

Interview

Members

- Andrew
- Lucas
- Cyrus
- Siju
- Catherine
- Peam

Overview

- Engineering
 - Game Strategy
 - Process
 - Design & CAD
 - Building
 - Testing, evaluating and improving
 - Robot features
 - Coding - Caroline
- Business & Sustainability - Nandita
- Outreach - Caroline

Introductions

*motivate award

- Blu Cru from Explorer Post 1010 in Rockville, Maryland
- 6 members
- FTC for 8 years
- We'll be structuring our presentation today around three values that we outline in our mission statement: **innovation, community, and team building.**
- Everyone's names and role

Game Strategy

*think award

- Maximize points vs time and feasibility of design
- Minimize build time, buying new parts

- Combine engineering processes wherever possible— capping and normal blocks
- Focus on being competitive and good alliance to pick— focus on autonomous and end-game point values

Bot Design & Evolution

- Chassis
- Arm
- Grabber
- Carousel
- Lessons learned
 - Careful practice match score-keeping
 - Brainstorming as team, experimental process
- “Finalize” designs for competition and practice driving

Programming

*control award

- Autonomous
 - Sensors
 - Key algorithms
- Driver controlled enhancements

Outreach

*motivate award, connect award

- Python programming workshops
- In-progress interviews
- RSC outreach

Lucas -

Hello Judges! My name is Lucas, and I am a senior at Richard Montgomery.

Catherine -

My name is Catherine, and I am a sophomore at Churchill.

Andrew -

My name is Andrew, and I am a junior at Richard Montgomery.

Lucas -

We are Team 6417, the BluCru, out of Rockville, Maryland. Unfortunately our whole team could not be here, but I think you will enjoy our presentation regardless. Catherine, why don't you start us off.

Catherine -

Thank you Lucas. When we started the season off, we decided very quickly what we wanted our robot to be able to accomplish. We wanted to have a versatile robot that can score on any level, any side, and go everywhere easily. Superior mobility was a key aspect of this year's competition, as to score high you have to be efficient and fast. Because of this we decided to go for a mecanum wheel drive train, with the added bonus of both high clearance and a thin profile. As you can see, our robot fits within a 12 inch width, which allows us to both traverse around and over the barriers with ease, thus ensuring that we would always be able to score as many points in as many different ways as possible.

Lucas -

The next key aspect of our robot is our arm. We chose to use an external scoring system for this year, as the limitation on holding one piece of freight at a time severely limits the efficiency of complex internal systems. The orientation of the arm on the robot allows for a consistent and easy pickup, with a home position that keeps the arm out of the way. We can then move the arm around the robot and set the height to whatever is necessary at that moment in time. If necessary, we can also extend the arm outwards by over a foot, thus allowing for easy access to the shared hub, while avoiding penalties by reaching from the front. However, none of this could be accomplished without our grabber. The grabber that we are using is mounted parallel to the ground while in pickup

position. This makes intake fast and easy to accomplish. It can grab every single type of freight, and our capping object. It uses two different high torque servos to ensure a firm grasp, allowing us to move fast. When in the home position, our arm rests on one of the cross beams, putting the grabber at the perfect height.

Andrew -

Now, our robot may be pretty good. But it can't run without any code. Being a rookie coder this year definitely influenced our strategy for coding. We started off by making the simplest autonomous that we could think of, that still scored points. Once that worked flawlessly, we expanded, slowly adding more and more, like placing the block on the wobble goal and parking, and since our previous competition, we have

even been able to implement easyopencv using this webcam to visually detect the location of our marker and act accordingly. This strategy of building up from the bottom allowed us to have fallback code to use in case something stopped working, and made the code easy to modify, understand, and improve.

Catherine -

And finally, our outreach. Because of the continued relentlessness of the Covid-19 pandemic, we still have not been able to get as many outreach opportunities as we would have liked to. However, the opportunities that we did get are very important, and we believe very impactful to the communities they take place in. We ran exhibits demonstrating our robots to everyone of all ages at the rockville science

center during its open house, rockville science day, and many other special occasions. The team helped to run multiple different science and engineering related camps, from lego robotics to geology. We are also scheduled to host and run multiple First lego League qualifying tournaments this month, as FLL was something that we all enjoyed so much, and want to continue to see thrive.