let's celebrate
10 years of

MAGAZINE 2015

Formula Student Germany

JULY 28TH – AUGUST 2ND 2015 HOCKENHEIM

AN INTERNATIONAL DESIGN COMPETITION
OF SKILLS, SPEED AND SPIRIT

We thank all our sponsors for their longstanding support

Audi

in cooperation with

Supporter: fishfarm netsolutions | Hockenheimring | Kautex Textron | Linde Material Handling | Maxim Integrated | RIEDEL Communications | SLV Mannheim

Media Partner: audimax MEDIEN | campushunter media | HI:TECH Campus

A special thanks goes to the numerous volunteers who contributed significantly in the realisation of the tenth Formula Student Germany.

Greetings / Grußwort

Dear guests, participants and friends of Formula Student Germany

2015 is a special year. FSG is turning 10, in two ways actually. 10 years ago, in 2005, we first made the plan for FSG in England, and in Aschersleben and Leipzig we organized the first FSG event ever. 2006 was the first event in Hockenheim and today, 9 years later, we meet here for the 10th time.

Hardly anybody expected FSG 2015 to develop into what it represents today. Too big is the difference from the initial ideas scribbled on a beer napkin in a pub 2005 to the world-class competition it is now. This has come true thanks to you. Thanks to the sponsors, supporting the idea from the start, thanks to the teams, trusting FSG to hold an outstanding event, thanks to the judges, engaging in the support of new talents, thanks to the volunteers, organizing the event and spending a lot of their free time and certainly thanks to the spectators, guests and friends contributing decisively to the unique atmosphere on the Hockenheimring.

In the spirit of FSG we do not dwell on past achievements and us turning 10, but we look onto this year's as well as the future events. We are looking forward to an exciting and fun competition and are working hard on further improvements and developments for the next 10 years.

Liebe Gäste, Teilnehmer und Freunde der Formula Student Germany,

2015 ist ein besonderes Jahr. Die FSG wird 10 Jahre alt. Und das im doppelten Sinne. Wir haben vor 10 Jahren in 2005 in England den Plan für eine FSG gefasst und dann im gleichen Jahr in Aschersleben und Leipzig das erste FSG Event überhaupt organisiert. In 2006 waren wir das erste Mal in Hockenheim und nun, 9 Jahre später sind wir das zehnte Mal vor Ort.

Kaum jemand der Beteiligten hat sich vorstellen können, dass die FSG in 2015 das ist, was sie heute ist. Zu groß ist der Unterschied von einer Skizze auf dem Bierdeckel in einer Kneipe 2005 zu einem Wettbewerb der Weltklasse heute.

Dass dies möglich war, liegt an Ihnen. An Sponsoren, die die Idee von Anfang an getragen haben, an Teams die der FSG vertraut haben einen guten Wettbewerb abzuhalten, an Juroren, die Spaß an der Dynamik haben und sich auf- und einbringen für die Förderung Jüngerer; an Freiwilligen, die das Event selbst organisieren und viel Zeit aufopfern und natürlich an den Besuchern, Gästen und Freunden, die ganz maßgeblich zu einer unverwechselbaren Stimmung beitragen. Dafür sagen wir Danke!

Und ganz im Geiste der FSG liegt unser Fokus auch mehr auf 2015 und den kommenden Jahren als auf der Freude über vergangene Jahre.

Wir freuen uns auf einen spannenden und fröhlichen Wettbewerb und arbeiten an den Weiterentwicklungen, die hoffentlich 10 weitere Jahre Spaß bereiten!

Be a part of it and enjoy FSG 2015 with us.

Helfen Sie uns dabei und feiern Sie mit bei der FSG 2015.

Tim Hannig

Leipzig 2005

Hockenheim 2015

10 Years FSG:
Happy Birthday!

Roger Knobelsdorf Functional Verification and Validation of Alternative Powertrains RD, Germany (Kirchheim unter Teck)

We develop next-generation technology. For the generation after the next.

That's us.

Those who create carry responsibility. As an inventor of cars, we feel it's our special duty to make every new model not only more comfortable and safe, but also more efficient and clean. We're getting ever closer to our goal: emission-free driving. If that thought also drives you, let's get to work on the solution together.

Tomorrow's career starts today at
www.career.daimler.com

DAIMLER

The brand portfolio of Daimler AG comprises Mercedes-Benz, Mercedes-AMG, Mercedes-Maybach, smart, Freightliner, Western Star, BharatBenz, Fuso, Setra, Thomas Built Buses as well as Mercedes-Benz Bank, Mercedes-Benz Financial, Daimler Truck Financial, moovel and car2go.

Content

Inhalt

Introduction
Einführung

The Challenge

Formula Student Germany (FSG) is an international design competition for students, based on the Formula SAE rules and guidelines. Teams from around the world have the task of designing a single-seater formula car and then manufacturing a functional prototype. Along with these technical aspects, the teams must develop a viable business plan and a marketing concept for batch production of the vehicle. The target group is amateur weekend racers. Therefore, the race car must not only have manageable handling and possess good acceleration and braking ability, but must also be inexpensive to buy and run. Thus, other important aspects of the vehicle that need to be developed include aesthetics, ergonomics, and use of mass-produced components. The vehicle designs are judged by experts from the automobile, motorsport, and supply industries. The teams are then able to score points in various static and dynamic events, which will ultimately decide the overall ranking. The team with the best overall combination of construction, financial planning, marketing strategy, and performance on the track will win Formula Student Germany.

Practical Experience

FSG enriches the teaching content of a course of study with challenging and practical experience in the fields of manufacturing and production, while not neglecting the practice-oriented requirements relating to profitability and market relevance. The aspects assessed by the competition correspond directly to the demands of the different branches of the industry for new product development, which is why they are not merely restricted to vehicle construction. By working as part of an interdisciplinary team of students from different fields of study and expertise, the competitors learn, first-hand, how to combine the economic and technical goals of product development and, at the same time, how to defend the solutions they themselves have developed and assert these against competing developments.

Herausforderung

Die Formula Student Germany (FSG) ist ein internationaler Konstruktionswettbewerb für Studenten, der sich an den Formula Student Wettbewerb der amerikanischen Society of Automotive Engineers (SAE) anschließt. Die Aufgabe für die Teams aus der ganzen Welt besteht darin, ein einsitziges Formel-Fahrzeug zu konstruieren und einen fahrfertigen Prototypen herzustellen. Gleichzeitig mit der technischen Entwicklung müssen die Teams einen tragfähigen Businessplan und ein Vermarktungskonzept für eine Kleinserienfertigung des Fahrzeugs entwickeln. Zielgruppe ist der nicht-professionelle Wochenendrennfahrer. Daher muss der Rennwagen nicht nur ein beherrschbares Handling, sowie gute Beschleunigungs- und Bremswerte besitzen, sondern muss auch günstig in der Anschaffung und im Unterhalt sein. Wichtige Nebenaspekte des entwickelten Fahrzeuges sind daher Ästhetik, Ergonomie und die Verwendung von Serienbauteilen. Bewertet werden die Fahrzeugkonzepte von Experten aus der Automobil-, Motorsport- und Zulieferindustrie. In verschiedenen statischen und dynamischen Disziplinen können die Teams wichtige Punkte sammeln, die letztlich über die Gesamtplatzierung entscheiden. Den Sieg der Formula Student Germany erringt das Team mit dem besten Gesamtpaket aus Konstruktion, Finanzplanung, Verkaufsargumentation und Rennperformance.

Praxisnahe Erfahrung

Die FSG bereichert die Lehrinhalte des Studiums um herausfordernde und praktische Erfahrungen in den Bereichen Konstruktion und Fertigung, ohne dabei die praxisrelevanten Voraussetzungen in Bezug auf Wirtschaftlichkeit und Marktrelevanz zu vernachlässigen. Die im Wettbewerb abgefragten Aspekte entsprechen weitgehend den Anforderungen verschiedener Industriezweige hinsichtlich der Produktneuentwicklung und sind daher nicht nur auf den Fahrzeugbau begrenzt. Durch die Arbeit in einem interdisziplinären Team aus Studenten verschiedener Studien- und Fachrichtungen lernen die Teilnehmer anhand praktischer Erfahrungen, die wirtschaftlichen und technischen Ziele einer Produktentwicklung in Einklang zu bringen und dabei ihre selbst entwickelten Lösungen zu verteidigen und gegenüber konkurrierenden Entwicklungen durchzusetzen.

Continental
The Future in Motion

Ready, set, career.

I create development software tools for cars.

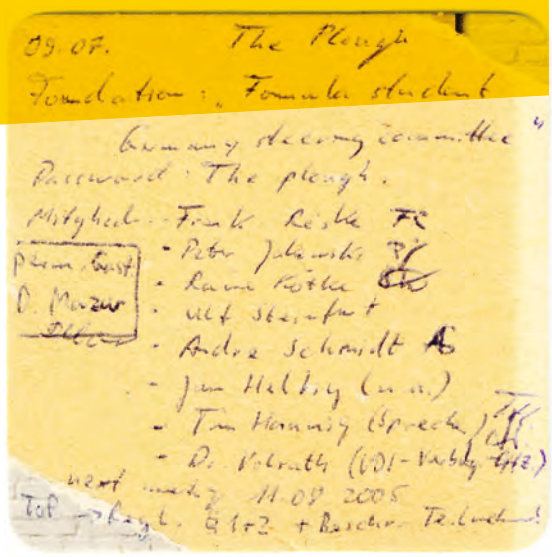
My motivation: As a student I developed racing cars. Today I bring in all my passion and effort into the development of tools that help to bring self-driving car features to the market.

