Building the Future with Accu Components: Norwood Industries' FTC Journey

OUR TEAM

We are Norwood Industries, the No. 1 ranked UK First Tech Challenge® (FTC) robotics team.

Each year, our team of 12 students (aged 11–16) competes against more than 500 teams across the UK and over 5,000 teams globally. The challenge? To design, manufacture, and program a fully functional robot capable of completing a series of tasks set by the FTC game committee.

OVERVIEW

This season, we were proud to partner with Accu Components, who generously sponsored us with £250 worth of fasteners. These components were vital to assembling our robot, which includes over 1,000 fasteners and features five advanced subsystems—our most complex build to date.

DESIGN

At the start of the season, we were introduced to this year's game: Into the Deep.

Scoring strategies included:

- Collecting "Samples" from the Submersible and depositing them in the high bucket for 8 points.

- Or, depositing Samples in the Observation Zone where a Human Player clips them into "Specimens" and attaches them to Chambers for 10 points.

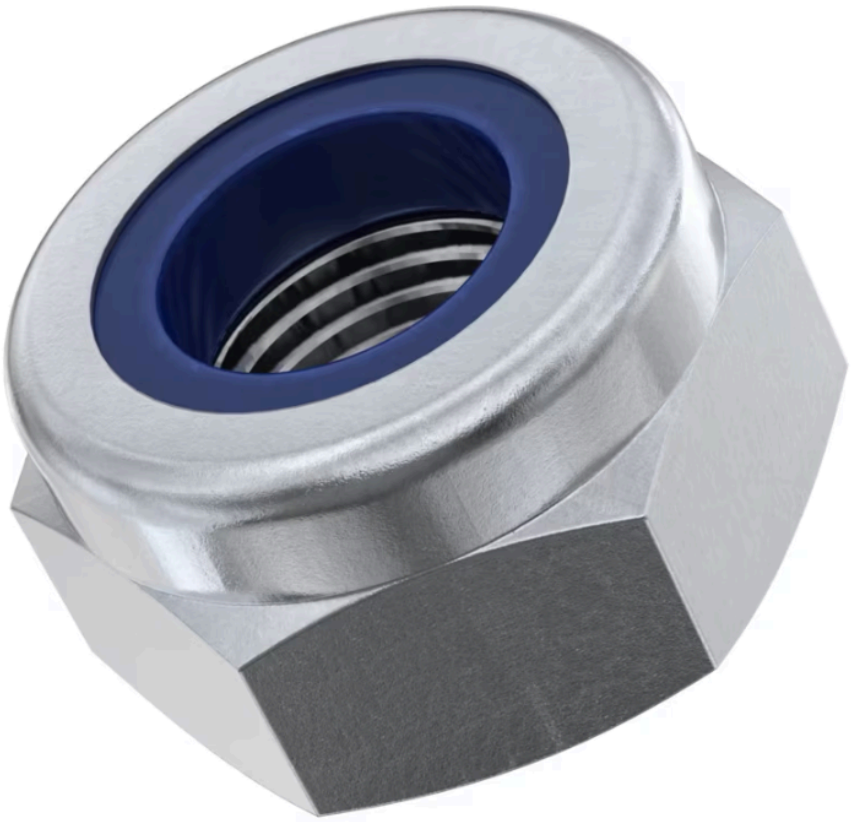
To maximize flexibility, we chose to design for both strategies.

Our design journey began with sketches of different intake and deposit mechanisms. After multiple design meetings and iterations, we settled on:

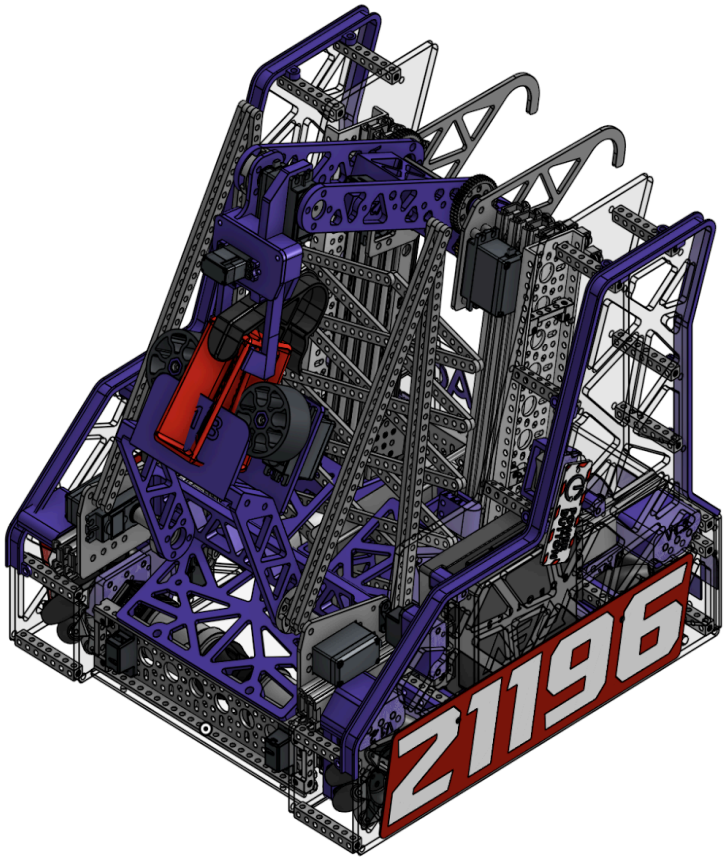
- A dual counter-rotating intake.

