

A close-up photograph of a young male driver wearing a racing helmet with 'A CRIMSON RACING' branding. The driver has blue eyes and is looking directly at the camera. The helmet is black with green and red accents. The driver is wearing black racing gloves with 'OMP' and 'BORG' logos. The background is a blurred racing track.

# *A* CRIMSON RACING

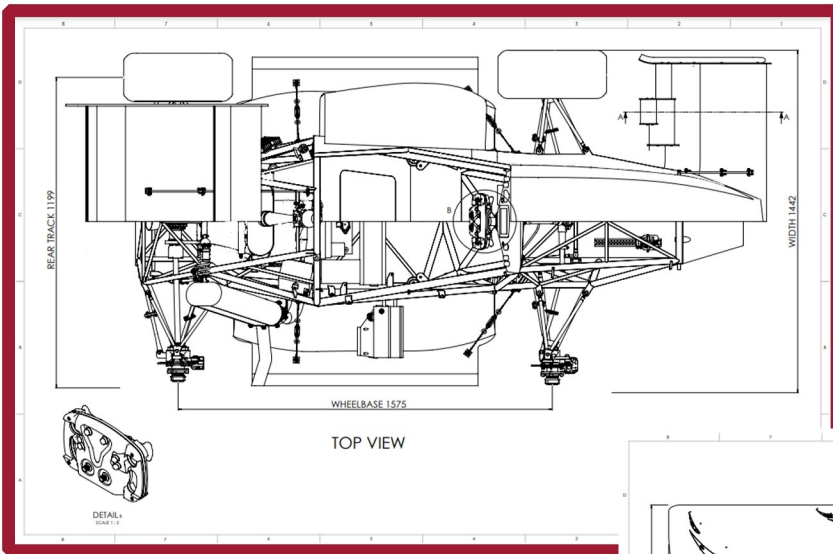
FORMULA **SAE**

*March 2024 Newsletter*

**Hello from Crimson Racing!** As competition approaches, we're excited to update you on our progress.

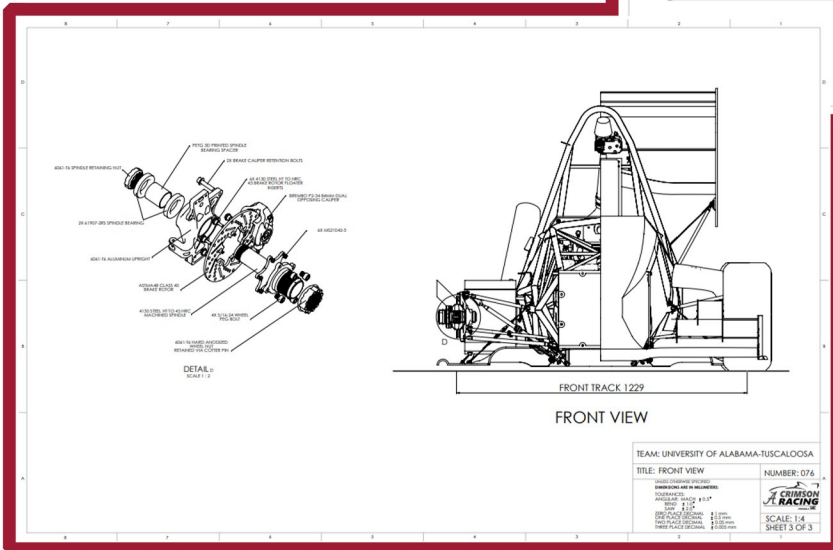
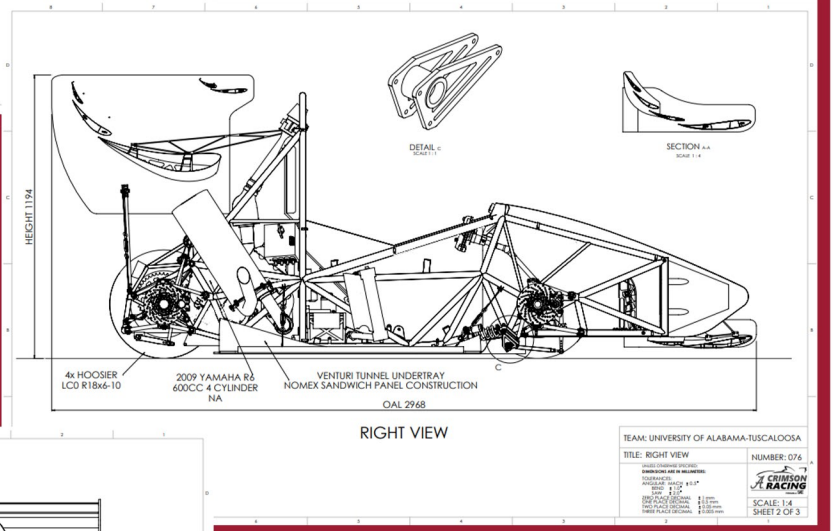
# Document Submissions