Let your ideas shape the future.

www.careers-continental.com

Keja Rowe
Electrical Engineer
Frankfurt, Germany

10 YEARS OF FORMULA STUDENT GERMANY – LOOKING BACK



As no other writing utensils were available, the first concrete tasks for Formula Student Germany were written down on a beer mat

Da keine andere Schreibunterlage zur Verfügung war, wurden die ersten konkreten Aufgaben für die Formula Student Germany auf einem Bierdeckel niedergeschrieben

10 JAHRE FORMULA STUDENT GERMANY – EIN RÜCKBLICK

Formula Student Germany will celebrate its 10th Anniversary in 2015. Starting out as a small pre-event, over the years it has grown into a large event of thousands of participants and visitors. Not only has the event grown, but so too has the level of professionalism with which this international competition is carried out. The essential character has, however, not changed much. And neither have those who are responsible for its success.

Die Formula Student Germany feiert 2015 ihr 10-jähriges Jubiläum. Aus einem kleinen Pre-Event wurde im Laufe der Jahre eine Großveranstaltung mit mehreren tausend Teilnehmern und Zuschauern. Dabei ist nicht nur die Veranstaltung gewachsen, sondern auch die Professionalität, mit der dieser internationale Event durchgeführt wird. Trotzdem hat sich der Grundcharakter der Veranstaltung kaum geändert. Und selbst die Verantwortlichen sind irgendwie die gleichen geblieben.

It sounds strange, but Formula Student Germany (FSG) all began in England. More specifically, on 9 July 2005 after a race event and in a pub in Bruntingthorpe called "The Plough". There sat Daniel Mazur, Ulf Steinfurt, Tim Hannig, Frank Roeske, Rainer Koetke, and Peter Jakowski; other Formula Student team members from race teams from Stralsund and Braunschweig and Dr. Ludwig Vollrath, who at the time was the managing director of the Vehicle and Traffic Engineering department of the Association of German Engineers (VDI). At the time, there was just a handful of German Formula Student Teams, which would travel abroad to compete with their vehicles. There had long been the consideration to bring the competition to Germany, but to date, it had not happened.

In view of such experience and enthusiasm, it was mutually agreed that the hosting of a Formula Student competition in the motherland of the automobile industry was long overdue. In the absence of any writing utensils, the first concrete steps and tasks towards a German event were documented on a beer mat. Along with other things agreed upon in the English pub, was who would be delegated what tasks for the yet-to-be organ-

Es klingt zwar seltsam, aber der Startschuss für die Formula Student Germany (FSG) fiel in England. Genauer gesagt am 9.Juli 2005 in einem Pub namens „The Plough" in in Bruntingthorpe. Dort saßen Daniel Mazur, Ulf Steinfurt, Tim Hannig, Frank Röske, Rainer Kötke, Peter Jakowski und einige weitere Teammitglieder der Formula Student Rennteams aus Stralsund und Braunschweig nach dem Rennevent mit Dr. Ludwig Vollrath zusammen, der damals Geschäftsführer der Gruppe Fahrzeug- und Verkehrstechnik im VDI war. Zum damaligen Zeitpunkt gab es nur eine Handvoll Formula Student Teams in Deutschland, die mit ihren Fahrzeugen an Wettbewerben und Rennen im Ausland teilnahmen. Zwar gab es von verschiedenen Seiten immer wieder Überlegungen den Wettbewerb auch nach Deutschland zu holen, konkretisiert wurden diese aber bis dato nicht.

Aufgrund der eigenen Erfahrung und Begeisterung war sich die Runde einig, dass die Austragung eines Formula Student Wettbewerbs im Mutterland des Automobils längst überfällig war. Aus Ermangelung einer anderen Schreibunterlage wurden auf einem Bierdeckel die ersten konkreten Schritte und Aufgaben für einen deutschen Event festgehalten. Unter anderem

From the former Formula Student participants, to initiators of Formula Student Germany

Aus den ehemaligen Formula Student Teilnehmern wurden die Initiatoren der Formula Student Germany

ized event. So those present divided the organizing and the tasks required for the different disciplines, as well as the technical inspection and the overall organisation, between themselves and documented their decisions on the auspicious coaster, thereby laying the foundation for FSG.

The Pre-Event Left Us Wanting More

So that more Formula Student Teams could develop in Germany and sponsors could be found for a proper event, a pre-event was organised and hosted that same year, together with Porsche and under the VDI umbrella. Eleven teams from Germany, Austria, Finland, and Italy represented. Before the founders held a full-fledged competition with all the disciplines, they wanted to first gain experience through the pre-event in terms of the organization and the implementation of dynamic events. At the same time, they got to learn the necessary safety precautions vital to a racing event when handling automotive prototypes. A definite positive side effect was that the dynamic disciplines were more spectacular than the not-so-flashy static disciplines.

The teething problems that arose during the pre-event revealed the challenges that lay ahead and had to be solved before a fully-fledged Formula Student competition could take place. Despite a number of mishaps and misadventures, the pre-event served its purpose as a promotional event perfectly. Not only were the university representatives who had been invited enthusiastic about the idea of Formula Student, but also sponsors were convinced of how the competition could benefit them. Even back then, graduates with automotive backgrounds and a great practical experience were job candidates coveted by the automotive and supplier industries, and many hiring managers recognised early on the potential of Formula Student as a recruiting event. And the fact that the teams, which had been put together from various fields, had to finance themselves through team sponsors and partners and be legally self-sufficient was definitely an argument for the universities to actively support the founding of Formula Student teams.

wurde damals in besagter englischen Kneipe vereinbart, wer welche Aufgabe in Bezug auf den noch zu organisierenden Event übernimmt. So teilten die Anwesenden die Organisation und die Durchführung der verschiedenen Disziplinen sowie der technischen Abnahme und der Gesamtorganisation unter sich auf und hielten das Ergebnis auf dem Getränkeuntersetzer fest. Damit war der Grundstein für die FSG gelegt.

Pre-Event macht Lust auf mehr

Damit mehr Formula Student Teams in Deutschland entstehen und Sponsoren für einen vollwertigen Event gefunden werden konnten, wagte man unter dem Schirm des VDI einen ersten Vorstoß und veranstaltete noch im gleichen Jahr bei Porsche in Leipzig einen Pre-Event zur FSG, bei dem insgesamt 11 Teams aus Deutschland, Österreich, Finnland und Italien vertreten waren. Bevor die Initiatoren einen vollwertigen Wettbewerb mit allen Disziplinen veranstalteten, wollten sie anhand des Pre-Events Erfahrungen in Hinblick auf die Organisation und die Durchführung der dynamischen Disziplinen sammeln. Gleichzeitig lernte man auch die notwendigen Sicherheitsvorkehrungen kennen, die bei einer Rennveranstaltung und beim Umgang mit automobilen Prototypen erforderlich sind. Dass die dynamischen Disziplinen wesentlich publikumswirksamer sind als die eher unspektakulären statischen Disziplinen war definitiv ein positiver Nebeneffekt.

11 teams from 4 nations enjoyed the pre-event at Porsche
11 Teams aus 4 Nationen waren begeistert vom Pre-Event bei Porsche

The Move to Hockenheim

Even before the pre-event, the organisers knew that a fully-fledged Formula Student event required a suitable venue. Not only did they need a track with run-off and safety zones, but also plenty of space for the race organisers, spectators, sponsors, and teams, which need places for preparing their vehicles and sleeping. In order to satisfy all the requirements and have a site worthy of the event, it was decided that the competition should take place on the premises of a Formula 1 circuit. Spurred on by the success of the previous event and with the support of newfound sponsors, the competition moved to the Hockenheim Ring in 2006, where FSG is still held today.

With the preparations for the real Formula Student event, new issues emerged. In addition to the already proven dynamic disciplines, the competition also consists of several static events, a technical inspection of the vehicles, and many other elements that had not yet been tested. The next undertaking was to find enough staff and train them to cope with all these tasks. It must not be forgotten that the founders had also developed further in their professions in the meantime. They were no longer students able to manage their time relatively freely, but employees with families and precious vacation days. Ultimately, all the organisational problems were solved and the first of many competitions was held in Hockenheim. We have to thank for this, above all others, the many previous team members and their families, as well as the countless volunteers who volunteer with great enthusiasm and excitement at Formula Student Germany, and the support from the many sponsors and the VDI for putting the great event on its feet.

Development is Far from Complete

Looking back at the past ten years of Formula Student Germany, the competition has continued to develop. The number of teams alone has more than doubled over the years. In the first years, all 41 registered teams could be taken into account as they entered for a starting spot at Formula Student Germany. Today, those spots are gone within a few minutes . The number of teams is now 115 (75 Formula Student Combustion and 40 Formula Student Electric), giving the organisation even more new challenges. The timing has to be meticulously planned and adhered to in order for the competition to take place in the available time. Also, the space requirement for the

Tatsächlich offenbarten die bei dem Pre-Event auftretenden Probleme und Fehler gnadenlos, welche Herausforderungen vor der Durchführung eines vollwertigen Formula Student Wettbewerbs noch zu lösen waren. Trotz einer Vielzahl von Pannen und Missgeschicken erfüllte die Vorveranstaltung ihren Zweck als Werbeveranstaltung perfekt. Nicht nur die eingeladenen Hochschulvertreter konnten von der Idee der Formula Student begeistert werden, auch potenzielle Sponsoren wurden von der Sinnhaftigkeit des Wettbewerbs überzeugt. Automobilaffine Studienabgänger mit einem großen praktischen Erfahrungsschatz waren nämlich schon damals heiß begehrte Bewerber in der Automobil- und Zulieferindustrie, und viele Personalchefs erkannten bereits früh das Potenzial der Formula Student als Recruiting-Veranstaltung. Und die Tatsache, dass sich die aus verschiedenen Fachbereichen zusammengestellten Teams durch Sponsoren und Partner weitgehend selbst finanzieren und die Rennställe auch rechtlich autark agieren, war sicher ein Argument für die Hochschulen, die Gründung von Formula Student Teams aktiv zu unterstützen.

