



ROBOLANCERS' ROUNDTABLE Volume VI - February 2014

This newsletter is dedicated to providing updates of what's going on to the sponsors of Central High School's robotics team, the RoboLancers [FRC Team #321; FTC Team #5320 and Team #6676].

ROBOLANCERS GOLD AND CRIMSON FTC TEAMS ARE ADVANCING TO THE PENNSYLVANIA CHAMPIONSHIP!

By Justin Luu, 276

Nineteen FTC teams gathered at Central High School on Saturday, February 8, 2014, for the final meet, which determined the Philadelphia teams advancing to the State Championship to be held at Millersville University on March 1, 2014.

Central's gym witnessed robotics enthusiasts of all ages. Opening ceremonies saw remarks by Tom Zawislak of Pennsylvania *FIRST* Robotics, which profusely thanked Central High School for hosting this event, and by Daniel Ueda, Head Coach of RoboLancers FTC Teams #5320 and #6676 and FRC Team #321. City Councilwoman Cindy Bass, of Philadelphia's 8th District, congratulated Central for hosting this event and added a piece to the prize, inasmuch as the winning team will have the opportunity to visit her office to experience a day in City government, attend a City Council session, and meet the Mayor and other government officials. The National Anthem was sung brilliantly by robotics team and choir member, Vincent Mills, 273.

State Representative and Central alumni Mark Cohen came to the event and admitted it was his first robotics competition. He was enthralled by the FTC action and also visited the RoboLancers robotics lab.

The game was intense at times, but when the dust settled, the four teams which will advance to the Pennsylvania State Championship are: FTC Team #5488, RoboDragons of Freire Charter School; FTC Team #5320, RoboLancers Gold of Central High School; FTC Team #6552, Northeast High Robotics of Northeast High School; and Team #5321, Tech Heroes of G.W. Carver High School. In addition, FTC Team #6676, RoboLancers Crimson of Central High School won the PTC Design Award. As one of the two hosting teams, FTC Team #6676 will also be advancing to the State Championship.



Setting up for the Final Meet



(left to right) Alex Farley, William Myrick, Ahmed Amin, Tommy Weiler, Cordell Beatty, PJ Lorenc, and Tyler Massa



Councilwoman Cindy Bass





Daniel Ueda and State Rep. Mark Cohen





The RoboLancers' Mascots: The Rock'em Sock'em Robots

PTC Design Award won by FTC Team #6676

FTC Team #5320's robot

WORDS TO THE WISE

By Daniel Ueda, Head Coach

Yesterday [February 1, 2014] at the FLL championships where we were volunteering, I asked Kamal Carter, our lead mechanical designer and robot design judge at the competition, how he was doing. He replied, "Tired, very tired."



One of our new mentors, Daniel

Marut, a software specialist from Comcast, said that we have to look at this as a marathon, and not a sprint, "though at times, it definitely seems like a sprint."

Well, we are currently in the last leg of this marathon of sprints and the team knows that there is no time for tired. Six weeks never seems like enough time. Pressure increases, tempers flare, messes get created, mistakes get amplified - it is by far the most intense learning environment you can create. The students come out of this more mature, more confident, and more capable and the mentors and coaches come out with more grey hairs.

Our strategy this year is to be an assisting team fast, agile, catch and release. We are hoping to become a main ally to other shooting robots that will surely exist. FRC is about strategy and we hope we have chosen the right one. Come out and cheer us on as we show our RoboLancers pride!

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THE FRC BUILD SEASON (SO FAR)



By Etienne Jacquot, 273, President

Six weeks. We are given six weeks to build a robot, and that is it. As I write this, we are halfway through build season, and so far it has been a crazy ride.

A lot of preparation went into getting ready for this year's FRC season. We tested out new shifting gearboxes on a practice chassis and had driving practice for people who want to be drivers at competitions, which the team has never done during preseason before. We set up a comprehensive Gantt chart to plan out our build season, making sure we left time at the end to make sure everything is finalized. By Saturday,

January 4, at Upper Darby High School where the FRC Kickoff unveiled this year's game, as a team, the RoboLancers were ready to go full steam ahead.