In preparation for competition, we have recently submitted our cost report, design briefing, and three view drawings. With the updated cost report guidelines, we have worked to make the report as accurate as possible. We have also made improvements to our three view drawings which can be seen at the end of this newsletter. And with the completion of the design briefing, we're looking forward to the upcoming design review!



**TOP VIEW**

**RIGHT VIEW**



**FRONT VIEW**

# Testing

At our most recent drive day, CR22 attempted multiple mock endurance tests to identify weak areas of the car in terms of reliability. On the first two attempts, there were a few problems that needed to be addressed such as an electrical connection with the steering wheel, drivers learning to adjust brake bias throughout the event, some issues with the shift tank pressure regulator, and steering effort due to caster. Once these were resolved, CR22 completed a mock endurance with consistently fast lap times.



Later in the day, some complications with the new spindles and how they interact with the wheel nuts were also identified. We also hit a new record for the acceleration event at 3.95s timed using GPS. Overall, the day was successful in identifying weak areas of the vehicle system, and many lessons were learned throughout the team at all levels. The team has been working hard this week to develop solutions to these issues in preparation for continued mock endurance testing with the objective of demonstrating the reliability of the vehicle.

# Paint Booth

The aerodynamics subteam was finally able to try out the new paint booth. This let them finalize the clear coating process for CR22's package. With clear side panels, any member can now observe the painting process without having to get into the booth. The simple inflatable setup resulted in a significant decrease in prep time. We are very excited to see how this will affect the manufacturing process next fall.

# Sidepod Ducts

This year we have been working to manufacture sidepod ducts to increase the amount of air flowing through the radiators. Expanding foam was used to cast the core of the duct molds, which were then trimmed to the car. Following that, the foam was coated in Bondo and sanded down to create a smooth blend between the inlet and the radiator surface.



Currently one mold is in the final stages of manufacturing with the other close behind. We hope to lay up on the molds within the next few weeks and will have an update for you next month.

# Torsional Stiffness Jig

We have made significant progress on our Torsional Stiffness Jig. The milling process for this component has been completed, along with the welding of upright towers. We are now awaiting the final assembly stage. This tool helps us understand our actual stiffness and can help us set targets for the future, allowing us to enhance future frame designs.



# Steering Wheel Manufacturing

We are also wrapping up manufacturing for our new steering wheel. The wheel has been redesigned this year to allow for interchangeable grips, which we expect to improve our ergonomics and overall lap times despite the slight increase in weight. It has a two-part construction of a structural carbon fiber sandwich panel flat plate and a vacuum-infused shell to protect the electronics. Hopefully, we can use what we learn with the interchangeable grips to make a lighter one-part version in the future.