Der Umzug nach Hockenheim

Bereits im Vorfeld des Pre-Events war den Veranstaltern klar, dass ein vollwertiger Formula Student-Event einen geeigneten Austragungsort benötigt. Nicht nur für die Piste samt Auslauf- und Sicherheitszonen musste genügend Raum vorhanden sein, sondern auch für die Rennleitung, Zuschauer, Sponsoren und Teams, die ausreichend Platz für die Vorbereitung Ihrer Fahrzeuge und zum Schlafen brauchen. Um allen Anforderungen zu genügen und gleichzeitig einen würdigen Rahmen für die Veranstaltung zu schaffen wurde entschieden, den Wettbewerb auf dem Gelände einer Formel 1-Rennstrecke stattfinden zu lassen. Angestachelt vom Erfolg der Vorveranstaltung und mit der Unterstützung der neu gewonnenen Sponsoren folgte im Jahr 2006 der Umzug an den Hockenheimring, wo die FSG noch heute ausgetragen wird.

Mit der Durchführung eines vollwertigen Formula Student Events taten sich aber neue Herausforderungen auf. Neben den bereits erprobten dynamischen Disziplinen besteht der Wettbewerb auch aus mehreren statischen Disziplinen, einer technischen Abnahme der Fahrzeuge und vielen weiteren Elementen. Es galt daher als nächstes, genügend Personal zufinden und einzuweisen, um all diese Aufgaben bewältigen zu können. Dabei war zu bedenken, dass sich die Initiatoren beruflich weiterentwickelt hatten. Sie waren nun keine Studenten mehr, die ihre Zeit relativ frei einteilen konnten, sondern Mitarbeiter in Unternehmen und Familienmenschen, deren rare Urlaubstage kostbar sind. Letztlich konnten aber

multiple race teams with all their equipment gives the organisers great logistical challenges and fills the paddock at the Hockenheim Ring to its capacity limits.

In 2010, Formula Student Electric (FSE), one of the most important and promising developments of FSG, was introduced. Initially, the competition for battery electric driven vehicles was to be a test. However, the idea was so well received by participants and the industry that FSG was divided into combustion (Formula Student Combustion [FSC]) and electric vehicles (FSE). The electric vehicle competition is now a permanent part of the event, and being increasingly imitated worldwide. Although the participation of electric vehicles brought with it a lot of additional areas of organisational and logistical problems, for example, the infrastructure for charging the batteries and appropriate safety features, there were no regrets from the organising team about this step. For one, because the field of alternative drive technologies requires qualified and motivated employees, and the students have had the opportunity to gain valuable practical experience through the FSE competition. What's more, the fire that burns in the FSE teams is the very same that still drives the founders and the FSC teams. There is no fear that FSG will ever have a shortage of these technology-crazy alumni, who volunteer for this competition and continuously improve the event, advancing the teams through their wealth of experience.

alle organisatorischen Probleme gelöst werden und der erste von vielen Wettbewerben in Hockenheim stattfinden. Zu verdanken ist dies aber vor allem den vielen ehemaligen Teilnehmern, deren Familien, sowie unzähligen freiwilligen Helfern, die mit großem Enthusiasmus und Begeisterung ehrenamtlich für die Formula Student Germany tätig werden und mit der Unterstützung der vielen Sponsoren und des VDI diesen großartigen Event auf die Beine stellen.

Entwicklung noch lange nicht abgeschlossen

Blickt man auf die bisherigen 10 Jahre Formula Student Germany zurück, so hat sich der Wettbewerb stetig weiterentwickelt. Alleine die Zahl der Teams hat sich im Laufe der Jahre mehr als verdoppelt. Konnten in den ersten Jahren noch alle 41 gemeldeten Teams für einen Start bei der Formula Student Germany berücksichtigt werden, sind die heiß begehrten Startplätze heute nach wenigen Minuten vergeben. Die hohe Zahl von mittlerweile 115 Rennteams (75 FSC + 40 FSE) stellt die Organisatoren vor neue Herausforderungen. Der zeitliche Ablauf muss minutiös geplant und eingehalten werden, um eine Durchführung des Wettbewerbs in der zur Verfügung stehenden Zeit überhaupt durchführen zu können. Auch der Platzbedarf der vielen Rennteams mit all ihrer Ausrüstung stellt die Veranstalter vor große logistische Herausforderungen und bringt das Fahrerlager am Hockenheimring an die Kapazitätsgrenze.

2010 erfolgte mit der Einführung der Formula Student Electric (FSE) eine der bedeutendsten und zukunftsweisendsten Weiterentwicklung der FSG. Zwar sollte die Öffnung des Wettbewerbs für batterieelektrisch betriebene Fahrzeuge zunächst nur ein Test sein, allerdings kam die Idee bei den Teilnehmern und in der Industrie so gut an, dass die Aufteilung der FSG in Verbrenner (Formula Student Combustion, FSC) und E-Fahrzeuge (FSE) mittlerweile ein fester Bestandteil des Events ist und weltweit immer mehr Nachahmer findet. Die Teilnahme der E-Fahrzeuge bringt viele zusätzliche organisatorische und logistische Fragestellungen mit sich, z.B. muss eine leistungsfähige Infrastruktur zum Laden installiert werden und entsprechende Sicherheitsvorkehrungen getroffen werden, doch bereut niemand im Organisationsteam diesen Schritt. Zum einen, weil die Industrie auch im Bereich der alternativen Antriebstechnologien qualifi ierte und motivierte Mitarbeiter benötigt und die Studenten durch den FSE-Wettbewerb wertvolle praktische Erfahrungen sammeln können. Zum anderen brennt in den FSE-Teams das gleiche Feuer, das bereits die Initiatoren und die FSC-Teams bis heute antreibt. Und daher wird es der FSG auch in Zukunft nicht an technikverrückten Ehemaligen mangeln, die sich ehrenamtlich für diesen Wettbewerb engagieren, den Event stetig verbessern und dadurch die nachrückenden Teams an ihrem reichhaltigen Erfahrungsschatz teilhaben lassen.

FSG 2005 – 2015

Highlights & Innovations

Acceleration at
F1 start-finish straight

Design judging at the Marquee
above pits needs car lifting

Where it
all began:
Pre-event
at Porsche

Introducing
FS Electric rules

FS Electric Night
Endurance
accompanied by
music

2005 06 07 08 09 10

First Formula Student World Council Meeting
at Hockenheim

FSG found its
home base,
the Hockenheim Ring

The Mahle Party
kicks into life

Craig Dawson – best commentator ever

Introducing the “Wet Pad”

Incredible heat during the week – cool down by the water cannon

New stadium lights

Tell me who you are – RFID wristbands

A new competition at start?

11

12

13

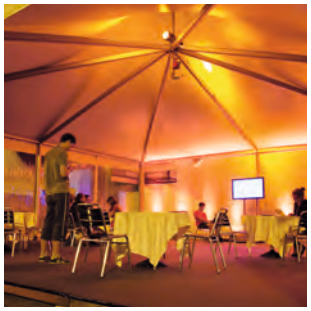
14

Aerial views

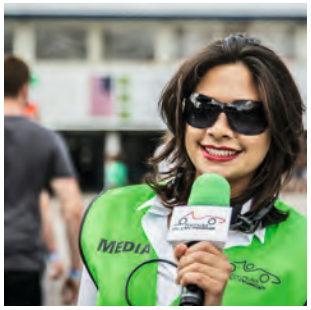
Pat´s Corner live

View of the new track layout from grandstands

The first Formula Student Poem



All-night recreation area



FSG TV goes on the air

Echoes from Pat´s Corner

Pat Clarke
FSG Chief Design Judge and Advisor

It certainly does not seem like ten years since I was approached by Frank Roeske and Peter Jakowski at FSUK 2005 to help advise with the formation of Formula Student Germany, and to be the Chief Design Judge.

I knew Frank and Peter as competitors in the UK and from their visit to FSAE Australia. They knew me through my part in organizing FSAE Australasia, regarded at the time as 'the best' little event. They also knew I helped advise teams technically, on building a team and a car without involving myself in the actual design.

I was pleased to accept the challenge and in July 2006 found myself part of a very enthusiastic young team at Hockenheim. Initially, I was impressed at the quality of the organizing team that had come together. I was more impressed when this young team pulled off a fantastic first event.

Sure, there were some mistakes made and several times snap management decisions had to be taken, but the event came off a great success and afterwards I shared the emotional tears and laughter.

Apart from the few teams who had visited other events, the early European cars were a little odd. Not odd in a bad, poorly designed way, but different.

I discovered that 'Design' in Germany referred to aesthetic design whereas 'Design' in Formula Student referred to engineering design, so the German cars tended to be very stylized and at early events there was actually an award for Aesthetic Design. One amusing aspect of this was the large number of cars with stylized mufflers.

From the beginning, FSG has been the leading FS event, despite Michigan claiming to be the 'World Championship'. The numbers at Michigan may be slightly higher but the average quality of teams and the organization in Hockenheim is much better. One reason for this is the requirement that teams submit information on their project before the event, the result being the overall standard of the teams and their cars is very high.

