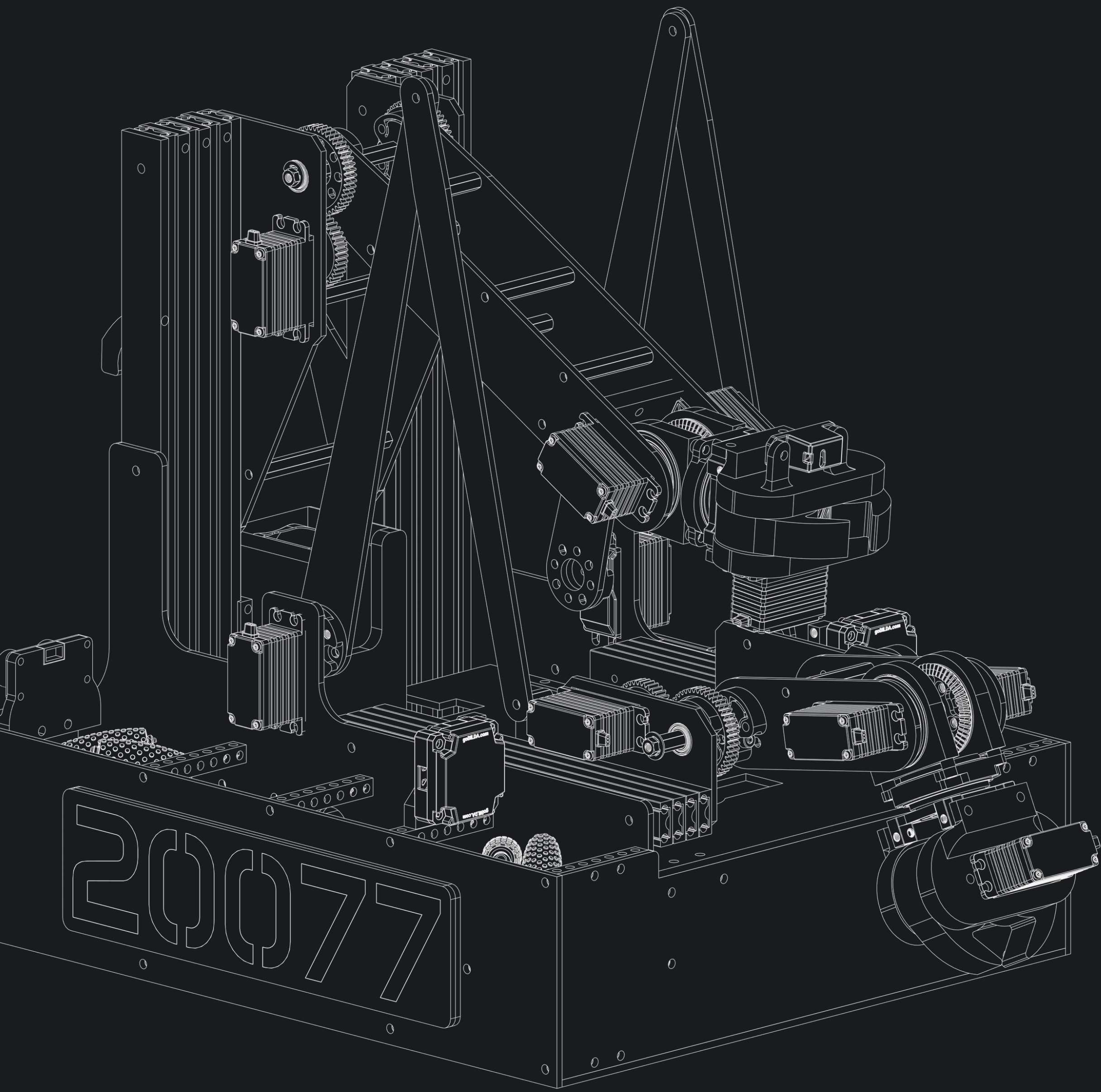
The Indubitables 20077

HORIZON



INTO THE DEEP

PRESENTED BY RTX

FIRST TECH CHALLENGE

FIRST 2025 CHAMPIONSHIP

PRESENTED BY BAE SYSTEMS

MEET THE TEAM

DRIVE TEAM | Operate with precision, speed, and teamwork.

BUILD TEAM | Push the limits of efficiency, durability, & maneuverability.

PROGRAMMING TEAM | Optimize performance with advanced control.

PORTFOLIO & MEDIA TEAM | Communicate, document, & promote.

COMMUNITY TEAM | Network, scout, bolster spirits, & motivate.

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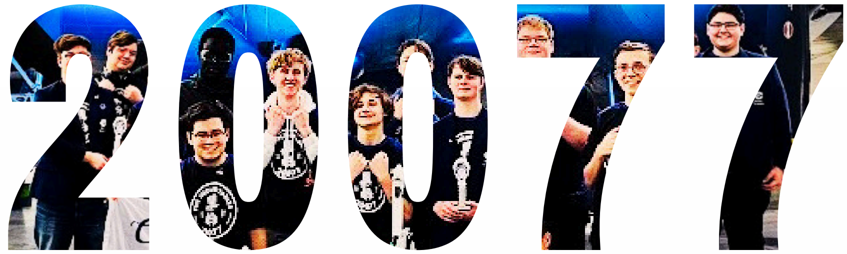


INTRODUCTION

We're **The Indubitables, FIRST® Tech Challenge Team 20077 from Omaha, Nebraska.** Since our start in the 2021-22 Freight Frenzy season, we've evolved from a group of confused high school freshmen into a collaborative, business-like, multi-grade level coalition organized into select departments and built from the ground up through rigorous trial and error (a core process behind engineering). We're all about the long-term sustainability of our team and are proud of how we've matured as leaders through local outreach and promoting FIRST® along the way.