- A claw deposit system, capable of picking up specimens directly from the wall—eliminating the need for a transfer mechanism.

- We then moved into CAD, using Accu's part library to model components efficiently. This phase involved over 700 versions of our design document.

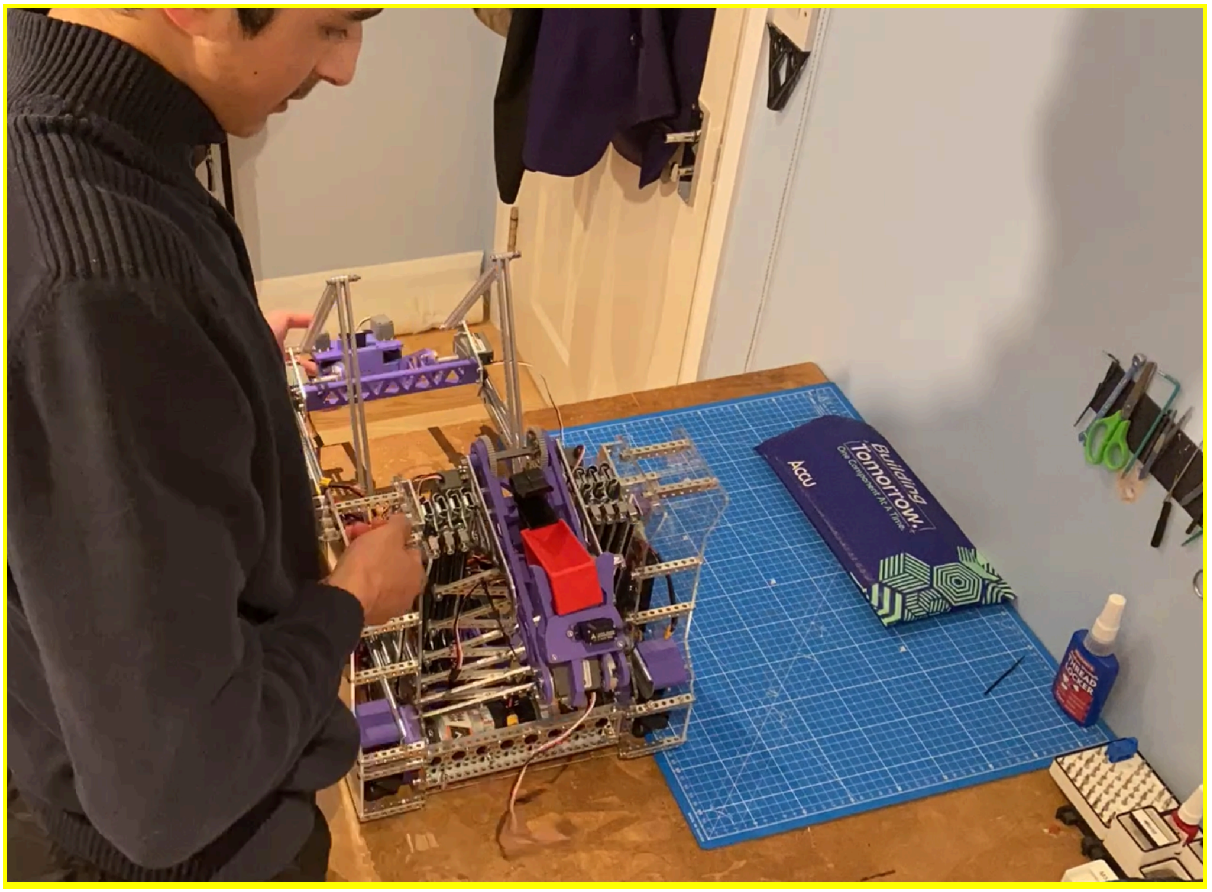


One of the standout fasteners in our build is the M4 Nyloc Nut (HNN-M4-A4). Unlike standard nuts, these feature a rubber ring that locks onto the bolt, preventing loosening due to vibrations—a critical feature for our moving mechanisms. This also reduced our reliance on Loctite, which can be messy, time-consuming, and incompatible with some plastics.



