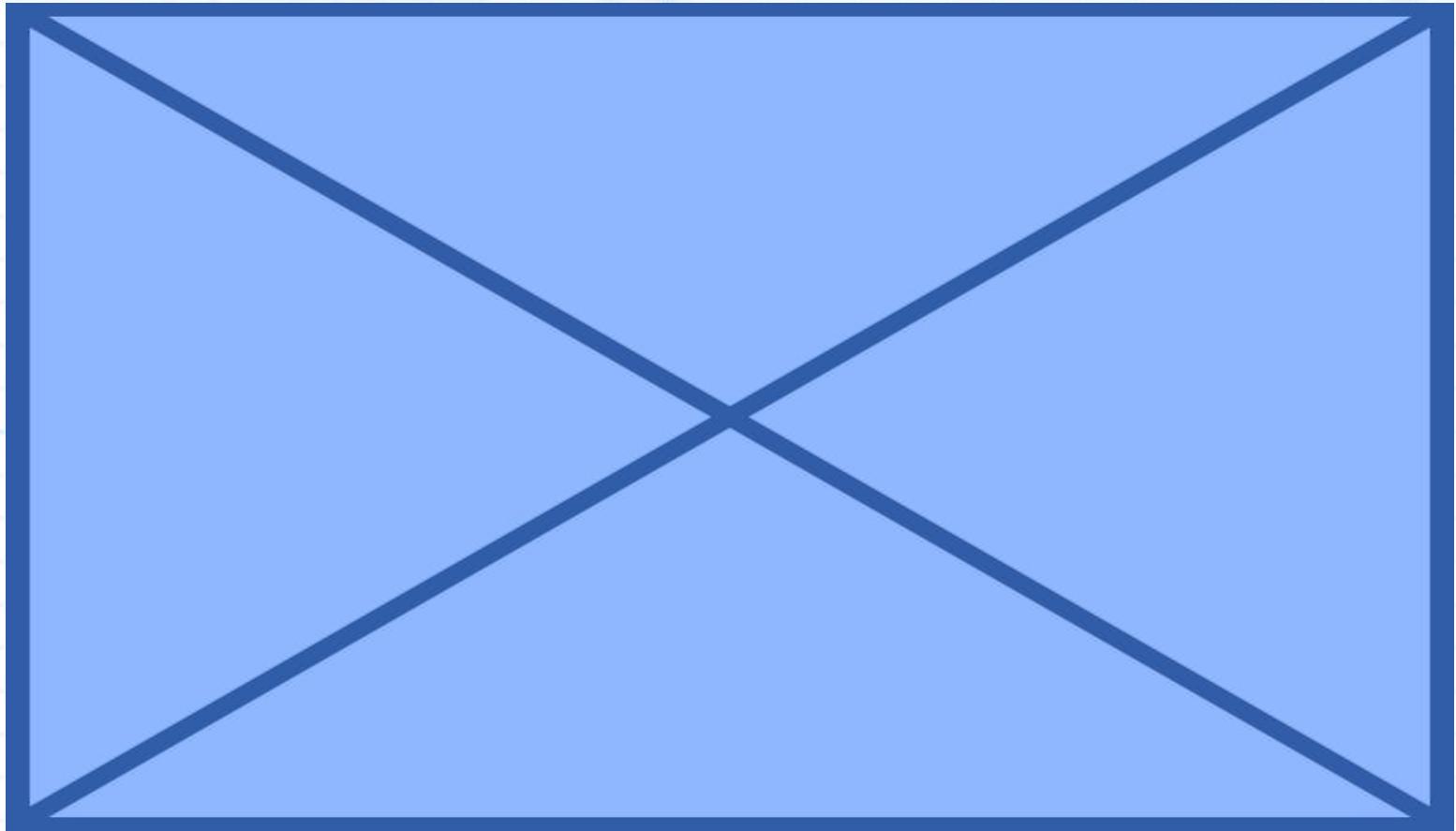
Meeting 02/20/17

Context - Prep for Regionals

Meeting start 3:50pm

- Continued work on the autonomous
- Also built a wooden capture to prevent the intake surgical tube from jumping out of the gear
- For software progress, see the software section of the Engineering Notebook.

Meeting end 8:00pm



Signed off by:

William Doyle  

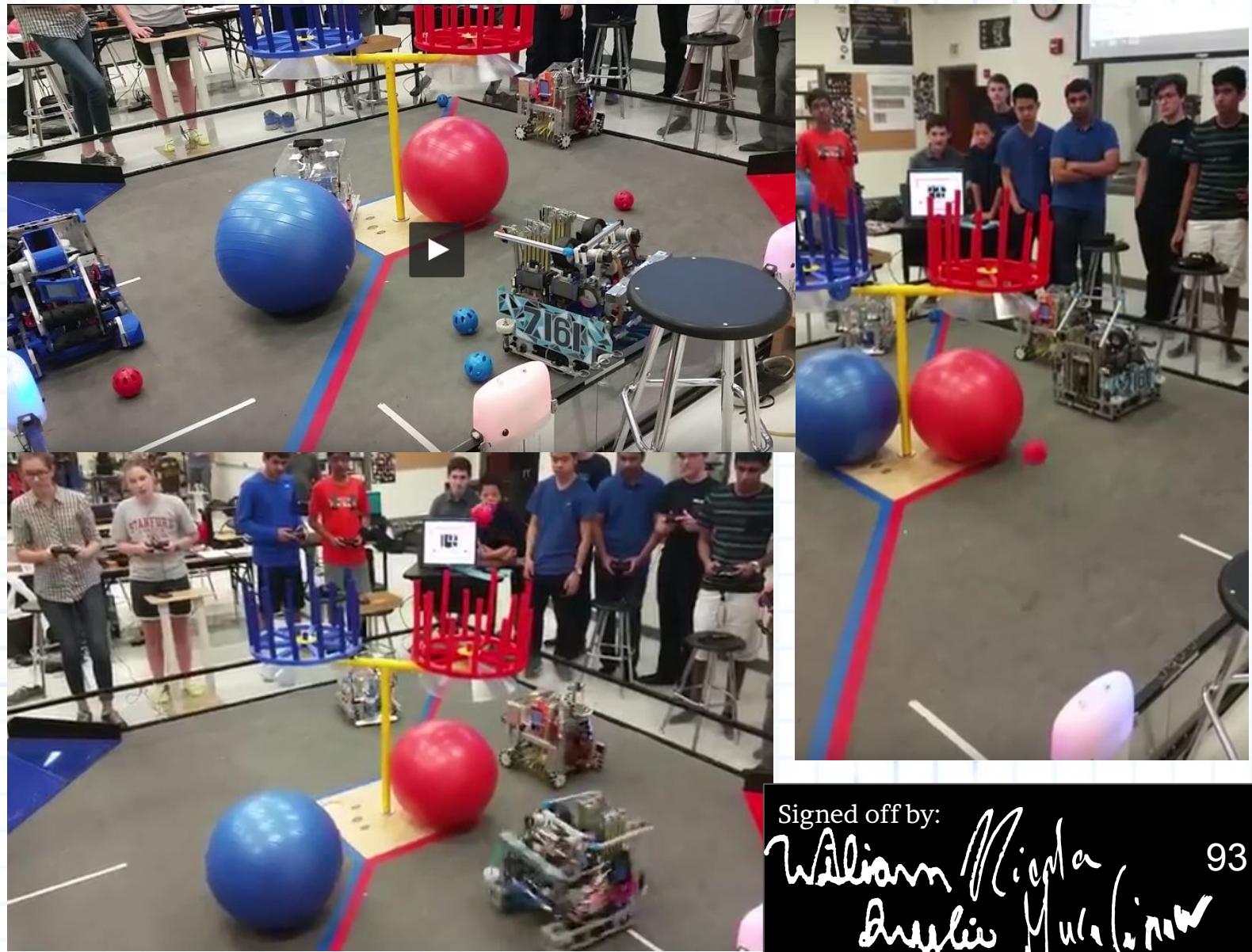
Meeting 02/21/17

Context - Prep for Regionals - Vandegrift Scrim

Meeting start 3:50pm

- Drove down to vandegrift for another scrimmage
- Lots of autonomous progress
- Really fun to see all the crazy mechanisms some of the teams have developed in the 3 weeks since we last saw them, notably:
 - Team 9048 Philobots' turret style launcher, driven like a tank with cannon
 - Team 7161 Hydra's surgical tubing spring loaded cap ball extension
- Played two matches, had scores in the hundreds
- Also got autonomous nearly to the point of working - hopefully just a few more tweaks.

Meeting end 9:00pm



Signed off by:

William Micala
Angie Micala 93

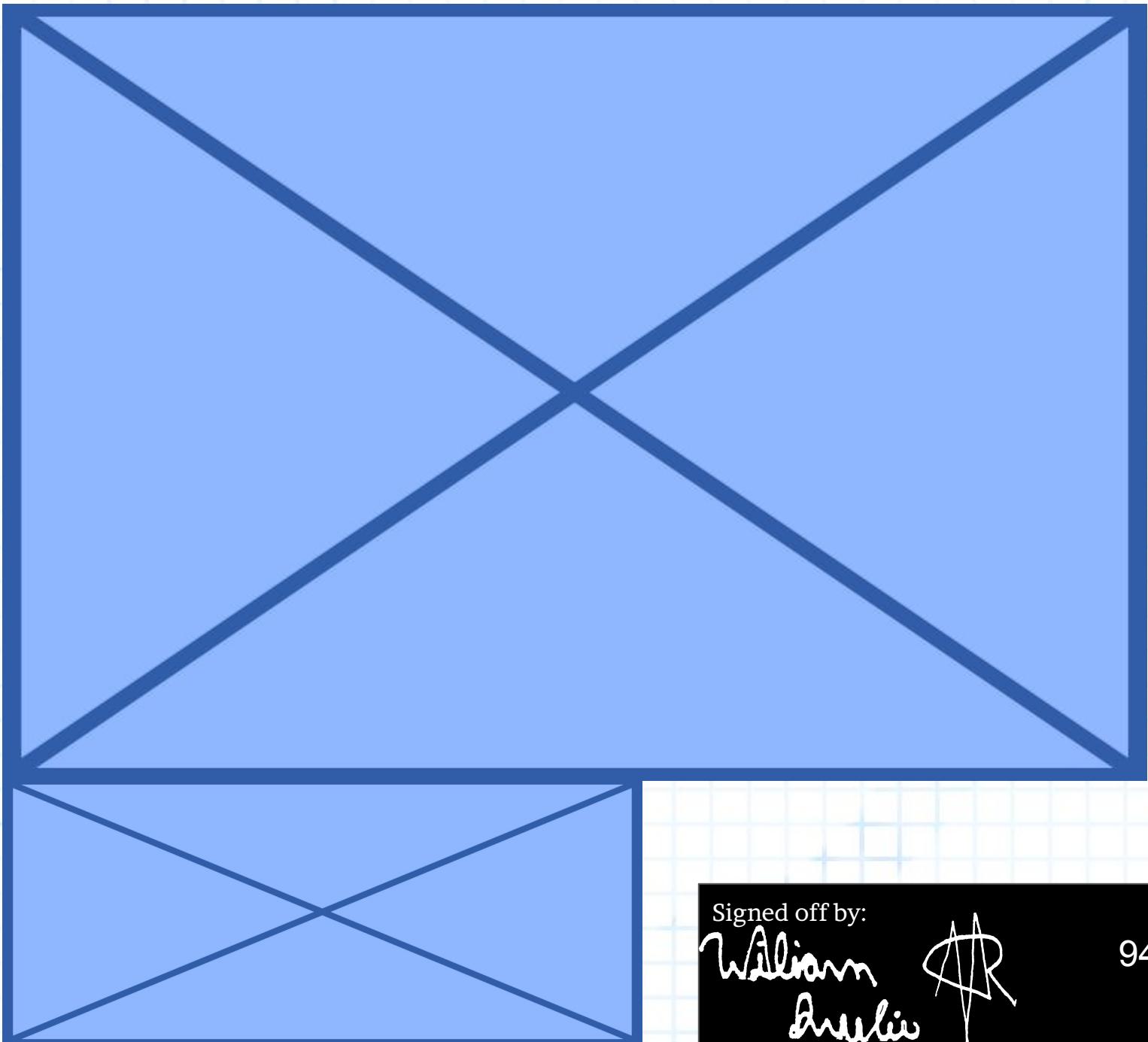
Meeting 02/22/17

Context - Prep for Regionals

Meeting start 3:50pm

- Continued work on the autonomous
- Had to replace one of the cap ball servos, because we slammed the arm into the wall and broke it while testing autonomous. Oops.
- For software progress, see the software section of the Engineering Notebook.

Meeting end 10:00pm



Signed off by:

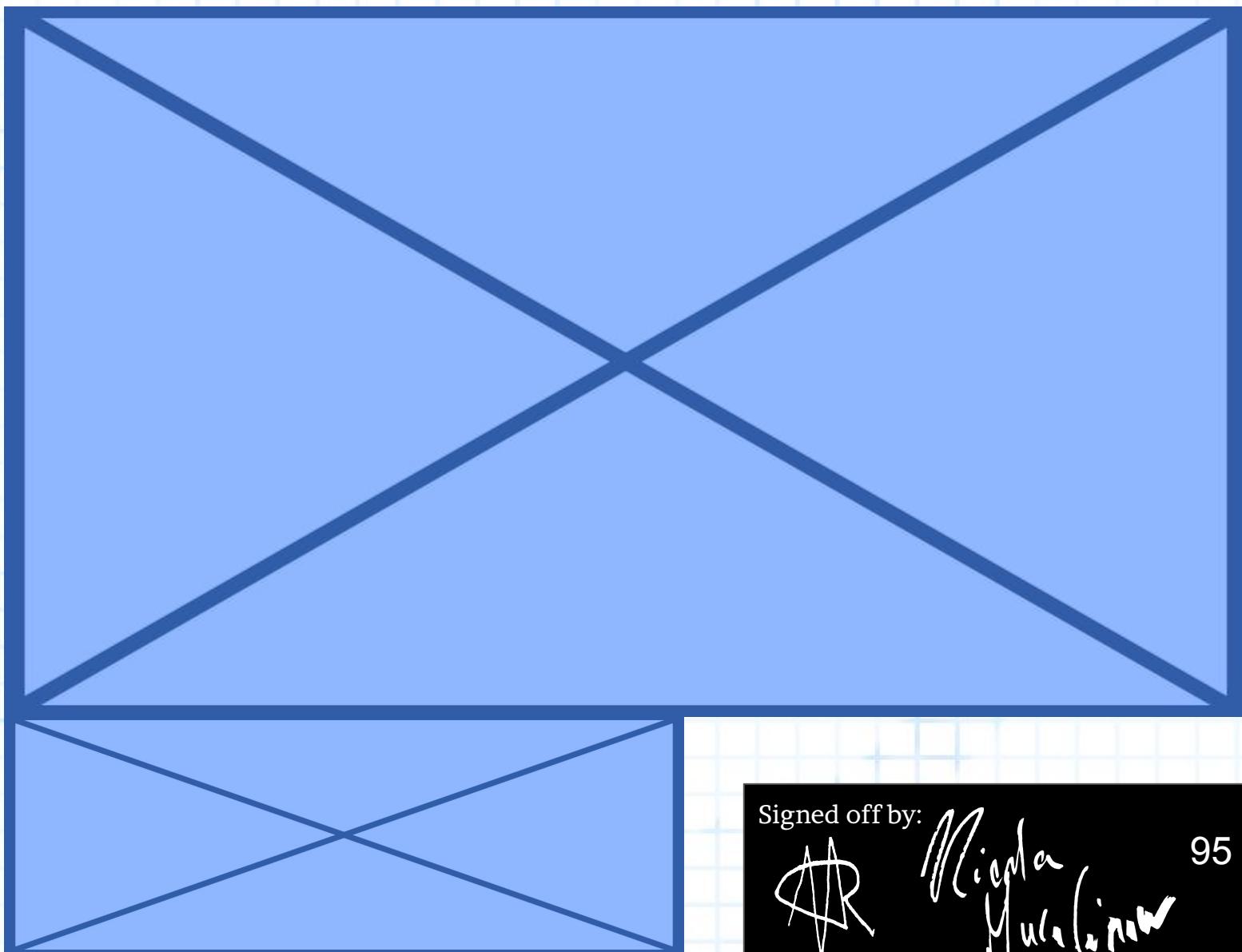
Meeting 02/23/17

Context - Final Day - Prep for Regionals

Meeting start 3:50pm

- Today we need to fine tune the autonomous and pack up for competition tomorrow
- For software progress, see the software section of the Engineering Notebook.
- Packing process:
 - Lay everything out in groups on the long tables
 - Make a spreadsheet of what gets packed and where it all went
 - This allows us to quickly find anything we need at competition.
- Mounted the robot numbers on wooden backing for extra support
- Packed up - Can't wait for tomorrow!

Meeting end 9:00pm



REGIONALS

Arrive at school: 5:30 am

- Put our gear on the bus and drive down to San Antonio
- Arrived at Regionals at 7:45am
- Found that we had forgotten our robot phones in the room, and had to ask a parent to run them from Austin.
 - In the meantime, 4545 Orobos loaned us their phones to get through inspection with. Huge shoutout to them
- Judging went well, although not as well as our first presentation.
- 6209 Strike had a very cool demonstration at their booth, with a Samsung Gear VR
- Matches began slightly behind schedule
- Rest of day went well

Arrived at hotel at 7pm

Alamo FTC Regional Championship
Division: Kane
Match List

QJL

Qualification Matches

Number	Field	Red 1	Red 2	Blue 1	Blue 2
1	1	5998	6210	7161	12305
2	2	4750	6990	9048	11090
3	1	5714	12307	10863	11404
4	2	9278	4932	12227	12471
5	1	4719	8424	4902	5628
6	2	11009	8214	12432	10782
7	1	8683	12392	11503	11809
8	2	11549	11446	8876	12115
9	1	12429	7789	4545	3781
10	2	4749	7993	11157	4721
11	1	5628	8214	5998	9278
12	2	12471	7161	12392	4719
13	1	9048	11549	11809	8424
14	2	12432	12115	12305	12307
15	1	8683	5714	3781	4750
16	2	7789	4721	12227	11446
17	1	11090	4932	10782	12429
18	2	4902	11503	11009	7993
19	1	4545	11404	6210	4749
20	2	8876	11157	10863	6990
21	1	12227	3781	5628	9048
22	2	10782	11809	4721	4750
23	1	12305	7993	8683	11446
24	2	6210	5714	8424	12429
25	1	4545	11503	12115	4932
26	2	4749	4719	8214	6990
27	1	12307	5998	12471	11090
28	2	7789	10863	11009	11549
29	1	7161	4902	9278	11157
30	2	12392	8876	11404	12432
31	1	11446	9048	5714	8214
32	2	5628	12305	4721	11503
33	1	11009	8424	4932	4749
34	2	3781	9278	4719	11549



Signed off by:


Miguel Muñoz

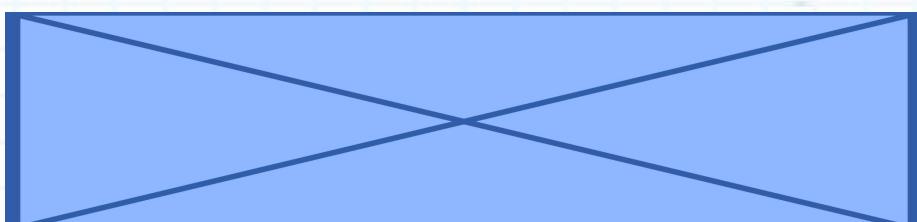
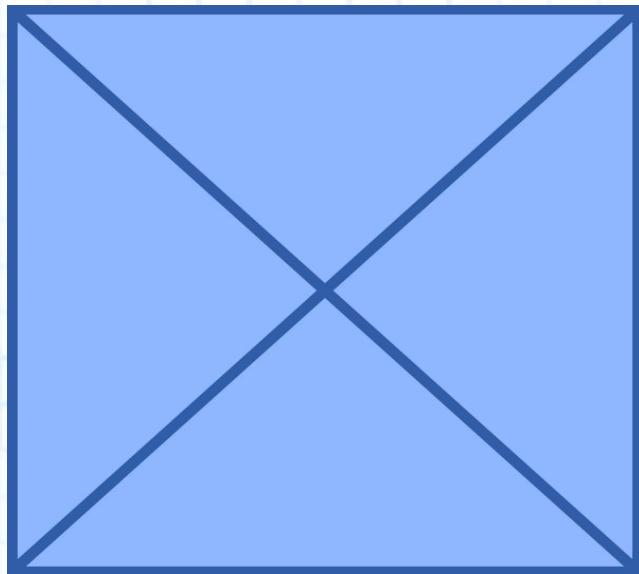
96

REGIONALS (day 2)

Arrive at Regionals for day 2 at 8am

- We played our final two matches
- We were then selected for alliance by teams Philobots and Rhomans
- We moved on from our first round, beating the 4th place alliance
- We won the finals round, defeating the alliance of Hydra / Oroborus / LASA Murphy
- We then won the super finals, defeating the alliance of QuadX / Saber / Silverbolt

Arrived home at Vista at 11pm



Signed off by:

