

November

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Contact Info/ Interesting Websites

- **Dan Niemitalo:** Head Coach
- **Contact the organization:**
lmhsrobotics@gmail.com
- **Linn-Mar Robotics Website**
lmrobotics.org
- **Linn-Mar Website:**
http://linnmar.k12.ia.us
- **FIRST Website:**
http://www.firstinspires.org



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INTO THE DEEPSM

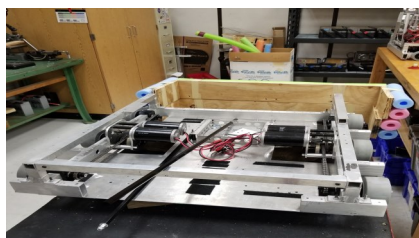
This year, the FTC game **INTO THE DEEPSM** presented by RTX was released. Like in previous years, it is played on a 12 ft x 12 ft foam mat field between 4 teams. In the autonomous period, in which the robot is controlled by the code, robots score points by placing game pieces into containers. During the remaining 2 minutes of game time, players take control of their robots. Players are tasked with collecting game pieces and taking them to their designated location. Scoring is achieved by accomplishing tasks like moving game pieces to baskets and net zone, parking or climbing.

Summer camps

This summer Linn-Mar Robotics had its annual summer camps. They offered classes on WEDO using Legos for younger kids, EV3 robots using old Lego League games, and an all-new CAD class for older kids. They did two weeks of a week-long camp where students were taught teamwork, robotic principles, design basics, and more. Summer camps are fun for the campers and are the organization's main fundraiser for the season and help recruit future members. And the new class on CAD was a major hit, attracting many new students who were eager to learn, it was successful.

Recruiting

Currently, Linn-Mar Robotics has over 60 member across the four teams. They have finally reached pre-COVID levels after significant drops during the pandemic. The recruitment efforts, involving summer camps, parades, and posters, have been a huge success, leading to the ginormous increasing in members over the last few years.





967 Iron Lions

April Tags

April tags are a big part of the First Robotics Competition. They are extremely important for orienting the robot, running set plans or routes, and especially for autonomous. April tags work by activating certain parts of the code when scanning the April tags on the papers, which function similarly to QR codes. When scanned, the preprogrammed commands activate, allowing for improved driving, aiming, and more. The 967 robot scans the April tag using the extra cameras added to the back of the robot. It then uses the pitch or angle to figure out what it should do. It decides what angle to aim and how hard to shoot. Later plans involve using LED lights to signal the drive team when the robot has a lock on a tag.



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New Member Training

This year, team 967 got many new and inexperienced members joining their team. The team wanted to train the newcomers on useful skills relevant to both robotics and engineering as a whole. They did this in the pre-season when they had more free time. The training mainly focused on using Onshape for CAD and hardware projects, but they also did training on outreach and coding. For CAD, new members were trained on Onshape. They were taught how to use the many features effectively and how to work as a team in the cooperative environment. The Iron Lions also launched a few hardware projects to help teach new members tool names and uses, wiring, and practical design. The team also has makeshift lectures on coding for those interested. Veteran members teach newcomers coding principles and applications to help them become more acquainted with the robot code. The outreach team also launched many smaller outreach projects to give new members things to work on while they get trained on skills they will use for bigger projects.

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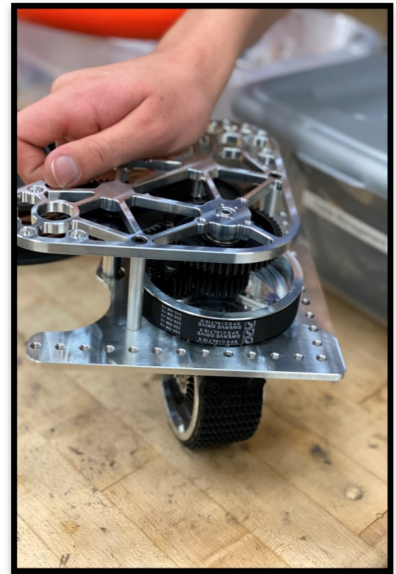
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Swerve Drive

Swerve drive is a new and vital invention for all FRC teams. Swerve drives are specialized wheels that allow robots to move in all 4 directions without turning. They work using motors that control gears which move the wheels without turning the robot physically. This quick movement is critical for the fast paced environment of the competition. They give drive teams more speed and overall more control over the robot. Team 967 only recently started using swerve drives. They are only a year old in the team, being used for one game as of 2024.