Our passion for robotics goes far beyond the competition field. We **push the boundaries of design, build sustainable systems for future teams, and strive to make S.T.E.A.M. accessible to everyone** — both locally and globally. Whether we're mentoring other teams, driving innovation, or growing Nebraska's robotics community, we're dedicated to leaving a lasting impact on the FIRST® community and beyond.

GUIDING PHILOSOPHY | R.I.S.E.

Reflect
We strive to be observant at all times, in all instances, and learn from past experiences, good or bad.

Innovate
Creativity is one of our forefront skills and main pillars of our team.

Solve
We value the engineering process and strive to find new ways to achieve success through trial and error.

Elevate
The FIRST® Tech Challenge is about more than robots—it's about community. We uplift others to ensure all teams have equal opportunities to succeed.

SOCIAL MEDIA

Our **YouTube** channel, **The Indubitables FTC**, has become a key platform for sharing tutorials, progress updates, and meet recaps with a global audience. This season, we expanded beyond our local community, building a strong digital presence and connecting with viewers worldwide.

- Grew from **30 to 630+ subscribers** in one season
- Accumulated **180,000+ total views**
- Logged **2,700+ hours of watch time**
- Attracted **40% global viewership**

Our **Discord** platform is a key channel for collaboration, allowing us to connect with other FIRST® teams globally, strengthen relationships within the community, and build connections.

- **Created the Unofficial Nebraska FTC Server** to support and connect local teams
- Engaged with the **Unofficial FIRST® Tech Challenge** community
- Contributed to **Official Pedro Pathing discussions**
- Connected with the **FIRST® Updates Now Network** for broader outreach

PROMOTING FIRST®

We understand the importance of promoting FIRST® by staying engaged in our community. Through hosting and attending events, we spread S.T.E.A.M. awareness while strengthening our networking skills to recruit new members and mentors.

RISING FRESHMAN SUMMER CAMP

Before the school year, we inspired incoming freshmen to join our robotics program by outlining what to expect during the season and the opportunities available through FIRST®.

AIR & SPACE SHOW

At the 2024 Defenders of Freedom Air & Space Show, we highlighted the impact of FIRST® and strengthened our ties with Metropolitan Community College.

CELEBRASIAN FESTIVAL

In May, we inspired young attendees at the Des Moines CelebrAsian Festival with exhibition matches showcasing our robot.

PROJECT POTENTIAL

We presented our robots, Eclipse and Solstice, at Alvine Engineering and IP Design Group, showcasing our team's innovations.

NEWS FEATURE

In September, KETV, Omaha's leading news provider (average reach of over 38,000 viewers), featured our team's journey, goals, and lessons learned, spotlighting the city's S.T.E.A.M. programs.

Hosting a Camp

Air & Space Show

CelebrAsian Festival

Engineering presentation

Segment on KETV

Teaching Peers

We're not using kids to build robots. We're using robots to build kids.

– Dean Kamen, FIRST® Co-Founder

OUTREACH

MENTORING

HELPING OTHERS

Our goal is to help everyone compete at their best. We collaborated with a large variety of teams in our local community, such as when we helped "Space Blankets" with their robot before qualification matches, provided Misumi belted slides to "N-Bots", and assisted "Rebel Robotics" with a 26-hour 3D print. We also encouraged our freshman team, "Crashouts", to complete their robot and continue their season.

INSPIRING S.T.E.A.M.

"'Paying it forward' is central to FIRST®, and we strive to share our passion for S.T.E.A.M. through community, regional, and international outreach. We've **hosted camps** to introduce aspiring engineers to basic and advanced robotics techniques. Our goal is to continue applying and sharing the skills we've gained, employing "Gracious Professionalism" in competition and beyond as an example to those around us.

BUILDING FIRST® NEBRASKA

With the support of our Program Delivery Partner, Randy, other local teams such as Rebel Robotics, and Metropolitan Community College (MCC), we **reinstated Nebraska as a FIRST® region after eight years.** Over the summer, we recruited teams statewide and secured funding through MCC to help them compete. We **hosted two of Nebraska's six events** at our school and **mentored six sister teams** from our school. Together, we **earned 14 awards** at Nebraska State Qualifiers and State.

In March, we attended the **Nebraska FLL State Championship** and showcased our robot. We demonstrated our design, highlighted the techniques we used, and shared insights on teamwork and problem-solving. It was a great opportunity to promote FIRST® and inspire the next generation of innovators.

ROBOT DESIGN

HORIZON

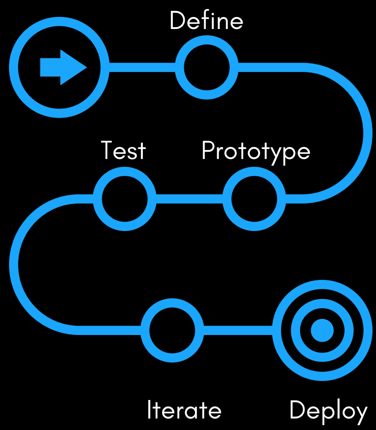
INTRODUCING...HORIZON

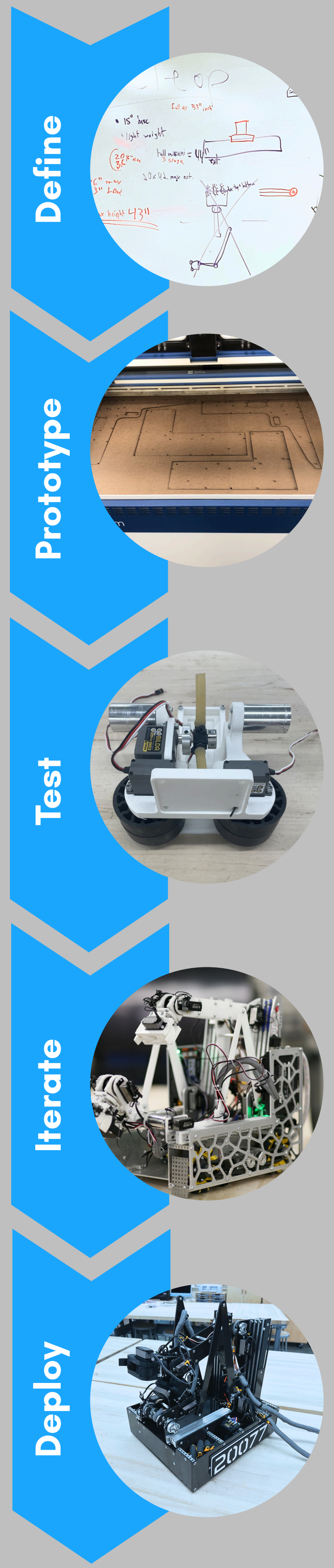
"*Horizon*" is our vision for the most efficient design in this year's FIRST® Tech Challenge season, INTO THE DEEP. *"Horizon"* features:

Custom lightweight drivetrain - Designed for agility & efficiency
Carbon fiber components - Ensuring strength & minimizing weight
Multiple power transmission types - Max performance & versatility
Two differential wrists - Geared for extra speed & torque
High-speed linkages - Enabling smooth horizontal extension
Belt-driven vertical extension - For precise & reliable movement

DESIGN PROCESS

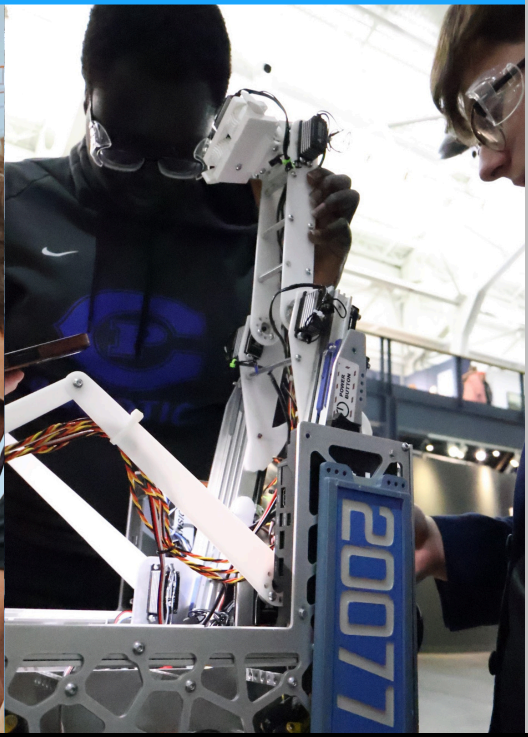
Our design process **prioritizes simplicity**, focusing on **efficient and reliable solutions.** We avoid intricate designs prone to failure, ensuring our robot performs optimally and remains easy to maintain.





DIGITAL DELINEATION

We highly value the use of CAD (Computer-Aided Design) as a key tool in streamlining our design process, improving precision, and creating cost-effective solutions. Our primary CAD software is **Fusion 360**, which offers a wide range of features that support both the design and testing of components. One of the most effective tools we use is the **stress analysis feature within the manufacturing section,** which allows us to identify potential weaknesses in a design and address them early — before any physical prototypes are made. This proactive approach not only helps us optimize performance but also significantly reduces material waste and costs.



DRIVETRAIN SUBSYSTEM

REQUIRED FUNCTIONALITY

- Efficiency in power
- Swift holonomic motion around the field to aid in efficient scoring
- Strength and security against external force

Exhibit 1: Dead axle

Exhibit 2: Carbon fiber

DEAD AXLE (EXHIBIT 1)

Dead axles in our drivetrain **reduce the energy needed** to power our wheels, **lowering power consumption by 30%**. They also provide **less strain** and **more safety** to the motor shaft and gear health by not directly powering them.

CARBON FIBER (EXHIBIT 2)

Carbon fiber side plates enhance our drivetrain by providing **exceptional strength-to-weight ratio**, ensuring **durability** without adding **unnecessary mass**. This rigidity improves structural integrity, minimizing flex under load while maintaining a lightweight frame for increased efficiency. Additionally, carbon fiber's **resistance to warping and impacts** makes it ideal for withstanding the rigors of competition.

GRIPFORCE MECANUM WHEELS (EXHIBIT 3A, 3B)

We evolved our drivetrain design by switching from 96mm GoBilda Mecanum wheels to 104mm GoBilda GripForce wheels**.** This decision was based on several tests comparing the speed of both wheels on a test drivetrain. We found that the **GripForce wheels increased the forward top speed by 8.3%** and **improved acceleration by roughly 10%.** The GripForce wheels helped us **save approximately 2.5 seconds during autonomous** (graphs are in cm/sec and sec).

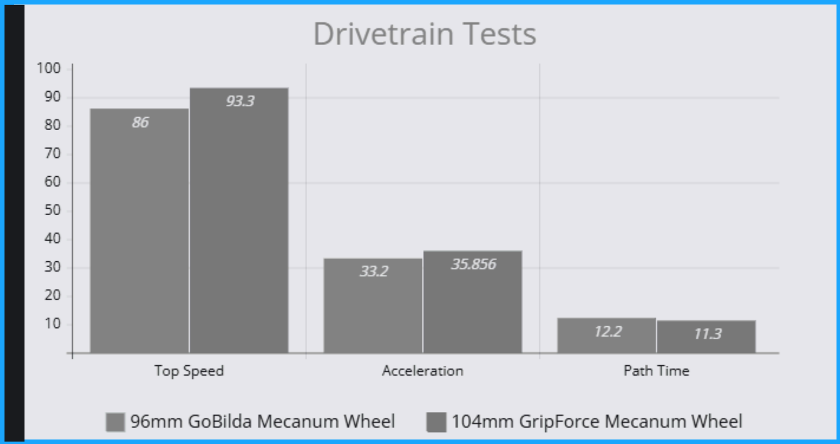


Exhibit 3a: Drivetrain tests

REQUIRED FUNCTIONALITY

- Collect samples from the field and submersible quickly and with high precision
- Transfer to the outtake mechanism reliably
- Ability to grab samples from the submersible in multiple different positions

PRIMARY DIFFERENTIAL CLAW (EXHIBIT 4)

The differential claw integrated into our intake system allows for **reliable sample retrieval** from the submersible, **regardless of orientation or positioning.** This is achieved through a dual-gear mechanism, where two independently controlled gears drive a smaller constrained gear, allowing synchronized pivoting from both sides. This design enhances our adaptability when grabbing and the claw's grip stability, ensuring efficient sample acquisition in dynamic environments.