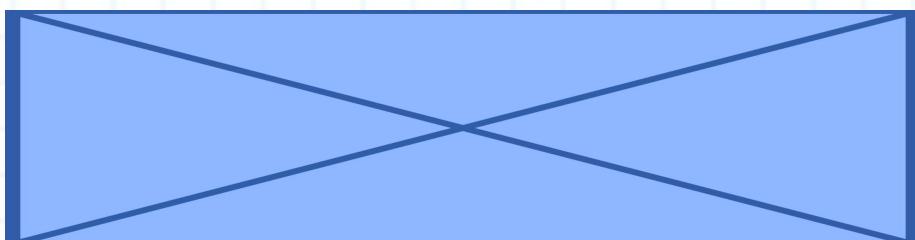
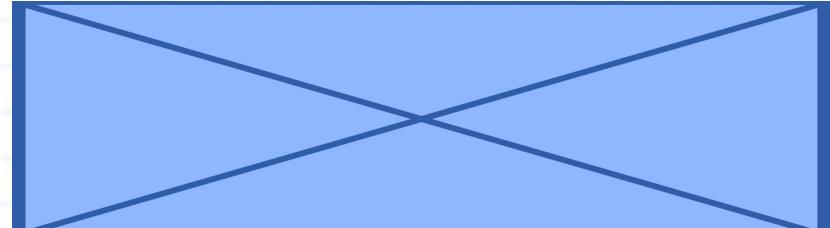
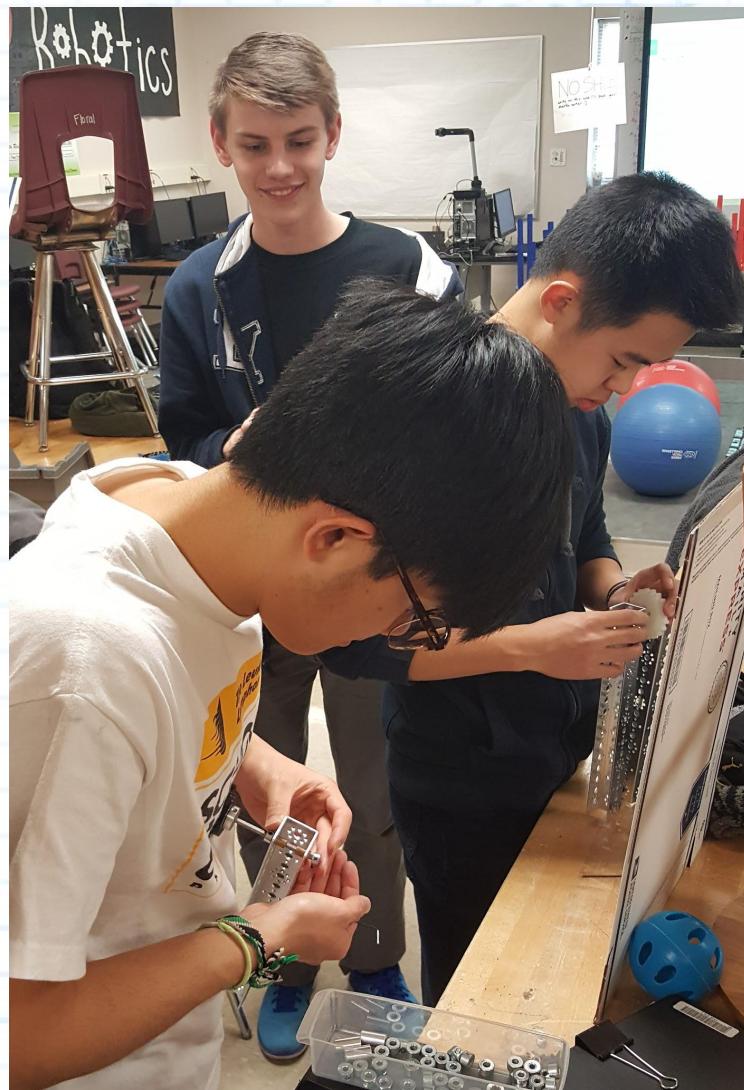
 Michael Mullin

Meeting 3/6/17

Content- Reinvent intake system

- Magnetized allen-wrenches & sorted them by size: duct tape- screws, masking tape- motor/axle collars, none- small collars
- Took old intake system out. Changed gear ratio from a medium-small to big-small (intake runs faster, with less torque)
- Started new intake prototype with cardboard
- Get ready for Super Regionals in Georgia!!

Meeting ends at 7:00 PM



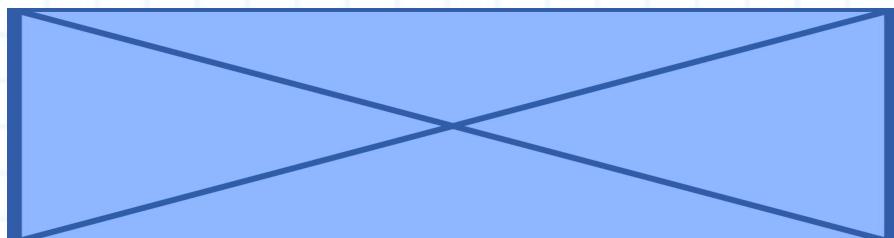
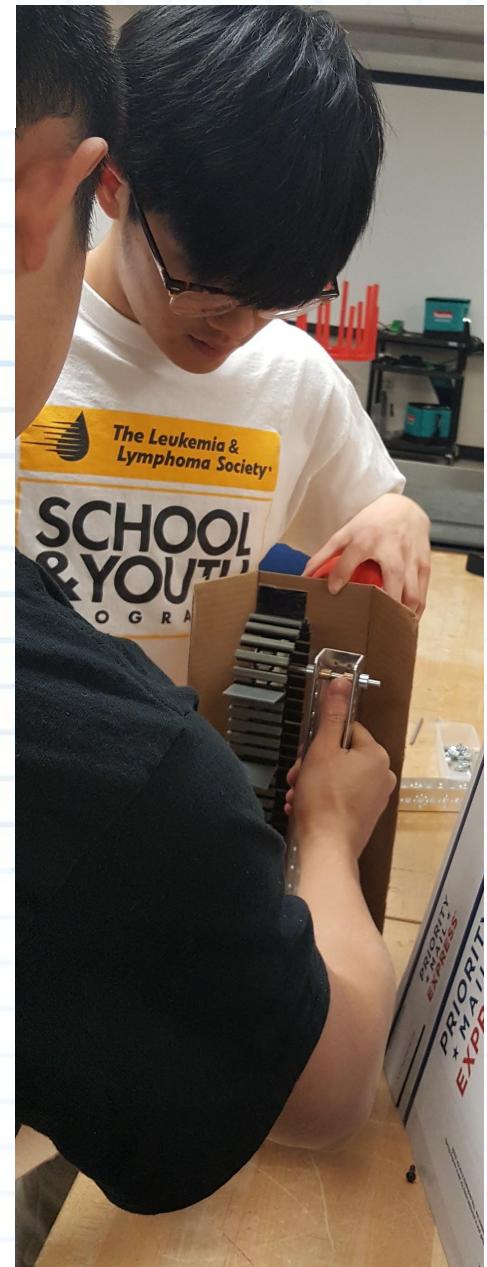
Signed off by:  98

Meeting 3/7/17

Content- work on making the flicker more accurate and productive

- Bent & mounted new plexi-glass for intake- now feeds in properly
- Made a "double-launcher" (launcher with 2 flicks).
- Launcher kinda flicks too fast- software may need to lower the power

Meeting ends at 6:30 PM



Signed off by:





99

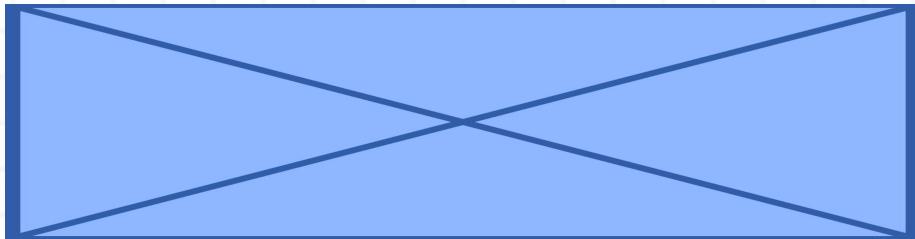
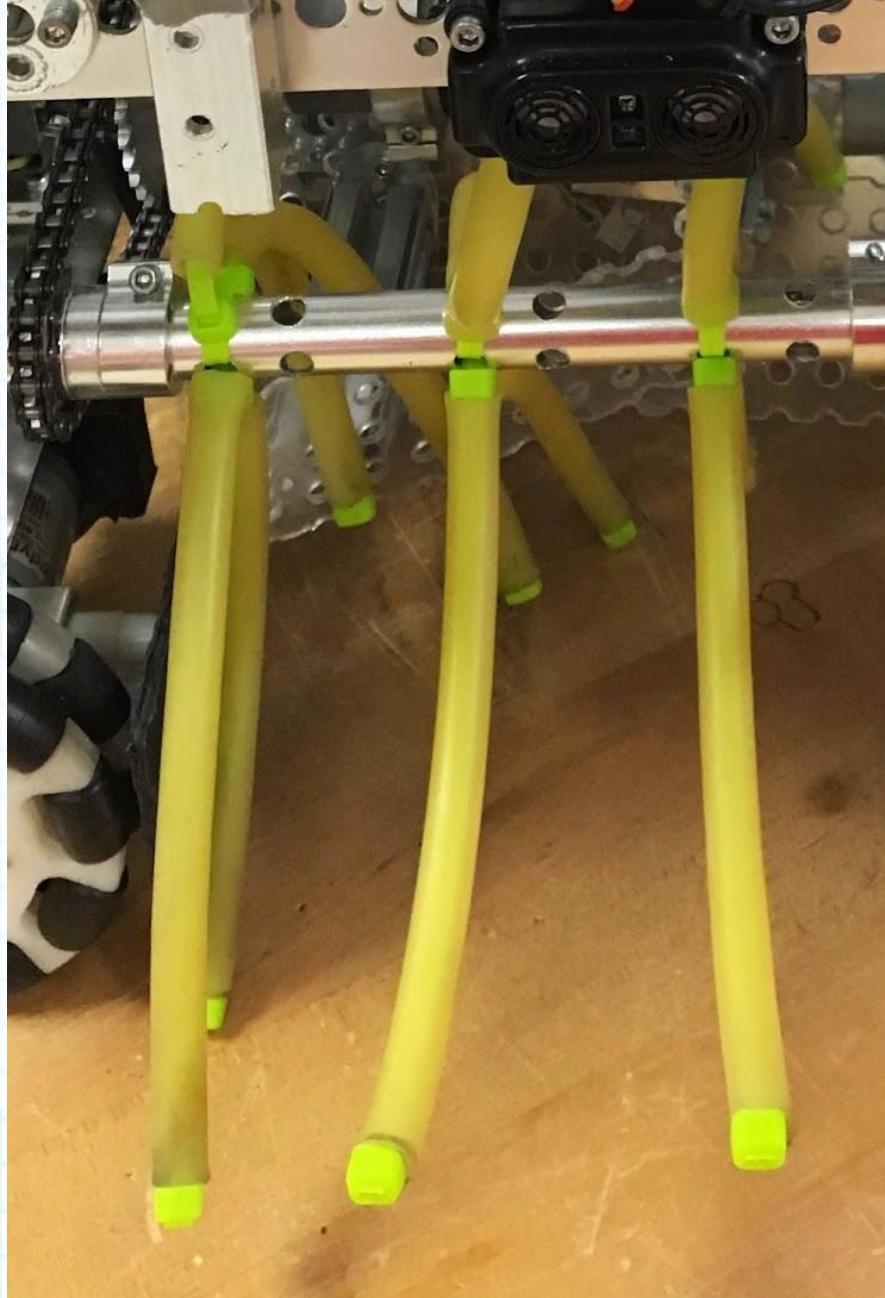
Meeting 3/8/17

Content- change the feeder and intake system to make it feed balls faster

-Mounted intake system completely- runs fast!

-Attached zip ties to the feeder to grip the ball better

Meeting ends at 6:00 PM



Signed off by:



100

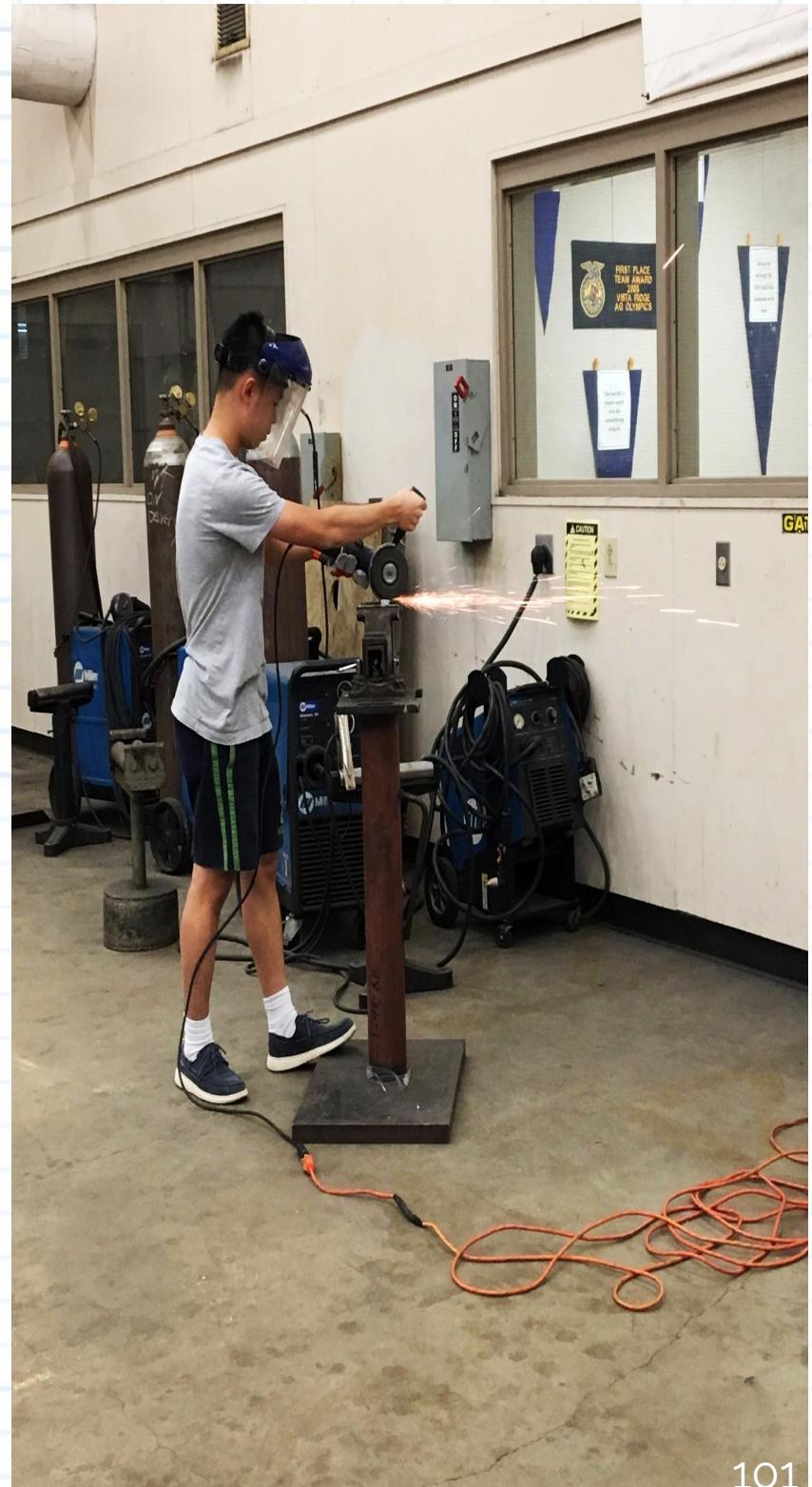
Meeting 3/9/17

Content- work on evening the weight distribution of the robot

-Problem: the robot keeps rotating because of uneven weight distribution on the robot

-Added steel blocks on the side of the robot to keep the robot from unwanted rotations

Meeting ends at 7:00 PM



Signed off by:

 Michael Mullin

Meeting 3/10/17

Content- trying to limit the amount of static coming from the robot

- Problem; the robot was affected by electrostatic discharge (ESD)
- Solution: attach drier sheets to parts of the robot that are in contact most with the mat
- We also painted parts of the robot with liquid electrical tape

Meeting ends at 8:00 PM



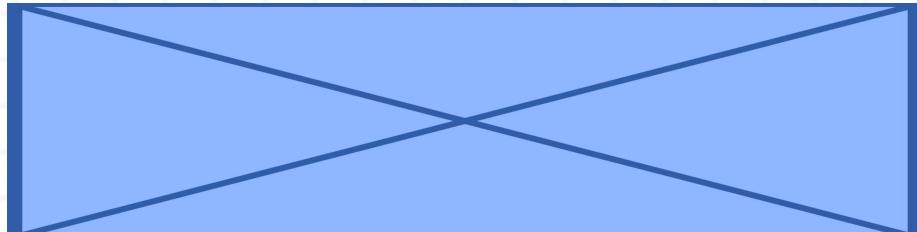
Signed off by:  102

Meeting 3/13/17

Content- putting the robot controller at an angle to see the mat

- One of the motor controllers broke- had to switch it out.
- We plan on making a 3D printed mount so that if another motor controller broke, we could switch it out easier.

Meeting ends at 7:00 PM



Signed off by:





103

Meeting 3/14/17

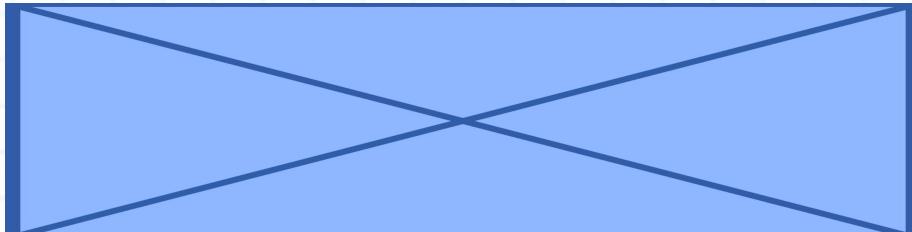
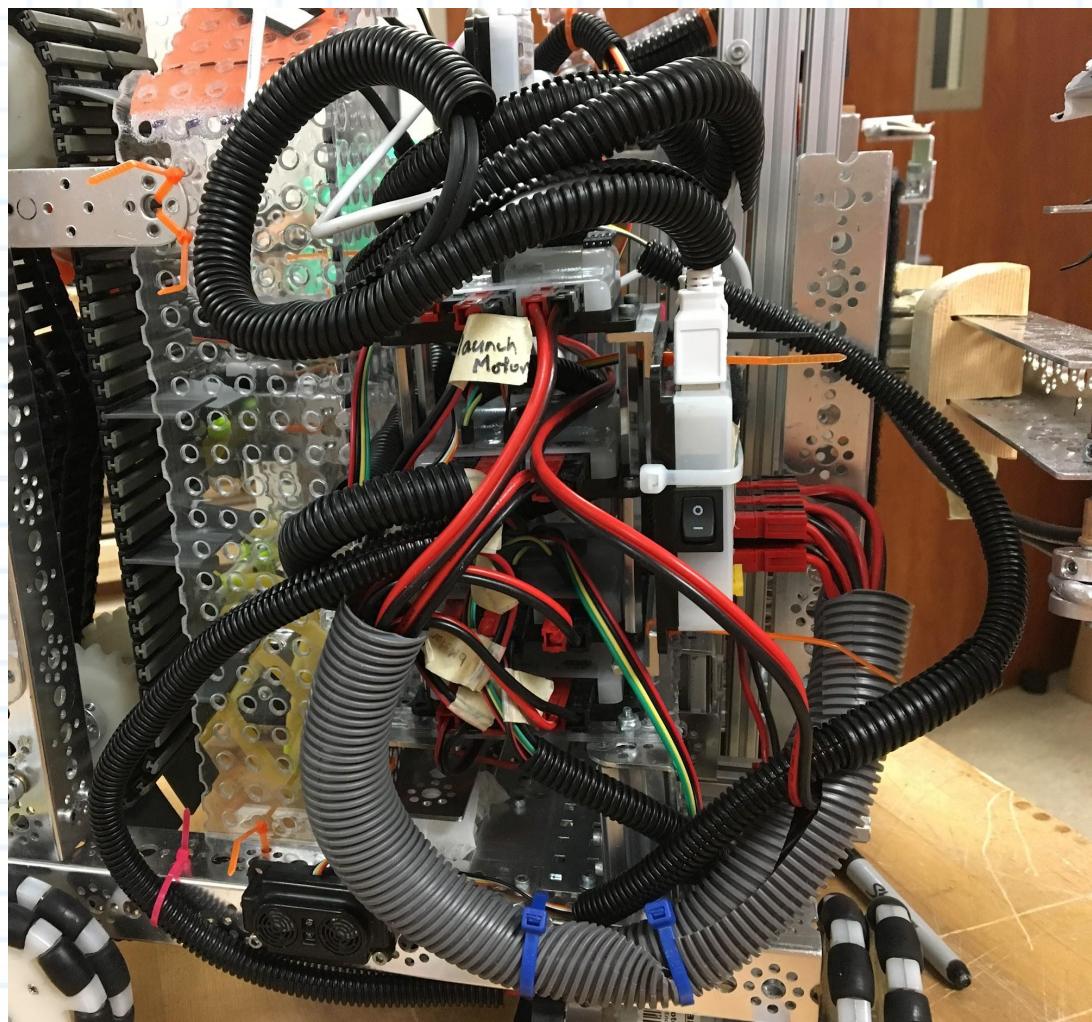
Content- Insulated the wires and fixed the ElectroStatic Discharge (ESD) on the cap ball

- Problem: the wires on the robot were getting intertwined within each other and often got disconnected when hit by another robot.

-Solution: put tubing around wires. Now they're much more organized and can take hits from other robots.

