ALABAMA FORMULA SAE

CRIMSON RACING FORMULA SAE

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Summer 2008

LETTER FROM THE CAPTAIN

The University of Alabama Crimson Racing Team was founded in 2001, and has since been growing within the university. The main objective is not to race cars, but to provide opportunities for individuals to learn and test their knowledge against students from around the world.

Many students from other Colleges, such as Business, have joined to share their passion for the automotive industry. The Formula SAE project welcomes encourages diversity and team building skills that will carry over into the future working environment.

Crimson Racing provides in-depth analysis, construction, and testing, which is seldom matched by any other organization. Students are able to take their ideas and develop them into functional components for an open-wheeled, formula-style race car.

From Left to Right: Sam Hathcock, Kyle Aldridge, Ryan Nelms, Jeff Scheurer, Dr. William Sutton, Marc Hansen, David Trawick, Andrew Gilbert

Inside this issue:

FSAE Timeline

Summer 2008:

- **Design complete for '09 Car**
- **Start Sponsorship Campaign**

August 2008:

- **Fall Semester Begins**

WHAT IS FORMULA SAE?

The Formula SAE ideas and goals are not necessarily novel, but the Society of Automotive Engineers (SAE) puts an exciting new spin on the old phrase, "work-related experience." Most anyone in industry will agree that hands-on experience is one of the most vital keys to being successful in any career; and the earlier you get that experience, the quicker you will succeed. This philosophy especially holds true for engineering in today's world, because the job market is so vast and broad that education in the classroom is but only a stepping stone for the education you receive while on the job. The Formula SAE competition provides a hands-on opportunity for students to envision, design, and construct an open-wheeled, formula-style racer and then go head-to-head with 140 colleges and universities from around the world, including schools from Japan, Australia, England, Korea, South America, Mexico, Canada, the United States, and more. The premise behind the design competition is to tackle real world problems, and to challenge students to reason and resolve issues just as project team members do in the current automotive industry.

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2009 CRIMSON RACING PLAN

After the success of the 2008 Season, Crimson Racing is back and ready to bring home the first place trophy. Design is currently in progress, and will be completed at the beginning of August. The 2009 car is far superior to the previous cars, with the main focus on weight and packaging. Driver ergonomics and manufacturability will also be much improved upon.

Since our initial car in 2001, we have established ourselves as an energetic up and coming team, and really drove that home in 2008 with a top ten finish. The 2009 car will drive with the best of them at the competition in Detroit, and bring home a top five trophy.

Here is a list of some of the improvements we will be implementing this year to enhance car speed, handling, reliability, and fuel efficiency:

- Slightly increase wheelbase and track width
- Increase torsional rigidity in the frame
- Reduce weight down from 490 lbs to 450 lbs
- Improve suspension geometry

GOALS FOR 2009

The 2008 Crimson Race Team was a tremendous success over previous years, but that does not mean there not room for improvement. The 2008 year was but a stepping stone that has taken our program to the next level. The 2009 Crimson Race Team has a long road ahead of them, in order to keep this team at a top 25 level; therefore, we have created a few goals that will help us keep this program competitive for future students of the organization.

Our number one goal for any competition year is safety. Although this is fun hands on engineering project, that does not take away from the inherent risks that come with racing. Our team has all required safety gear for driving and we comply with all safety engineering requirements that must be built into the car. We ensure that every member of our team is as safe as can be, while still maintaining a high level of enjoyment in the program.

Second, we want to make a competitive car as simple as possible. A goal originally started last year, we have found the simpler a design is, the more reliable that part will be. In a field, such as engineering, it is easy to make a project as complex as possible, but from our experiences over the past 2 years, a simple design is one that is easy to make, functional, and reliable.

Finally, we always strive to keep 100% of our members from the previous year. All members have returned from 2008 to build the 2009 car, and we are expecting a high turnout of new members in the fall. A team that is familiar with each other is a team that not only motivates, but is able to push each other beyond what members could normally do physically as well as mentally.

It is with these goals that the 2009 Crimson Race Team hopes to continue building a strong team foundation while making the program as exciting as possible to everyone interested in learning.