The Iron Lions first used their swerve drive during a scrimmage in *Cedar Falls*. There they played one match before their swerve completely broke. With no swerve they could not drive and had to leave early. After this failure, the Iron Lions put more focus on proper assembly techniques and developing spare parts lists and learning how to better repair minor problems. Despite their failures, the Iron Lions continued to improve.



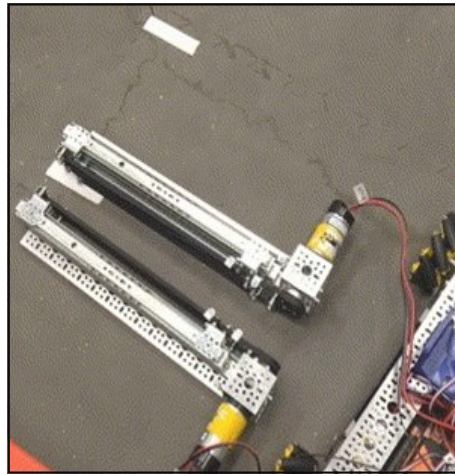
Drive Training

After their time at the off season Clash of the Corn event in Dubuque Iowa, the Iron Lions decided to put more focus on drive training. During the event, it became very clear that they were not prepared enough to play the game at their best. So much more focus was put into drive practice for both new and old members. The hardware team even made a defense bot to help train drives to combat defenses. The main goal of the increased training is to better prepare potential drive team members for both this season and following years as students graduate.



10107 In Theory

Making Two Motors Move in Unison



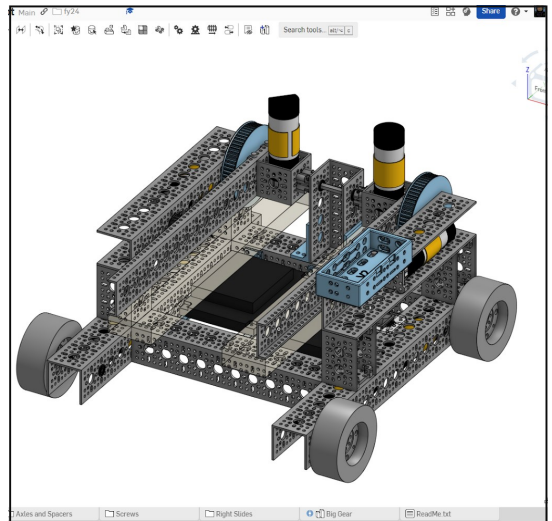
These slides will be mounted on the sides of the robot facing each other. The mechanism we use to grab game pieces will be mounted between them, and they share an axle with two motors that will pivot the whole thing up and down. These slides must always move together and their pivot motors must always move together.

Many small factors, such as manufacturing tolerances and slight voltage differences, caused these slides to move at slightly different speeds when setting their power. So we set their *velocity* instead. This feature of the FTC SDK

uses sensors in the motors to monitor how fast they are actually moving and adjust the power it is sending to make them exactly match each other's speed.

Simplifying CAD Models

Manufacturers often provide CAD models of their parts, and we use those to create a model of our robot as a precise plan for how we will build it and a way to take precise measurements. However, those models often have more detail than we need. In fact, it's too much - the model pictured above is so big that the model can only really be viewed on powerful computers, and not all of our team members can access such a computer.



The model pictured above is actually a simplified version that will even load in the Onshape app on our phones. We re-constructed certain components and removed small details that we don't need, but we retained the details we do need and made sure the components are still easily recognizable. These models are also easier to work with, since they are native to Onshape and are composed of Onshape features that we can easily edit. These changes have made it much easier to work on the CAD model of our robot.