The 'secret' to FSG's success is that it is run by a group of mostly ex FS competitors, that it is for the students rather being run for the organizers. These ex students have a better understanding of what the competitors expect and do a good job of providing it.

They are not afraid to innovate. Running the event at a real racetrack, the wet skidpan, the electric competition, the Mahle after-party, Pat's Corner and even the Design Finals judging system are examples of this forward outlook that keeps FSG as the leading global Student Engineering Design event.

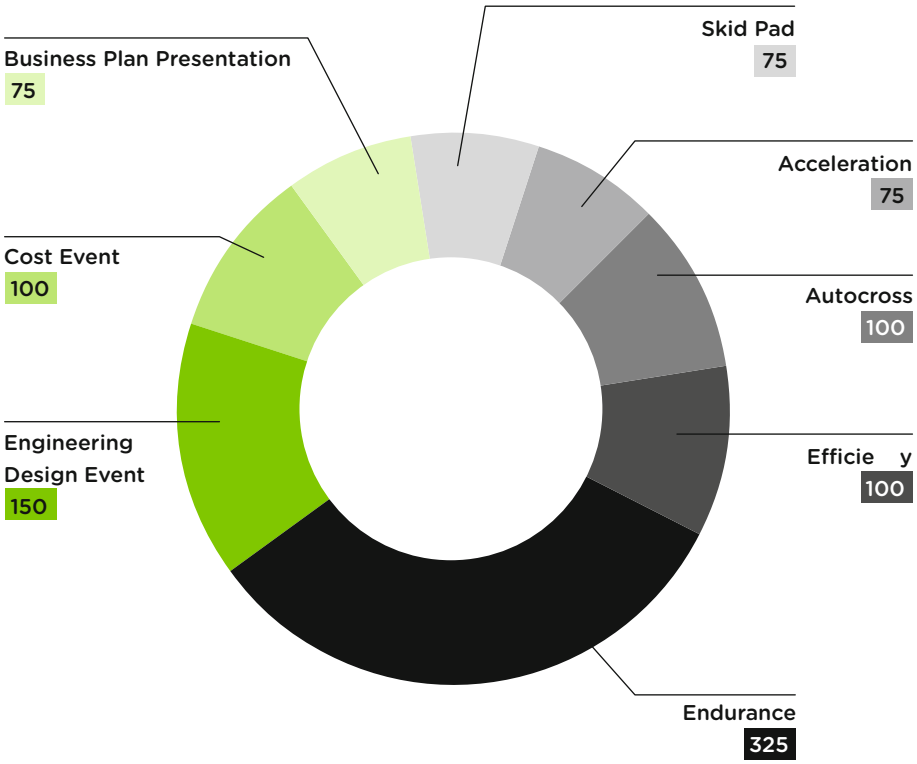
These features are now copied by most other events, but FSG is the one I am most pleased and proud to be part of. And, the Good Lord willing, I look forward to another 10 years of involvement.

An International Design Competition

Ein Konstruktions-wettbewerb

Formula Student Germany is a design competition for students to produce the prototype of a race car based on a hypothetical manufacturing contract. In order for the competing teams to be compared, their designs, plans, and cars are judged by experts. Each team has the chance to win in total a maximum of 1,000 points over the course of three static and five dynamic events. The team with the best overall combination of construction, track performance, financial planning, and marketing strategy will be the winner of FSG. In theory, a team which is not the best in (or is even eliminated from) one or more events can still win the overall competition. Similarly, teams can win the top prize in one or more of the categories, and still have no chance at an overall victory. However, before the winners of individual events can be celebrated, the teams have some hurdles to overcome, which will now be explained in more detail.

Die Formula Student Germany ist ein Konstruktionswettbewerb für Studenten, bei dem unter der Annahme eines fiktiven Konstruktionsauftrags der Prototyp eines Rennwagens entstehen soll. Um einen Vergleich der startenden Teams zu ermöglichen, werden die Konzepte, Planungen und Fahrzeuge von Experten bewertet. Insgesamt kann jedes Team in drei statischen und fünf dynamischen Disziplinen maximal 1000 Punkte erhalten. Den Gesamtsieg über die FSG erringt das Team mit dem besten Gesamtpaket aus Konstruktion, Rennperformance, Finanzplanung und Verkaufsargumentation. Prinzipiell kann also auch ein Team den Gesamtwettbewerb gewinnen, das in einer oder mehreren Disziplinen nicht zu den Besten zählt oder sogar ausscheidet. Auf der anderen Seite können durch dieses Bewertungssystem auch Teams einen Titel in einer oder mehreren Disziplinen erringen, obwohl sie keine Chance auf den Gesamtsieg haben. Bevor es jedoch zur Siegerehrung in den einzelnen Disziplinen geht, haben die Teams einige Hürden zu überwinden, die im Folgenden näher erläutert werden.



There are 1000 points to be gained in 3 static and 5 dynamic disciplines.

Insgesamt werden 1000 Punkte vergeben, die sich auf die drei statischen und fünf dynamischen Disziplinen verteilen.

Static Events

The Formula Student competition is designed to introduce the participating students to the interdisciplinary approach of today's automotive industry. This not only includes technical understanding but also economic and communication abilities such as presentation techniques or financial planning skills. This is why the three static events demand collaboration across the team in the areas of design and layout, construction, marketing and pricing of a product. They also require specialized expertise from different technical and financial courses of study. The teams can win up to 325 points in the three static events, and each individual event is weighted differently. A panel of experienced experts from the automobile, motorsport, and supply industries judge the performance of each team.

Engineering Design (150 points)
At the start of the engineering design competition, the students must hand in an eight-page technical description of their car. It must show both their design and how the design will be applied to their chosen construction. On the basis of this document, the members of the jury will evaluate the layout, technical design, construction, and implementation of the production of the actual vehicle. Then, there will be a discussion where the teams are questioned by the judges. These discussions focus on clarifying technical details, exploring the thinking behind the chosen design, as well as the corresponding technical understanding of the students. The evaluation will not only assess the quality of the technical solution in question but also the reasons behind it.

Cost Analysis (100 points)
Cost is a decisive factor in the design of any product. In the cost analysis event, the teams must grapple with the calculative size of the vehicle, its components, and the necessary manufacturing steps, and record all of this in a written cost

Experienced judges from the world of motorsport, automotive engineering, and the supply industry know exactly where to look in order to evaluate the technical solutions.

Die erfahrenen Juroren aus dem Motorsport, Automobilbau und der Zulieferindustrie wissen genau wo sie hinsehen müssen, um die technischen Lösungen bewerten zu können

Statische Disziplinen

Der Formula Student Wettbewerb soll die teilnehmenden Studenten an die interdisziplinäre Arbeitsweise in der Industrie heranführen. Dazu zählen nicht nur technisches Verständnis, sondern auch wirtschaftliche und kommunikative Fähigkeiten, wie z. B. Präsentationstechniken oder Kompetenzen in der Finanzplanung. Daher wird in drei statischen Disziplinen sowohl die teamübergreifende Zusammenarbeit bei Konzept, Auslegung, Konstruktion, Vermarktung und Preisung eines Produktes als auch spezielles Fachwissen aus verschiedenen technischen und wirtschaftlichen Studiengängen gefördert und abgefragt. In den drei statischen Disziplinen können die Teams maximal 325 Punkte erreichen, wobei die Einzeldisziplinen unterschiedliche Gewichtungen haben. Bewertet werden die Leistungen der Teams durch eine Jury aus erfahrenen Experten der Automobil- und Zulieferindustrie sowie dem Motorsport.

Engineering Design (150 Punkte)
Zu Beginn des Engineering Design Wettbewerbs reichen die Studenten eine achtseitige technische Beschreibung zu ihrem Fahrzeug ein, um das Konzept sowie die besonderen konstruktiven Umsetzungen darzustellen. Die Juroren begutachten auf Basis der Unterlagen das technische Konzept, die Auslegung, Konstruktionen sowie Umsetzung in der Fertigung am realen Fahrzeug. Die Teams müssen ihnen dabei zu allen Fragen in einer Diskussion Rede und Antwort stehen. In den Gesprächen geht es um die Abfrage der technischen Details, die Hintergründe für die Wahl eines Konzepts und das dazugehörige technische Verständnis. In die Bewertung fließen daher nicht nur die Güte der vorliegenden technischen Lösungen ein, sondern auch die Gründe für die gewählte Lösung und das technische Verständnis der Studenten.

report. The students must then answer questions from the judges relating to the cost report on their prototype. In addition to considering the thoroughness of the written report, the students' understanding of the manufacturing process and the total cost calculation will be assessed. The teams will also have to handle a real case scenario where they must react to product requirements being altered at short notice. The quality of their response to these changing circumstances will also form part of the overall point score.

Business Plan Presentation (75 points)

Each team presents their business plan for the constructed prototype to a fictitious manufacturing company, represented by the judges. During a ten-minute presentation, the team must demonstrate why their design best fulfils the demands of their target group of amateur weekend racers, and show how their design can be successfully marketed. The presentation will be followed by a five-minute discussion and question round with the judges. In this event the content, structure, and editing of the presentation, as well as the team's performance in delivering it, will be evaluated alongside their answers to the panel's questions.