-Solution for the capBall discharge was liquid electrical tape coating

Meeting ends at 7:00 PM



Signed off by:
William Boyle Michaela Mula (104)

Meeting 3/16/17

Content- Worked with FLL kids, visited Dell

Hardware:

- Chute to ramp was made to deliver faster to allow for faster shooting
- Working on making robot static resistant

Software:

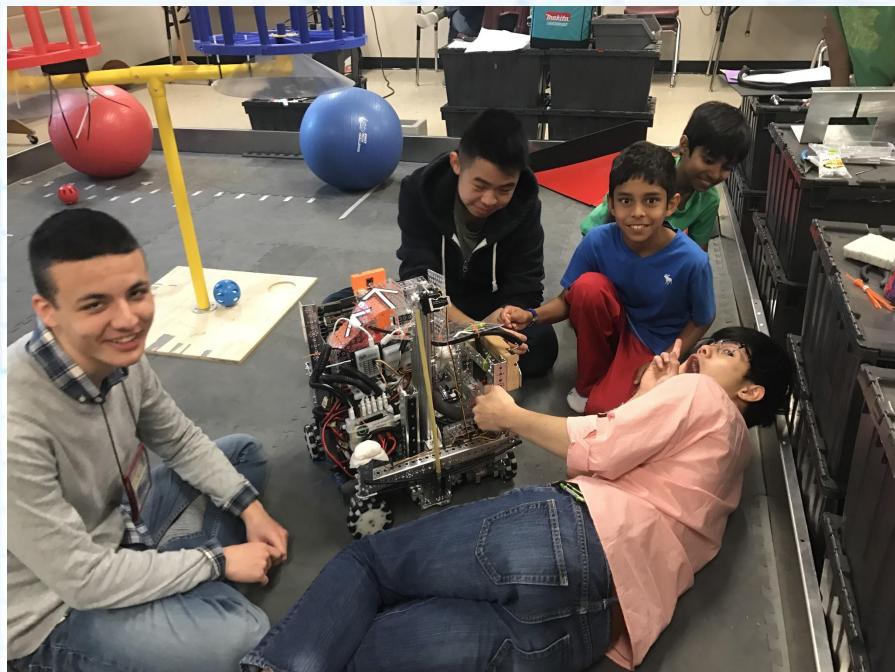
- New encoder autonomous works really well

Marketing:

- Worked with FLL kids from rutledge elementary- gave them advice on their robot and showed them our own. Also played basketball with them afterwards.
- Visited Dell to get 3D prints done and advice on the robot- they suggested adding plastic to cover exposed metal parts. (Couldn't get pictures because Dell's policy didn't allow it)



Meeting ends at 7:00 PM



Signed off by: *William* 105
Angie
Yashashika

Meeting 3/17/17

Content- Balanced robot, and halfway finished with basic autonomous

Hardware:

- We added some of the weights to balance the robot
- Installed the finished, correct field wall to practice with
- Tied wires up from under the robot so they won't drag against the ground

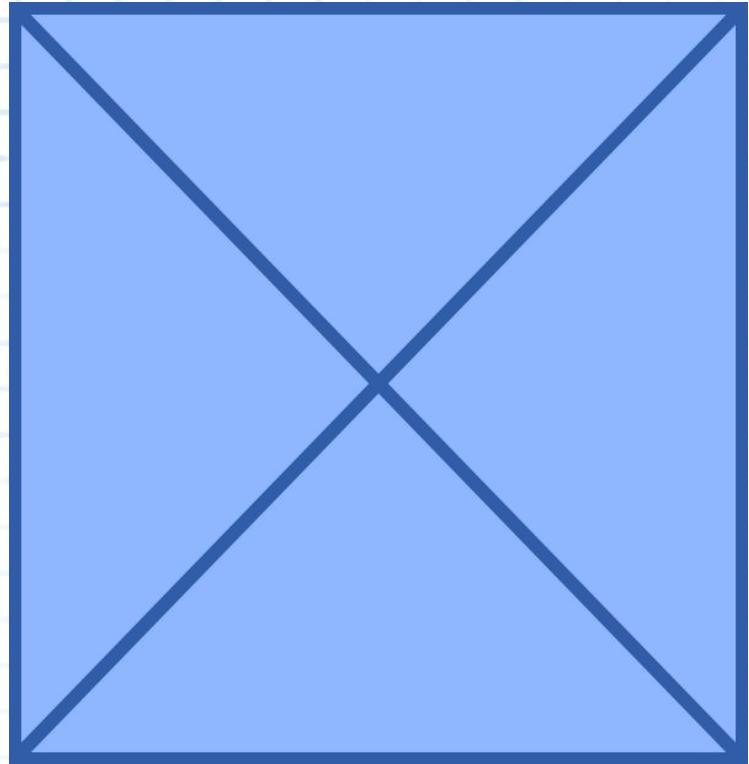
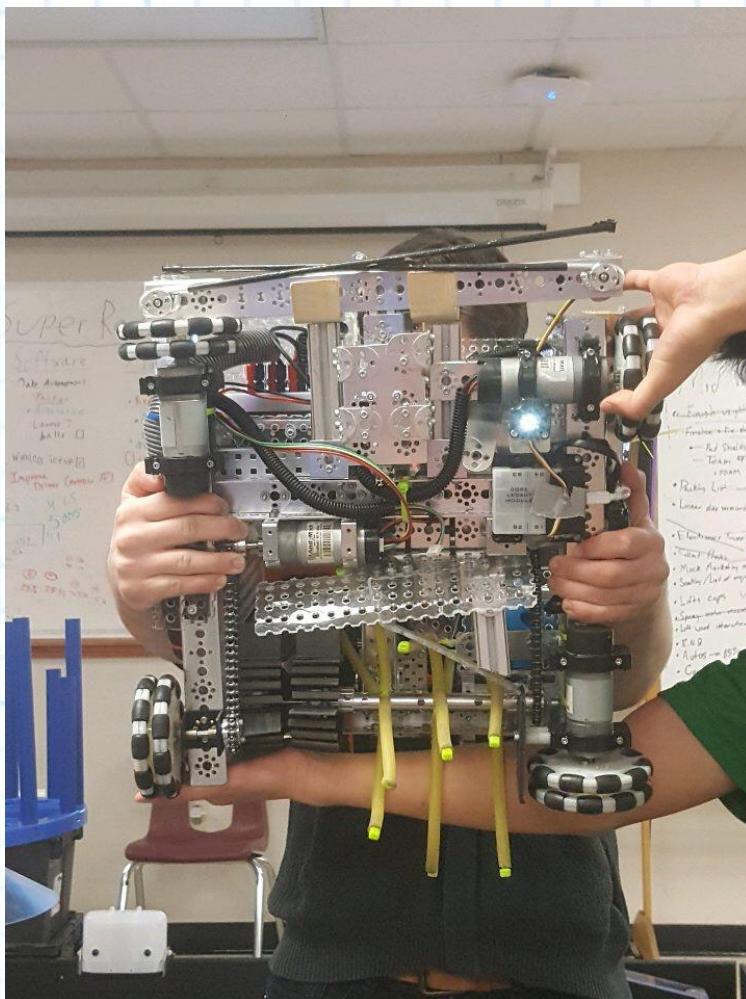
Software:

- Finished basic beacon + shoot + park autos for blue side
- Worked on "Ultrashoot" - started ball searching in autonomous
- "Supershoot" perfecting
- Control Award Paper Started

Marketing:

- Took videos with the goPros from various perspectives on the robot
- Started building carts for robot and tools

Meeting ends at 7:00 PM



Signed off by:

*Michael Mullin
Yashashchandra*

Meeting 3/18/17

Content- Finalized hardware, finished field and practiced, almost finished autonomous

Hardware:

- Caps on the linear slide to prevent string from falling off
- Checked out electrical tower mounts that were printed at Dell- unfortunately didn't print well- we won't be using them.
- Finished new field- has better walls now!
- Designed the new electrical tower rack, which we will hopefully have for this competition.
- Began CAD models for the electrical tower rack.

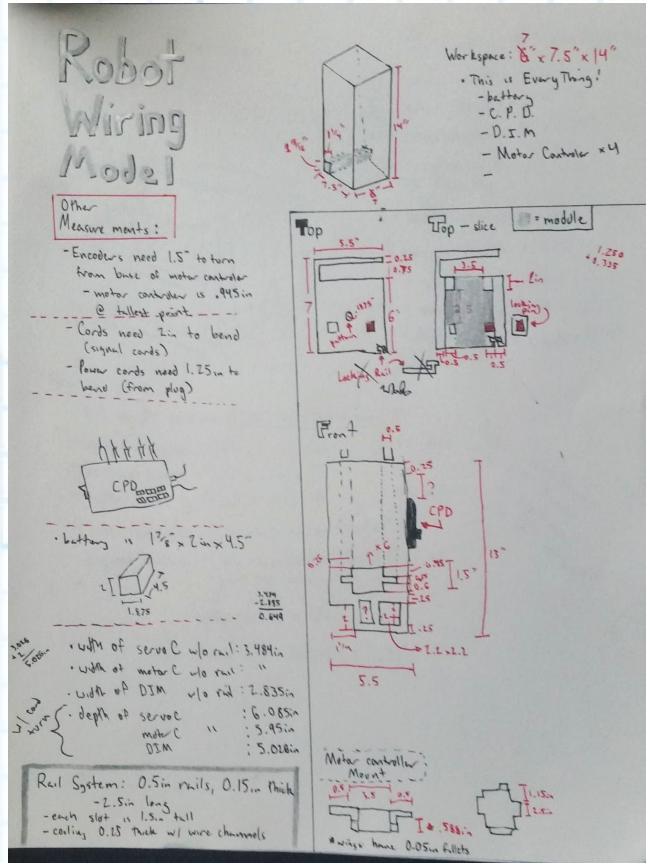
Software:

- Finished with basic beacon + shoot + park autos for both sides
- Worked on "Ultrashoot"- ball searching almost done
- "Supershoot" perfected
- Control Award Paper in progress

Marketing:

- Took videos with the goPros from various perspectives on the robot
- Continued building cart for robot and tools

Meeting ends at 7:00 PM



Signed off by:

Yashashchuk *AR*

Meeting 3/19/17

Content- Packed up and finished coding autonomous

Hardware:

- Took out everything we needed and started packing everything up
- Finished CAD models for the electrical tower rack.

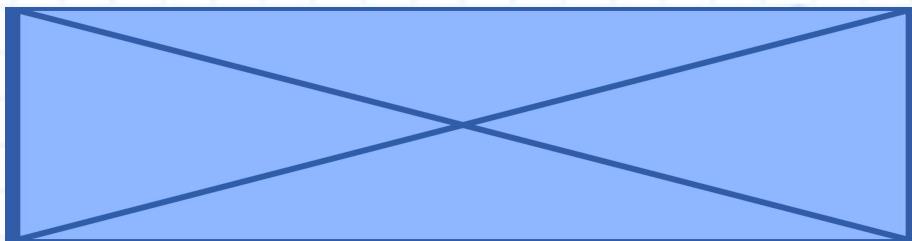
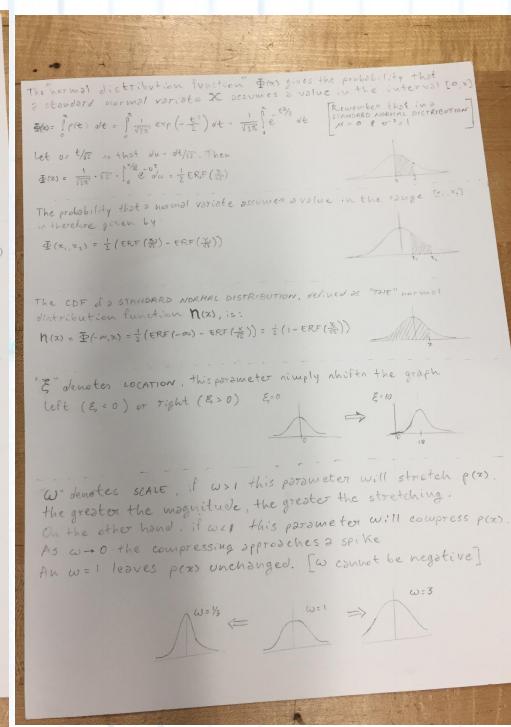
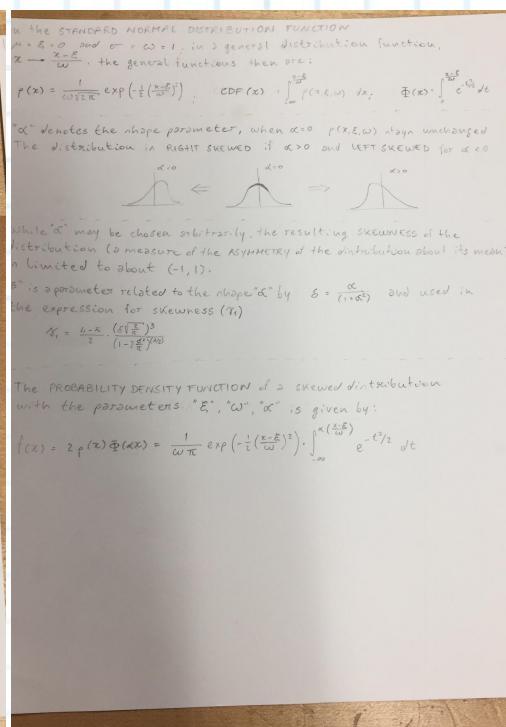
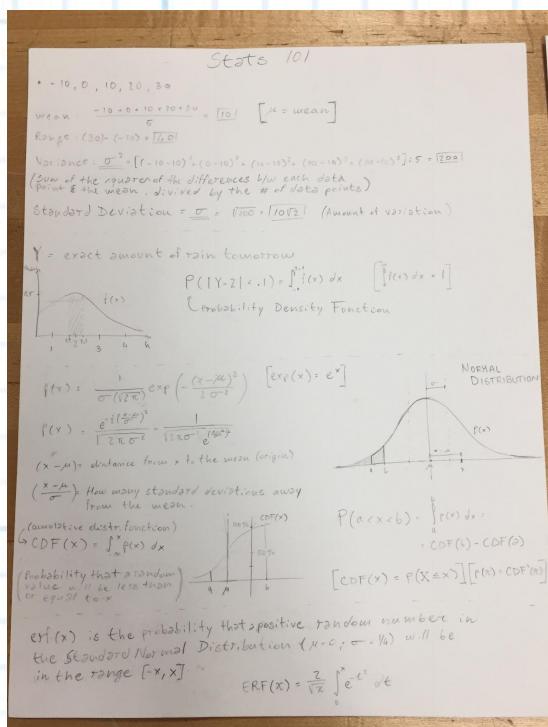
Software:

- Perfected basic beacon + shoot + park autos
- “Ultrashoot” can now scan for balls- working on avoiding hitting our alliance robot
- Control Award Paper nearly finished

Marketing:

- Took videos with the goPros from various perspectives on the robot
- Finished up cart for robot and tools, started packing

Meeting ends at 7:00 PM



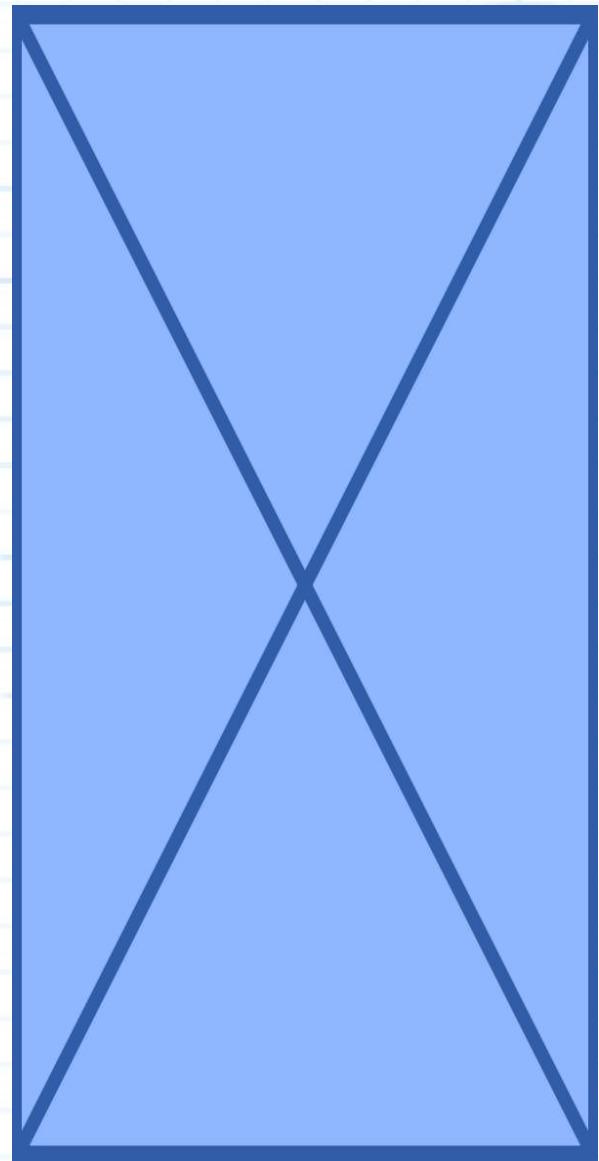
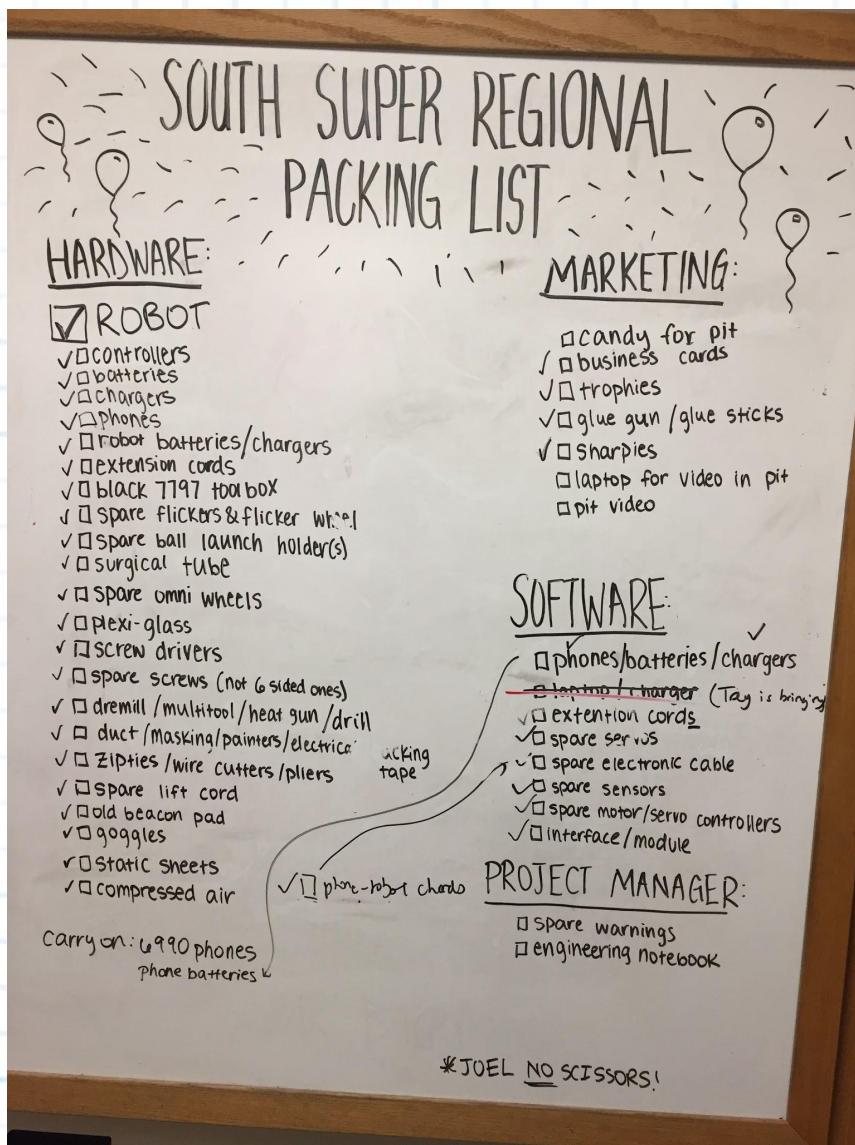
Signed off by: William 108
Yashashchandra
Anshul

Meeting 3/20/17

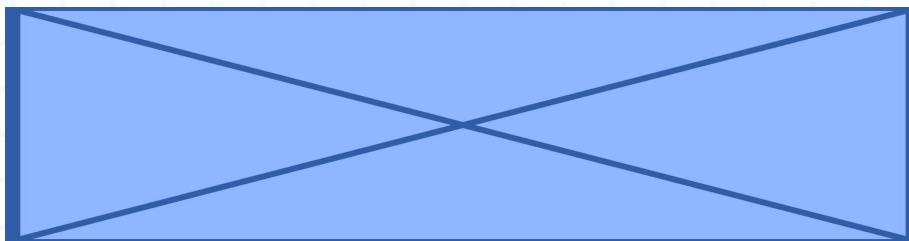
Content- Sent robot and tools on the way to Georgia!

- Finished Packing List!
- Most of the local teams in the area delivered all of their stuff together in one trailer (7 out of 8 teams total from the Austin area: 6209-Venom 6299-QuadX 6990- Static Void(us) 7079-Faltech 7161-Viperbots Hydra 8815- St. Dominic Savio Silverbolts 8886- Saber Robotics.)
- Robot cart broke while unloading- luckily we fixed it before loading up.