Exhibit 4: Differential claw

SERVO EXTENSION (EXHIBIT 5)

After designing early prototypes, we realized that a motor powered extension would not be necessary for this game. We could instead use **servos to convert angular movement into vertical movement.** Our first design used a scissor design. We switched to a two bar design, as the scissor had too much friction, causing the extension to be too slow.

Exhibit 5: Servo Extension

Using the formula below, we were able to **optimize the servo positions and power to reach our maximum extension in as little time as possible.** T = our extension time, 0.1118 seconds. R = servo hub radius, x inches. Theta = angle rotated, 70 degrees.

$$\frac{r\Theta}{t^2} = a_{In}$$

GEARED PIVOT SHAFT (EXHIBIT 6)

We utilize a **geared shaft powered by a single Axon Max** in order to pivot our differential claw. We decided to gear the pivot because previously, we mounted the pivots directly onto a servo spline, which led us to damaging multiple of our servos due to all of the stress being put on the spline of the servo.

Exhibit 6: Geared Pivot Shaft

OUTTAKE SUBSYSTEM

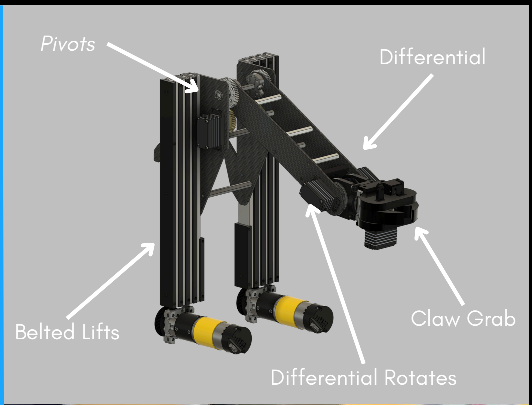


Exhibit 7: Robust Arm

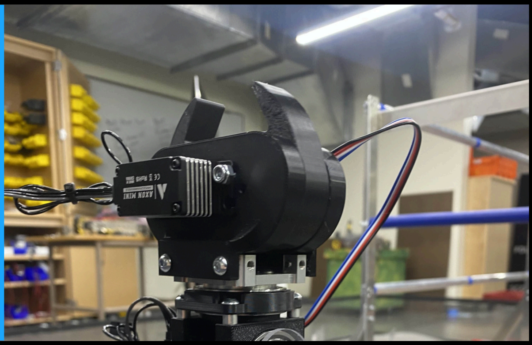


Exhibit 8: Secondary Differential Claw

REQUIRED FUNCTIONALITY

- Score samples in a high basket and specimens in a high chamber
- Reliably transfer samples from intake
- Function as well in Autonomous as TeleOp
- Achieve level two ascent on the low rung or high rung
- Be optimized for our Drive Team

ROBUST ARM (EXHIBIT 7)

Simplicity was the focus when designing our outtake arm. We prioritized **consistency and reliability** when designing the assembly. We used two custom plates of Carbon Fiber cut on our CNC Router with aluminum standoffs to be sturdy and dependable while getting specimens off the wall as well as receive contact from other robots during match play.

SECONDARY DIFFERENTIAL CLAW (EXHIBIT 8)

You may have noticed that we utilize the **same differential claw for both our intake as well as our outtake.** We utilize this design because it **enables us to score specimen on the high chamber without having to turn our robot 180 degrees** to a different heading, saving us time during Autonomous and TeleOp periods.

GEARED OUTTAKE PIVOT

To minimize the strain on our servos, we decided to install different gears to lessen the pressure on the mechanisms. The **40:36 gear ratio** we use for cycling both samples and specimens greatly **heightens our reliability and consistency.**

$$RPM_{servo} = \omega_{servo} \times 2\pi/60 \approx 1.19 \times 9.55 \approx 11.4 \text{ RPM}$$

BELTED OUTTAKE SLIDES

This season, we made a unique design choice that sets us apart from most teams: we use a **slide extension system with 4x SAR230 Misumi slides powered by a GT2 belt and pulley.** We chose GT2 belts because they **can handle more torque and torsion than string.** Unlike string, belts don't stretch over time, which reduces the need for regular maintenance. Additionally, while string often requires multiple spools, a belt system can operate with just one pulley and one set of belts.

VISION (EXHIBIT 9)

We use a **Limelight camera with a fully custom neural network** to detect and memorize the entire submersible in auto. We trained our neural network with **over 6,000 training images** to recognize samples in any environment. We can use the map of the submersible to rotate our intake claw to match the orientation of a selected sample. We also have the camera offset 5 inches left and 19 inches backward from where the claw is at max extension, so we have to account for that inside of our code.

LIFT CONTROL

We use a **PIDF controller for our outtake lift,** which allows us to correct for error reported by the motors' encoders:

- **Kp (Proportional),** Brings the system closer to the target
- **Ki (Integral),** Accounts for accumulation of errors over time
- **Kd (Derivative),** Dampens the output power, in order to eliminate sudden, jolting movements
- **Kf (Feedforward),** Accounts for a constant force, like gravity

We use **motion profiling** to move our robot smoothly and consistently by limiting acceleration, deceleration, and velocity. Unlike capping PID output, motion profiles define a gradual trajectory for the reference point over time. We used a **trapezoidal motion profile,** with acceleration, cruise, and deceleration phases, for more controlled and reliable motion.