MANUFACTURING & ASSEMBLY

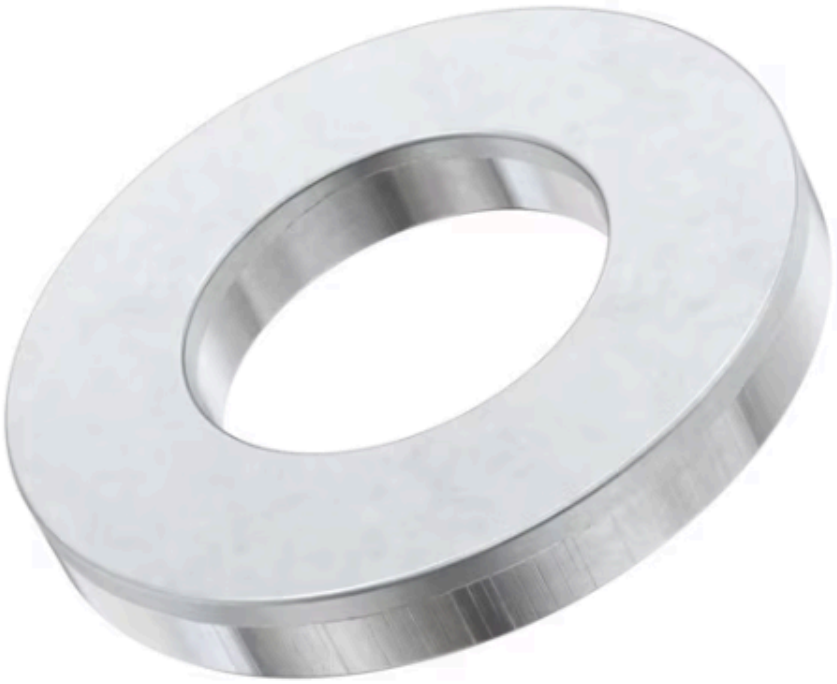
With the design finalized, we began building. The robot's main structure was laser-cut from 3mm clear acrylic using our school's laser cutter.



We also 3D printed over 300 parts, chosen for their precision and ease of modification. We inserted more than 400 threaded inserts using a soldering iron to ensure compatibility with Accu’s fasteners.

Thanks to 3D printing, we could quickly reprint broken or poorly fitting parts at minimal cost.

For off-the-shelf mechanical parts, we relied on suppliers like GoBilda, which provide downloadable CAD files to streamline integration.



Another essential component was the M4 x 9 flat washer (HPW-M4-A4). These distribute the tightening force of bolts over a wider surface area, preventing damage to softer materials like 3D prints. With over 400 washers in use, they've played a crucial role in ensuring reliability.

SCRIMMAGE & REDESIGN

By November, we were preparing for a Scrimmage—an unofficial, unscored event to test our robot on a real field and meet other teams.

At the event, we discovered that:

- Our intake struggled to pick up samples at an angle.
- The drivetrain was slow and couldn’t strafe efficiently.
- The linear slides and claw deposit worked well and were kept.

We decided to completely redesign the robot.

Our key improvement was switching to a parallel plate drivetrain—two modules, each with inner and outer plates. This made the robot significantly lighter and more maneuverable.

