



# **BONDS Week Five Newsletter**

February 2-February 8 2025

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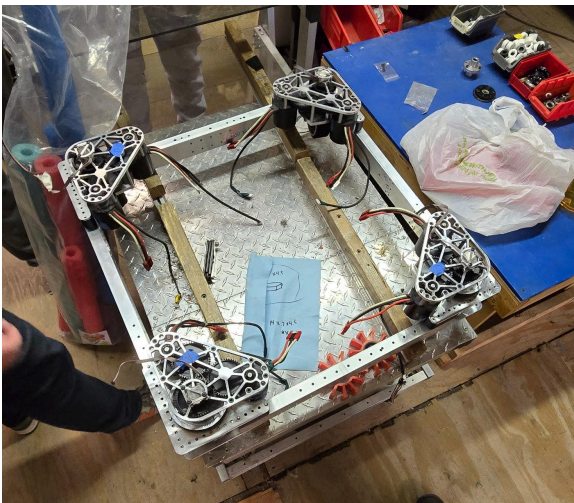
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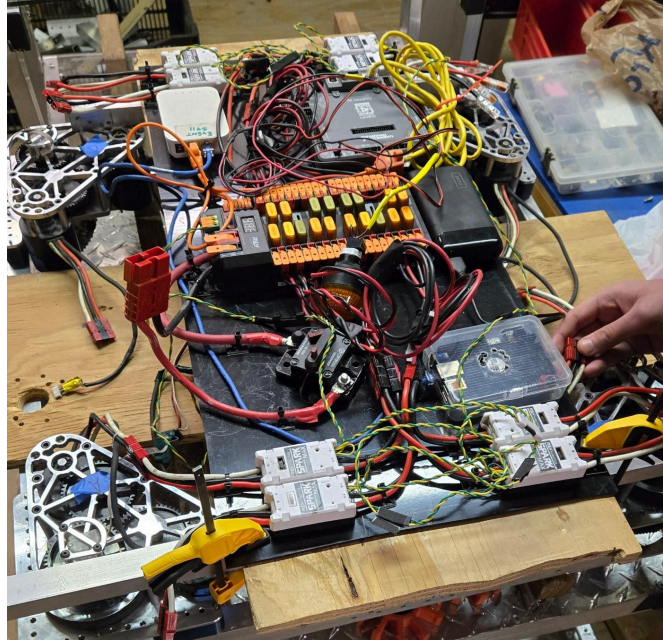
## Controls

The controls team spent this week finishing up the temporary electrical system and starting to program the driving code and vision system for the robot.

They started the week by finishing up the CAN-bus (Controller Area Network) wiring, updating firmware, and checking all CAN IDs. CAN is a communication method where electrical elements are connected by a daisy chain, and the computer (roboRIO) sends a command and an accompanying ID through the chain. The motor controller with a matching ID will obey the command, and all elements with different IDs simply ignore the command. One risk to this method, which is the prevalent method throughout FIRST, is that usually, if any spot on the daisy chain is cut or disconnected, the whole robot will lose communication and it will be dead on the field.

Additionally, the vision system installation on the temporary board was finished. Our main programmers, Harry and Oliver, worked on fixing up an autonomous alignment command and debugged wheel alignment issues on the drivetrain. Our drivetrain now samples the absolute encoders once every 100 cycles and sends the reading to the PID loop running on the motor controllers. The robot is operational and vision testing/tuning can be done. They tested and confirmed that the odometer drift we had been seeing was corrected with the vision system. The robot, when driven in a  $\sim 5 \times 5$  foot square with vision, produces no pose change when parked back exactly where it was, whereas without vision, it was off by 3-5 inches when asked to autonomously park itself back in starting spot.





## Manufacturing

Manufacturing has started with a (metaphorical) bang! For weeks 5 and 6, the CNC machines will be constantly running. Students cut stock, label them with part numbers, export the G-code, run the pieces through multiple jobs, and then check and deburr them before giving them over to the build team. One of our freshmen, who is new this year, has really taken to the CNCs and has run a majority of our jobs so far. Shout out to Nate for his hard work getting the pieces made!



## Miscellaneous

There are always plenty of things going on at practice! We don't put every detail of practices in these newsletters, but there are some fun things happening in the background that we thought we should mention.

Bumper frames (made from  $\frac{3}{4}$ " plywood) are finished up, and they're pretty square! We took a lot of care this year to make sure the angles of the bumpers weren't going to be off too badly - these bumpers are essential to protecting the robot! Once the pool noodles and duct tape come in, we'll be able to get the bumpers to a 90% completion! They'll be good enough to drive around with once the robot is ready for that - we will wait to add the fabric on the outside to avoid damaging it.

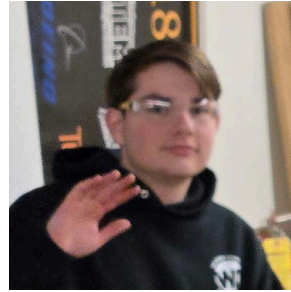


Please welcome me in congratulating Harry Zheng (Jr, Oakwood, programming captain) and George Sander (Jr, Springboro, co-captain) for their Deans List Nominations! Every year, teams have the chance to nominate up to 2 sophomores/juniors, and they interview with judges at competition. This award measures excellence in an individual student, looking at leadership on their team and

in their community. Two students receive the Dean's List Finalist award at every competition, and they go on to compete for the 10 coveted Dean's List Award winner spots at World Championships. We've had several students win both at a local Finalist and International award winner level, and we're always looking to add more students to that list! It looks great on college applications and resumes, and it recognizes the work that students do all around the world to promote FIRST, STEM, and giving back to their communities.



Harry



George

We want to give a big thank you to all of our sponsors! Our team can compete because of your support, and none of this would be possible without our sponsor's help. Our team, BONDS, will keep improving and continue learning STEM skills and values this season.

To see our season's progress, please follow us on Instagram, Youtube, Tiktok, and our official website for weekly newsletters.

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