FOOTBALL TAILGATING

Started during the 2007 season, Crimson Racing has been present at every home football game on the quad, raising awareness for our program as well as allowing people to see our hard work from the previous year, and current year during later home games. We believe tailgating on the quad has been a tremendous success as it brings friends, families, and fans together to marvel at the achievements of the students from this university. Tailgating is also a great way for sponsors to visit and meet the team in addition to seeing the ongoing construction of the car.

Race Report

Race Report
FSAE VIR 2008

RACE REPORT INTRODUCTION

As we come to the close of the 2008 FSAE competition year, Crimson Racing would like to reflect on our successful competition year, as well as give a little insight into how we will progress the team for 2009. Like any competition, the road to Virginia was bumpy and sometimes unforgiving, but it was the determination of a young energetic team that led to the most successful year the FSAE program at the University of Alabama has seen to date.

This year, the University of Alabama Crimson Race Team placed in the top 10 at our first competition of the year, at the Virginia International Raceway, in Alton, Virginia. This was the first year competition was held at VIR and is the third FSAE venue to be held in the United States, with FSAE in Detroit and FSAE-West in California being the other two. Even though this was the first year competition was held at VIR, 43 teams from around the county and Canada showed up on the third week of April to race. Even though this is fewer teams than the other FSAE competitions (FSAE: 130, FSAE-West: 90), Crimson Racing took this opportunity to shine above the limited number of competitors and impress the judges from the various events. This was made possible by the best car we have ever produced as well as the team that designed it, comprising of all sophomores and two juniors. Weighing in at 490lbs as well as pushing 80hp at the rear wheels, this is easily the lightest and most powerful car we have produced in our 4 year history. One key factor to this, is the 100% return of underclassmen from last year, with only a few members leaving due to graduation.

DAY 1

Competition officially started on Wednesday April 23rd, 2008 at 9 a.m. It was a wet misty morning in Alton, Virginia as teams began to fill the VIR infield with their trailers and equipment. Historically power house teams were present including current FSAE defending champions University of Wisconsin, as well as Missouri S&T (formerly known as UMR), Virginia Tech., Auburn, Cincinnati, and Illinois. As teams began to unload into their paddock area, many teams began the grueling task of attempting to pass technical inspection. Due to the early competition date, many teams arrived with unfinished cars in the hopes that they could complete them during the next two days before the racing events started. We were in the minority of teams that had zero work to be done on our cars before our first run at technical inspection, and spent our time making sure our Alabama flag was raised higher than the Auburn flag. As the time came for our technical inspection, there is a five page long laundry list of items that multiple judges have to check to ensure the car is within proper safety regulations, because when it comes down to it, this competition is about keeping everyone as safe as possible as well as performing well.

After a 30 minute inspection , we had a jam nut that was not tight enough and a seat belt bolt that was too tight. After less than 1 minute of tinkering, we were the 2nd car to pass this portion tech. and allowed us a chance to get a good night sleep for the second day.

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DAY 2

Day two is quite possibly the most eventful day of the entire four day competition. Not only do we have to continue with our technical inspection, but there are also static, or non-racing, events that we have scheduled times at which to appear. At 9:30 a.m., we were scheduled for our sales presentation. Since the actual competition is stated as designing and building a consumer race car that can be produced at a pace of 4 cars a day, every team must give a presentation to a panel of judges with their business plan on how to turn their prototype car into an actual business model, including number of workers, shop floor plans, market research on the feasibility of this product in the market place, etc. Each team has only 10 minutes to pitch their plan, which is then followed by a question and answer segment from those judges. This was one of our strongest events, which was led by junior team member, and public relations coordinator, Jeff Scheurer (who is only person on the team who has been to a previous FSAE competition). He was also aided by sophomore, and communications director, Marc Hansen. Overall, the well designed presentation granted the team a 6th place standing in the sales event. Virginia Tech. took 1st place in sales.

The teams' next stop was the continuation of passing technical inspection before being allowed to race on Friday. The second stage of tech. is the tilt test, which car and driver are placed on a hydraulic tilt table to test for fluid leaks at 45 degrees, and the car staying on the table at 60 degrees. After we passed tilt tech. we moved onto brakes and noise tech. At noise tech, your car must be below 110 db at 11,000 rpm and at the brake test your car must be able to lock out all 4 tires. By lunch, we had completely passed technical inspection and cleared to race during the next two days.