Meeting ends at 7:00 PM



Signed off by: William 109
Alyssa 109
Yashashtha 109

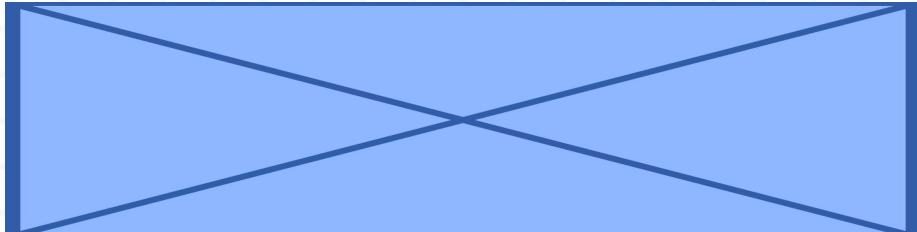


Meeting 3/21/17

Content- Finalizing ENB

- Second T-shirts designs arrived!
- Finished up Engineering Notebook and made it ready to print
- Scanned room for anything we left behind- we ended up forgetting mats- will have to bring them on the plane instead
- Control Award Paper has been finished

Meeting ends at 7:00 PM



Signed off by: *William Bruglio* 110
Yash Chahal

Supers 3/23/17

Context - South Super Regionals Day 1

DAY 1 OF SUPER REGIONALS

- Today started at 11am with the opening of pits.
- We unloaded from the Vandegrift trailer and began setting up, but had to take a break for our judging session.
 - Judging went well - judges were really interested in the ultrashoot program and seeing it on the field.
- After judging, we finished setting up the pit
- Next step was to compete our robot and field inspections
- The practice fields were in high demand, but during the time we did have on them we ran auto - and found out that each field reacts a little different.
 - We had to adjust timings and encoder ticks to match the fields at competition.
- We also ran into motor problems - we lost the Left drivetrain motor, and had to do debugging to find the issue, then once it was narrowed down, swap the motor.
 - The FTAs were super helpful, and made our debug much faster. Huge thanks to them.
- We spent until 7pm practicing, watching other teams, and meeting people. Super fun! We cannot wait for tomorrow.

Meeting ends at 7:00 PM



Signed off by:

William Bruglio
Yash Chahal
111

Supers 3/24/17

Context - South Super Regionals Day 2

DAY 2 OF SUPER REGIONALS

- Today started at 8am with the opening of pits.
- Step 1 was just auto refinement and practice while other teams inspected and the final set up got done.
- After lunch and the opening ceremonies, we started matches
 - Our first match was with Neutrinos, and their auto gave both beacons to the other side (bummer)
 - Second match our auto got stuck on the corner ramp and failed, resulting in a loss.
 - Third and fourth and fifth matches went very well.
 - The cap mechanism struggled consistently throughout the day, running out of torque at the top. We worked on it during the day and did a full rebuild at night.
 - More pictures from the day on the next page.

13th Place		10 QP	1160 RP	Blue Alliance							
Match	Score	Red Alliance				Blue Alliance				6990	
Q-8	235 - 190	8418	The League of Le	9829	MAKbots	6433	Neutrinos	6990	Static Void		
		Auto 150	Tele 45	End 40	Pen 0	Auto 55	Tele 95	End 40	Pen 0		
Q-15	220 - 135	7203	KNO3	3486	Techno Warriors	4100	Darbots 1	6990	Static Void		
		Auto 95	Tele 85	End 40	Pen 0	Auto 15	Tele 100	End 20	Pen 0		
Q-21	220 - 110	6990	Static Void	11572	Mouse Spit	11524	Team Name Want	10005	Diatomice Dingos		
		Auto 85	Tele 115	End 20	Pen 0	Auto 70	Tele 40	End 0	Pen 0		
Q-28	155 - 105	6832	Iron Reign	6990	Static Void	11096	East Cobb Robotic	4902	Team CHAOS		
		Auto 55	Tele 60	End 40	Pen 0	Auto 80	Tele 15	End 10	Pen 0		
Q-38	110 - 210	7373	Eagle Robotics - C	6047	Twisted Axles	11096	East Cobb Robotic	6990	Static Void		
		Auto 65	Tele 45	End 0	Pen 0	Auto 115	Tele 75	End 20	Pen 0		
Q-48	90 - 210	9110	WiredCats Omega	7083	Tundrabots	6990	Static Void	9778	Robotic Chinchilla		
		Auto 10	Tele 40	End 40	Pen 0	Auto 95	Tele 75	End 0	Pen 40		
Q-60	250 - 100	7300	Guzzoline Robotic	8886	Saber Robotics	6990	Static Void	5998	LASA Ultra Violet		
		Auto 95	Tele 75	End 40	Pen 40	Auto 50	Tele 50	End 0	Pen 0		
Q-70	170 - 215	3888	Greased Lightning	6990	Static Void	6566	Circuit Breakers	5064	Aperture Science		
		Auto 60	Tele 70	End 40	Pen 0	Auto 105	Tele 70	End 40	Pen 0		
Q-81	245 - 150	6990	Static Void	4717	Mechromancers	7842	Browncoats	4886	Robo Junkies		

Signed off by:

William 112
Angie
Yashashika

Supers 3/24/17 (page 2)

Context - South Super Regionals Day 2



Signed off by: *William*
Angus 113
Yashashtha
Kur

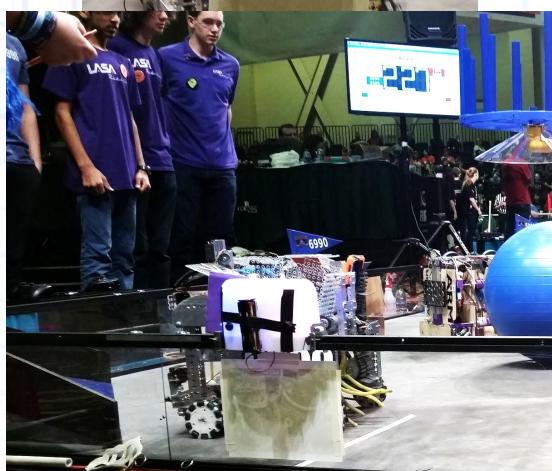
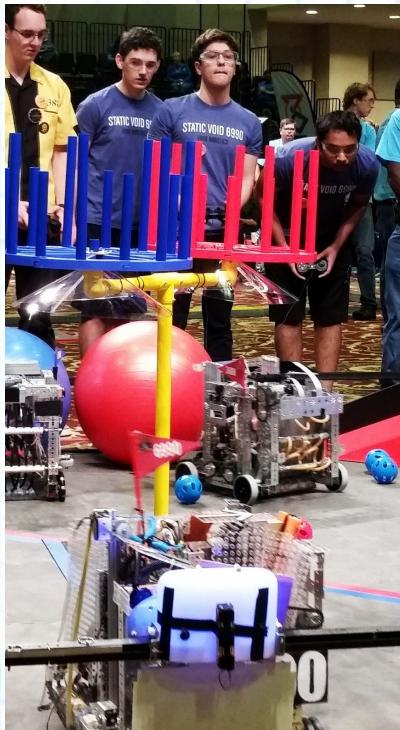
Supers 3/25/17

Context - South Super Regionals Day 3

DAY 3 OF SUPER REGIONALS

- Today started at 8am with the opening of pits.
- We played our last 3 qualifying matches, and ended 13th in Kilrain
- We were not selected for alliances
- WE ADVANCE on next highest ranked.
- Cool robot ideas:
 - 4717's speedometer on the flywheel to ensure consistent shots is really clean. The lightweight wooden frame makes the fast but easy to push.
 - Super 7 can shoot from any spot on the wall, which makes them very hard to defend.

Day ends at 7:00 PM



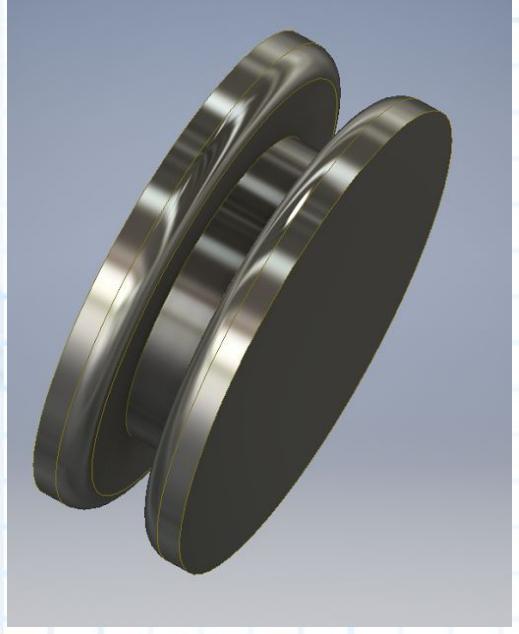
Signed off by: *William Bruglio* 114
Yash Chahal
Yash Chahal

Meeting 4/4/17

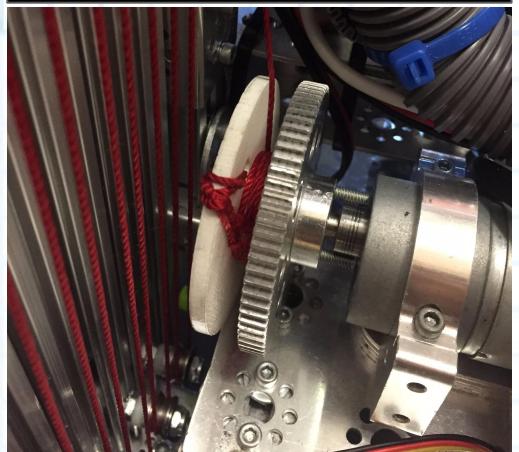
Content- Implementing PID (Proportional Integral Derivative) control algorithm and made a CAD file

- After MANY trials and errors, we implemented the PID successfully in autonomous (see software section for more details)
- We also worked on creating a CAD file that would be used for 3D printing. We increased the inner diameter of the cap ball spool by 1.625, which increases the speed of cap ball by the same amount.

Meeting ends at 7:00 PM



Above- new spool
Below- old spool
New speed = Old speed
 $\times 1.625$



Signed off by:

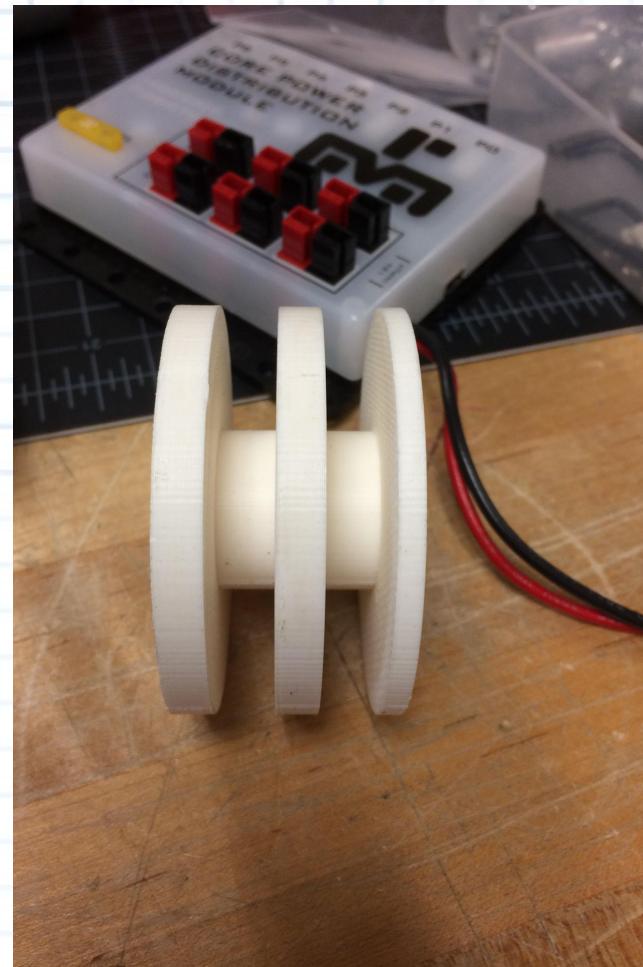
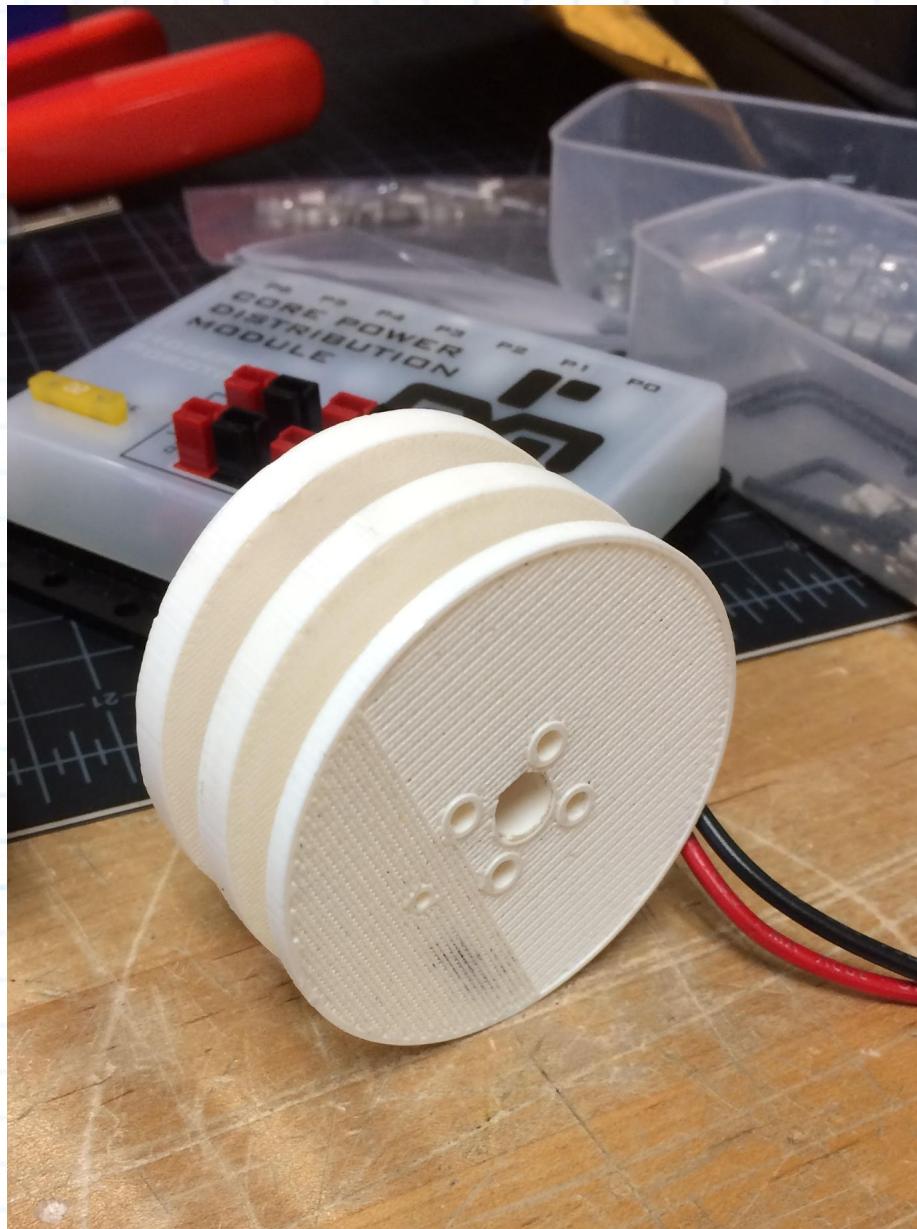
Aaron Slade
Yashashchandra

Meeting 4/7/17

Content- Organizing the Engineering closet and making a pulley system with two spools

- Problem: the robot is exerting a lot of energy trying to fully extend the cap ball and full extension of the cap ball is around 13 seconds and we would like to get the full extension of the cap ball to be less than 10 seconds
- This new pulley system will decrease the effort that it takes to bring up the cap ball and (hopefully) decrease the time it takes to fully extend the cap ball
- This will also increase the durability of the cap ball and in the case of robot error, we will still be able to extend the cap ball. This will also increase the torque on the robot

Meeting ends at 7:00 PM



Signed off by:

Aaron Slade 116
Yashashwini

Meeting 4/8/17

Content- organizing the robotics closet and cleaning/ repairing the field

- Today is just a day for us to get everything in the robotics closet organized and sometime back we broke one of the walls of the practice field so today we fixed the broken side wall.
- We also brought in a roomba that vacuumed the practice field while we weren't practicing on it

Meeting ends at 7:00 PM



Signed off by:

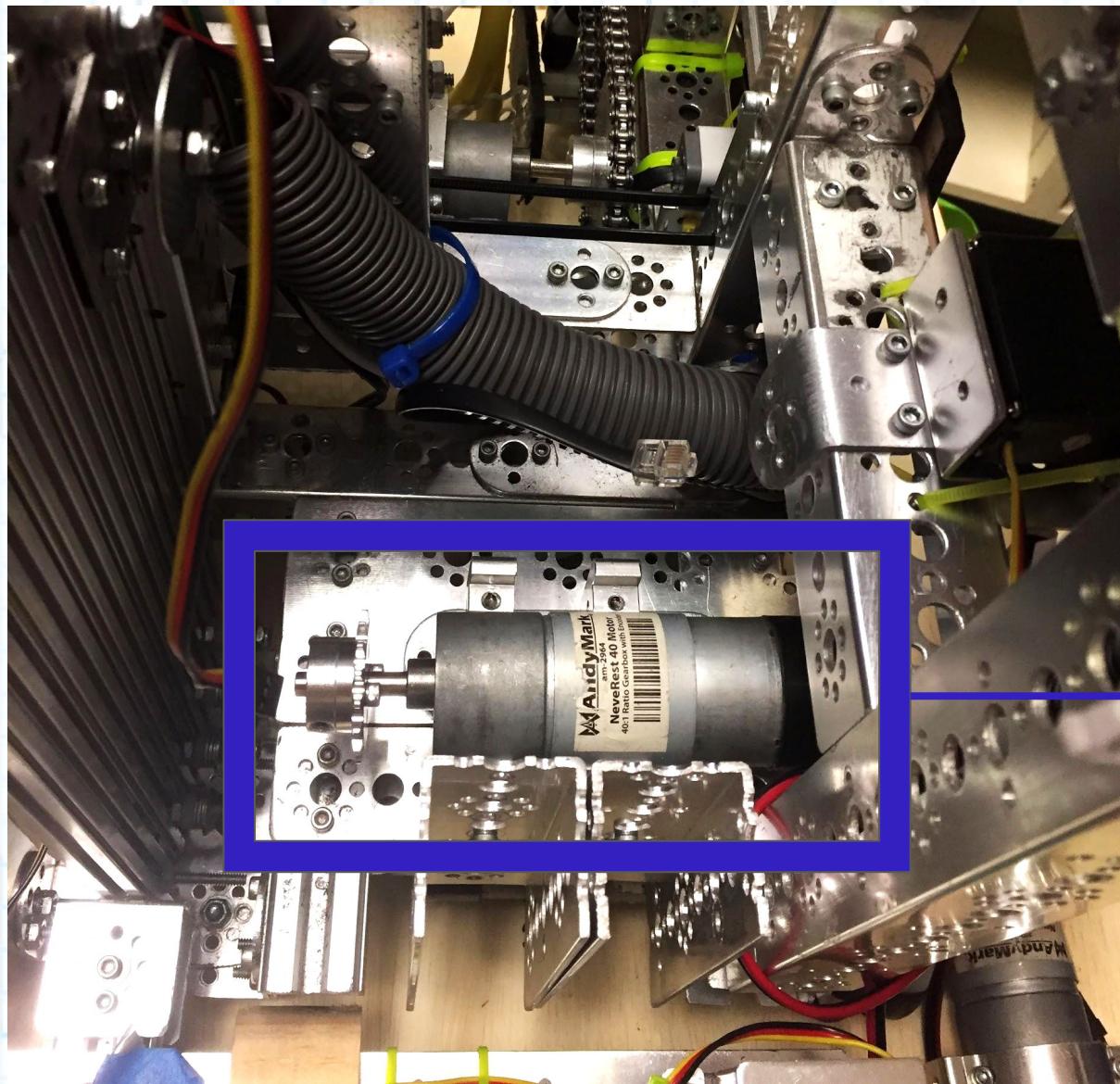
Aaron Slade 117
Yaheshawker

Meeting 4/11/17

Content- We incorrectly mounted the cap ball lift motor, removed ultrasonics and debugging turning code

- We removed one of the two side ultrasonics which we are no longer using. Instead, we are turning using the gyro sensor's rotational feedback.
- We incorrectly mounted the cap ball lift motor and we plan on re-mounting the cap ball lift motor tomorrow

Meeting ends at 6:00 PM



Signed off by:

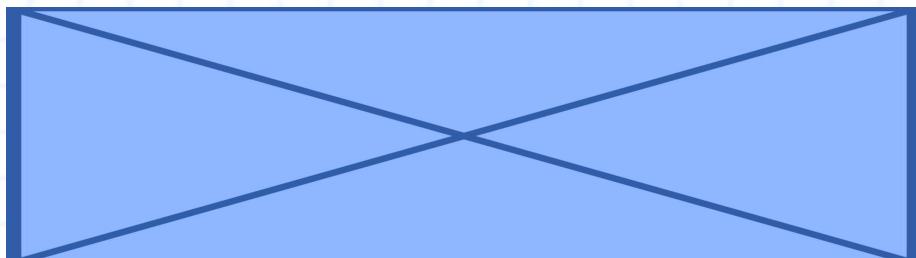
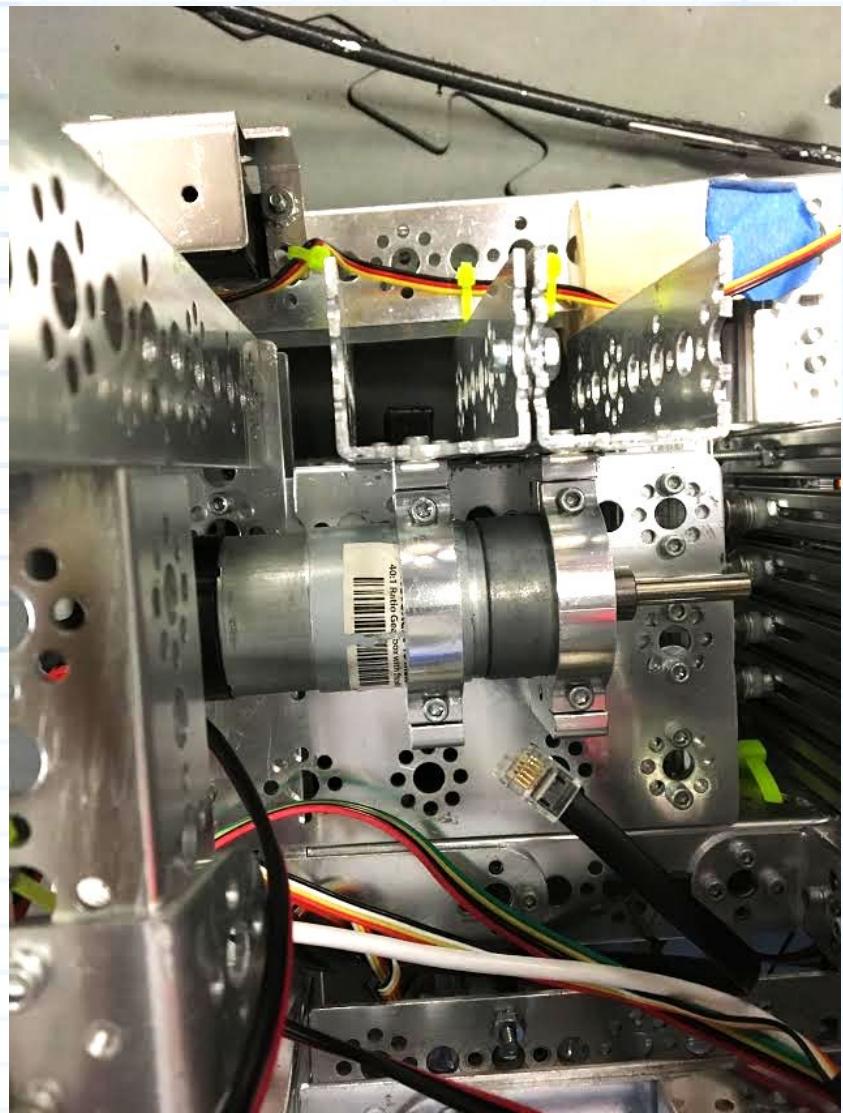
Aaron Slade 118
Yashashwini