Cost Analysis (100 Punkte)

Die Kosten sind für Auslegung eines Produktes ein entscheidender Faktor. Bei der Disziplin Cost Analysis müssen sich die Teams mit den kalkulatorischen Größen des Fahrzeugs, seiner Bestandteile und der notwendigen Fertigungsschritte auseinandersetzen und diese schriftlich in einem Cost Report festhalten. Zu den eingereichten Unterlagen müssen sich die Studenten mit ihrem Prototypen einer Diskussion mit den Juroren stellen. Bewertet werden neben der Aufbereitung und Vollständigkeit des schriftlichen Reports auch das Verständnis der Fertigungsprozesse sowie der Gesamtpreis. Darüber hinaus müssen die Teams ein Real Case Szenario bearbeiten, in dem es darum geht, kurzfristig auf veränderte Anforderungen an das Produkt zu reagieren. Die Ergebnisse werden ebenfalls benotet und fließen in die Gesamtpunktzahl ein.

Business Plan Presentation (75 Punkte)

Mit ihrem Business Plan präsentieren die Teams einer fiktiven Herstellerfirma, vertreten durch die Juroren, ihren Geschäftsplan für den gebauten Prototypen. Die Teams stellen in einem zehnminütigen Vortrag dar, weshalb ihr Konzept die Anforderungen der Zielgruppe von nicht-professionellen Wochenendrennfahrern am besten erfüllt und gewinnbringend vermarktet werden kann. Der Präsentation folgt eine fünfminütige Diskussions- und Fragerunde mit den Juroren. Bei dieser Disziplin werden Inhalt, Aufbau und Aufbereitung des Vortrags sowie der Auftritt der Teams ebenso bewertet wie die Antworten auf die Fragen der Juroren.

In the Business Plan Presentation, the team's appearance counts for as much as the facts.

Bei der Business Plan Presentation zählen nicht nur die Fakten, sondern auch das Auftreten des Teams

Dynamic Events

Of course, the cars that the students construct will not only be assessed when stationary. Their performance on the race track will also be put to the test. Each dynamic event tests different features of the vehicles. In addition to the maximum longitudinal and lateral acceleration, race performance, efficiency, and endurance of the formula cars will be examined and evaluated. For the acceleration, skid pad, and Autocross events, each car starts with two drivers, each of whom is allowed two attempts. The best attempt is the one on which the car will be scored. A maximum of 675 points can be scored over the course of the five dynamic events.

Acceleration (75 points)
The vehicle's acceleration from a standing start is measured over a 75 metre straight. In addition to traction, the correct engine design is especially important, either in terms of greater power or for the highest possible torque. The fastest cars cross the line in less than four seconds and can reach speeds of over 100 km/h by the end of the stretch.

Skid Pad / Wet Pad (75 points)
During the Skid Pad event, the cars must drive a figure-8 circuit lined with traffic cones, performing two laps of each circle. In each case, the second lap will be measured. The lap time gives a comparative value for the maximum possible lateral acceleration of the car. Most of the cars use aerodynamics to raise the contact pressure and, thus, increase lateral acceleration. To ensure the conditions are the same for all teams, the track is continually watered, hence the name "Wet Pad". Knocking over any of the cones results in a time penalty.

Autocross (100 points)
In the autocross event, the cars traverse a kilometre-long track with straights, curves, and chicanes. A fast lap time is a sign of high driving dynamics, precise handling, and good acceleration and braking ability.

Dynamische Diszplinen

Die von den Studenten konstruierten Fahrzeuge werden natürlich nicht nur im Stand bewertet. Sie müssen ihre Performance auch auf der Rennstrecke unter Beweis stellen. In jeder dynamischen Disziplin werden andere Eigenschaften des Fahrzeugs getestet. Neben der maximalen Längs- und Querbeschleunigung werden auch die Rennperformance, Effizienz und Haltbarkeit der Formel-Rennwägen ermittelt und bewertet. Bei den Disziplinen Acceleration, Skid Pad/Wet Pad und Autocross starten je Fahrzeug zwei Fahrer, die jeweils zwei Versuche haben. Gewertet wird das beste mit dem Fahrzeug erzielte Ergebnis. In den fünf dynamischen Disziplinen können maximal 675 Punkte erzielt werden.

Acceleration (75 Punkte)
Auf einer 75 Meter langen Geraden wird die Beschleunigung der Fahrzeuge aus dem Stand gemessen. Hier kommt es neben der Traktion vor allem auf eine richtige Auslegung des Getriebes und eine möglichst hohe Leistung, bzw. ein hohes Drehmoment an. Die schnellsten Fahrzeuge absolvieren diese Prüfung in einer Zeit unter vier Sekunden und erreichen am Ende der Messstrecke Geschwindigkeiten von mehr als 100 km/h.

Skid Pad / Wet Pad (75 Punkte)
Beim Skid Pad durchfahren die Rennwagen einen mit Pylonen begrenzten Parcours in Form einer Acht. Jeder Kreisring wird zweimal umrundet. Gemessen wird jeweils die zweite Runde. Die Rundenzeit gibt einen Vergleichswert für die maximal erzielbare Querbeschleunigung der Fahrzeuge. Bei den meisten Fahrzeugen werden durch den Einsatz aerodynamischer Hilfsmittel der Anpressdruck und damit die Querbeschleunigung erhöht. Damit die Bedingungen für alle Teams gleich sind, wird der Parcours kontinuierlich bewässert („Wet Pad"). Das Umstoßen von Pylonen wird mit einer Zeitstrafe belegt.

Autocross (100 Punkte)
Bei der Disziplin Autocross fahren die Rennwagen über einen etwa 1 Kilometer langen Kurs mit Geraden, Kurven und Schikanen. Eine schnelle Rundenzeit ist ein Indikator für eine hohe Fahrdynamik, ein präzises Handling sowie gute Beschleunigungs- und Bremseigenschaften. Auch hier werden umgestoßene Pylonen mit einer Zeitstrafe geahndet. Die Platzierung im Autocross entscheidet auch über die Startreihenfolge im nachfolgenden Endurance-Wettbewerb.

Damit später startenden Teams durch den Reifenabrieb der Vorausfahrenden keine Grip-Vorteile haben, wird beim Skid Pad die Strecke kontinuierlich gewässert

So that teams with a later start don't have a grip advantage from the rubber marks left on the track by tire abrasion from teams ahead of them, the skid pad is continuously watered.

The Endurance, in which the cars have to drive through harsh racing conditions, is the highlight of the event.

Der Endurance ist der Höhepunkt der Veranstaltung, bei dem die Fahrzeuge unter harten Rennbedingungen bestehen müssen

Once again, time penalties occur for those who knock over any cones. The autocross rankings decide the starting positions for the endurance competition that follows.

Endurance (325 points)

The endurance race represents almost a third of all available points and is consequently the most important event of the Formula Student Competition. The cars must demonstrate their capacity for endurance over a gruelling track distance of 22 km, and all of the prototype's features are crucial for this event, from acceleration and handling to driving dynamics. The skill of the driver is also tested here, as they may only familiarise themselves with the track before the race by walking the length of the course (Course Walk). Each team gets just a single try, and the drivers must be swapped at the halfway point. There can be up to four cars on the circuit at any given time, and so overtaking manoeuvres must be performed frequently. Overtaking is signalled by a blue flag and is only permitted at specially marked sections of the track. A team will receive no points at the end if they are more than a third slower than the fastest team overall. And again, hitting cones results in time penalties.

Efficiency (100 points)

During the endurance race, fuel consumption (FSC cars) or energy consumption (FSE cars) is precisely recorded. However, the absolute fuel and energy consumption is not what is used to calculate the efficiency score, but rather the consumption relative to speed. This is to prevent teams from driving particularly slowly in the endurance competition in order to score as highly as possible in the efficiency category.

Endurance (325 Punkte)

Das Endurance-Rennen stellt mit fast einem Drittel aller erreichbaren Punkte die Hauptdisziplin des Formula Student Wettbewerbs dar. Über eine Renndistanz von 22 Kilometer müssen sich die konstruierten Rennfahrzeuge unter Dauerbelastung beweisen. Bei dieser Disziplin sind alle Eigenschaften der Prototypen wichtig, von der Beschleunigung bis zum Handling und der Fahrdynamik. Zusätzlich ist auch das Geschick der Fahrer gefragt, da die Strecke vor dem Rennen nur abgeschritten werden darf (Course Walk). Jedes Team hat einen einzigen Versuch, wobei nach der Hälfte der Distanz ein Fahrerwechsel erfolgen muss. Es sind bis zu vier Fahrzeuge gleichzeitig auf der Strecke, wodurch es oft auch zu Überholvorgängen kommt. Diese werden von der Rennleitung veranlasst und finden in eigens dafür eingerichteten Überholzonen statt, an denen die Strecke breiter ist. Das langsamere Fahrzeug bekommt dafür von den Streckenposten durch blaue Flaggen signalisiert, dass es einen schnelleren Teilnehmer überholen lassen muss. Die Teams erhalten nur dann Punkte, wenn sie höchstens ein Drittel langsamer waren als das schnellste Team. Auch hier werden Pylonenfehler durch Zeitstrafen geahndet.

Efficiency (100 Punkte)

Während des Endurance-Rennens wird der Kraftstoffverbrauch (FSC-Fahrzeuge), bzw. der Energieverbrauch (FSE-Fahrzeuge) gemessen. Bei der Berechnung der Effizienz und der Punkte wird allerdings nicht der absolute Kraftstoff-/ Energieverbrauch gemessen, sondern der Verbrauch in Relation zur Geschwindigkeit. Dadurch wird verhindert, dass Teams während des Endurance-Wettbewerbs besonders langsam fahren, um eine möglichst hohe Punktzahl in der Efficiency-Disziplin zu erreichen.

Safety Regulations
Sicherheit und Regeln

Since all the cars at Formula Student Germany are prototypes, their teams must observe a series of safety measures and regulations. This guaranties maximum safety and sets up a level playing field between the teams, which start the competition with different qualifications in terms of experience, personal ability, and financial resources.