LOCALIZATION (EXHIBIT 10)

We use **four-bar odometry pods and a Pinpoint from GoBILDA.** The four-bar design of the odometry pods allows us to always track our position, even if we tip to the side. We can convert the "ticks" of the pods' encoders into inches. Combining this with the IMU from the Pinpoint, we can use a pose exponential method of localization - a way of turning movements from the robot's coordinate frame to the global coordinate frame.

ULTRASONICS (EXHIBIT 11)

We use **ultrasonic sensors** to align our robot with the field walls, ensuring **consistent specimen grabs** from the observation zones and precise positioning for scoring. By averaging the distances from the two ultrasonic sensors to nearby walls, we can correct our position in real-time, ensuring proper alignment of the outtake system and that the robot is square to the goal. This reduced reliance on odometry and improved the consistency of our autonomous routines.

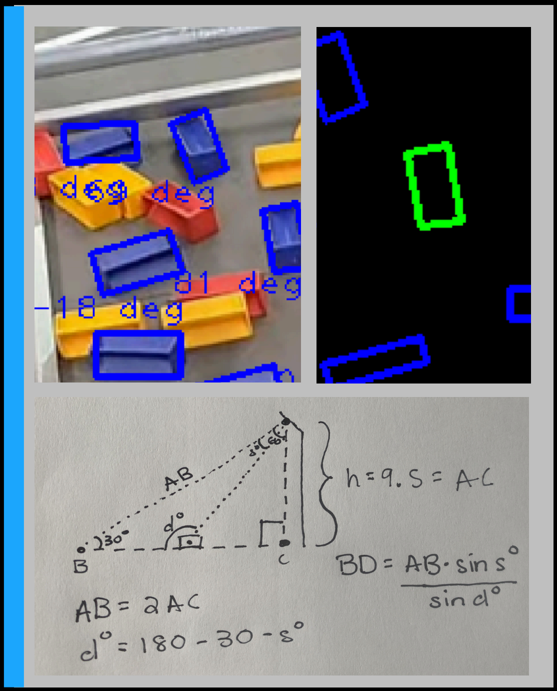


Exhibit 9: Vision

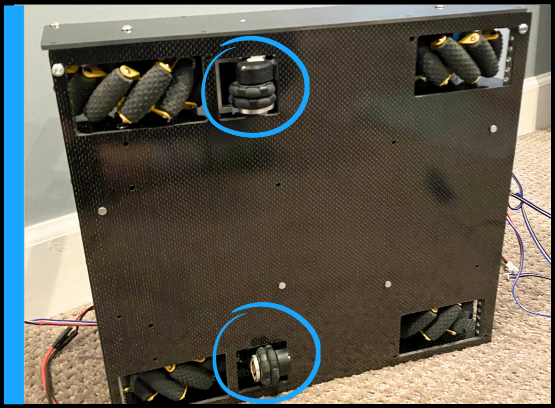


Exhibit 10: Localization

Exhibit 11: Ultrasonics

PEDRO PATHING (CONT.)

FIRST® TECH CHALLENGE SDK

The FTC SDK Development and Management team approached us to collaborate on integrating PedroPathing into the official toolkit. As co-leads of this initiative, **we worked with them to make PedroPathing available for all FTC teams**. **Since the SDK is required for every robot, this expands PedroPathing's use to all teams,** enabling compatibility with both Blocks and OnBotJava. **Thanks to our efforts, every FTC team can now leverage PedroPathing, enhancing their path-following capabilities and robot control.**

PEDRO PATHING LIBRARY

Our team has worked to make Pedro Pathing accessible to now be used currently by over 1000 teams around the world. Along with Aarsh, one of our mentors, we created comprehensive, continually updated documentation covering everything from the basics of Pedro Pathing to general FTC tutorials, as well as covering how to create an advanced autonomous. We transformed Pedro Pathing from being a mono-repo quickstart – which caused issues with version maintenance, manual updates by individuals instead of the development team, and changes to critical files affecting functionality — into **a streamlined library that supports centralized updates and easier management.** This transition results in a faster update process for users, reduces bloatware in teams' repositories, and improves the overall performance and scalability of the system.

FASTEST PATH ALGORITHM

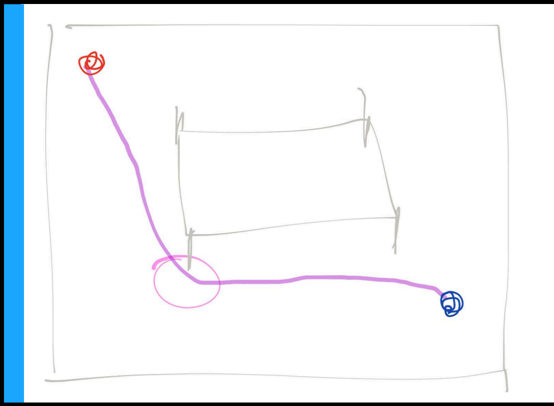


Exhibit 12: Field GUI Generalization

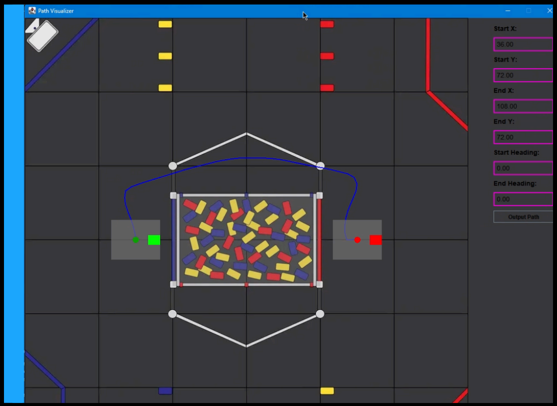


Exhibit 13: Heading-based Bezier design

OPTIMIZING EFFICIENCY (EXHIBIT 12 & 13)

In collaboration with Team 12808 RevAmped Robotics, **we developed an algorithm to find the fastest route between two field positions,** optimizing speed and efficiency. Exhibit 12 and 13 show a brainstormed hand drawn design and a coded prototype.