At 3 p.m. we had our design presentation with multiple design judges, each who had a specific knowledge about an aspect of the car, yet still questioned general knowledge about why our team designed every part on the car. This event if set up so the judges will find the level of knowledge at which you are comfortable about your car, and then ask questions above that level. This makes for a very stressful presentation, yet also provide key insight into what our team could do to make the car better next year as well as understanding the intricacies of race car design from professional engineers. Many of the design criteria our team had to design around were an engine with 610cc maximum displacement, a 20mm restrictor on the intake, specific wheelbase and track dimensions, roll planes, safety requirements, and adjustable features to make the car drivable to anyone within the 5% shortest female (5' 1") to 95% tallest male (6'1"). After having the judges rip our car apart, they complimented us on an outstanding overall design and awarded us 5th place in design. Our design presentation was led by team captain and suspension leader, Ryan Nelms, Frame design and construction leader, Kyle Aldridge, Brake leader, David Trawick, and Exhaust and Intake design leaders, Paul Bennett and Jeff Scheurer respectively. Wisconsin took 1st place in the design event.

Top: David Trawick waiting in line before his first attempt at the skid pad event. Bottom: The team at the fueling tent before heading to the skid pad course

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DAY 3

Day 3 is reserved primarily for dynamic (racing) events and continuation of tech., for those who have still yet to pass. The first event that we competed in was the skid pad event. Skid pad comprises of two giant 30m diameter circles in which the drivers must speed around. The drivers get to take two laps around one circle turning left, followed by two laps around the adjacent circle turning right. Our drivers for this event were team captain, Ryan Nelms, as well as sophomore, David Trawick. Each driver gets two attempts around the skid pad course, and each attempt includes one warm up lap followed by a timed lap in each direction. After all teams had had their go at the skid pad, David Trawick locked in the fastest time for Crimson Racing, giving us 11th place in skid pad. Virginia Tech. took 1st place in the skid pad event.

Top: Our car waiting in line for tech. inspection. Top Left: Sam Hathcock's acceleration time. Bottom Left: A coned off section of the autocross course. Bottom Right: Ryan Nelms coming around for the home stretch of his autocross lap.. Bottom: Our 8th place trophy for FSAE VIR.

The next event was the acceleration event. This event is nothing but a single car drag race for approximately 75 yards. Our drivers for this event were sophomore, David Trawick and freshman, Sam Hathcock. After two runs apiece, Sam came through with a time of 3.290s which was 1st place at the time, but ended up being 7th fastest overall. Maryland took 1st in this event with 2.9s.

The last event of the day was the autocross event. The autocross event is a single lap around a 1 mile long course with numerous hair-pin turns and slaloms that our car has to maneuver around. Coming off of a broken a-arm the week before our competition, and with the possibility of a re-break, we decided to run our car at about 75% during the autocross event to prevent a repeat break. During driver Ryan Nelms's second lap, a tie rod end snapped leaving us rushing to get the problem fixed before the event closed. With quick work and being prepared with replacement parts, we got the car back on the track as our second driver Kyle Aldridge completed both remaining laps and clocked in a time of 112s, giving us a 9th place finish in Autocross. Wisconsin took first place with a speedy 92s lap.

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DAY 4

There is only one event on day 4 of every FSAE competition, and it is the most notorious event of the entire competition. That is the endurance competition. Endurance is run on the same course that the autocross event is held on, but each of your two drivers must complete 11km each, with a 5 minute driver change and inspection in between. Every car must stay intact and not leak any fluids or break any parts while on the course or during the driver change. If something does go wrong, that car is immediately pulled off the course and given zero points for the event. Having the same problems with our a-arms as we did during autocross, we took the slow approach to this event. The order in which the cars race in this event, is based on how well the cars placed in the autocross event. That put us 9th on the line as freshman, Sam Hathcock and sophomore, Kyle Aldridge paced themselves correctly and finished the event 8th. Out of the 43 cars that attended the event only the first 9 cars to run endurance finished the event. Wisconsin took 1st place in this event.

Left: Our team half way through the endurance event performing the driver change while the judges begin their inspection. Right: Sophomore Kyle Aldridge driving through one of his six laps during the endurance event.