Successfully passing the process of scrutineering is a requirement for a car to be allowed to participate in the dynamic categories. Scrutineering is the safety-related inspection of the prototypes, and various stickers are placed on the front of a car to show it has passed. For the FSC and FSE series, there are also system-specific differences in terms of operation safety that have to be considered during scrutineering.

Tech and Safety (FSC and FSE)
For this inspection, all the components and accessories of the race car considered relevant to safety according to the regulations are checked. These include the framework, wheel suspension, steering, braking, rims, and tires. Other details, such as the layout of the fuel lines, the fixture of the air intake system, the observance of appropriate cockpit size, and the correct functioning of the kill switch, are all checked. In addition to this, all drivers must show that when in a ready-to-race condition, i.e., strapped in to the driving seat wearing their full racing suit and helmet, they can exit their vehicle within five seconds.

Da bei der Formula Student Germany alle Fahrzeuge Prototypen sind, müssen die Teams eine Reihe von Sicherheitsmaßnahmen und Regeln einhalten. Zum einen wird dadurch eine maximale Sicherheit garantiert, zum anderen kann so der Rahmen für eine Chancengleichheit zwischen Teams geschaffen werden, die mit unterschiedlichen Voraussetzungen in Bezug auf Erfahrung, personellen Kapazitäten und finanziellen Ressourcen an den Start gehen.

Das erfolgreiche Absolvieren des sogenannten Scrutineering ist die Grundvoraussetzung für die Zulassung eines Fahrzeugs zu den dynamischen Disziplinen. Dabei handelt es sich um die sicherheitstechnische Abnahme der Prototypen, deren Bestehen mit verschiedenen Aufklebern auf der Fahrzeugnase belegt wird. Bei den beiden Rennserien FSC und FSE gibt es systembedingte Unterschiede bei der Betriebssicherheit, die beim Scrutineering berücksichtigt werden müssen.

Tech and Safety (FSC und FSE)
Bei dieser Abnahme werden alle sicherheitsrelevanten Bau- und Zubehörteile des Rennwagens, die durch das Regelwerk vorgeschrieben werden, geprüft. Dazu gehören die Rahmenstruktur, die Radaufhängung, Lenkung, Bremsen und Felgen sowie die Reifen. Auch Details wie die Verlegung der Kraftstoffleitungen, die Befestigung des Ansaugsystems, die Einhaltung der Cockpitgröße oder das korrekte Funktionieren der Notschalter werden geprüft. Zusätzlich müssen alle Fahrer zeigen, dass sie in „ready-to-race condition“, d. h. volleingekleidet und angeschnallt, das Auto innerhalb von 5 Sekunden verlassen können.

The technical inspection of the vehicle is carried out by qualified xperts. The team must correct any faults and deficiencies in the pit be ore the car is checked again.

Die technische Abnahme der Fahrzeuge erfolgt durch sachverständige Prüfer. Fehler oder Mängel am Fahrzeug müssen die Teams in der Box beseitigen und das Fahrzeug erneut prüfen lassen.

Seit 10 Jahren offizieller Technischer Partner der Formula Student Germany

Mit

SICHERHEIT

auch nach dem Studium das Rennen machen.

Studierende und Absolventen (m/w) gesucht.

Mit Sicherheit Karriere machen. Kommen Sie in unser Team, ob als Praktikant, für eine Abschlussarbeit oder um Ihre Karriere nach dem Studium als Sachverständiger oder Prüfingenieur zu starten. DEKRA ist eine internationale Expertenorganisation und steht als verlässlicher Partner im automobilen und industriellen Bereich für abwechslungsreiche und zukunftssichere Arbeitsplätze in der Region.

Mehr Informationen zum Thema Karriere bei DEKRA:
www.dekra.de/karriere

www.facebook.com/DEKRAkarriere

Automotive — Industrial — Personnel

DEKRA

OFFIZIELLER TECHNISCHER PARTNER

formula student germany

Rollover safety is checked on the tilt table. The car will not pass if any fluids escape or the wheels lift off the tabl .

Auf dem Kipptisch wird die Überschlagssicherheit überprüft. Wenn Flüssigkeiten austreten oder sich Reifen vom Tisch abheben ist das Fahrzeug durchgefallen.

Tilt Table (FSC and FSE)

The tilt table test checks whether any operating fluids are leaking and rollover protection regulations are met. The car must be brought to the test ready to race, with all fluids and a full petrol tank. The driver is strapped in, and the car is set at an angle of 45 degrees. No fuel or other fluids are allowed to leak out at this angle. After this, the angle is increased to 60 degrees, which corresponds to a lateral acceleration force of 1.7 g. The race car only passes this test if the upper wheels remain on the surface.

Noise Test (only FSC)

The noise test checks that the car complies with the provisions for the acceptable noise level. In order to measure the volume, the engine is run in neutral at a rotation speed depending on the type of engine. In neutral, the noise level must not exceed 100 dBc or be any greater than 110 dBc at a specified rotation speed.

Brake Test (FSC and FSE)

The brake test checks whether a braking system is able to lock all four wheels of the car simultaneously and bring the vehicle to a controlled stop. However, since the FSE cars can also use their electric motor braking system, the driver must deactivate the high voltage system after accelerating and then come to a complete stop with all four wheels locked in order to demonstrate that the mechanical braking system functions properly in the case of a fault in the high voltage system.

Tilt Table (FSC und FSE)

Beim Tilt Table Test wird überprüft, ob keine Betriebsflüssigkeiten austreten und die Regeln zum Überrollschutz erfüllt werden. Die Fahrzeuge müssen startklar, mit allen Flüssigkeiten und vollgetankt, zum Test gebracht werden. Das Fahrzeug mit angeschnalltem Fahrer wird fixiert und bis zu einem Winkel von 45 Grad geneigt. Bei diesem Winkel dürfen kein Kraftstoff oder andere Flüssigkeiten austreten. Danach wird der Winkel auf 60 Grad erhöht, was einer Querbeschleunigung von 1,7 g entspricht. Nur wenn die oberen Räder auf dem Boden bleiben, besteht der Rennwagen den Tilt Table Test.

Noise Test (nur FSC)

Der Noise Test überprüft, ob das Fahrzeug den Vorschriften für die Einhaltung des Lärmpegels entspricht. Dazu wird bei laufendem Motor im Leerlauf, bei einer durch die Bauart des Motors vorgeschriebenen Drehzahl, die Lautstärke gemessen. Der Lärmpegel darf dabei im Leerlauf nicht höher als 100 dBc, bei vorgeschriebener Drehzahl nicht höher als 110 dBc sein.

Brake Test (FSC und FSE)

Der Bremstest dient zur Überprüfung, ob das Bremssystem in der Lage ist, alle vier Räder des Fahrzeugs gleichzeitig zu blockieren und dadurch das Fahrzeug zu einem kontrollierten Stillstand zu bringen. Die FSE-Fahrzeuge können den elektrischen Antrieb auch zum Bremsen verwenden. Um eine einwandfreie Funktion des mechanischen Bremssystems bei einem Fehler im Hochspannungssystem zu beweisen, muss der Fahrer nach dem Beschleunigen das Hochvoltsystem deaktivieren und anschließend mit vier blockierenden Rädern zum Stehen kommen.

Flags Flaggen

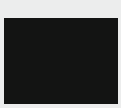
During the dynamic events, flags a e used to communicate with the drivers. The various colours and patterns have different meanings, and all drivers must understand and obey any flag signal th y receive during the competition. Infringements of flag signals ca be penalised with various penalties, ranging from time penalties to disqualific tion.

Bei den dynamischen Prüfungen werden zur Kommunikation mit den Fahrern Flaggen eingesetzt. Die verschiedenen Farben und Muster haben unterschiedliche Bedeutungen. Alle Fahrer müssen die Flaggen kennen und beachten, wenn Sie diese während des Wettbewerbs gezeigt bekommen. Verstöße gegen geschwenkte Flaggen können mit verschiedenen Sanktionen geahndet werden, die von Zeitstrafen bis zur Disqualifi ation reichen können.

Your session has started, enter the course!
Deine Fahrt beginnt. Fahr auf die Strecke!

Your session has been completed. Exit the course!
Deine Fahrt ist beendet. Verlass die Strecke!

Pull into the passing zone to be passed by a faster competitor! Fahr in die Überholzone, damit ein schnelleres Fahrzeug überholen kann!



Pull into the penalty box for a mechanical inspection of your car!
Fahr in die Kontrollzone für eine Untersuchung des Fahrzeugs!

Electrical Scrutineering (only FSE)

During electrical scrutineering, the electrical safety of the electric car is tested. That means all systems required by the regulations are checked in regard to their functional capacity. For example, system checks include the insulation monitoring device, correct operation of the signal light (the Tractive System Active Light, which displays the status of the high voltage system), and the sound that indicates that the vehicle is ready to race. In addition, general safety aspects are checked, such as whether the line mechanics are properly laid and the high voltage energy storage device is assembled according to regulation.

Rain Test (only FSE)

Rain can lead to critical situations for electric cars. In order to be allowed to operate during rainfall with no reservations, the FSE cars must undergo an artificial rain shower. During the artificial rainfall, the car's high voltage system is activated and the appropriate components can be checked to see if they are sufficiently insulated and protected from the rain.

Adherence to the Rules

Vehicles must conform to regulations and, from a technical point of view, be safe at all times, even after passing scrutineering. The authorised technical experts or the race stewards can remove a car from the competition at any time in the case of a breach of regulation or safety requirements, for example, if a car is leaking fluids, is too loud, or if the insulation is not up to standard. The car cannot return to the competition until the fault has been repaired. Cars are also inspected again following the endurance race in order to exclude the possibility of a violation during the race. This is why the cars are placed in a parc fermé after the endurance competition, and the team members are not permitted to touch them until all the inspections have been successfully performed.