## Custom Ergonomic Driver Hand Grips

We have molded new grips directly from the hands of our drivers, capturing their unique contours using a 3D scanner. Using the scan, we 3D printed the resulting molded grips which offer new comfort and control for our drivers.



# Bump Stops

The bump stops were tested for their spring rate curves using an MTS Exceed material testing machine. The machine compressed the bump stops at a linearly increasing load while measuring displacement. This test is useful for quantifying our exact vehicle wheel rate at every point in its travel, making our simulations and other calculations more accurate to the real world.

# New Welding Space

This past month, we set up a new welding space inside the shop. New welding curtains went up to protect bystanders from weld flash. In addition, it is equipped with two portable vent hoods to extract harmful gases created during the welding process. This new space will be used extensively for welding the chassis together, as well other suspension and powertrain projects. By creating a safe and reliable welding space indoors, our team will now be able to weld more efficiently and effectively. We're also excited to use this space to teach new members how to weld, an important skill for the future engineers of Crimson Racing.



# EV Updates

The EV Power Systems subteam is continuing to make progress on its test bench design. Most recently, the subteam has received their Sony VTC5A battery modules from ENEPAQ. The Accumulator Structures subsystem continues to work to design the internal and external structures of the accumulator container so these cells can be assembled safely on the test bench. Speaking of safety, we have placed the order for all personal protective equipment (PPE) needed to work in our high-voltage area including arc flash protection kits, insulated blankets, high-voltage gloves, and more. Members of the subteam are currently being high-voltage safety trained as well; thus, preparing them to work on active battery technology and to react quickly to any incidents that may occur.

# Crowdfunding

We were able to exceed our goal with a final total of \$18,975! We can't thank everyone enough for all of the support over the last month to help us create better engineers by giving them the tools they need!

# Go-Kart Drive Day

The go kart drive day was a big success for the new members. After a quick track-side alignment the kart hit the autocross course with freshly modified steering geometry, resulting in some much-improved handling through the tight corners of the course. After some blistering shakedown laps from one of our new members Kevin, the kart saw use throughout most of the rest of the drive day, rotating drivers while CR22 was in the pits. Towards the end of the day the kart experienced a clutch key failure, a valuable lesson learned in manufacturing tolerances and precision. With replacement parts ordered and backups waiting in the wings, the kart team is eager to improve.

## Member Spotlight: Zachary Halls

We would like to introduce one of our new members, Zachary Halls. Zachary is a freshman from Long Beach, California studying Aerospace Engineering. He is on the Powertrain subteam and has been helping to lead the Go-Kart project. Zachary has really enjoyed his time on the team, especially when working on the Go-Kart.

“The go kart project has been a really awesome learning experience because I've been able to get a ton of shop experience, leadership experience, and have met a lot of my fellow team members because of the support the subteams and leads have provided us. I've even gotten to get some time as a crew chief and run track operations while the kart is being driven, as well as suit up and get some time on track, which is something that I never would have guessed I'd be able to do as a first-year member.”

Zachary has really enjoyed the hands-on experience the team offers, as it has helped him apply classroom knowledge in real scenarios.



# Talladega

Crimson Racing will be showcasing CR22 at the Talladega Superspeedway. We will be located at the Midway before the NASCAR Cup Series Race on Sunday, April 21st. Fellow University of Alabama students can purchase their tickets through the college student ticket tab of the link. Then, any family, sponsors, and supporters of Crimson Racing can purchase their tickets through the supporters tab of the link!

<https://fevo-enterprise.com/group/Crimsonracing>



Overall, a lot is going on here at Crimson Racing and none of it would be possible without your help. Thanks for supporting our team and we look forward to updating you again as CR22 races toward competition at Michigan International Speedway, but first we have a stop at the Formula South Invitational. The best way to stay updated will be through our social channels!

Until next time,

Roll Tide!





Sunday, April 21st 2024



# CRIMSON RACING



- \$35 - COLLEGE TICKETS
- \$60 - SUPPORTER TICKETS



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