

THE SPARTAN RACER

NOVEMBER 2022

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The Lawrence Tech GP

Every year, Lawrence kindly hosts their Grand Prix, where various Formula SAE, Baja SAE, and Aero design teams can attend and show off their work. The event also features a small shootout-style competition for the Formula SAE teams.

After arriving and getting SR-22 started, the team passed technical inspection and the brakes on the first try before hitting the track. Since the Grand Prix was an autocross event, the team ran single laps all day, competing for the fastest lap.



Driver, Nick Coubard suiting up for the brakes test

The team's first driver for the day, Nick Coubard, took a few slow laps to warm up and get a feel for the track before pushing SR-22. After getting comfortable, Nick finished with a time of 34.63 s on his 4th lap, which stood as the fastest overall time for most of the competition.

Shortly after Nick's first stint, the team's next driver, Cal Walton, took control and quickly recorded a time of 35.95 s, which stood as the second-fastest overall time, allowing the team to stand with the top two times for most of the day.

After a quick tire change, review of system checklists and GoPro battery change, the team was ready to get back on track for Nick's second stint. Here, Nick would throw down some solid times, but none were faster than his previous one.

Before switching to Cal's next stint, the University of Illinois-Chicago jumped into first place with a time of 33.96 s as the day was nearing a close. The team quickly followed up and beat their long standing personal best with a time of 34.29 s, but it wasn't enough to knock off UIC.

With only about an hour remaining in the day, Nick hopped back in and was ready to reclaim 1st place. On the team's final lap, Nick was able to finish with a time of 33.68 s, which was adjusted to a 35.68 due to contact with a cone during the lap. He gave it his all on the track, and gave the team the best possible chance of winning.

This ensured a 2nd place finish for the team, and a very successful day. Leads and drivers were able to gain a final day of competition experience as the team hunkers down for the winter and begins to manufacture SR-23.



The 2nd place trophy atop SR-23

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System Spotlight: EV

Here is a showcase of the newest and most exciting system on MSU Formula Racing, EV Powertrain! With the teams upcoming transition, EV Powertrain has been full steam ahead, purchasing various components and preparing to assemble a test car for this upcoming spring. The current plan for the team is to assemble a completely working, rules compliant test car for this spring in 2023, so the team can be prepared to compete with the first competition ready EV car in spring 2024.

This test car will use the old chassis from SR-20, the reasoning behind this comes from the size of the cars monocoque, as it makes packaging much easier with the large EV components.



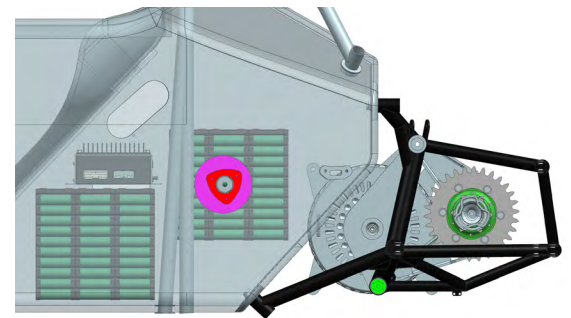
The Emrax 228 motor at the shop

The first two items on the teams checklist were the motor and inverter. New motors and inverters tend to be very expensive due to high demand. These prices lead the team to get in touch with Carnegie Mellon Racing, where the team was able to pur-

chase an Emrax 228 motor and Rinehart PM100dx inverter to be used as the heart of the test car.

After purchasing the motor and inverter, the team looked to the accumulator, which is essentially just Formula SAE terminology for a battery. The team ran lap time simulations to determine the energy consumption of the car and properly size of the accumulator. Through this information, the team eventually landed on 8.6 Kilowatt hours. This size should allow the team to comfortably finish an endurance, but will need to be validated in real life once the test car is complete.

The team is now looking to the next steps in the process, designing the low voltage harness and fitting everything in CAD. This is a very important process, as it is critical to follow every rule possible on this test car so the team gains experience and finds any issues that may arise during a competition with SR-24 in the future.



Packaging of the accumulator and motor in the SR-20 chassis

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Name: Rafael Abage
Role: Aerodynamics Lead
Hometown: Curitiba, Brazil
Major: Mechanical Engineering
Class Standing: Senior



Why did you choose to join Michigan State Formula Racing?

Motorsports has always been a great part of my life. I've always religiously watched Formula 1 races with my family, which became one of my greatest fascinations. After finding out about Formula SAE, I made sure that the university I was applying to had its own FSAE team. So when I came to MSU I knew exactly what I had to do – join MSU Formula Racing. Joining the team allowed me to find out what goes into the design and development of a racecar. More so, being part of the team has taught me how to manage my time better and changed the way I see project management.

What is your favorite memory from your time on the team so far?

Being part of this team has provided me with plenty of memories where we all laughed, had fun, and bonded as a team. Although my favorite memory comes from one of the team's most stressful moments last year; running against the clock to finish the car before the MIS competition. During those last days, all of us went above and beyond to get the car done. Showing me a lot about myself and my peers. Seeing everyone fight for the same goal, giving their all, really showed me how much of a family we are, and how important the team is for us all.