Aerial Assist is the name of this year's game. To summarize, this year's game is played on a 27' by 54' field in which two alliances (made up of three robots) must score points in a variety of ways using 2ft diameter balls. Working together, the three robots on each team must be able to pass, catch, and shoot into goals for points, and bonus points are earned if teams can achieve certain goals -- from shooting over a railing, to catching and moving into their zone, to letting their robots shoot for themselves for extra points during autonomous. Sitting in the stands of Upper Darby's auditorium, brains churning and ideas flowing, we started to discuss the game and that was the real beginning of the RoboLancers' FRC season.

That evening immediately after the kickoff, we went to the ExCITe Center at Drexel University to strategize. We sat down and listed everything our robot could possibly do and went from there. Do we want to be an assisting catcher, a defensive juggernaut, or an offensive shooter? With more than 40 students on the FRC team, of course, there were conflicting ideas and by the end of the night, the team was nearly divided in half on what type of robot we should build.

The next day, we met up again at Drexel and decided that essentially the question was this: How can we play the game as it is meant to be played? The answer is "assists". After a team vote between using a catcher or shooter, we decided on a catching robot.

On the first day back to school after kick off, we started to talk design. From the beginning, we all made it clear that whatever we do, we need to do it right. So, we sat and with ideas from the strategy meetings from the previous two days, we broke the robot into its main four mechanisms: chassis, catching, grabbing the ball from the floor, and getting the ball out of the robot. From there, we split up into the four groups and designed the mechanisms.

Construction of the chassis then immediately began, and even though we came racing out of the gate, the chassis construction has been troublesome. We planned for the chassis to be completed within the first week, but now at the end of week three, it still is not finished. We learned you can plan ahead so much, but problems inevitably pop up. We've had tremendous problems with belts for our drive train, and I hope we can get the right size belt soon so we can finish the chassis and work to build the rest of the robot.

THIS YEAR'S FRC GAME¹



AERIAL ASSIST is played by two competing Alliances of three Robots each on a flat 25' x 54' foot field, straddled by a lighting truss suspended just over five feet above the floor. The objective is to score as many balls in goals as possible during a 2 minute and 30 second match. The more Alliances score their ball in their goals, and the more they work together to do it, the more points their alliance receives.



The match begins with one 10-second Autonomous Period in which robots operate independently of driver. Each robot may begin with a ball and attempt to score it in a goal. Alliances earn bonus points for scoring balls in this mode and for any of their robots that move in to their zones. Additionally, each high/low pair of goals will be designated "hot" for five seconds, but the order of which side is first is randomized. For each ball scored in a "hot" goal, the Alliance earns additional bonus points.

For the rest of the match, drivers remotely control robots from behind a protective wall. Once all balls in autonomous are scored, only one ball is re-entered in to play, and the Alliances must cycle a single ball as many times as possible for the remainder of the match. With the single ball, they try to maximize their points earned by throwing balls over the truss, catching balls launched over the truss, and scoring in the high and low goals on the far side of the field.

Alliances receive large bonuses for "assists," which are earned for each robot that has possession of the ball in a zone as the ball moves down the field. Points are awarded for each action per the table below.

Action	Base	AUTO (=Base+5)	AUTO & HOT (=Base+AUTO+5)	1 ASSIST (=Base+0)	2 ASSIST (=Base+10)	3 ASSIST (=Base+30)
LOW GOAL	1	6	11	1	11	31
HIGH GOAL	10	15	20	10	20	40
TRUSS	10					
Mobility		5				
CATCH	10					

¹ http://frc-manual.usfirst.org/viewItem/178

ROBOSTRESS: ADVICE TO ROBOLANCERS

By Jurges Tahiraj, 275, and Albert Tanjaya, 275

Robotics can get very stressful at times.



If someone misses a day from robotics, they would be stressing out trying find out what happened. To avoid this kind of stress, all you have to do is ask a fellow robotics teammate to inform you about what has happened, so you get the latest update to avoid being stressed out.