HOW TO USE

To use the algorithm, input robot values like velocity, angular velocity, mass, friction, and dimensions. Then, set the clearance from the submersible and border wall, and choose the start and end positions on the x and y coordinates.

The user can choose from three heading interpolation options:

- **Constant Heading:** The robot maintains a steady course throughout the path.
- **Linear Heading:** The robot gradually adjusts its heading to follow the course.
- **Tangential:** The robot continuously adjusts its heading for smoother, more flexible navigation.

After setting these parameters, the algorithm calculates the fastest path. The resulting Bezier curve(s) can be exported for implementation in the robot's autonomous routine.

ABOUT PEDRO

Pedro Pathing is a reactive **vector-based path follower** that accounts for positional and rotational error when following a path by using three different PIDFs: Translational, Heading, and Drive. It is faster than Roadrunner, the other most commonly used follower, which is a motion-profiling follower. It allows for **unrestricted speed**, since it can correct for error. The main difference between Pedro Pathing and Roadrunner is that Pedro Pathing is more responsive and adaptive to positional and rotational changes in real-time, offering faster corrections and more fluid movement through dynamic environments.

ERROR CORRECTION (EXHIBIT 14)

- **Translational** corrects for lateral deviation, keeping the robot on course
- **Heading** adjusts for angular discrepancies between the robot's current and target heading
- **Drive** powers the robot along the path, ensuring the motors maintain the correct velocity for effective movement. It controls the speed of the motors to ensure consistent and accurate navigation throughout the path

BEZIER CURVES (EXHIBIT 15)

A Bezier curve is a **smooth, continuous parametric curve defined by control points (P_x).** The first and last control points are the curve's endpoints, while intermediate points shape the curve without lying directly on it. This structure gives Bezier curves predictable behavior, offering more precise control than splines. Unlike splines, which approximate a path with multiple segments, Bezier curves provide a more direct, smoother, and controllable trajectory.

HOLD POINT (EXHIBIT 16)

Before developing the Hold Point feature, collisions or hits would cause the robot to lose its position and deviate from the intended path, leading to inconsistencies in performance. **We created Hold Point to quickly correct the robot's position after any impact, ensuring it returns to the correct path.** This is especially useful when scoring or collecting specimens, as it eliminates discrepancies between runs and maintains consistent performance. **As admin developers for the Pedro Pathing project, we integrated error correction algorithms to make this feature effective in real-time, even after disruptions.**

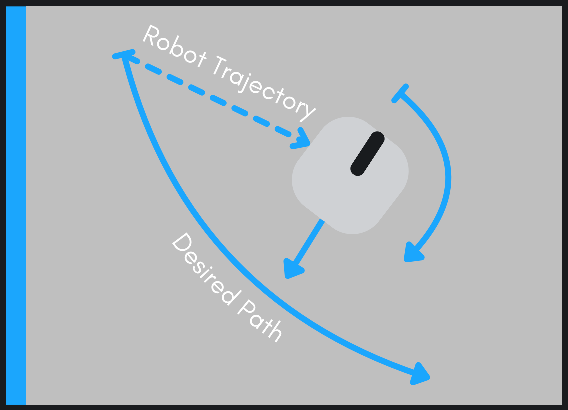


Exhibit 14: Error Correction

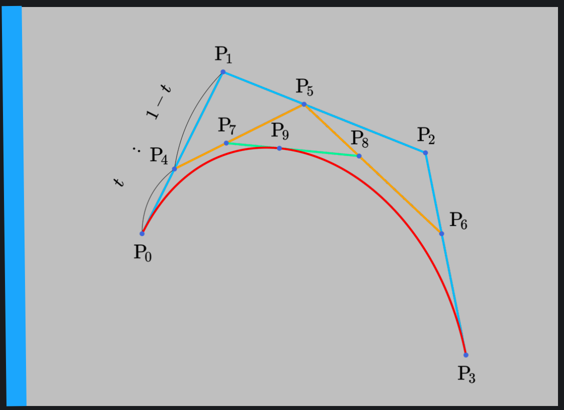


Exhibit 15: Bezier Curves

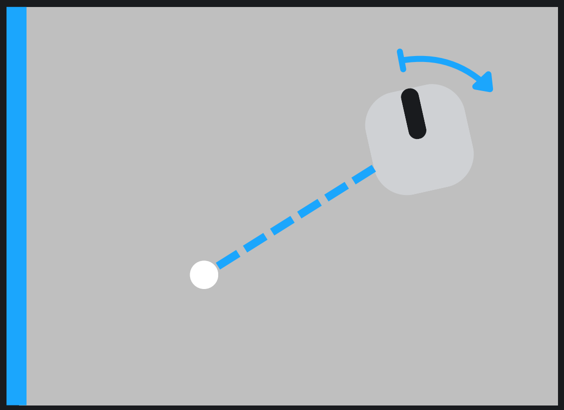


Exhibit 16: Hold Point

GAME STRATEGY

AUTONOMOUS STRATEGY

Our autonomous strategy involves preloading and scoring another specimen while grabbing a sample from the submersible each score cycle, then sweeping three samples into the observation zone. While doing so, our human player clips the samples in the human player zone. We then cycle grabbing and scoring specimens, **scoring a total of seven specimens in the match**, combining all of our sensors and subsystems.