Electrical Scrutineering (nur FSE)

Während des Electrical Scrutineering wird die elektrische Sicherheit der Elektrofahrzeuge überprüft, d. h. alle durch das Regelwerk vorgeschriebenen Maßnahmen werden auf ihre Funktionsfähigkeit getestet. Zu den geprüften Systemen gehören u. a. die Isolationsüberwachung, die korrekte Funktionsweise des Signallichtes (Tractive System Active Light), das die Aktivität des Hochvoltsystems anzeigt, und das Geräusch, das die Fahrbereitschaft des Fahrzeugs signalisiert (Ready To Drive Sound). Es werden aber auch allgemeine Sicherheitsaspekte wie z. B. mechanisch einwandfrei verlegte Leitungen oder der regelkonforme Einbau der Hochvolt-Energiespeicher überprüft.

Rain Test (nur FSE)

Regen kann bei Elektrofahrzeugen zu kritischen Situationen führen. Um den Betrieb auch während Niederschlägen vorbehaltlos erlauben zu können, müssen sich die FSE Fahrzeuge einem künstlichen Regenschauer unterziehen. Während der künstlichen Beregnung des Fahrzeuges wird bei aktiviertem Hochvolt-System kontrolliert, ob die verwendeten Komponenten ausreichend isoliert und gegen Regen geschützt sind.

Geltungsbereich

Die Fahrzeuge müssen auch nach bestandenem Scrutineering zu jeder Zeit regelkonform und sicherheitstechnisch unbedenklich sein. Die offiziellen technischen Sachverständigen oder die Rennleitung können Fahrzeuge bei einem Verstoß gegen das Reglement oder die Sicherheitsanforderungen jederzeit aus dem Wettbewerb nehmen, bis der Mangel behoben ist, z. B. wenn Flüssigkeiten austreten, das Fahrzeug zu laut ist oder die elektrische Isolation nicht gewährleistet ist. Nach dem Endurance-Rennen werden die Fahrzeuge zudem erneut geprüft, um Regelverstöße während des Rennens ausschließen zu können. Die Fahrzeuge werden nach dem Endurance-Wettbewerb in einem Parc-Fermé abgestellt und dürfen von den Teammitgliedern nicht mehr berührt werden, bis die letzte Abnahme erfolgt ist.

The isolation monitoring device of a FSE car must not fail the rain test, otherwise the electrical safety of the race car cannot be guaranteed.
Die Isolationsüberwachung der FSE-Fahrzeuge darf beim Rain Test nicht anschlagen, da ansonsten die elektrische Sicherheit des Rennwagens nicht gewährleistet ist.

Pull into the penalty box for discussion concerning an incident that may cause a time penalty!
Fahr in die Kontrollzone zur Diskussion eines Vorfalls! Ggf. Zeitstrafe!

Come to an immediate safe controlled stop on the course! Pull to the side of the course.
Komm sofort kontrolliert zum Stehen. Halte die Strecke frei.

Something is on the track that should not be there. Be prepared for evasive maneuvers to avoid debris or liquids!
Es ist etwas Unerwartetes auf der Strecke. Sei bereit Flüssigkeiten oder Bruchstücken auszuweichen!

Something has happened beyond the flag station. No passing unless directed by the track marshals. Stationary: Danger! Slow down, be prepared to take evasive action. Waved: Great Danger! Slow down, evasive action is most likely required, be prepared to stop.
Etwas ist jenseits der Flagge passiert. Fahr nicht vorbei ohne Anweisung der Streckenposten. Feststehend: Gefahr! Fahr langsam, sei bereit zum Ausweichen. Geschwenkt: Große Gefahr! Fahr langsam, Ausweichen wird erforderlich sein. Sei bereit anzuhalten.

There is a slow moving vehicle on the course. Be prepared to approach it at a cautious rate.
Es ist ein langsames Fahrzeug auf der Strecke. Nähere dich vorsichtig an.

development loves inspiration

Whether it's in research, maintenance, or engineering, engineers at BASF carry out a broad range of duties with passion and responsibility. From day one you'll be servicing and developing production plants worldwide. And we're all motivated by the same thing: succeeding together. When inspiration is the beginning of great developments, that's how we create chemistry. At BASF. Find out more now and apply at: **www.basf.com/career**

Visit us on Facebook: www.facebook.com/basfcareer

BASF
We create chemistry

Awards 2015

Formula Student Germany

Audi Vorsprung Award “Best Lightweight Concept”	II
BASF “Best Use Of Fiber Reinforced Plastic”	I
FSG Sportsmanship Award presented by FSG Executive Committee	II
Opel Style Award	I

Formula Student Combustion

Formula Student Combustion Champion	II
Formula Student Combustion – 2nd	II
Formula Student Combustion – 3rd	II
FSC Business Plan Presentation Award – 1st	I
FSC Business Plan Presentation Award – 2nd	I
FSC Business Plan Presentation Award – 3rd	I
FSC Cost Analysis Award – 1st	II
FSC Cost Analysis Award – 2nd	II
FSC Cost Analysis Award – 3rd	II
FSC Engineering Design Award – 1st	II
FSC Engineering Design Award – 2nd	II
FSC Engineering Design Award – 3rd	II
FSC Acceleration Winner	II
FSC Autocross Winner	II
FSC Endurance Winner	II
FSC Skid Pad Winner	I
Dekra “Best Prepared Car For Scrutineering”	I
Kautex “Most Fuel Efficient Car”	II
MTU “Most Innovative Powertrain”	I

Formula Student Electric

Formula Student Electric Champion	II
Formula Student Electric – 2nd	II
Formula Student Electric – 3rd	II
FSE Business Plan Presentation Award – 1st	I
FSE Business Plan Presentation Award – 2nd	I
FSE Business Plan Presentation Award – 3rd	I
FSE Cost Analysis Award – 1st	I
FSE Cost Analysis Award – 2nd	I
FSE Cost Analysis Award – 3rd	I
FSE Engineering Design Award – 1st	I
FSE Engineering Design Award – 2nd	I
FSE Engineering Design Award – 3rd	I
FSE Acceleration Winner	II
FSE Autocross Winner	II
FSE Endurance Winner	II
FSE Skid Pad Winner	I
Daimler “Best E-Drive Packaging”	I
Dekra “Best Prepared Car For Scrutineering”	I
Harting “Most Energy Efficient Car”	II
Schaeffler “Best Wheel Hub Drive”	I

The letter behind the award states at which time the award will be presented.
I – Award Ceremony – Part I (Friday)
II – Award Ceremony – Part II (Sunday)

René Queck, IT Project Manager

What's more interesting than looking into the future?
Shaping it.

Porsche is seeking interns (f/m).

For further information, visit www.porsche.com/careers

or join us on www.facebook.com/porschekarriere

manager magazin
"Imageprofile"
2014
1st PLACE
Category
"Employee Orientation"
Issue 02/2014