What do you find most challenging about being a member of the team?

The toughest part of being a member of the team is time management. Being part of this team comes with a handful of opportunities that you're only able to exploit if you're able to manage your time properly. Learning how to make good use of your time efficiently while in and out of the shop is almost as important as anything else we do out here. If you use up your time outside the shop poorly, chances are, you will have to cut down on your hours of sleep.

Name: Noah Benson
Role: Project Manager
Hometown: Bloomfield Hills, MI
Major: Mechanical Engineering
Class Standing: Junior



Why did you choose to join Michigan State Formula Racing?

Before coming to MSU, I competed in FIRST Robotics from a very young age, I always had a passion for hands on work and I knew from a very young age that engineering was the path for me. Upon arrival to MSU, I began looking for ways to get more involved and continue my passion for design and competition outside of the classroom. I stumbled upon the Formula SAE team and instantly knew it was the place for me, as I recognized the competitiveness of the team and dedication of the leads.

What are you most excited about for this upcoming racing season?

I can't even begin to explain how excited I am to make the transition to EV. These cars are incredibly quick, and I believe that they really take the competition of Formula SAE to the next level. It also makes me very proud that I am on the team during one of the largest transition periods in its history, and the work that I do will have a lasting impact on the team.

What are some of your favorite hobbies or activities outside of the racing team?

Outside of Formula SAE, I'd say most of my hobbies involve traveling, being outside, and watching sports. In the Fall, I do my best to attend football games with friends and family, as I've been going to MSU games my entire life, it's very fun to finally attend as a student. I also enjoy traveling up north, and specifically to the Upper Peninsula, I think the nature up there is consistently beautiful. I find getting out of the shop for a little very comforting, as it lets me come back stronger and ready to make more progress for the team.

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Name: Josh Frontiera
Hometown: Rochester Hills, MI
Degree: Applied Engineering & Supply Chain
Years on the team: 2009-2013
Roles: Project Manager (10-11)

How did you contribute to the advancement of Michigan State Formula Racing?

I joined the team in 2009 during my sophomore year. That year proved to be extremely challenging year for the team as we didn't finish the car in time for comp. The next year I became PM and my role effectively was getting the train back on the tracks. While it didn't come easily, I will always be proud of what the team accomplished that year by getting back to comp and improving our performance each year thereafter.



Josh with Tom Izzo before 2009 Midnight Madness

What is your favorite memory from the team?

If I had to pick one stand out moment, it likely was the moment our car finished endurance in 2010. That year was particularly tough for the leadership team. It was a rebuild year after failing to finish the car in 2009. The first carbon fiber monocoque was a challenge to say the least... seeing that car finish comp after 2 years of blood, sweat and tears with your teammates was a moment I'll never forget.

How did your experience as a member of Michigan State Formula Racing help shape your future

Whew – there is a lot to look back on! Learning how to overcome adversity, communicating effectively, time management, learning to be an effective leader... all experiences that were invaluable to how I show up today. However, one of the most significant impacts the team has made on my life wasn't in the form of a specific experience as much as it was the people I bonded with and built relationships with over that time. Those friendships are worth gold and to this day continue to mold the person I am and strive to be.

What is your current professional role?

I'm currently living the good life of unemployment! I've spent a majority of my professional career as a Supply Chain Manager for upstream Oil and Gas companies in Denver, CO. I'm back in the mitten taking some much-needed R&R through the holidays before jumping into the next gig



Josh and the team outside with car 71



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FOWLERVILLE PROVING GROUND

Name: FT Techno of America
Location: Fowlerville, MI

FT Techno of America, also known as FTT-A is a large vehicle testing facility in Fowlerville, MI. FTT-A is home to multiple tracks, including an oval track, a dynamic pad, NVH surfaces, and a low friction pad. The facility also has a 4,500 ft straight-away and spans over 950 acers.

FTT-A is a long term sponsor of the team, consistently providing the team with a space to come and test its newest creation year after year. Considering the size of the dynamic pad at FTT-A, the team is able to reach 4th and 5th gear, something that is not possible at the smaller parking lots in the East Lansing area. These higher speeds allow the team to validate various components on the car and gain information that otherwise would not be learned at smaller testing areas.

The team greatly appreciates the kindness of FTT-A, and is always excited to go to learn about and improve upon the current vehicle. Thank you for your contributions, FTT-A!



Name: Airtech
Location: Huntington Beach, CA

Airtech Advanced Materials Group was founded in 1973 by Mr. Bill Dahlgren, the company was founded as a distributor for vacuum bagging and composite tooling materials, primarily for the aerospace industry. In 1977, Airtech decided to expand towards the manufacturing side of the business, and in 1998, the company moved to it's current location in Huntington Beach, CA.

Currently, Airtech operates in various industries as both a manufacturer and distributor, the company brands itself as a "one stop shop" for all materials related to vacuum bagging, wet layup, and resin infusion materials.

Similar to FTT-A, Airtech has also supported the team for a number of years, providing various materials that make the teams advanced chassis and aerodynamics package possible. Airtech has kindly donated vacuum bagging materials for the team which will allow the team to lay up a new chassis this year. Thank you for your continued kindness and support, Airtech!

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