TELE-OP STRATEGY

SPECIMEN

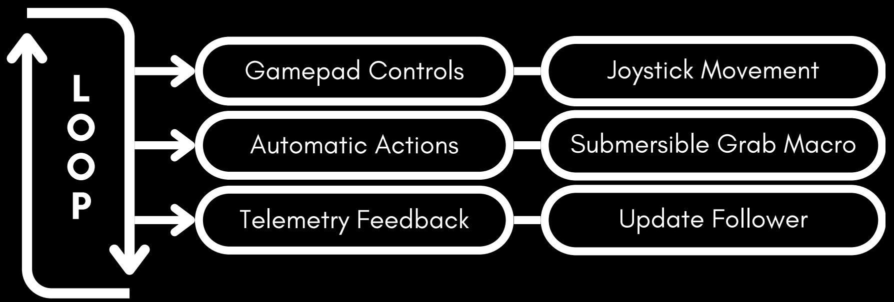
To collect samples from the submersible, **we use servos to power our extension to cycle as fast as possible.** A **differential wrist** geared up for speed is used for our intake to address the need for high level adjustability when grabbing the randomly assorted samples from the submersible. Lastly, when scoring specimens, to limit the amount of turning necessary in autonomous and TeleOp, we have a **long & light outtake arm** to help us achieve blazing-quick cycle times when scoring specimens by providing reach when grabbing and scoring.

SAMPLE

Our strategy adapts based on alliance partners, which is why we also have the ability to score samples as well. We were able to **cut down the RPM of our lift motors** needed to score samples quickly because of our long outtake arm which allows us to reach the bucket quickly without much extension from the slides. The low RPM also allows us to achieve Level 2 Ascent with the extra torque of the motors.

TELE-OP SETUP

We run commands to control and get feedback from our robot...

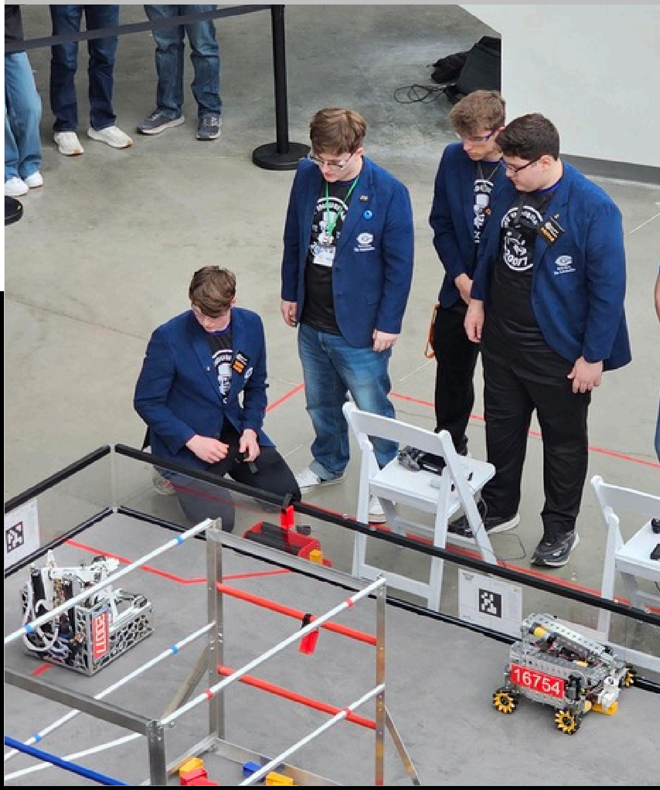


PEDRO PATHING IN TELEOP

In TeleOp, Pedro Pathing can be used to enhance control and precision while following predefined paths with minimal manual intervention. The reactive nature of the path follower allows it to dynamically adjust to slight changes in the robot's position, offering better adaptability in real-time scenarios where obstacles or slight misalignments may occur.

By utilizing the three PIDFs (Translational, Heading, and Drive), the robot is capable of maintaining high performance while responding to quick changes in direction or speed demands during TeleOp.

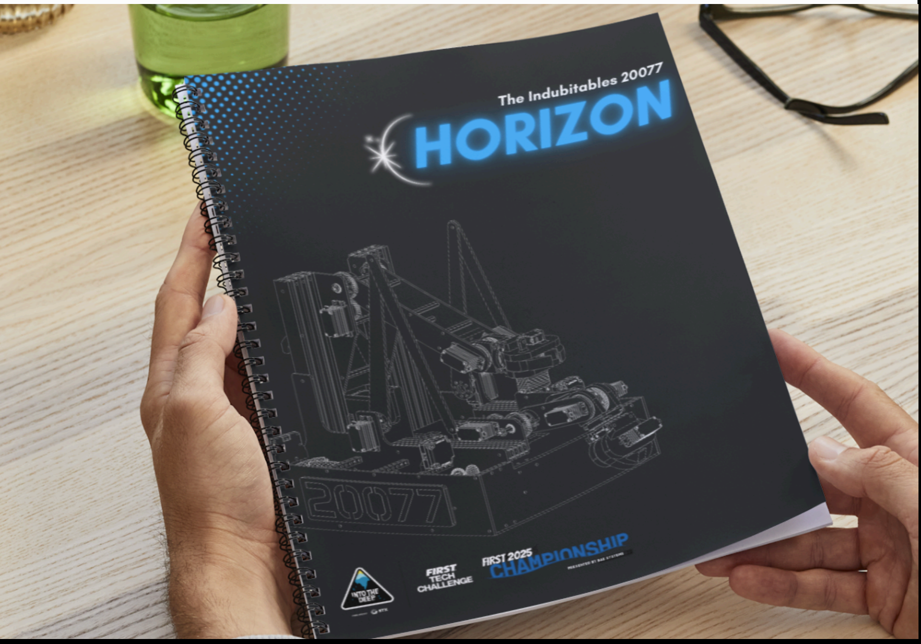
This results in smoother, faster, and more accurate movements, reducing the strain on the operator and increasing overall efficiency during competition.



A CONTINUOUS EVOLUTION

Our portfolio is more than just a document—it's a reflection of our growth, collaboration, and commitment to sharing our story. Using our guiding principle, R.I.S.E., we saw each phase of our path to Worlds as an opportunity to enhance our work.