Meeting 4/12/17

Content- Putting in new motors and installing second part of the cap ball lift

- First things first, we had to correctly mount the cap ball lift because we messed up yesterday
- Today we got in the new motors!! The new motors were about 1.05 seconds faster than the old motors but the new motors don't have enough torque.
- The new batch includes 5 40s and 2 20s

Meeting ends at 5:30 PM



Signed off by:

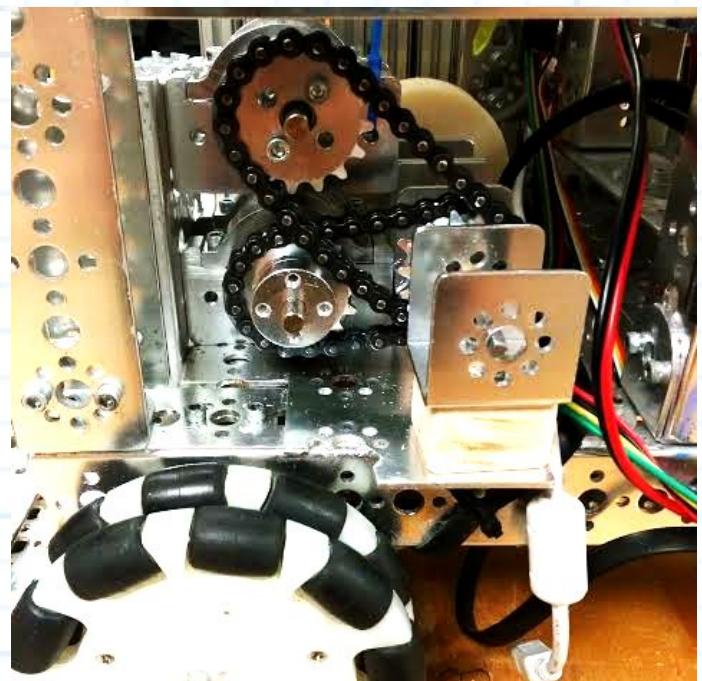
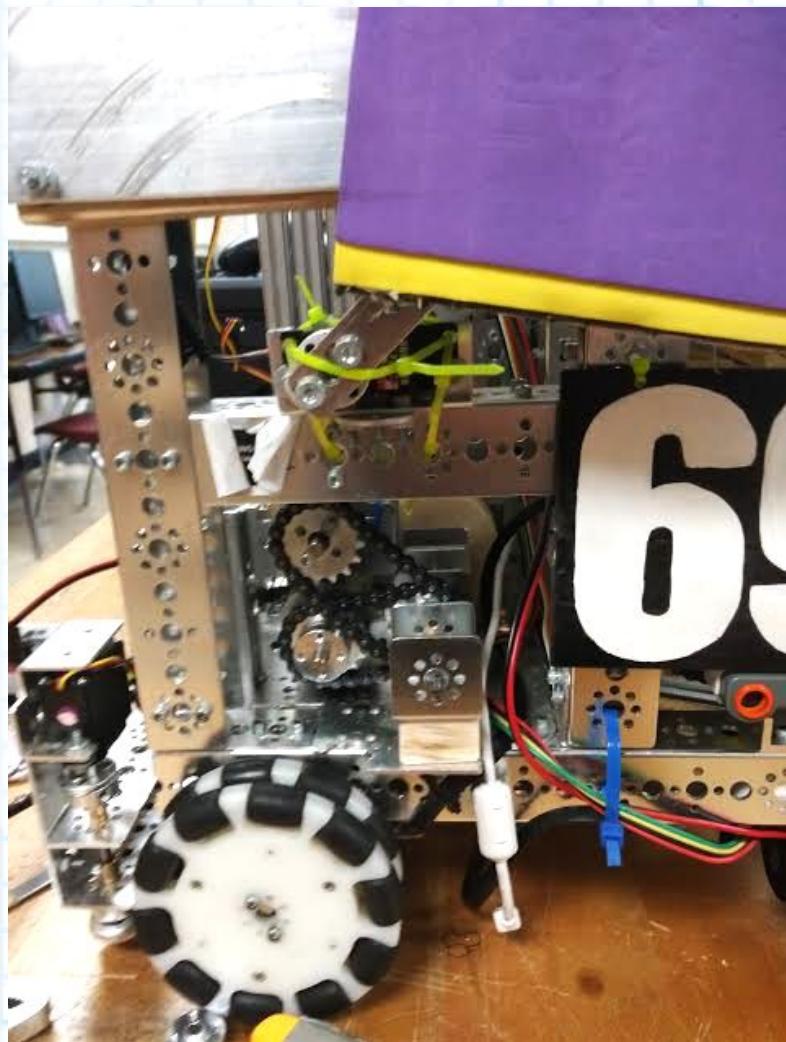
Aaron Slade 119
Yashashchandra

Meeting 4/13/17

Content- Finishing new motors and mounting the new spool

- The first task was to finish the mounting of the dual motors for the new cap ball drive.
- Once the motors were mounted, we placed the new spool axle and ran the twin chains from the motors to the shaft
- The 3rd step was drilling the mount holes in the new spool.
- Finally, we had to restring the pulley and get it going
- We also had to have a taco run to fuel up for the busy working day

Meeting ends at 11:00 PM



Signed off by:

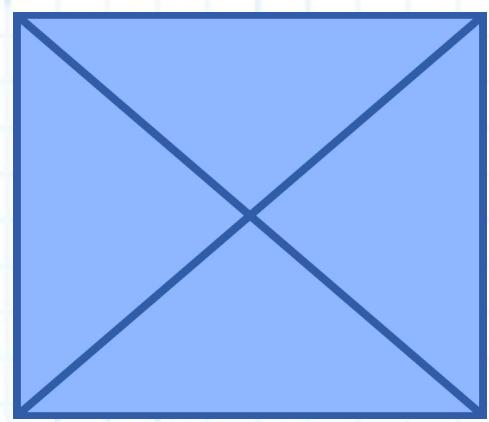
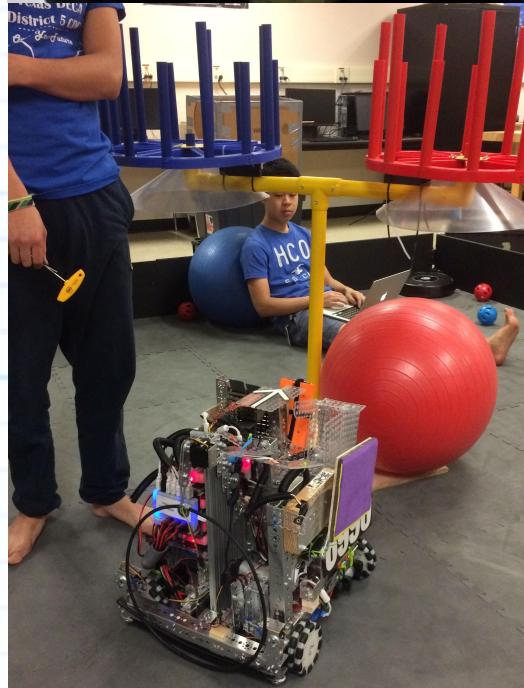
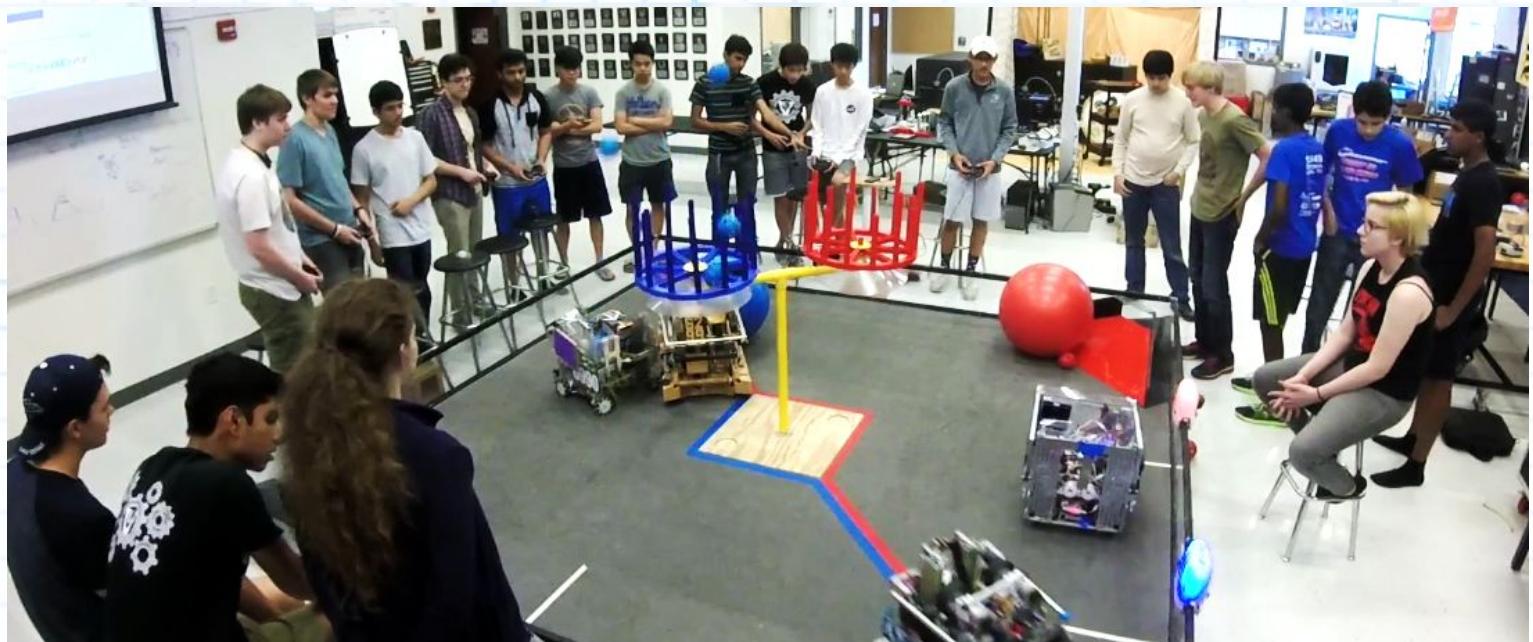
Aaron Slade 120
Yash Chaudhary

Meeting 4/14/17

Content- Changing autonomous and scrimmaging with Vandegrift and driver practice

- After going to super regionals we decided that there was a path that we could take in our autonomous that would be more efficient and would allow us to get two beacons, shoot two balls, hit cap ball, and park on the center, averaging 95 points
 - The new path does not require running the distance back and reduces opportunity for error.
- Vandegrift invited us to scrimmage at their school so we took the opportunity to have a little driver practice

Meeting ends at 11:00 PM



Signed off by:

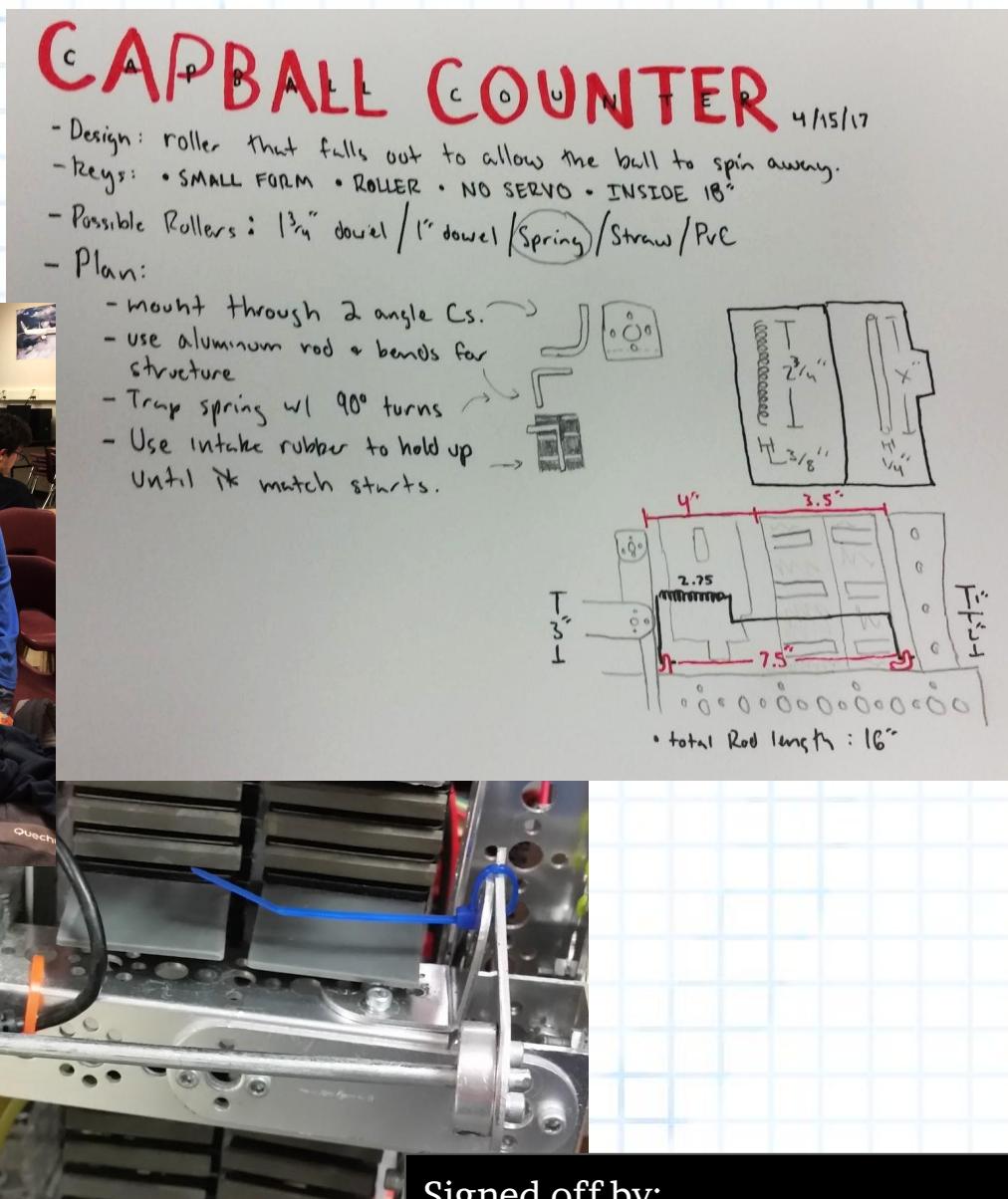
Aaron Slade
Yashashwini

Meeting 4/15/17

Content- Last minute touchups to the robot

- Three days until we leave for worlds! We are finishing up last minute touches to the autonomous (which is taking longer than we thought it would) and re-spraying the cap ball arms with antistatic electrical tape.
- Today we also changed out the motors so that we would have fresh motors for worlds.
- We added a roller so that the cap ball will roll without the robot getting stuck on the cap ball.

Meeting ends at 11:00 PM



Meeting 4/16/17

Content- Refining autonomous...still.

- Getting the perfect autonomous is definitely taking a lot longer than we thought it would.
- Worked on ultrashoot
 - Found out HSV is a non-standard measurement compared to OpenCV, so we had to convert the values
- We attempted to use PID control but it wouldn't function - probably something wrong with the motors.
- Finished red auto with 100pts
- We also made our worlds lists (packing and to-do)

Meeting ends at 6:00 PM



Shay Treyfer

@Aaron Slade dude, HSV works differently than you have it coded. H is on a 360 scale, S and V are on a 100 scale

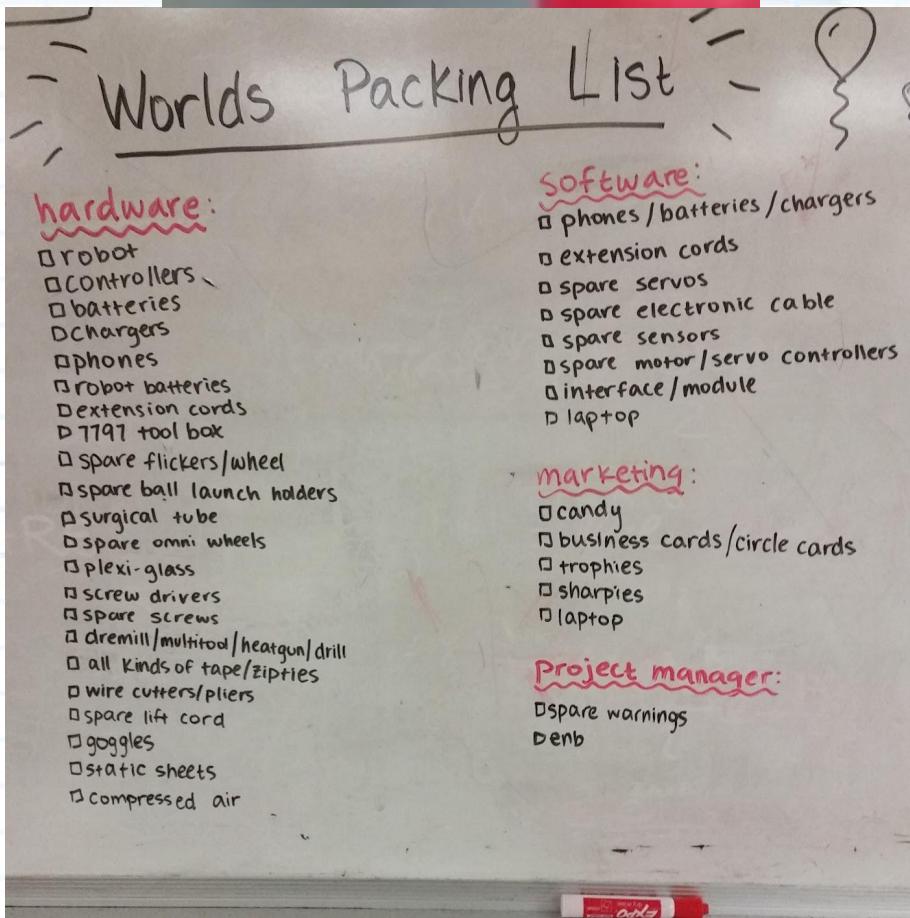
Sunday, 7:17 PM

AS

Aaron Slade

For HSV, Hue range is [0,179], Saturation range is [0,255] and Value range is [0,255]. Different softwares use different scales. So if you are comparing OpenCV values with them, you need to normalize these ranges.