RACE CONCLUSION - 8TH PLACE!

After all the events were said and done, Crimson Racing came in a highly placed 8th out of 43 teams. This is amazing coming off of a 2007 car that never made it to competition, followed by the graduation of team members who held most of the experience with the program. It was the determination and perseverance of a team, made of mostly of sophomores and freshman, to bring this program back on track or face the termination of the organization on campus. The 2008 Crimson Race team came through and not only will continue the FSAE organization on campus but placed very respectively in a competition full of experienced veteran teams. But this would not have been possible if it wasn't for the support of the University of Alabama as well as our numerous sponsors throughout the year. After our competition in Virginia, work does not cease as we are preparing our car for local SCCA events as well as starting the design process for our 2009 car. We also have big dreams to make it to all 3 FSAE venues in 2009 as compared to this year where we could only make it to one due to the expense of traveling a team and equipment. We would like to thank all of our sponsors on their efforts for the team for 2008, and we look forward to working with you again during the 2009 FSAE competition year.

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YOU CAN HELP!

A projected budget of $30,000 will be needed to achieve our goals for the 2009 FSAE car. With 140 teams from more than 10 countries, the Formula SAE competition is extremely competitive, and this budget is considered relatively modest as compared with many teams. We believe we can achieve our goals and finish competitively with this modest budget. We cannot, however, realize our goals or even compete without outside support.

The University of Alabama has set up three different levels of sponsorship for supporting the Crimson Race Team for the 2009 season. Each category of sponsorship is guaranteed to get your name or your company's name in front of people from the local to the international level. In addition to supporting the team for this years competition, you will also help to move forward a growing project that can be offered to students for years to come.

The University of Alabama Crimson Race Team is looking forward to working with you or your company on this years car for competition. With your help, this project can keep momentum and provide learning for generations of students to come.

WE OFFER THREE LEVELS OF SPONSORSHIP:

Driver: $500—$1,499

- Full Race Report
- Company logo indicating sponsorship at our FSAE website
- Company name on 2009 FSAE car
- Company name listed on Crimson Racing t-shirt

Engineer: $1,500—$4,999

- Driver: package
- Your company's logo on team merchandise
- An autographed poster signed by all members of the 2008 University of Alabama FSAE team
- Invitation to demonstration and unveiling of the 2009 FSAE car

Captain: $5,000—Above

- Engineer: package
- Your company's name permanently posted in the Formula assembly area
- Prominent placement and larger size company logo on 2009 FSAE car
- Promotional appearance of 2009 FSAE car, after competition, at your company location

WHY SHOULD YOU CONTRIBUTE?

Participating and contributing to the University of Alabama's FSAE team means that you will become a vital part of our success and a valuable contributor to an up and coming team aiming to break the top 25 at competition in Michigan, Virginia, and California. Contributions to the FSAE team are not limited to financial donations. Various forms of in-kind donations are welcome.

Contributing to education in today's world, especially in the area of engineering, is rewarding and vital to the students as well as the contributors. You and your company will be afforded many benefits from joining the Crimson Race Team for the 2009 competition year, including an entire year of exposure to thousands of people who view the FSAE car at many UA events as well as at Competition. We have a dedicated staff that works around the clock to promote our partners, ensure that our partners investing in the project receive exposure locally, around the state and nationwide. In addition, you and your company's efforts will leave a lasting impression on the students who participated and directly benefited from your generous contributions. The FSAE Team is proud to represent Alabama and the University of Alabama in this International competition.

ALABAMA FORMULA SAE

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Roll Tide

WE LOOK FORWARD TO HAVING YOU AS A PART OF OUR TEAM!

Once again, on behalf of the entire Crimson Racing Team, we are looking forward to working with you and/or your company for this years calendar year of competition. We hope to forge new connections with our sponsors as well as establish this program as a long lasting tradition at the University of Alabama.

Would you like a custom sponsorship package for your needs? We will be happy to work with donations of all kinds. Our public relations group is committed to making your contribution as easy and as beneficial for your company as possible. Let us help!

All donations are tax exempt and should be made payable to The University of Alabama and mailed to Box 870276 Tuscaloosa, AL 35487, Attn: Formula SAE.