The DUT Racing Team consists of a group of sixty students that will design and produce a racing car for the Formula Student competition in the period of one academic year. Within the team there is a great variety of people, all from different faculties, nationalities and age. In addition there is an association of former members that ensures the continuity of the project. This makes the DUT Racing Team the largest and oldest student project at the TU Delft.

TEXT: Joeri Kortenhorst, Student Aerospace Engineering, Operations Manager DUT Racing Team

The purpose of the student project, which includes a prestigious competition, is education. Therefore continuity is one of the most important aspects of the project. Because a lot of new students get involved every year, experienced members organize workshops and lectures to pass on essential knowledge and skills at the beginning of each year. In this way the quality of the team as well as the first prize at the upcoming events can be ensured! Internationally the team is known to be either a good loser (car breaking down when the odds are against you) but more as a great winner, which results in achievements such as three times second place at Silverstone (UK) from 2007 to 2009 and two wins at Hockenheim (GER) in 2008 and last summer.

FORMULA STUDENT COMPETITION
The Formula Student competition is one of the largest and most successful design competitions in the world, it is a great challenge to make it to the podium when competing with approximately 400 teams from USA to Germany to Japan. You are not supposed to just set the fastest lap time but also make the best design choices that you can at the same time substantiate. In addition, you have to make a business plan for a theoretical production of 1000 cars, which then has to be presented to a jury. Participating teams can compete in any of the ten different events that are organized worldwide each year.

The jury represents experts from throughout the entire engineering industry, varying from Ross Brawn, teammanager of the Mercedes GP F1 team, Jon Hilton, owner of the company introducing KERS in F1, to cost engineers at Airbus or electronics specialists at Bosch.

The essence of the competition is to prepare engineering students for their future career as an engineer or manager through practical experience gained in developing of a formula style racecar. The design goal for a Formula Student car is based on a realistic scenario; a company has approached the group of students to design, build and present the car as a prototype that could possibly go into production. The sales market for this car is the amateur weekend racer. Therefore it must have consistent race car performance, braking and acceleration and good handling. In addition, the car must not be too expensive and should be easy to service. Moreover, it has to be safe and reliable. The car must accommodate the 5th percentile of the largest women and the 95th percentile of men.

Marketability is also important, so the appearance and comfort will have a major impact on the car. The company plans a production of four cars per year as a limited edition. The challenge for the teams is to meet these requirements as best
they can. The results will be compared to the other cars by the jury and eventually a winner will be selected. In order to convince the jury that your design is the best, you also need good communication skills. All in all, this competition contains a test of all the skills that being a modern engineer requires.

**ELECTRICAL CAR**

After ten years of experience with combustion engines it was time for something new. In the previous years E85 (Bio-Ethanol) was used as fuel, because it is much more efficient than regular gasoline and it is better for the environment. Last year, the combustion competition in Germany was won by the DUT Racing Team, it was time to move on; building an electric car would be an interesting new challenge. The design differs greatly from combustion engines; therefore to design and produce the car completely within nine months is a great new goal.

**LIGHTWEIGHT**

The DUT Racing team uses the design philosophy to make a car as light as possible. The less weight you have, the easier it is to make a turn and the more economical your car becomes. The team is therefore internationally known for its lightweight cars, achieved by using lightweight materials such as carbon fiber and magnesium. Because this year an electric power train, a relatively heavy assembly, will be used it is a great challenge to continue with this concept. With a target weight of 180 kilos, however, the main competitors (lightest 220 kilos) are still far behind.

**AEROSPACE AND DUT RACING**

In 1999 the DUT Racing team was founded by two Aerospace Engineering students who wanted to put their vision and theoretical knowledge into practice. The main objective at this time was simply to just participate in the competition, however over the years the growing team’s quality has led to the ability to be able to compete for first place, every event, every year. Today almost half of the sixty member team are future Aerospace Engineers applying skills gained at the university.

The design philosophy of the DUT Racing Team, which states that the car has to be as light as possible while meeting the structural requirements, is mainly achieved through the ability to design and produce lightweight materials. Both the faculty of Aerospace Engineering itself, and the skills of the team’s Aerospace students studying there, create this possibility. For example at the competition the teams have to show, by calculation, that their structure (in our case a carbon fiber monocoque) is able to withstand a side impact from another Formula Student car. Next to that it has to be shown by actual testing that your driver’s feet will survive a head-on collision with a wall at 50km/h.

The (monocoque) structure is not the only part in a Formula Student car that requires calculation, another interesting department is the suspension. As most of the loads are transferred through the inner wheel structure to the suspension rods and subsequently to the monocoque, it does not take a rocket scientist to figure out this is another very important part of the car. To successfully design the suspension of a Formula Student car, a lot of experience and knowledge is needed in the area of mechanics. The inner wheel structure is also an important part of the vehicle dynamics, because it is designed in such a way that you can change the total suspension and wheel set-up. If you do this the right way it can save you 2 seconds on a 50 second lap!

Even though over the years the job of Aerospace students in the team has been mainly on the technical side, this does not mean an Aerospace student is required to be in a technical department. Another option is the operations department; this department takes care of all the non technical tasks like sponsoring, event organization, newsletter, website and so on.

**WANT TO BECOME A MEMBER?**

We are currently looking for new team members for the DUT12 team! There are different possibilities, you can do a minor with our team to make sure your study progress will remain on schedule and still enjoy the great experience that the DUT Racing Team has to offer. It is also possible to design and produce the car as a part-time member of the team, this will take about 15 hours per week. If you have more time next year, then a spot on the board may be one for you, for these positions we are looking for motivated students who have their bachelor’s (almost) completed.

Would you like to join the DUT Racing team, check out the recruitment page on dutracing.nl! You can also send an email to recruitment@dutracing.nl with all your questions.