Jurges Tahiraj, 275

Being a programmer means a lot to the team because when your programs do not work, it is easy to get stressed out. Luckily, you are not alone because you can ask other programmers on your team for help or even members of other robotics teams.

When working with mechanical you have to work with tools such as a jigsaw in-order to cut pieces. Cutting the pieces requires perfection and you can't afford to waste too much time on one segment. To avoid stress, take your time and cut it perfectly.



When working with electrical systems, you must be very careful because when things do not go according to plan, it could be very stressful.

Albert Tanjaya, 275

You could easily get stressed from working in robotics, but it is a very fun experience. Our team encourages members not to overthink things and relax. If you are having academic problems, then catch up on that work or if you need help, do not be afraid to ask another member for tutoring. It is a great stress reliever because you are doing something you enjoy after a long school day.

ROBOTICS: A LIFE-CHANGING EXPERIENCE

By PJ Lorenc, 275

Robotics has changed my life in general. I came into my life at Central expecting to learn and develop my mechanical skills. However I learned much more. Being the Gold Team Captain has opened up a world of opportunities that I can see in my not so distant future.



Robotics is fun. It is something I have fun doing. As my years progress, my love and passion for creating has grown immensely, and with robotics, we can express this in a beautiful, functional art. Although some see robots as purely a functional piece of machinery, I see robotics as an expression of ideas. What truly amazes me was that WE made our robot; it is a culmination of ideas and concepts that we developed, we divided, accomplished, and refined our designed almost exclusively by ourselves, and we did succeed. Even if we do not go all the way to Worlds, we accomplished much more than any award could show.

As a team, I observed the growth of many team members who learned so much over the course of this year. For example, sophomore Cordell Beatty began this year knowing little about electronics, and he has developed into an electrical lead for our team, as well as a key asset on the FRC team. This robot will only last a year or two before we disassemble it; however, the knowledge we have all gained over the course of this year will stay with us for the course of our lives.

I have been given the great opportunity to lead Central High School's Robolancers team Gold. I believe that these people I work with on a daily basis will eventually have the skills to change the world for the better, as is the point of *FIRST* robotics. Our team exemplifies the pinnacle of success and shows great cohesion and flexibility as we get thrown challenges. This season has been a magical one, and it is not even over. Our team has what it takes to achieve greatness, even on the biggest stage of competition.

ON BEING THE ROBOLANCERS' PHOTOGRAPHER

By Brian Cheng, 274

Imagine going to work in an office every day of your life. From morning to evening, you are confined to a little cubicle, working non-stop on an assignment someone left on your desk, and the worst part about it is it's a never ending cycle -- everyday it's the same routine which you have to abide by. That's how I felt about school -- boring and repetitive. Then there's robotics, an extracurricular that is never boring or repetitive. Every day, there is something exciting going on. Each section, whether it is mechanical, electrical, programming, or marketing, always has something going on.

If you would have told me when I first started as a RoboLancer that I eventually would become a photographer, I wouldn't have believed you. It never was a huge interest for me. Taking photos was just a small curiosity I had when I asked Mr. Ueda about being a photographer. "It should be fairly simple right? Just press a button and you're done," I thought. Wrong. Little did I know that I would learn every technical skill there is to taking photos -- stuff like aperture, shutter speeds, and ISO settings. Johnson Kan, 272, lead photographer at the time, recommended the camera I use now and gave me a whole lot of information about these things. I tried applying them to a photo but it came out badly, even with a DSLR camera. Then Johnson took the camera, flipped stuff around like some mad man and out came this really professional and powerful photo of the person he was taking picture of. Curiosity took a hold of me again and I began experimenting with all the info I had. This was where a small interest evolved into a hobby.