That is directly from opencv



Signed off by:

Aaron Slade 123
Yashashwini

Meeting 4/17/17

Content- Last day of prep

- Ran the marketing gear down to vandy for shipping to Houston
- Still working on auto
 - One of our brand new Modern Robotics motors has a broken encoder port, which took us a while to figure out and was causing havoc.
- Made necklaces with blue Mardigras beads for giving out at competition

Meeting ends at 6:00 PM



Signed off by:

Aaron Slade 124
Yashashwarkar

Engineering Section

Subsection: Software

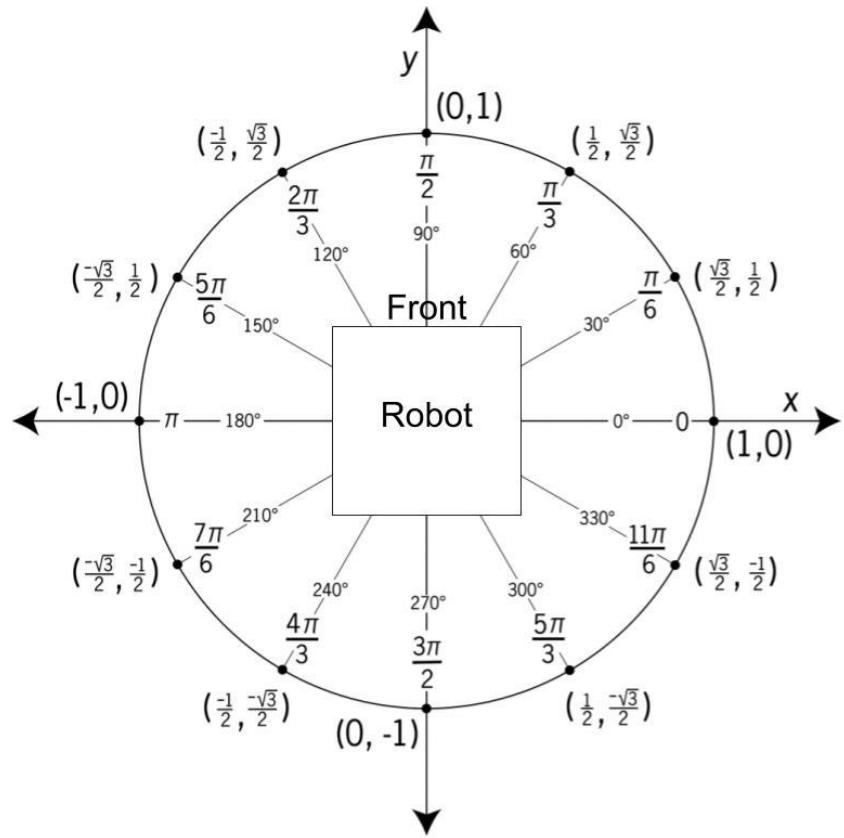
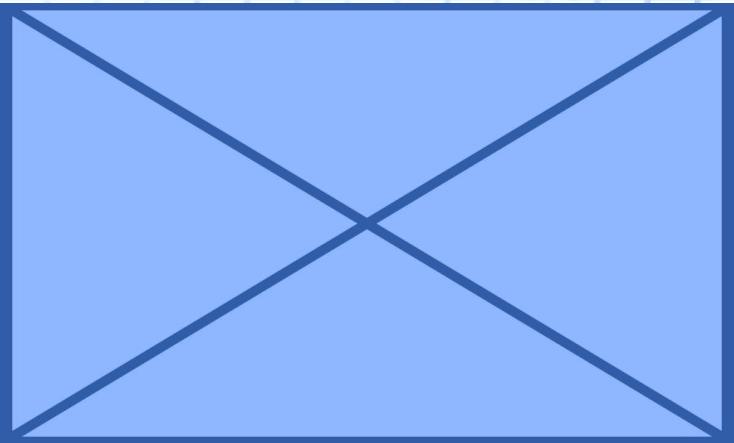
Omni-Directional Drive

Programming on our chassis

Moving at an angle

```
public void move(double angle, double  
timeouts)
```

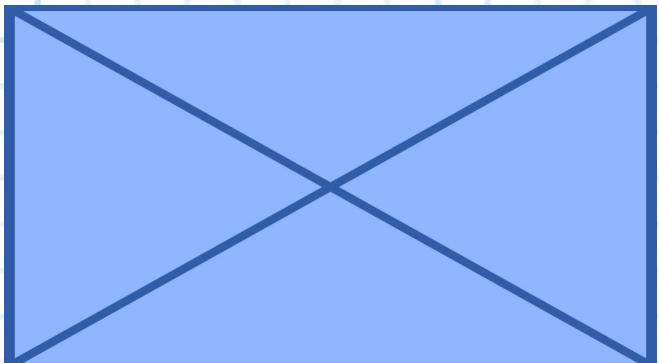
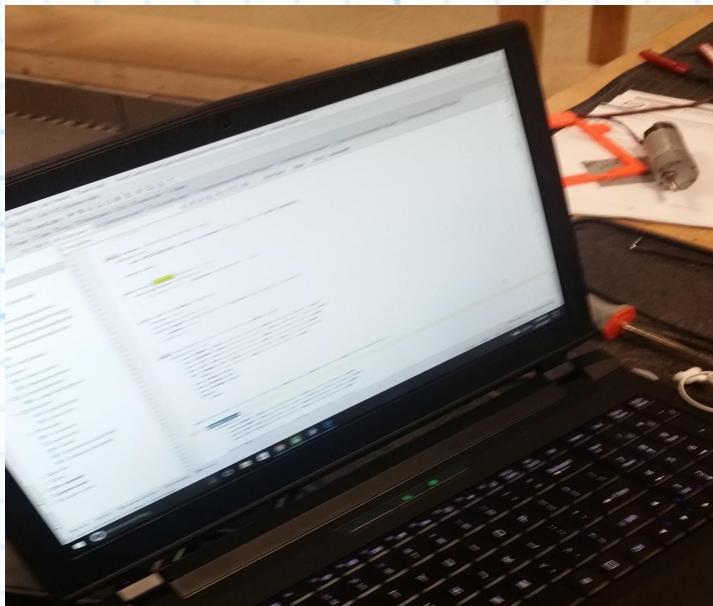
```
throws InterruptedException {  
    runMotors(  
        Math.sin(angle),  
        Math.cos(angle),timeouts);  
}
```



Turning

Turning the robot is accomplished by adjusting the direction of the motors. The code to the right will rotate the robot right.

```
fMotor.setPower(-power);  
bMotor.setPower(power);  
rMotor.setPower(-power);  
lMotor.setPower(power);
```



Signed off by:

Aaron Slade

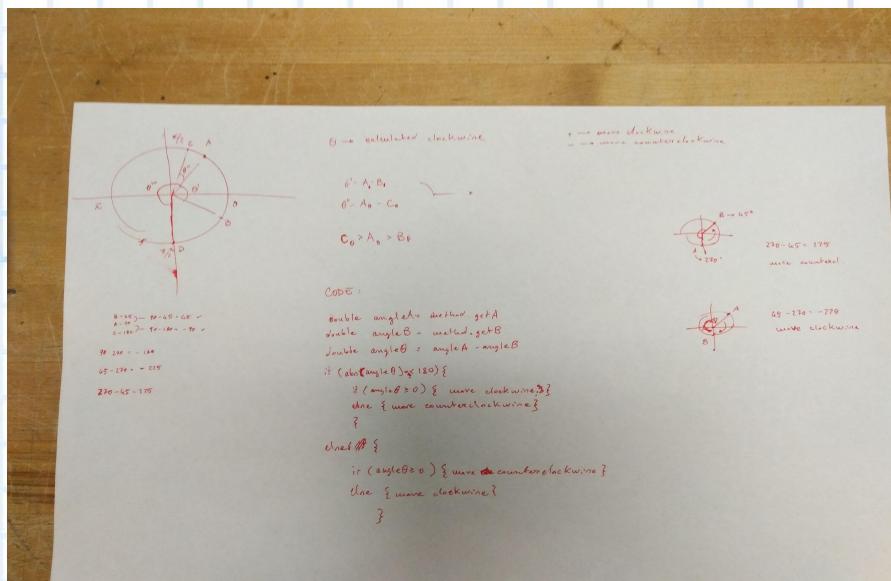
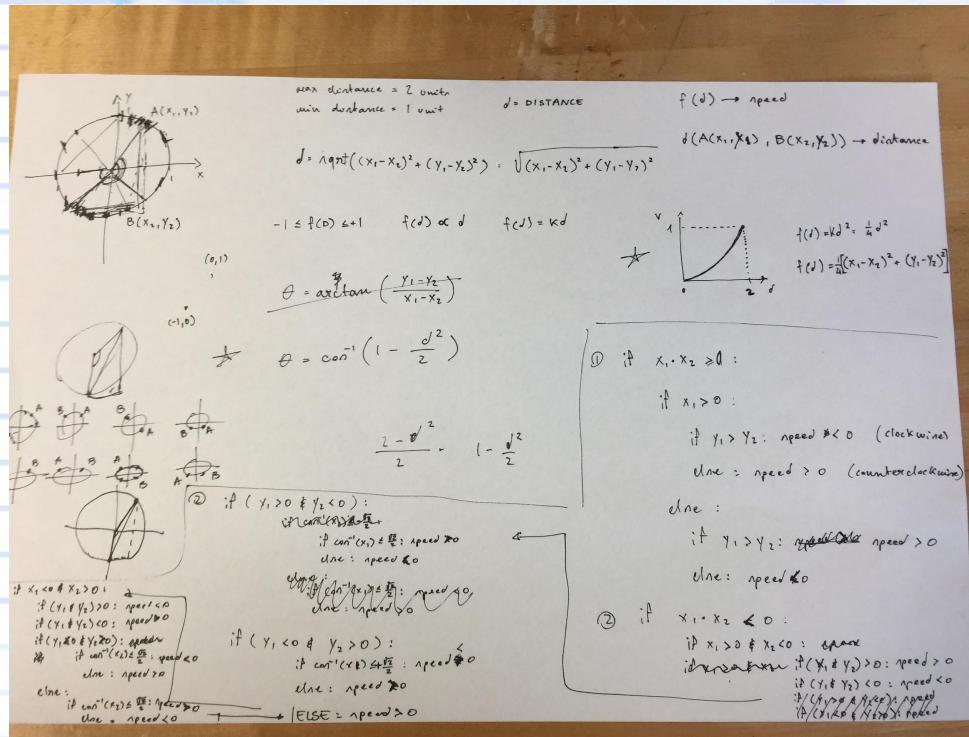
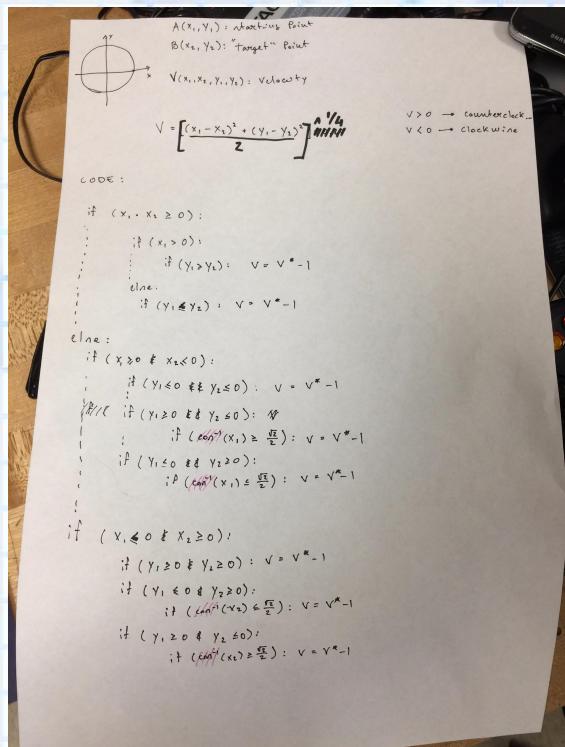
Omni-Directional Drive

The math involved in our turning functions...

Moving at an angle

We wanted our turning speed to be proportional to the distance between the starting point and the point where we wanted to end up; for this purpose we figured up that the best type of function would have been found through a process of optimization.

At the end we chose a function in the form $y = k * \sqrt{x}$ where y is the turning speed and x the distance between the two points previously mentioned. The value of k is carefully chosen to make the highest possible y value 1, at the maximum distance $x = 2$ (the distance is the distance of two points in the unit circle).



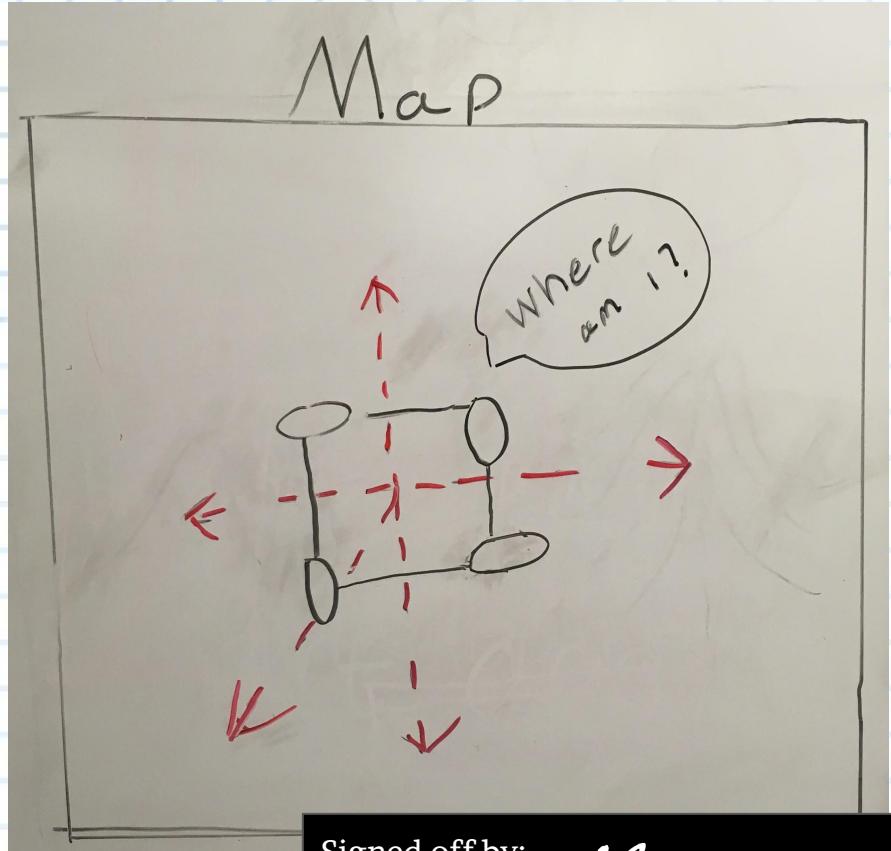
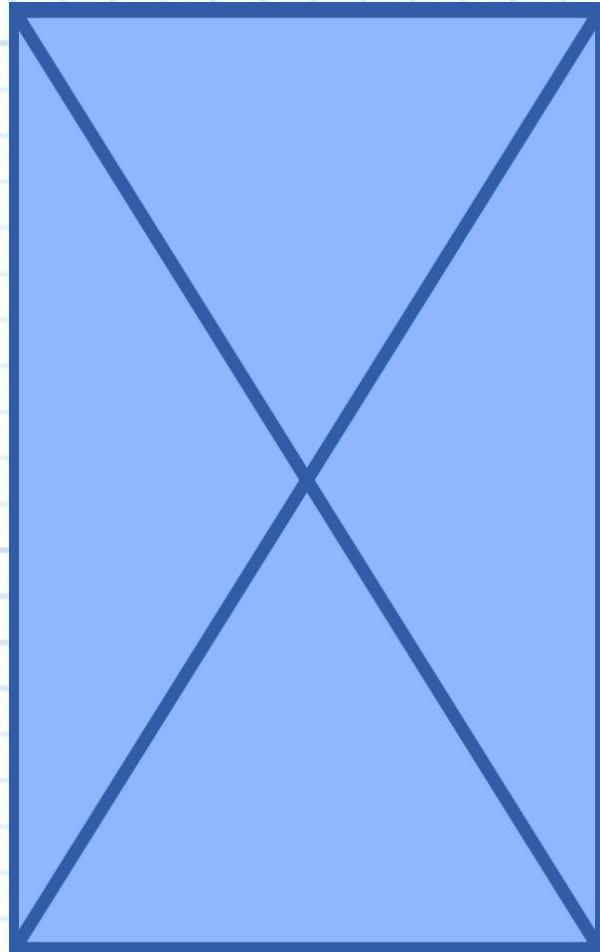
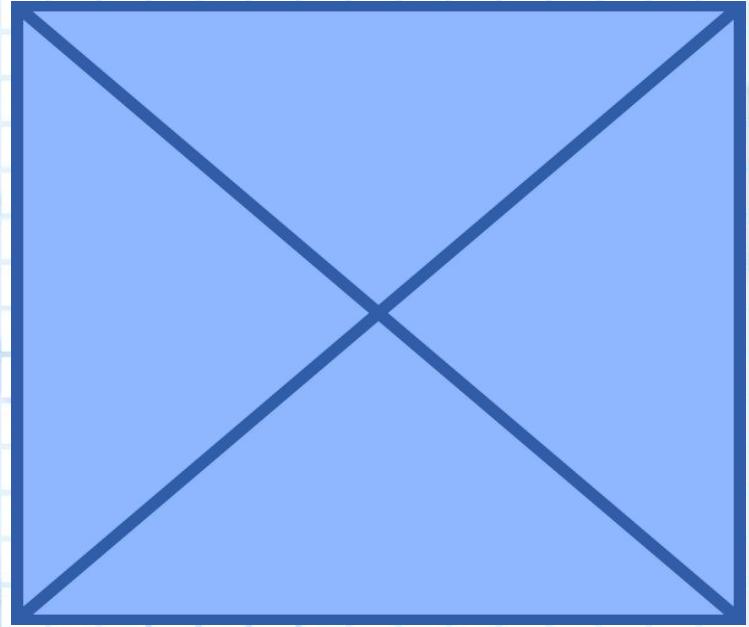
Signed off by:

William Michael Mullin 127
Angus Mullin ✓

Robot Localization

Robot localization one of the many key problem in making an autonomous robot. If a robot can't calculate where it is, it will be impossible to determine what to do next.

In order for the robot to know where itself is, it has access to relative and absolute measurements. The feedback from these measurements allows the robot to determine its next driving actions and the situation of the environment around the robot. Given this information, the robot has to calculate its location as accurately as possible. What makes this difficult is the existence of uncertainty in both the driving and the sensing of the robot. The uncertain data is collected and combined with the other measurements to allow for optimal calculations.



Signed off by:

William Michaela
Angie Mulinix

Kalman Filter

In order to solve robot localization we used Kalman filtering. Kalman filtering is an algorithm that uses series of measurements observed over time, and produces estimates of unknown variables that tend to be more precise than those based on a single measurement alone.

Gauss $N(x|\mu, \sigma^2) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{1}{2} \left(\frac{x-\mu}{\sigma}\right)^2}$

Kalman Update:

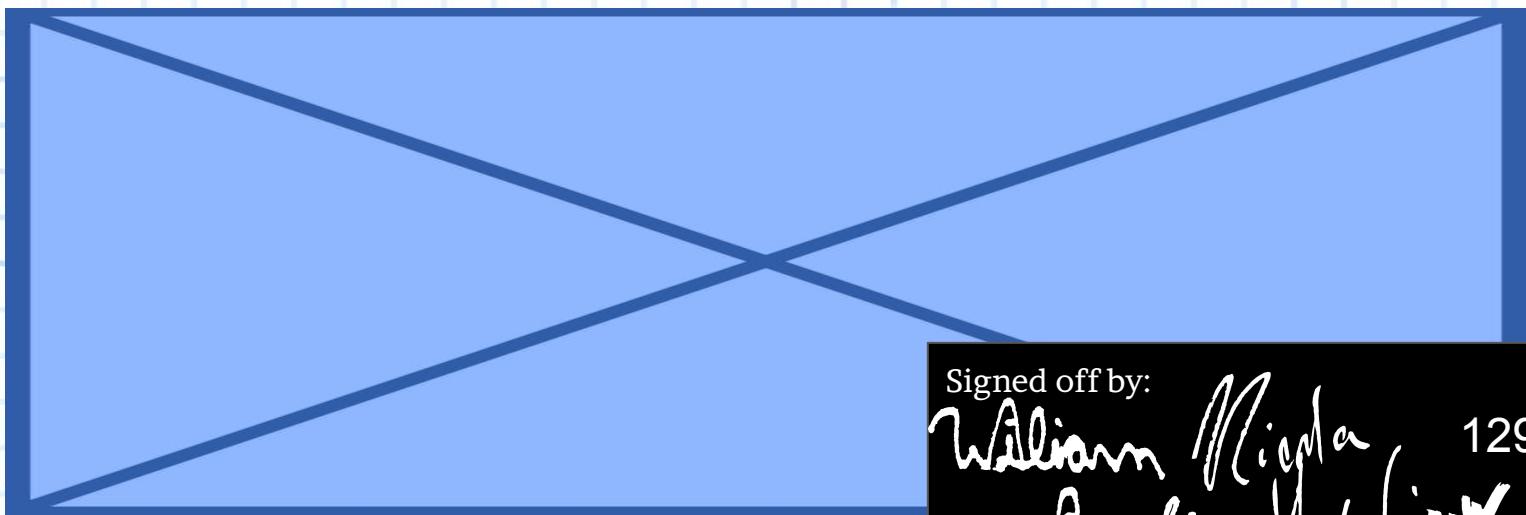
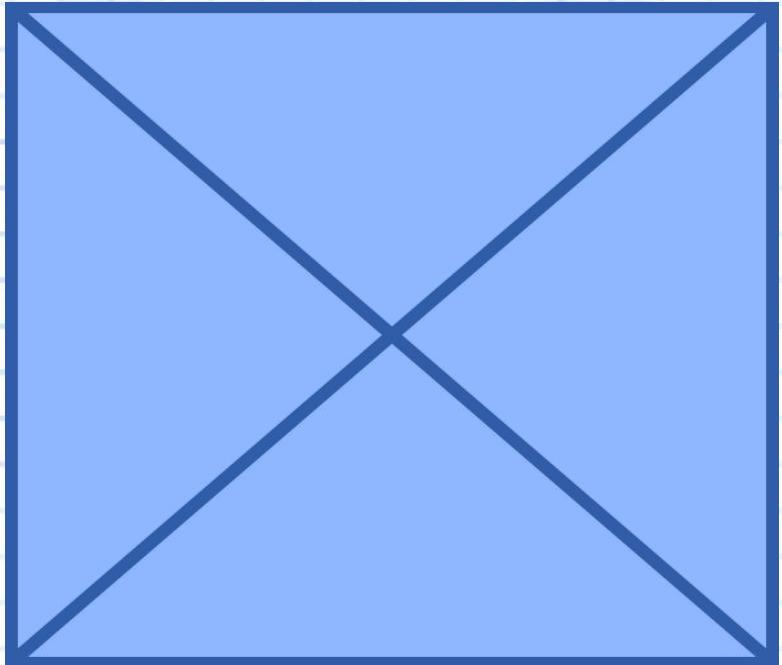
$$\tilde{y}_k = z_k - H_k \hat{x}_{k|k-1} \quad \text{measurement residual}$$
$$S_k = H_k P_{k|k-1} H_k^T + R_k \quad \text{residual covariance}$$
$$K_k = P_{k|k-1} H_k^T S_k^{-1} \quad \text{Optimal Kalman gain}$$
$$\hat{x}_{k|k} = \hat{x}_{k|k-1} + K_k \tilde{y}_k \quad \text{State estimate}$$
$$P_{k|k} = (I - K_k H_k) P_{k|k-1} \quad \text{estimate covariance}$$

Kalman Predict:

$$\hat{x}_{k+1|k} = F_k \hat{x}_{k|k-1} + B_k u_k \quad \text{state estimate}$$
$$P_{k+1|k} = F_k P_{k|k-1} F_k^T + Q_k \quad \text{estimate covariance}$$

$\hat{x}_{k|k}$?