- **Reflect:** We began by reviewing past portfolios, identifying areas for improvement. Our goal was to document our progress in a clear, engaging way, so we focused on key messaging and visual elements that would best communicate our journey.
- **Innovate:** As we moved forward, we continued to develop our approach, finding the use of Canva effective for collaborative creation. This tool allowed us to work in real-time with mentors and teammates, ensuring constant iteration and refinement.
- **Solve:** With each iteration, we worked to brainstorm design challenges by learning and applying design principles such as visual hierarchy and typography. This allowed us to communicate our achievements effectively and ensure clarity. By the time we reached Worlds, our portfolio was polished and cohesive, accurately reflecting our technical skills and our values of Gracious Professionalism.
- **Elevate:** We remained insistent on creating a final portfolio that was polished, cohesive, accurately reflected our technical skills, and highlighted our core values.



VIDEO & PHOTOGRAPHY

The Media Department played a vital role in documenting our team's journey throughout the season. They were responsible for **capturing every moment,** from competition matches to behind-the-scenes activities, ensuring that our team's progress was visually recorded and shared with our community. In addition to their photography work, they also created **sizzle reels for our YouTube channel, offering exciting recaps of our milestones and achievements.** These reels helped us engage with our audience and showcase our story to a global community.

As the season progressed, the Media Department continuously enhanced their skills in photography, film, and video editing. **They honed advanced techniques in both photo and video editing**, enabling them to produce polished, professional content that clearly communicated our team's progress and accomplishments. Their dedication to refining their craft and capturing the essence of our journey helped promote our mission, connect with other teams, and inspire future innovators.

COACHES & MENTORS

COACHES

Our coaches are the foundation of our team, offering their time, expertise, and encouragement to help us grow and succeed. We wouldn't be here without their support.

Coach Rich

As our coach since our rookie season, Coach Rich has provided invaluable insight into what it means to be a team in FIRST®. He guides us in technical and collaborative aspects, showing us how to manufacture parts and start complex designs. His hands-on approach and dedication have shaped our growth, teaching us the importance of problem-solving and teamwork.

Coach Abby

A newer addition to the team, Coach Abby quickly became essential. She helps refine our speeches, keeps spirits high, and ensures we stay focused. One key moment was when we were close to a breakthrough in our autonomous program, but were running out of time. Coach Abby stepped in to monitor the lab before it closed, helping us complete the autonomous successfully.

Coach Greg

Coach Greg has volunteered countless hours watching the lab after school, allowing us to keep working on our robot. A memorable moment was when a part broke during a meet, and Coach Greg opened the lab to ensure we had the replacement in time for the competition, saving us from a potential first loss of the season. His dedication and support have been vital to our success.


Coach Rich


Coach Abby


Coach Greg

MENTORS


Aaron W


Aarsh


Andrei


Alison N

Aaron W - Engineer at Alvine Engineering

Aaron, an experienced architectural engineer, has helped ensure our robot complies with rules during brainstorming sessions and provided valuable insights into the robot's structural design.

Aarsh - Alumni of FTC Team 12869: Voyager 6+

Aarsh is our mentor from Northern California, and has been a constant source of advice, through guiding us in preparing for Worlds, suggesting robot improvements, and offering feedback on our portfolio.

Andrei - Alumni of FTC Team 19234: Byteforce

An alumni from Team Byteforce in Romania, Andrei now attends the Technical University of Munich studying Information Engineering. He advises with technical design and giving ideas for complex issues.

Alison N - Marketing Consultant

With a background in advertising and market research, Alison's expertise was crucial to our portfolio development. She was pivotal advising on design, content, layout, and overall presentation.

SUMMARY & APPRECIATION

Innovation and Engineering Excellence

We push the boundaries of robotics design, developing efficient, reliable hardware and software systems. Highlights include our drivetrain, differential claw, and servo extension, which provide flexibility, speed, and precision. We use Pedro Pathing, a reactive path-following system that outperforms traditional methods like Roadrunner with faster, adaptive corrections, improving real-time performance in both autonomous and TeleOp modes.

Impact and Outreach

In collaboration with local teams, we helped reinstate FIRST® Tech Challenge in Nebraska, hosting events and mentoring teams. Our outreach includes a YouTube channel with over 630 subscribers and 180,000+ views, engaging a global audience. We also support teams like Space Blankets and Rebel Robotics and contributed to several Discord servers to strengthen local and global connections.

Gracious Professionalism and Teamwork

We embrace Gracious Professionalism in all aspects, from hosting rising freshman camps to inspiring youth at the CelebrAsian Festival, fostering an inclusive environment for team success.

Continuous Improvement in Autonomous and TeleOp

Our Fastest Path Algorithm and advanced techniques like Bezier curves and heading interpolation optimize our robot's speed and efficiency, ensuring peak performance in varying conditions.

Mentoring the Next Generation

We're committed to maintaining team sustainability by preserving a multi-year structure. We'll also continue mentoring local teams, expanding our influence in Nebraska's robotics community, and promoting S.T.E.A.M. education through outreach, providing opportunities for new teams and students.

Leadership and Collaboration

Through collaborations like Team 12808 RevAmped Robotics on the Fastest Path Algorithm and as co-leads of the Pedro Pathing initiative, we drive innovation and teamwork. By integrating Pedro Pathing into the official FTC SDK, we're helping all FTC teams enhance their path-following capabilities.

Recognition and Thanks

We are deeply grateful for the mentors and coaches who have guided us. We'd also like to thank our primary funding sponsor, Kiewit, and our secondary partners, the Tomorrow Labs and Arby's Panda Inc. Importantly, we'd like to thank the Nebraska FIRST® coordinators for providing the support and resources that make competitions possible.

A special thanks goes out to all the teams we've had the honor of competing with and learning from. Their collaboration and spirit of innovation have made our journey truly rewarding.

FIRST® continues to inspire us to not just build robots, but to build a community. We look forward to continuing our journey and helping others.