



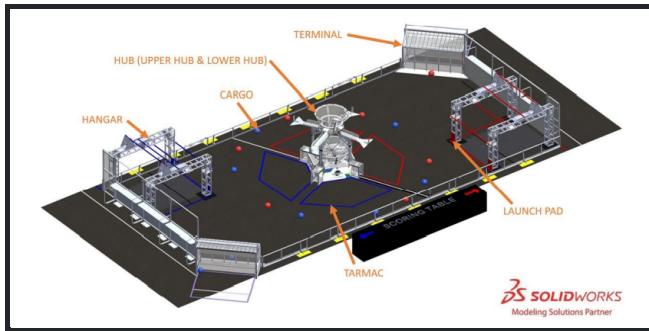
BONDS

581P

Welcome to our first BONDS Status Report of the 2022 season, where we summarize what our team has achieved in each week of our build season! In this entry, you'll see what BONDS Robotics accomplished in the first week of the build season for the 2022 FRC competition, Rapid React!

Our season began on January 8th, Kickoff Day. BONDS continued its tradition of attending a FRC game reveal viewing party, hosted by Pirate Robotics 6032 at West Carrollton High School. In addition, we met Innovators 3138, as well as Vault 6936, who is merging with Innovators this year. It was a great experience to be with these teams again, especially considering that this was many of our students' first time participating in a full scale FRC competition. Our students chatted with other teams while waiting for the livestream of the reveal to start. Finally, after watching the livestream's pregame, we all were given the reveal of this year's exciting game!

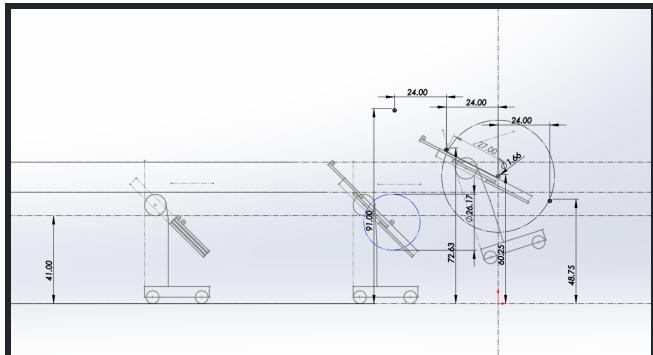
This year's game is centered on transportation. The game is 2 minutes and 30 seconds long, with the first 15 seconds being the autonomous period and the remaining time being the teleoperated period. The objectives we have are to collect cargo balls and score them in either the upper or lower hub, and to climb up the rungs in the hangar area. Human players can help robots by feeding them balls from the terminal, and even by scoring points in the upper hub during the autonomous period. Many of the tasks on the field were quickly ruled out by our team, like using the terminal in the corners of the field or shooting into the upper hub. Other tasks, like the climbing rungs, were placed at the top of our priority list. Not only are the rungs worth a great deal of Match points, but they are also great in scoring Ranking points, which can place our team high in competitions. However, the rungs are incredibly complex. They're placed high off the ground and are fairly far apart from each other. Robots must begin from either the low or middle rungs and cannot touch the ground on their climb up. Robots also have a height restriction that they must abide by while climbing. Outside of the rules set by FIRST, there are also risks in having our robot fall, which could damage our machinery and block the way for other climbing robots. With all of this in mind, we are determined to focus our efforts in creating a robust and reliable climbing mechanism.



After a lunch break, all of the teams split into smaller, separate groups that went over the game rules and methods of scoring. This was a great way for us to clear up any confusion we had over specific parts of the game and to share ideas for potential strategies. Later, we regrouped back in the main lecture hall for a Q&A session led by the captains of the three teams. With the help of mentors and FIRST alumni, we got to share many of the strategies we had brainstormed, as well as interesting game rules that could play a part in our overall strategy.



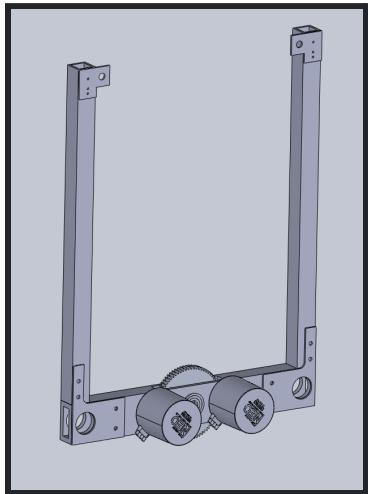
rest of the week. With our Preliminary Design Review on Saturday, January 15th, we aimed to maximize each meeting we met to the fullest. Lastly, we split into two groups. Six of our students began development on our climbing mechanism, while five students worked on our scoring mechanism.