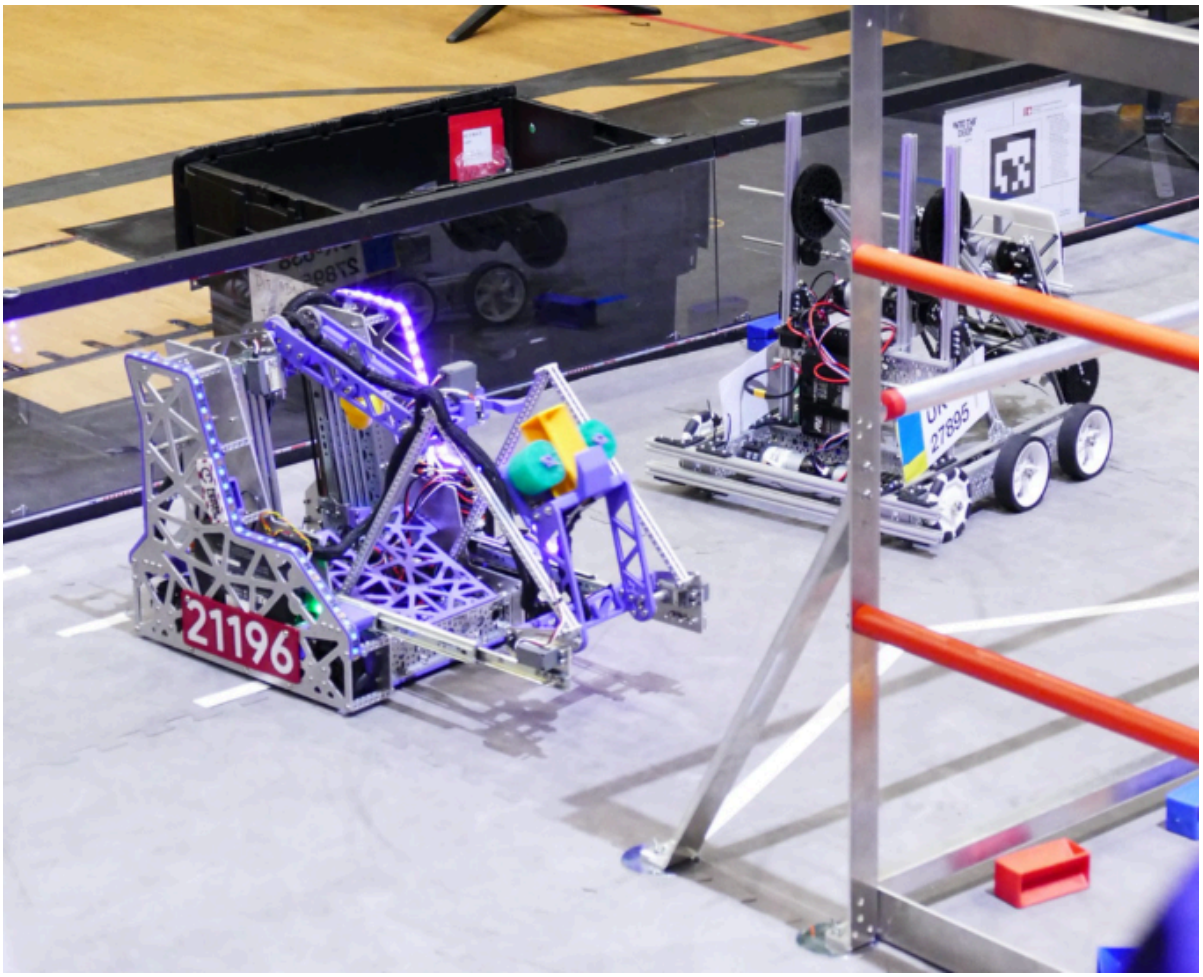
We refined our intake wheels with a more aggressive tread pattern and printed them in TPU, a flexible, rubber-like filament that improved sample pickup.

After two months of redesign, we built the new robot. Initial school tests showed a dramatic performance improvement, prompting us to reinforce key areas with aluminium panels.

We also reached out to Blackout Robotics, an alumni team, who generously machined our hang hooks and intake plates—further boosting durability and strength.

QUALIFIER EVENT

After months of hard work and multiple redesigns, we arrived at our Qualifier Event—our one shot at advancing to the UK Championships.



We went undefeated during our 5 qualification matches, setting four consecutive UK national records in TeleOp and securing a spot in the finals alongside Powercut Robotics. In the final, we again went undefeated, setting a new national record of 204 points!

We also received the Inspire Award—FTC's most prestigious honor. This recognized not only our robot's performance but also our extensive outreach, including:

- 40+ community projects
- Impacting over 2,000 children and 95,000 families nationally

- Releasing multiple open-source resources to help other teams

This success has advanced us to the UK Championships in June, where we're already considering a fourth full robot rebuild to push even further.

FUTURE GOALS

Looking ahead, we aim to:

- Win the UK Championships and join the winning alliance
- Earn the Inspire Award to qualify for the FIRST Global Challenge
- Recruit 6 new members from younger year groups to ensure the team's future

It's been an incredible journey so far, and we're just getting started. None of this would be possible without the support of Accu Components, whose fasteners quite literally hold our robot—and our dreams—together.

Thank you, Accu!

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