I love it when the school bell rings and I get to go to robotics. Instead of feeling stuck in a cubicle, I get to go

and roam about with something new to see every day. To see each section of robotics with what they were working on, from constructing pieces of metal into a fully functioning robot, wires and batteries that power the robot, lines of words and numbers that enable movement and the brainstorming of a script that brings forth the core ideals and values the team as a whole incorporates into their work. I get to see that every day as I take photos. It's not just limited to robotics either. Over the year, I have had the pleasure of working with many creative students in Central with their projects, as well as form new connections with people and organizations that I would never have before. As I look through photos of the RoboLancers on flickr from the beginning of the year, the freshmen, these inexperienced kids who knew nothing of FIRST or STEM, and then look at them now, they have become mature young adults who take command of their work. From children to leaders to role models, that is the change one can witness when staying in robotics, and for me, getting to see them all change within a year is remarkable.

New opportunities for me have opened all through having a camera and through just asking of a single question, "Should I join robotics?" Being team photographer has been very rewarding, granting me the freedoms that were never open to me and experiences that I value. I hope to contribute even more, not just as a photographer but as a member of the team. I don't find that boring and repetitive at all.

THE FOURTH ANNUAL PHILLY ROBOTICS EXPO (PRX)

By Thomas Davidenko, 275, Marketing Lead

This year the RoboLancers are hosting the Fourth Annual Philly Robotics Expo (PRX) in conjunction with UPenn's GRASP Lab. The event will be held at the newly built Singh Nanotechnology Center on Friday, April 4, 2014.



This year's PRX will feature tours of robotics labs at UPenn, workshops, the Exhibitor Hall, *FIRST*

Robotic scrimmages, and seminars presented by UPenn and Drexel professors and grad students.

Last year, organizations like Boeing, LEGO Education, UPenn's GRASP Lab, PTC, and high school robotics teams from the region captivated robotics enthusiasts with their achievements in cutting edge technology in the Exhibitor Hall. This year proves to be no less exciting! The RoboLancers believe PRX will continue to be an event where students from all around the City of Philadelphia can come and be inspired by robotic and STEM education.

Individuals, school groups, community groups, and professionals interested in STEM fields are invited and encouraged to sign up and attend this much anticipated event! Registration opens on February 12, 2014 at http://phillyroboticsexpo.com/registration.



ROOKIE MENTOR: PETER FERGUSON

By Peter Ferguson

As the newest member of FRC Team #321 and a mentor, it has been an exciting first month for me, as we prepare for the Aerial Assist district events in March. The highlights include getting to know how the team works and approaches the creative process which is part of this competition and learning how to be an effective mentor for Team #321, a totally new experience for me, but most importantly, seeing how



beneficial the FRC experience can be in teaching many useful skills. I think FRC is great way to encourage high school students to become exposed to engineering, and I am excited to be part of that process.

A bit about myself first. I grew up and went to high school in Denver, Colorado before moving to Philadelphia to attend Haverford College. Haverford is a small liberal arts school with extremely good science departments. In May 2013, I graduated with a B.S. in Astrophysics. Since then, I have been continuing research into nearby dwarf galaxy interactions, and stealth galaxies at Haverford and Princeton. Before making the decision to continue to grad school to get a PhD in either physics or astronomy, I want to explore other fields and get some real world experience. Right now, I am looking for a job as an operator or support staff at national telescopes, which include sites in Arizona, California, Puerto Rico, Hawaii, Chile and Antarctica, while exploring a number of alternate career paths that include becoming part of a nearby tech startup or going back to school for engineering or teaching. Becoming involved with FRC gives me a small taste of multiple types of engineering as well as a view of high school from the

other side. So, I jumped at the chance to become a mentor for Team #321.

When I started working with Team #321, I was not exactly certain what the goals of FRC were or how the students would approach the task of building a competitive robot in such a short time. I just knew that when I was in high school if someone had asked me to build a robot, I would have had very little idea where to start. I wanted to be a part of the process from the beginning and see exactly what the members of Team #321 had up their sleeves. Unfortunately, Mother Nature conspired against me and I was stuck 1,800 miles away after three flight cancelations. So, by the time I became involved, much of the basic planning of the robot had occurred. The team decided to focus on making a robot that could catch extremely well, which will hopefully entice the more experienced, high achieving teams to want to ally with our team.