The Kalman filter keeps track of the estimated state of the system and the uncertainty of the estimate. In the end, Kalman filtering allows the robot to be able to calculate where itself is throughout the arena.



Signed off by:

William Michael 129
Angie Mulinick

Particle Filters

Particle Filters, like Kalman filters, are a great way to track the state of a dynamic system. That means that if you have a model of how the system changes in time, possibly in response to inputs, and a model of what observations you should see in particular states, you can use particle filters to track your belief state.

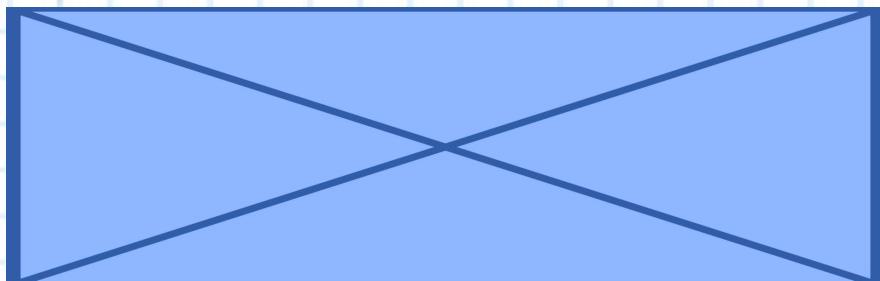
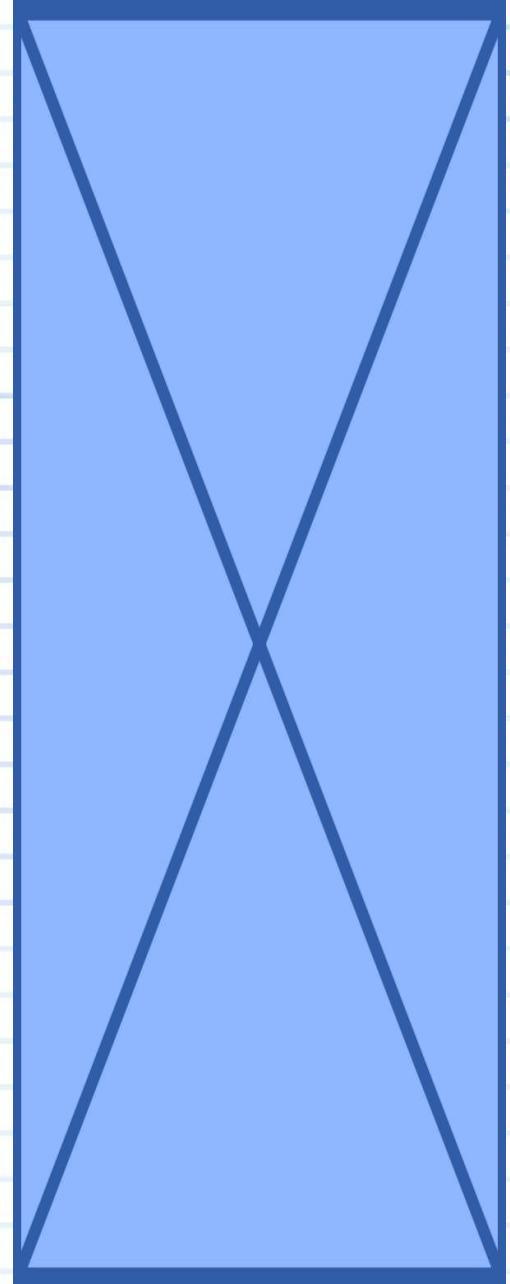
Kalman Update:

$$\tilde{y}_k = z_k - H_k \hat{x}_{k|k-1} \quad : \text{measurement residual}$$
$$S_k = H_k P_{k|k-2} H_k^T + R_k \quad : \text{residual covariance}$$
$$K_k = P_{k|k-2} H_k^T S_k^{-1} \quad : \text{Optimal Kalman gain}$$
$$\hat{x}_{k|k} = \hat{x}_{k|k-1} + K_k \tilde{y}_k \quad : \text{State estimate}$$
$$P_{k|k} = (I - K_k H_k) P_{k|k-2} \quad : \text{estimate covariance}$$

Kalman Predict:

$$\hat{x}_{k+1|k} = F_k \hat{x}_{k|k-1} + B_k u_k \quad : \text{state estimate}$$
$$P_{k+1|k} = F_k P_{k|k-1} F_k^T + Q_k \quad : \text{estimate covariance}$$

\hat{x} KALMANS?



Signed off by:
William Michaela 130
Angus Mullain

Autonomous Modes

Of our four autonomous modes, our two ball autonomous is our simplest one. In this autonomous, our robot moves forward after a pre-configured amount of seconds, depending on what our teammate asks of us, and then shoots two balls into the center vortex, knocks over the cap ball and then finally parks on the corner vortex.

Our three ball autonomous is similar to our two ball autonomous, except it can recollect a ball off of our partner, and then go to a preconfigured spot, where it will move towards the center vortex, score three balls, knock the cap ball off of the center stand, and then finally park on the corner vortex, precisely as our robot does in the two ball autonomous.

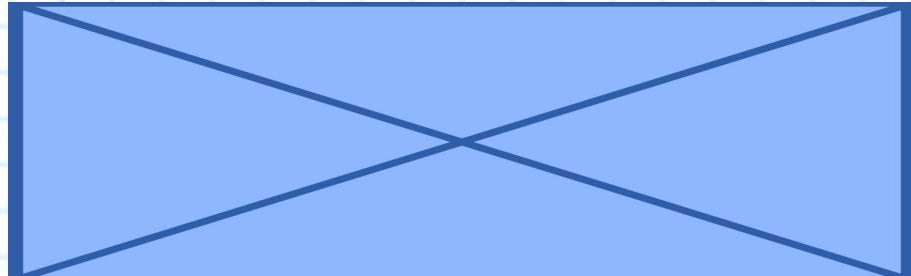
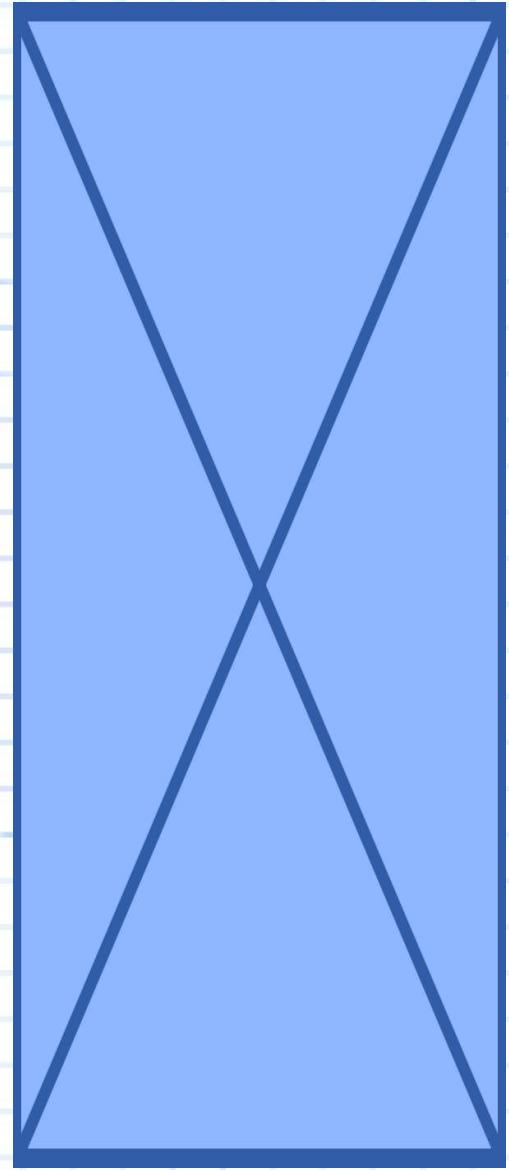
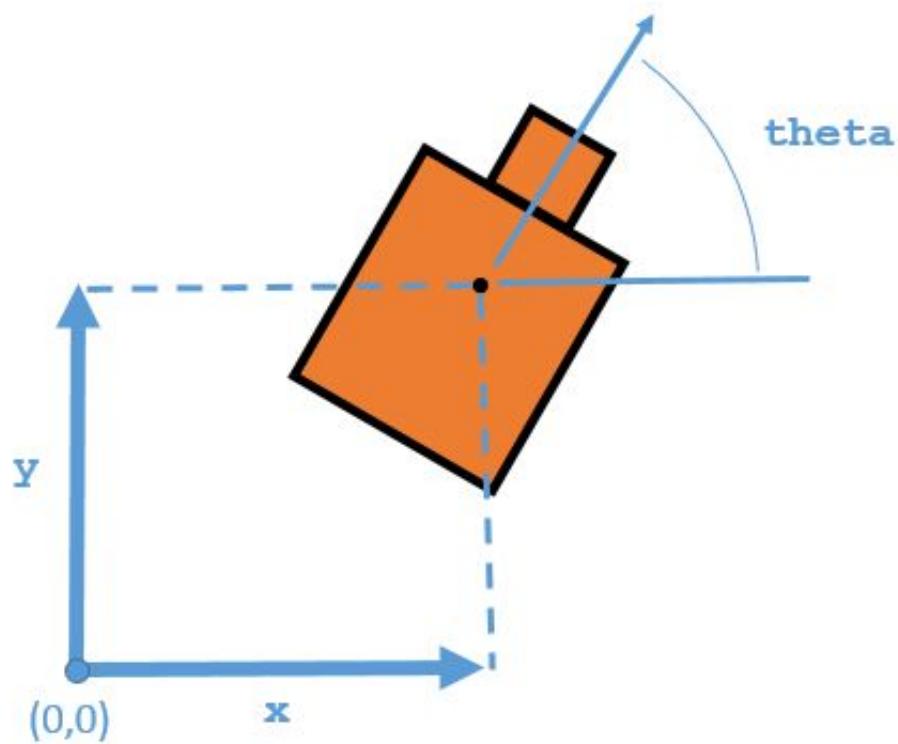
Our primary autonomous mode is our beacon pressing autonomous, where after start is called, our robot moves directly towards the first beacon, presses the correct side color, and then continues to the second beacon where it pressed the correct color based on the team color we are on. After that, it turns back to the corner vortex, turns towards the center vortex, shoots two pre-loaded balls, knocks the cap ball off of the center and then finally parks on the corner goal, for a total of 100 points in autonomous mode. If we collaborate with another team, and they are capable of shooting a particle into the center vortex and parking on the center, then we will be able to score 120 to 125 points in this round alone!

Signed off by:

William Michaela
Angie Mulinick

Ball Recollecting Autonomous

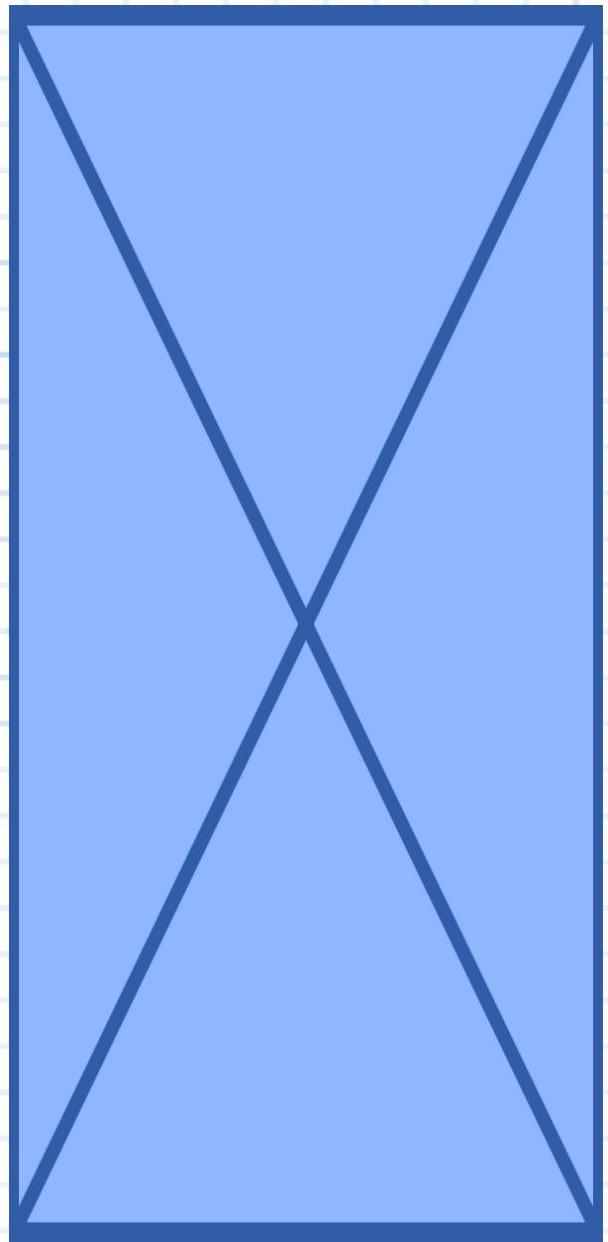
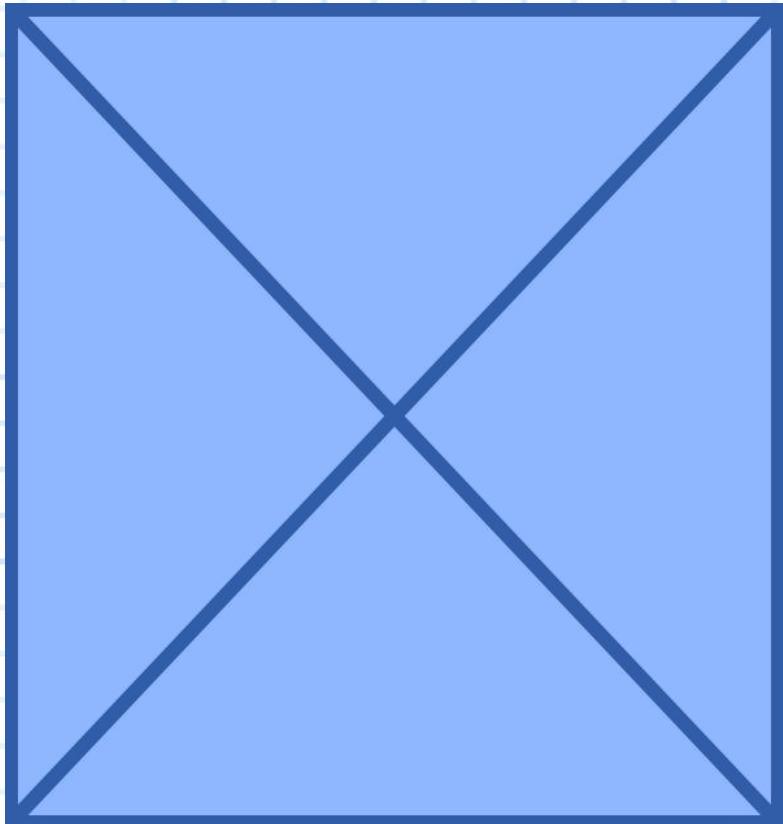
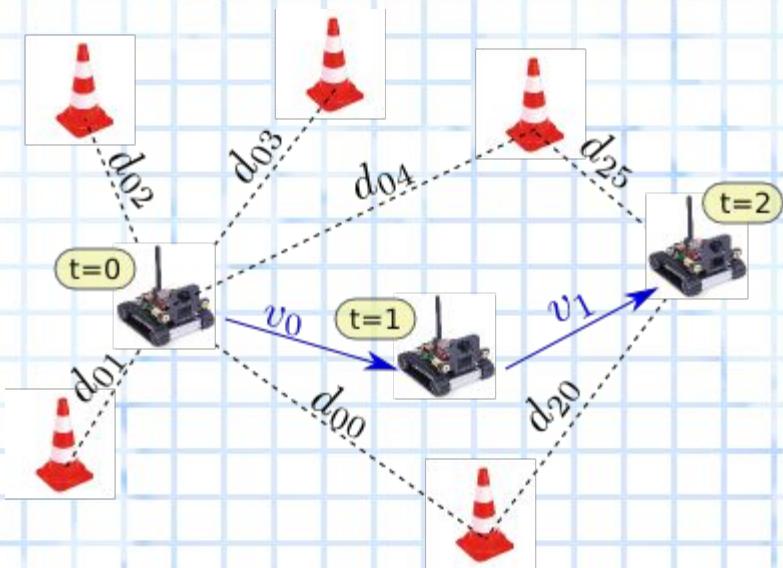
In our ambitious ball recollecting autonomous, we work on recollecting balls from the field that have already been scored into the center vortex and attempt to rescore them. This autonomous was prepared in hopes that it could expand the typical 130 point limit available to most statically configured autonomous and hopefully allow for larger variation amongst teams that can score outstandingly well. The details as to how this is implemented is specified in the paper in the following pages.



Signed off by:
William Michaela
Angus Mullin 132

SLAM

Simultaneous localization and mapping, SLAM, is the process of creating a map using a robot that navigates the environment while using the map it creates. The robot or vehicle plots a course in an area and it has to figure out where its own self is located in the place. The process of SLAM uses a complex array of computations, and sensory inputs to navigate around a previously unknown environment or to review a map of a previously known environment. Both Kalman Filter and Particle Filter can help solve SLAM.

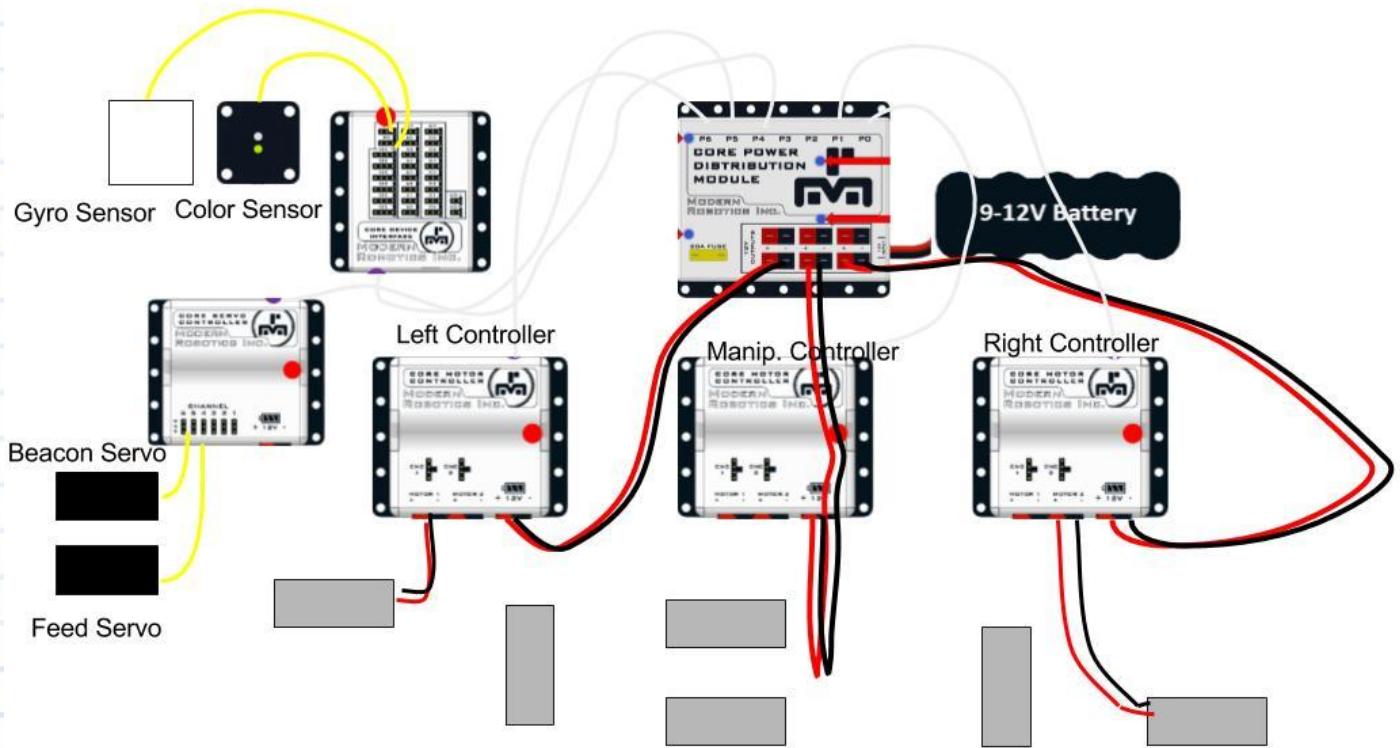


Signed off by:
William Michael Angelo Mulinaw
133

Diagrams & Problems

How everything connects & how we fixed it

DEVICE LAYOUT



Android Studio

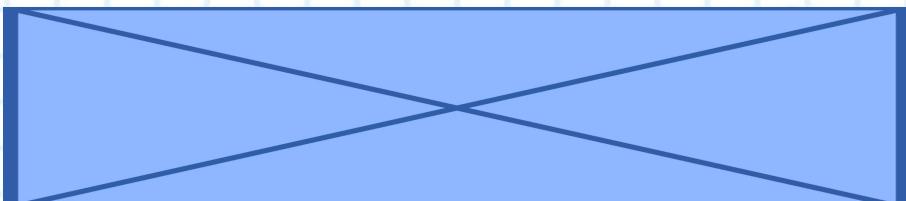
Errors were solved by deleting certain directories

Modern Robotics

We had issues communicating with the Modern Robotics Color Sensor using the Color Sensor class in the FTC project.