On Monday, January 10th, BONDS met to discuss our team's strategy for the competition and our overall season goals. After having time to read through the game manual over the weekend, each of us had a more clear idea of what objectives we wanted to aim for. We first created a list of priorities for our robot, separated into three categories: Functional, Competitive, and World Class. Our goal is to have each of the objectives in the first category finished before we move on to the next one. Once we mapped out our priorities, we focused on what our schedule would look like for the rest of the week.

Climbing Mechanism

On January 10th, the climbing mechanism team researched climbers that different teams have built in previous years and took notes on their strengths and weaknesses. We then devised an elevator to climb with. On

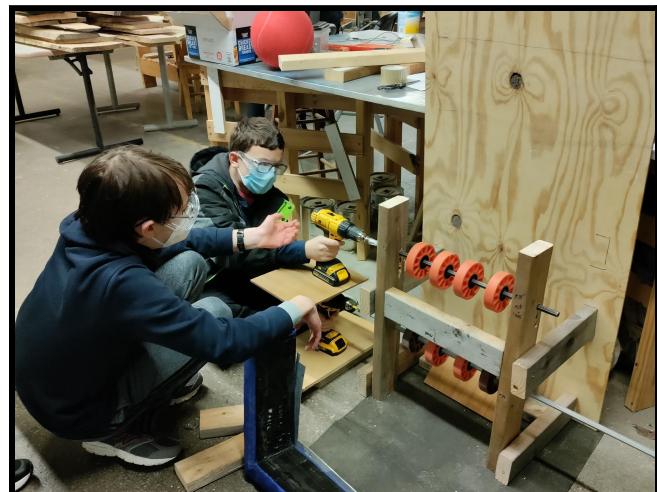
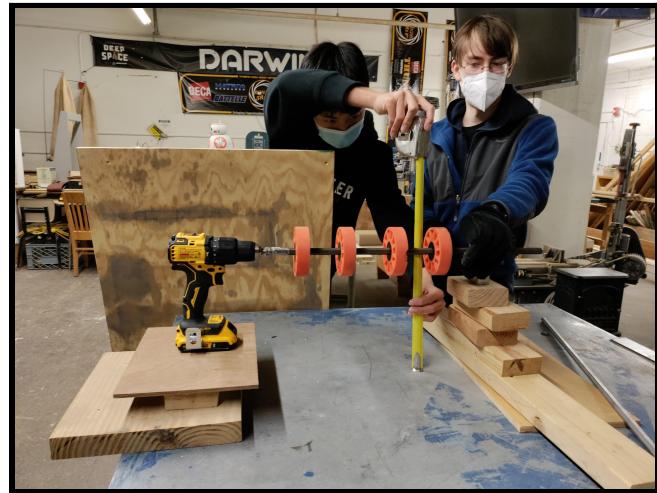


Tuesday, January 11th, we created a proof of concept of the elevator system using rope and box tubes. One feature of it is that we could cause multiple stages to extend. We then used blob CAD to design our climbing mechanism. Finally, we created a gearbox and have begun with the manufacturing process to create a prototype to perform further tests on.

Scoring Mechanism

On Tuesday, January 11th, the scoring mechanism team began working on its proof of concept. Using a drill connected to an axle with wheels attached to it, we experimented with cargo balls from this year's game to see if our intake mechanism was possible. Once we knew our proof of concept would work, we used blob CAD to design an elevator that the cargo balls would travel up once they went through the intake. On Wednesday, January 12th, we made a wooden frame that would hold two axles, equal to the one we tested on Tuesday. We reinforced the two axles on Thursday, January 13th, with stronger wood, which our students helped cut using our shop machinery. We then drilled three holes into the sides of the wood for one of our two axles to go through, in case we wanted to test different spacing between the two of them. With our makeshift elevator system in place, we powered the axles with drills and practiced intaking the ball. We explored all types of possibilities by placing ramps in the elevator and using robot bumpers for the ball to

bounce against.



Preliminary Design Review

To end our week, we held a Preliminary Design Review on Saturday. During the review, we presented to a group of engineers on what this year's game is, what objectives we want to

complete, and how we want to complete them. The engineers in the panel gave us excellent critiques on our prototypes, and helped us to consider details we would need to provide for our Critical Design Review the following Saturday on January 22nd. All of the input we received is pivotal for us going forward, and we will work to incorporate everything we've learned into our upcoming Critical Design Review and our final robot

design. To wrap up a very productive meeting, we all ate delicious Korean BBQ for lunch, cooked by our very own team captain, Brogan!

Now, with the insight we've gained from our PDR, our team is excited to discuss what we will want to rethink for our Critical Design Review. We've accomplished a lot in our first week, and we are excited to learn more STEM values in the weeks to come!

We want to give a big thank you to all of our sponsors this year! None of this would be possible without you, as your support allows us to continue learning STEM values and to Bring Opportunities Near Dayton Students.

To see more of our progress throughout the season, please follow us on Instagram, Twitter, YouTube, and our official website! Stay tuned!



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