From there, each step seemed logical. We brainstormed ways to catch the ball, pick the ball up and eject it. Next, obviously, we built prototypes. It was quite entertaining to see how any idea under the sun could be tested with enough zip ties and duct tape. From fairly undeveloped ideas, rough models were created. A set of tubing held in a wishbone structure with the aforementioned zip ties and duct tape was tested against a basketball hooplike device. A pool noodle connected to a drill proved that we could suck the ball into the robot. Using just simple machines and an 11-inch pneumatic piston, we figured out exactly how far the ball could be launched. The result of all this testing was that our robot would catch the ball using a wishbone like structure that also has many elements of a basketball hoop. We will use a roller to suck up the ball if it is on the ground, and yes, we can launch the ball far enough using levers and pistons.

From there, the students begin to work in smaller specialized groups with lots of overlap. Some build the chassis; others work on the catcher or ejector. There is an electrical team, and other people sort out the code. Many obstacles crop up along the way. Parts need to be ordered, software needs to be updated, there is never enough room on the robot and it feels as if there is no time to get everything done. That being said, the robot is beginning to take shape.

While it is exciting and fun to help the students build a robot, there are challenges to being a mentor and new to FRC. One of the biggest challenges is I have been a student for most of my life, and part of that is taking every problem and finding the solution in the most efficient manner, but now, it is my job to help others grow and learn through this experience. My philosophy, and Mr. Ueda's, is that as a mentor, I should be doing as little of the work as possible, instead focusing on guiding the students to problem solve for themselves and helping them avoid getting stuck on all of the little details. It took me a couple of tries, and I am still learning, but I think I have become much more adept at helping the students think through ideas, and implement solutions without doing all of the work myself.

By finding this balance, I, as a mentor, can maximize the benefits the students get from participating in the competition. And boy, are there benefits to be had by participating in FRC (in addition to a good time!). The last four weeks have impressed upon me how important the FRC experience can be for students because of the many life skills it gives them as well as an opportunity to learn. There are the hands-on acts of learning to program the robot, or setting up a transmission and electrical system, but I think the real benefit of the robotics program can be found in the development of intangible skills. Students are learning to work together and think critically at a much earlier stage than their peers. Members of FRC learn how to collaborate and delegate because there is too much work to be done in a six-week period for one or two students to carry the team. So, as previously mentioned, the team splits off into groups to deal with the different aspects of the robot. By getting experience in a specific facet of the robot, while getting to contribute in a very real manner to the overall success of the robot. I believe the students are getting exposed to a much more rewarding and common method of getting work done. When I was in high school the vast majority of work I did was individual and depended very little on the work of others, but that is not how the real world has been for me. Almost all of the scientific research I have done has relied heavily on being able to work well with others, and it will serve the members of the RoboLancers well to get an early exposure to this style of work.

Additionally, building the robot while adhering to the large set of constraints set out by *FIRST* encourages creativity and independent thinking on the part of the students. There is no right answer to how to make a robot, just as there is no right answer or formula in how to start a business. Basically it all boils down to the fact that I think the underlying skills learned and experiences had through participation in robotics will remain useful.

It is great to see this growth and learning in the members of the Robolancers even over a short timeframe. I am hopeful that we will finish our build season strong, and that that we will do well in the competitions in March. More importantly, I think that the students are learning skills which will serve them well for the rest of their lives and I am excited to be a part of that.



Peter's Next Destination: The Víctor M. Blanco Telescope, also known as the Blanco 4m, is a 4m telescope located at the Cerro Tololo Inter-American Observatory, Chile.

A ROBOLANCERS' CROSSWORD PUZZLE: ROBOTS!



Answers will be in the next edition of RoboLancers Roundtable.