Fix:

Wrote new ColorSensor class that communicated with the color sensor using the I2CDevice and I2CDeviceSyncImpl classes

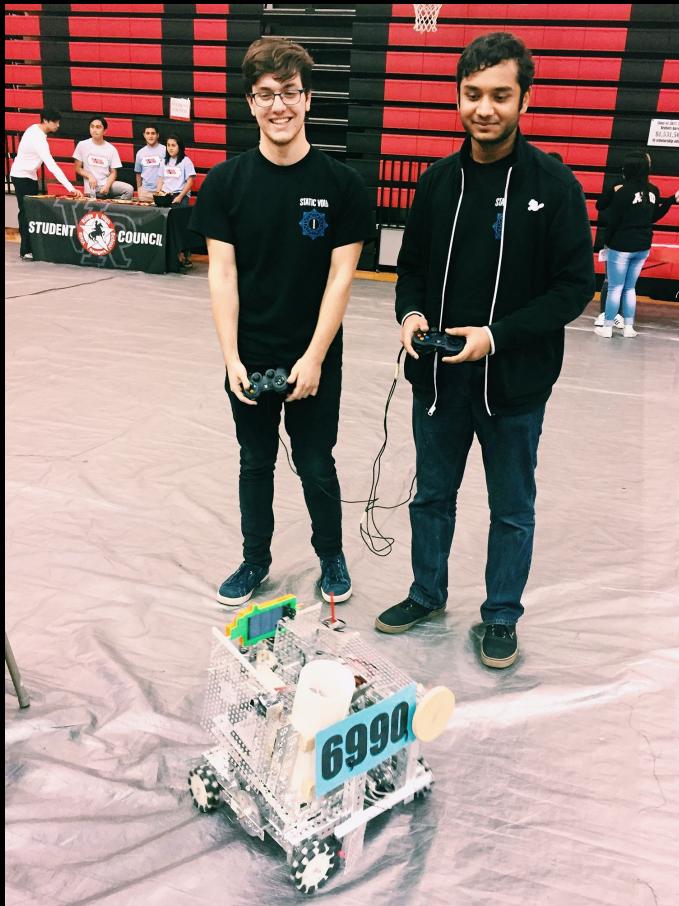


Signed off by:

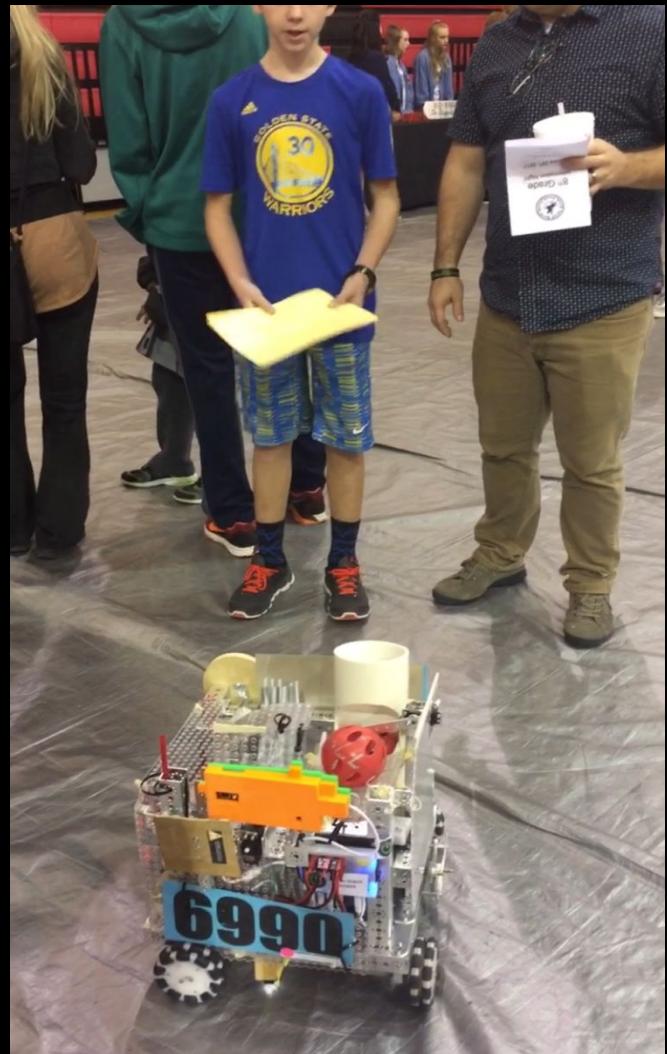
Aaron Slade

Outreach Section

01/25/17 - 8th Grade Night @ VRHS

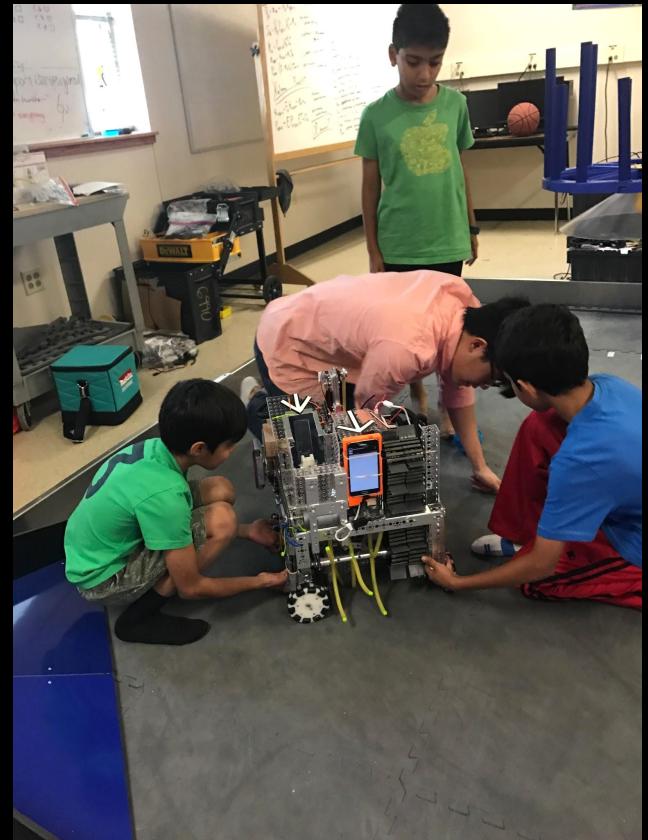
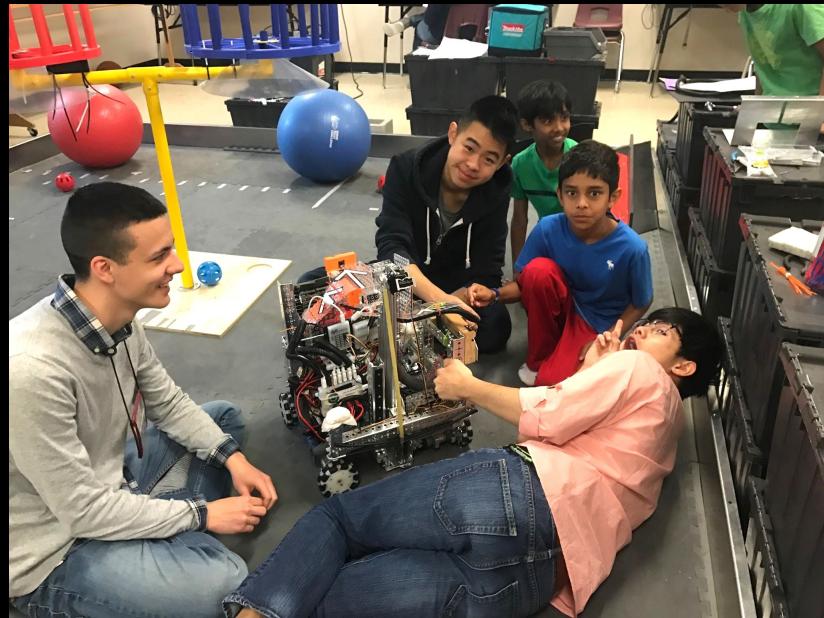


We enjoyed demonstrating our robot to the incoming freshman and their parents. Many kids showed interest in robotics and engineering.



Outreach Section

03/16/17 - Rutledge FLL Team Visit @ VRHS



We demonstrated our robot to the FLL Team from Rutledge Elementary, one of our feeder schools. They received an inside look at the engineering of our robot and gained knowledge about joining FTC in the future.

Team Section

Project Manager - William Smylie

Assistant Project Manager - Yash Chacharkar

HARDWARE

Lead - Nicola Muça Cirone

Morgan C Rogers

Joel Siew

Eric Tseng

Kaylin Tam

Minsong Lee

SOFTWARE

Lead- Aaron Slade

Trey Shaffer

Cole Reid

MARKETING

Kailee Keiser

Chloe Tosh

Team Section

Project Manager - William Smylie

William, 6990's project manager, is a high school junior, and has been involved in robotics since fifth grade. He enjoys participating in Static Void because it allows him to apply a wide variety of skills acquired from different classroom settings. He would like to continue his interest in robotics and prosthesis into college. Outside of robotics he participates in NHS, DECA, UIL, and Venture Crew. His main skill set is problem solving and leadership.



Assistant Project Manager - Yash Chacharkar



Yash, in his final year of high school, is Static Void's assistant project manager. He has been involved in robotics for three years. He has always had an interest in figuring out how things work and in their internal relationships. Yash enjoys robotics because it gives opportunities for building friendships and robots in a fun environment of people with common interests. In his free time he participates in HSS, gaming, and Tabla drumming.

Hardware



Connor finds robotics fun because he gets a chance to use his engineering skills and gets to experience the excitement of competitions. He would like to major in mechanical engineering and participates in clubs other than Static Void, including French club.

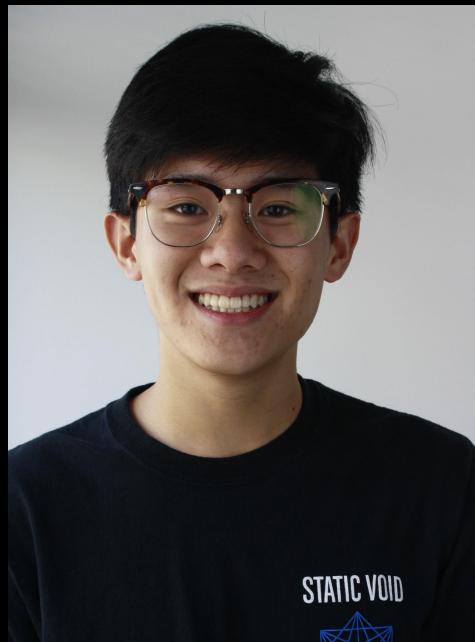
Connor Rogers

Nicola Muca
Cirone

Nicola is a junior in high school, who is also an exchange student from Italy for the 2016-2017 school year. This is his first time participating in robotics and he has had a blast. After high school he wants to go to college and major in Mathematics with plans for getting a PhD.



Hardware

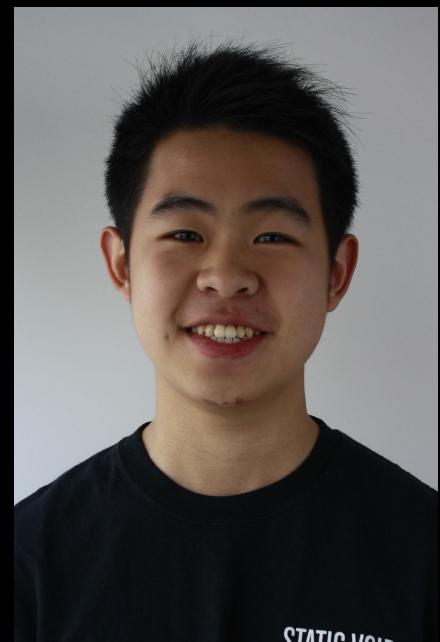


Joel is a senior in high school and a fourth year veteran of the program. His favorite parts of robotics are the robot design and the competition atmosphere. He would like to major in computer science and participates in Student Council in addition to his role in Static Void

Joel Siew

Eric Tseng

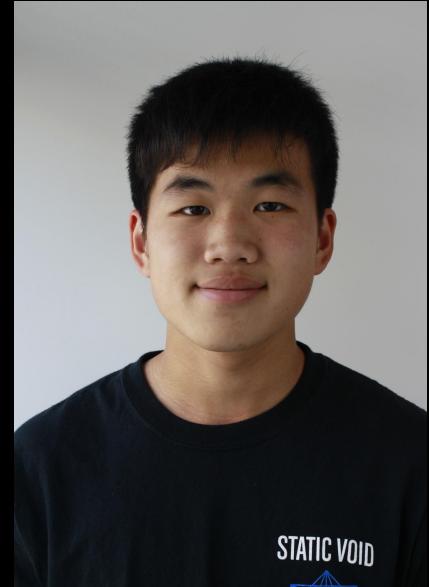
Eric is a junior in high school. This is his first time participating in robotics and he loves it. After high school he wants to go to either the University of Texas or A&M University and plans to major in Engineering.



Hardware

Minsong Lee

Minsong is a junior and this is his first year participating in robotics. He has fun working with others to find unique design solutions . Minsong wants to go to the University of Texas and study Computer Science. He also is in our school's chapter of DECA and on the tennis team.



Kaylin is a senior and plans to attend Texas A&M to study mechanical engineering or computer animation. She participates in Theatre, Diversity club and Student Council. She looks forward to robotics because it is a fun challenge to build and design a robot that completes the requirements of the complex game.

Kaylin Tam

Software



Aaron has been doing robotics for two years and enjoys it because of the opportunity it gives to apply programming to a real world scenario. He is a junior and plans on attending Brigham Young University. He wants to major in either Computer Science or Mechanical Engineering. Outside of robotics he participates in Choir.

Lead -
Aaron Slade

Trey Shaffer

Trey, a senior, participates in robotics because enjoys learning more about programming and meeting other teams. He has been doing robotics for two years. Trey also participates in NHS, Computer Science UIL, and founded the GEARS club. He is attending Texas A&M University and is majoring in Computer Science.



Cole is a second year member of the team, and came back for the friends and the competition days. As a junior, Cole is also involved in Tennis and NHS. Cole hopes to attend Texas A&M for college, majoring in computer science.

Cole Reed

Marketing



Chloe
Tosh

Chloe is a sophomore, and this is her first year participating in robotics. She enjoys it because it is interesting and is a great learning experience. She wants to attend Boston University and major in Mechanical Engineering. Outside of Static Void she is involved in photography and French Club.

This is Kailee's first year participating in robotics and is learning a lot of new things through it. She is a sophomore who wants to attend the University of Texas and major in Biomedical or Mechanical Engineering. She also is in French club and dance.

Kailee Keiser



Gracious Professionalism in Action

Static Void would like to thank the following teams that have demonstrated gracious professionalism during the 2016-2017 qualification season:

Stryke 6210

Vandegrift High School

Loaned our team two phones for the second set of qualification matches when we heard from Amazon that our phones would not arrive as scheduled.

Guardian 8814

St. Dominic Savio Catholic High School

3D printed phone holders & the launcher trigger for our robot.

Optimus 3708

St. Dominic Savio Catholic High School

Loaned us a phone during the first set of qualification matches when our phone failed.

The ViperBots Organization

Vandegrift High School

For lending us their breadth of knowledge and saving us hours of debug.

Static Void Business Plan

1.0 Executive Summary

1.1 Team Mission Statement

To create a community that enjoys the open exchange of ideas to positively respond to opportunities and challenges. To develop individuals with leadership and social skills that reflect positively on Vista Ridge High School, Leander Independent School District, the state of Texas, and FIRST.

In the short term, 2016, we would like to be part of an alliance in the championship matches.

1.2 FIRST Description

The mission of FIRST is to inspire young people to be science and technology leaders, by engaging them in exciting mentor-based programs that build science, engineering and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.

FIRST was founded in 1989 to inspire young people's interest and participation in science and technology. Based in Manchester, NH, the 501 (c) (3) not-for-profit public charity designs accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and math, while building self-confidence, knowledge, and life skills.

1.3 Program Summary

FIRST Tech Challenge is designed for students in grades 7-12 to compete head to head, using a sports model. Teams are responsible for designing, building, and programming their robots to compete in an alliance format against other teams. The robot kit is reusable from year-to-year and is programmed 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 for community outreach, design, and other real-world accomplishments.

1.4 Team Origin, Description, and History

Static Void was registered with FTC as Team 6990 in 2013 at Vista Ridge High School by the Project Lead the Way (Engineering) teacher. Two teams were started concurrently at the high school and served as an extracurricular club for students interested in robotics and engineering. The first year there were ten students on the team.

In 2016 Static Void began to operate as a subset of the Engineering Club. Twelve members were chosen from thirty-eight applicants from grades 9 -12 by the team Project Manager. The Project Manager was selected by the three Team Mentors who are Computer Science and Project Lead the Way (Engineering) teachers. The team welcomed its first parent mentor this year.

2013-2014: Brobots, Project Manager: Nick Hemstreet, advance to Super Regionals as a rookie team

2014-2015: Marvelous Machines, Project Manager: Chris Charnecki, advanced to Regionals on the Control Award

2015-2016: Static Void: Project Manager: Maria Teleki

1.5 Team Organizational Structure

The management of Static Void is distributed across three teachers from the Computer Science and Engineering departments. Our team is structured by division into three departments: hardware, software and marketing, in order to evenly distribute workload and increase efficiency. Each branch of the team is responsible for contributing to the shared goal of creating the best possible robot in terms of function, aesthetic, and presentation. Our Project Manager (PM), William Smylie, works with each member and department to ensure our productivity, success as a team, and cooperation as a whole. The three departments of our team allow each person to explore their interests and strengths within the field of robotics. We strive to create a fun atmosphere where students can further their knowledge in STEM through creating and designing a robot.

1.6 Team Relationships

2016 Sponsors: Vista Ridge High School and IBM.

Vista Ridge High School provides funding for the club as well as space in the computer science lab and engineering shop to store the robot, tools, and supplies; to work on the robot, and to hold team meetings. IBM provides a Mentor with an electrical engineering background. The mentor personally provided funding for Robot materials.

2.0 Team Impact and Goals

2.1 Team Future Plans

Static Void plans to use the off season from building and competition to pursue community outreach. Primary focus will be through the Vista Ridge Engineering Club and Henry Middle School, including hosting an Hour of Code event for the second year.

3.0 Sustainability

3.1 Team Action/Implementation Plan

The team has identified the following actions for sustainability and growth:

Strategy	Actions	Responsibility	Planned Completion
Create a repository for notebooks and programs to jumpstart Team each year (legacy files) and to use as education for new members	- Acquire a hard drive or USB device for consolidation of digital files - Educate Team on existence of, access to, organization of, and items to be stored on device	Team Mentors Project Manager	February 2017 February 2017

Strategy	Actions	Responsibility	Planned Completion
Document status of critical hardware at end of competition season to plan expenditures for following season.	- Hold a team meeting to discuss which robot components might need replacing before the next season	Project Manager and Team	March 2017
Select new team members from incoming freshman and sophomores to grow the team.	- Host outreach events at Middle and High School events to generate new interest and new members.	Project Manager and Team	April 2017
Consider viability of adding a third team so more Engineering Club students could participate in Robotics.	- How many applicants were not selected for a team? - Is budget available for a team kit? - Are mentors available and willing?	Team Mentors	May 2017

3.2 Team Financial Statement

Item	Budget Amt.	Actual Cost	Category	Rationale/Explanation
Expenses				
Registration	275.00	275.00	Fees	FTC Team Registration Fee
Austin Metro League	250.00	250.00	Fees	League Fee
Team t-shirts	300.00	260.00	Marketing	JM Athletics; for competition & outreach
Parts and Supplies	175.00	168.00	Hardware	Modern Robotics
Parts and Supplies	100.00	71.65	Hardware	Tetrix
Parts and Supplies	0.00	20.49	Hardware	Powerwerx
Parts and Supplies			Hardware	Samsung S5 phones (X2)
Parts and Supplies	Donated		Hardware	Modern Robotics; Gyroscope and light sensors
Sub-Total	1100.00	1045.14		Projected total expense for the 2016 season

Item	Budget Amt.	Actual Cost	Category	Rationale/Explanation
Monies				
Rollover Amount	0			Money left over from previous season
School Allocated Club Funds	1200.00		Income	Annual Amount
Sub-Total	1200.00			Anticipated amount of money coming in throughout the season. Actual amount may be lower/higher.
Bottom Line				
Credit/Deficit	154.86			Current money still left/Money owed that still needs to be raised (marked in red)

4.0 Outreach and Recognition

4.1 Outreach

Static Void plans to host an Hour of Code event at Henry Middle School for the second year. The team would be happy to take the robot to elementary and middle schools in Leander ISD to generate interest in STEM and FTC.

4.2 Recognition

Advanced to Regionals as a rookie team , 2013 – 2014 (Team named Brobots)

Advanced to Regionals on the Control Award, 2014 – 2015 (Team named Marvelous Machines)

5.0 Resources

5.1 Photos and Other Supplemental Materials

For more information about the team and our outreach, please check out the following materials:

Team Twitter (<https://twitter.com/StaticVoid6990>)

Team Website (<http://www.blogabot.net/>)

Team You Tube (<https://www.youtube.com/channel/UCPBm6GcSLk52NgkHMIzKGig>)

Team Digital Engineering Notebooks (coming soon)

5.2 Team Contact Information

Team Mentor: Juan Flores, Juan.Flores@LeanderISD.org, 512-570-1876

Team Mentor: Jose Villalpando, Jose.Villalpando@LeanderISD.org, 512-492-5605

Team Mentor: Dennis Bonsall, Dennis.Bonsall@LeanderISD.org, 512-638-5138

Parent Mentor: Scott Smylie, scott_smylie@yahoo.com, 512-986-6370

Parent Mentor: Simon Siew, simonhsiew@gmail.com, 512-923-2578

Team email: staticvoid6990@gmail.com

Team Project Manager: William.Smylie, williamsmylie0@gmail.com