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4150 Dark Matter

Food Drive

Although FIRST Tech Challenge teams do a **lot** of work with the robot, one of the main tenets and goals of FIRST Robotics is to increase the awareness of FIRST and of STEAM as a whole, and to display the tenets of the Core Values through supporting and servicing the community. This past month (September 28th - October 31st), Dark Matter ran a food drive to support our high school's food pantry and strive to support more students and families in need of proper nutrition. At various swim meets and orchestra concerts our team was able to showcase our goal while also at the same time explaining what Dark Matter was and more importantly, what FIRST Robotics stands for. In total, our team was able to collect almost 200 lbs. of food and collected 172 items for the food pantry. The picture below displays the food pantry which some of the members of the team helped to fill. Even though we as a team are focused on this season and the challenges laid ahead of us, we always strive to support and inspire others in numerous ways.

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4324 Lost In Time

Web Development Class at Hazel Point Intermediate School

Hazel Point Intermediate students recently had the exciting opportunity to dive into the world of web development, thanks to a coding class launched from a collaboration between Linn-Mar Robotics Team 4324 Lost in Time and the Linn-Mar High School Computer Science Club. This two-week after-school program introduced 5th and 6th graders to the essentials of HTML and CSS, allowing them to create and personalize their own websites. Guided by mentors Erich and Kushal of FTC 4324, the class covered the basics of web development in 4 hour-long sessions.

The students learned how to structure web pages, bring personality to their websites with styling, and ultimately worked on projects where, by the end of the sessions, each student had built a unique website reflecting their own interests and creativity. They faced challenges, such as learning proper syntax but persevered with help from their high school mentors. The class created a supportive, collaborative environment that encouraged experimentation and problem-solving. This programming initiative not only gave students practical web development skills but also fostered an early interest in STEM fields, preparing them for further exploration in technology!



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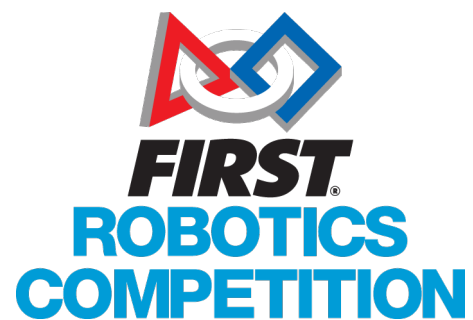
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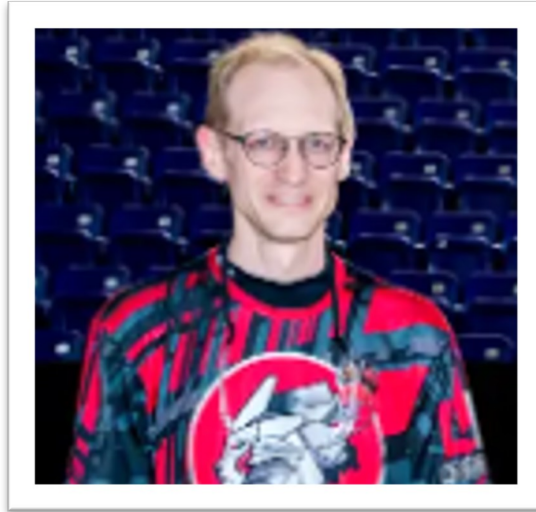
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Mentor Spotlight



DAN (NEMO) NIEMITALO

Dan Niemitalo is the current head coach for all four Linn-Mar robotics teams. He has been running Linn-Mar robotics for 17 years. He took over for the old head coach and founder, Ken Lough, after he retired. Mr. Niemitalo, who is known as Nemo, does a lot for the teams he coaches. He teaches CAD, helps come up with robot design, help come up with strategy, and more. Nemo is also responsible for administrative parts of robotics. He handles the budget to make sure students have proper parts and acquires proper transport for students during game season. He also attends nearly all the competition events. There he helps and shows his support anyway he can, whether by scouting, cheering the teams on from the stands, or helping drive teams come up with plans. At one event, in 2013, he was recognized for mentorship through the Woodie Flowers Finalist award. The Woodie Flowers Finalist Award is a student-nominated award through FIRST, recognizing mentors who show their ability to inspire students through motivational communication and spread their creativity to their students. Nemo is a cornerstone of all four Linn-Mar robotics teams through his teaching, leadership and his continued support of students.

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