Across

- Across
 what you should wear at every FIRST competition
 FTC game
 a self-aware, sentient, and fully functional android who serves as the second officer and chief operations officer aboard the starships USS Enterprise-D and USS Enterprise-E
 boy makes friends with an innocent alien giant robot
 Jetsons' robot maid
 members who have graduated and come back to help
 an event hosted by the RoboLancers on April 4
 an actuator ("motor") used on FTC

- on April 4 14 an actuator ("motor") used on FTC bots 16 big league 18 FRC game 22 You're my favorite Deputy! 23 2k13GotY 24 not second 25 God

Down

- science, technology, engineering and mathematics 1
- mathematics a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community set in the near-future where the sport of boxing has gone high-tech a lonely robot who discovers love on a fantastical journey across the universe created with discarded scrap metal and parts by a young Anakin Skywalker 2
- 4 5
- 9
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- 17
- created with discarded scrap metal and parts by a young Anakin Skywalker little league movie about a robot that got struck by lightning and brought to life science fiction action film based on a toy line not stand man a resourceful astromech droid, served Padmé Amidala, Anakin Skywalker and Luke Skywalker invention by Dean Kamen an electro-mechanical machine that is guided by a computer program or electronic circuitry 19 20
- 21



Central High School's RoboLancers (FRC Team #321, FTC Team #5320, and FTC Team #6676) - 2013-2014

SPONSORSHIP

If you want to sponsor an award-winning Philadelphia public high school robotics team, please consider becoming a sponsor of the RoboLancers.

Your sponsorship provides a connection with students who will be tomorrow's leaders in STEM (science, technology, engineering and mathematics) fields. Would you please help? In addition to financial support, the team always is in need of tools, materials, software, hardware, and services (e.g., printing, copying, t-shirt production, advertising). If you are unable to provide financial support, we always are in need of team mentors. Please contact the RoboLancers for more information about these important aspects of giving. The following levels of sponsorship* currently are available:

Sponsorship Reward Levels	Bronze (Under \$500)	Silver (\$500-\$999)	Gold (\$1,000- \$2,499)	Platinum (\$2,500- \$4,999)	Diamond (\$5,000- Plus)	Premier
RoboLancers' recognition, along with thank you letter and current year subscription to RoboLancers' Roundtable						THIS IS THE ROBOLANCERS' HIGHEST AND MOST UNIQUE LEVEL OF SPONSORSHIP. SPONSORS AT
Your name /company name (or logo) will be indicated in all team publications and on website						THIS LEVEL HAVE MADE A CONTRIBUTION TO THE ROBOLANCERS WHICH
Your name /company name (or logo) will be imprinted on the team's t-shirts and sponsor will receive a free t-shirt						SURPASSES A DOLLAR VALUE AND HAS AN IMPACT ON THE TEAM WHICH IS BOUNDLESS.
Your name /company name (or logo) will be displayed at competitions, appear in the Chairman's video, and placed on the robot						PREMIER- LEVEL SPONSORS' RECEIVE THE HIGHEST LEVEL OF REWARDS,
You will receive a copy of the team's annual yearbook and receive a team plaque						WHICH WILL CONTINUE JUST AS LONG AS THE TEAM EXISTS.

* Sponsorship of the RoboLancers shall begin once funds are received by the team. It shall continue for the minimum of one calendar year, but if the donation is made at the end of a school year, it will continue through the following school year, ending in June, unless an additional donation is made.

Please send your tax-deductible donation made payable to **The Associated Alumni of Central High School**.⁺ **Please make a note on the check: "To be used for Central High School's Robotics Team, the RoboLancers."** The desired logo or company insignia may accompany your check or be emailed as an attachment (in PDF [preferred], JPG, PNG, TIFF, or GIF format), to robolancers@gmail.com. Donations should be mailed to:

Central High School 1700 West Olney Avenue Philadelphia, PA 19141 Attention: Daniel Ueda, Head Coach.

⁺ The Associated Alumni of Central High School is a 501(c)(3) charitable corporation under the Internal Revenue Code [Tax ID: 23-1618008]

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For more information and free registration, visit: www.phillyroboticsexpo.com





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For More Information:

Contact Daniel Ueda, Coach, at 215-276-5262, Ext. 95, or email robolancers@gmail.com Come out and meet the team! Enjoy a delicious breakfast and have lots of fun! Raffles, 50/50 drawings and great prizes! The proceeds from this fundraiser will be used to buy parts to build robots for competition.

> Valid only at participating restaurant listed above. Ticket valid for pancake event only. Applebee's menu items are not included as part of purchase.