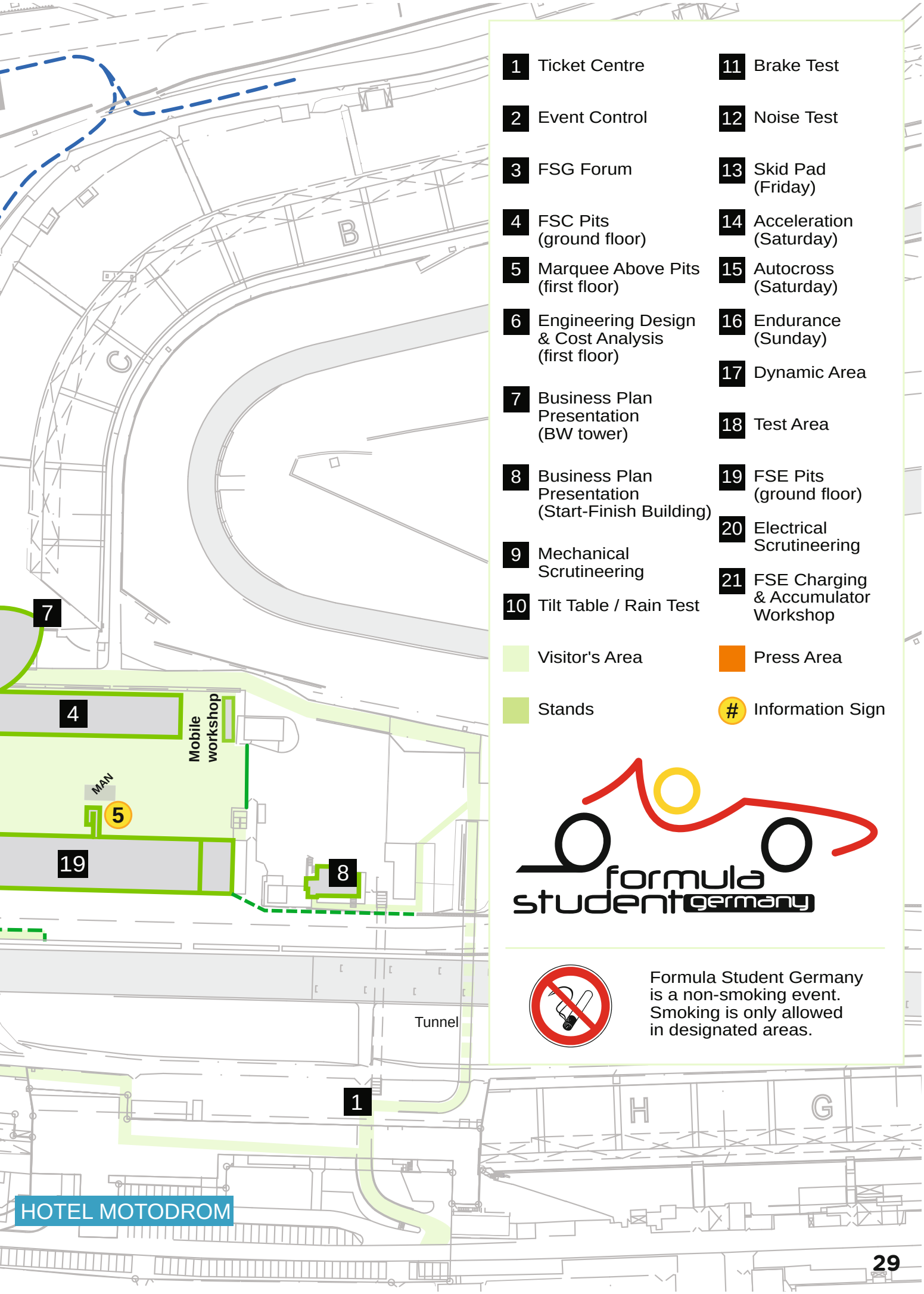
PORSCHE

918 Spyder: Fuel consumption (in l/100 km) combined 3.1–3.0 · CO_2 emissions combined 72–70 g/km · electricity consumption 12.7 kWh/100 km

Schedule 2015

TUESDAY, 28th of July		
14:00	Scrutineering Order, Registration & Entrance Order Available	1 Ticket Centre
15:30 – 17:30	FSE & FSC Team Registration	1 Ticket Centre
16:00 – 22:00	Truck Stop => Entrance for Team Vehicles	4 19 Pits
17:00 – Sun 20:00	FSE & FSC Pits available	2 Event Control
18:00 – 20:00	Event Control, Driver & Safety Responsible Registration	
18:00 – 20:00	Accumulator Scrutineering	21 Charging Tent
18:00 – 22:00	Charging Tent	21 Charging Tent
21:00 – 22:00	Team Welcome	5 Marquee above Pits
WEDNESDAY, 29th of July		
06:00 – 22:00 daily	Charging Tent	21 Charging Tent
07:30 – 19:00	Ticket Centre & Event Control	1 2 Ticket Centre/Event Control
08:00 – 08:30	Scrutineering Briefin	5 Marquee above Pits
09:00 – 13:00	Scrutineering/Tech Inspection/Tilt, Brake, Noise, Rain/Fuel	9 10 11 12
13:00 – 14:00	Lunch Break & Staging for Panoramic Photograph	17 Big Dynamic Area
14:00 – 19:00	Scrutineering/Tech Inspection/Tilt, Brake, Noise, Rain/Fuel	9 10 11 12
14:00 – 19:00	Engine Test	
THURSDAY, 30th of July		
07:30 – 19:00	Ticket Centre & Event Control	1 2 Ticket Centre/Event Control
08:00 – 08:30	Team Briefin	5 Marquee above Pits
08:30 – 19:00	Scrutineering/Tech Inspection/Tilt, Brake, Noise, Rain/Fuel	9 10 11 12
09:00 – 19:00	Engine Test/Testing	17 Big Dynamic Area
11:00 – 12:30	Judge Briefing: Busine s Plan, Cost & Design	7 BW Tower
12:00 – 13:00	Scrutineering Lunch Break	
13:15 – 17:55	FSE Engineering Design & FSE Cost Analysis	5 Marquee above Pits
13:30 – 18:10	FSE Business Plan Presentation	7 8 BW Tower, Start-Finish Building
18:30 – 20:30	Judge Briefing: ost & Design	7 BW Tower
19:00 – 20:30	FSE Business Plan Presentation Finals	5 Marquee above Pits
20:30 – 21:30	Get-together for all Volunteers	7 BW Tower
FRIDAY, 31st of July		
07:00 – 19:00	Ticket Centre & Event Control	1 2 Ticket Centre/Event Control
07:30 – 08:00	Team Briefin	5 Marquee above Pits
08:00 – 08:45	Judge Briefing: Busine s Plan Presentation	7 BW Tower
08:30 – 18:40	FSC Engineering Design, FSC Cost Analysis	5 Marquee above Pits
08:30 – 19:00	Scrutineering/Tech Inspection/Tilt, Brake, Noise, Rain/Fuel	9 10 11 12
09:00 – 18:40	FSC Business Plan Presentation	7 8 BW Tower, Start-Finish Building
09:00 – 18:30	Engine Test/Testing	17 Big Dynamic Area
10:00 – 12:00	Worldwide Formula Student Officials Meeti	Motodrom Hotel
11:00 – 18:30	Skid Pad	13 Dynamic Area
12:00 – 13:00	Scrutineering Lunch Break	
19:00 – 20:30	FSE Engineering Design Finals (not public)	3 FSG Forum
20:00 – 21:00	FSC Business Plan Presentation Finals	5 Marquee above Pits
21:00 – 22:00	Award Ceremony – Part I	5 Marquee above Pits
22:00 – 23:00	Get-together for all Judges	7 BW Tower
SATURDAY, 1st of August		
07:00 – 19:00	Ticket Centre & Event Control	1 2 Ticket Centre/Event Control
07:30 – 08:00	Team Briefin	5 Marquee above Pits
08:30 – 18:30	Fuel/Engine Test/Testing	18 Small Dynamic Area
08:30 – 18:30	on request: Scrutineering/Tilt, Brake, Noise, Rain	
08:30 – 13:00	FSC & FSE Acceleration	14 Start/Finish Line
09:00 – 10:00	Design Feedback Table	8 BW Tower (4th floor
11:00 – 11:45	Press Guided Tour	8 BW Tower (basement)
12:00 – 12:45	Press Conference	8 BW Tower (4th floor
13:00 – 14:00	VIP Reception	8 BW Tower (5th floor
13:30 – 13:50	Coursewalk Autocross	15 Big Dynamic Area
14:00 – 19:00	FSC & FSE Autocross	15 Big Dynamic Area
19:00 – 21:30	FSC Engineering Design Finals (not public)	3 FSG Forum
SUNDAY, 2nd of August		
07:00 – 19:00	Ticket Centre & Event Control	1 2 Ticket Centre/Event Control
07:30 – 08:00	Team Briefin	5 Marquee above Pits
08:00 – 08:20	Coursewalk Endurance	16 Big Dynamic Area
08:30 – 18:30	Fuel/Engine Test/Testing	18 Small Dynamic Area
08:30 – 13:00	FSC & FSE Endurance Morning Session & Parc Fermé	16 Big Dynamic Area
13:00 – 18:00	FSC & FSE Endurance Afternoon Session & Parc Fermé	16 Big Dynamic Area
19:30 – 20:30	Design Review	3 FSG Forum
21:00 – 22:00	Award Ceremony – Part II	5 Marquee above Pits
22:00 – 01:00	MAHLE-Party	5 Marquee above Pits


Medical Centre
Parking Trucks
21
e
Sling Shot
The Jump
Horse Shoe
Chicane
Killer Cone
15
16
17
Broken Dreams
13
Wings
Halfway
Pendulum
The Klink
Fuel
18
11
10
12
9
20
f
Wi Fi
2
3
1
Parking for Sponsors
Parking for Sponsors
DEKRA
BOSCH
BMW
IAV
Brunel
MTU
ZF
Mahle
AUDI
Daimler
MathW.
Press
10
3
2
9
a
8
VDI
BASF
11
12
Porsche
FSG Startup
AMG
Hall of Fame
4
Volkswagen
ETAS
Schaeffler
SLV
Adam Opel
Siemens Ind.
SKF
7
6
Welding
4
5
6
Continental
Tyres
15
16
Lost Chain
d
c
Grandstands
Nordkurve
14
b
20150707
A
C



1 Ticket Centre

2 Event Control

3 FSG Forum

4 FSC Pits (ground floor)

5 Marquee Above Pits (first floor)

6 Engineering Design & Cost Analysis (first floor)

7 Business Plan Presentation (BW tower)

8 Business Plan Presentation (Start-Finish Building)

9 Mechanical Scrutineering

10 Tilt Table / Rain Test

11 Brake Test

12 Noise Test

13 Skid Pad (Friday)

14 Acceleration (Saturday)

15 Autocross (Saturday)

16 Endurance (Sunday)

17 Dynamic Area

18 Test Area

19 FSE Pits (ground floor)

20 Electrical Scrutineering

21 FSE Charging & Accumulator Workshop

Visitor's Area

Stands

Press Area

Information Sign

formula student germany

Formula Student Germany is a non-smoking event. Smoking is only allowed in designated areas.

Guided Tours

Welcome to Formula Student Germany. To help you make most of your visit we have prepared a tour for visitors, press and sponsors, which is indicated by signs placed across the event site (see map below). You can either explore Formula Student Germany by yourself or get a tour from one of our experienced tour guides.

Exploring Formula Student Germany by yourself

The information signs are numbered 1 to 12. Following them in order will take you from the large dynamic area, to the technical inspection and then on to the pit lane. Along the way you will learn about the history of the competition. Don't be shy to ask team members anything you would like to know about their car.

But at the same time remember they are participating in a competition, so make sure not to hinder them. From the pit lane the tour takes you back to the large dynamic area. Finally you can get a better insight in the participants of Formula Student Germany 2015 at the FSG Forum. Smartphone users can get more in-depth information via the QR-code on each sign.

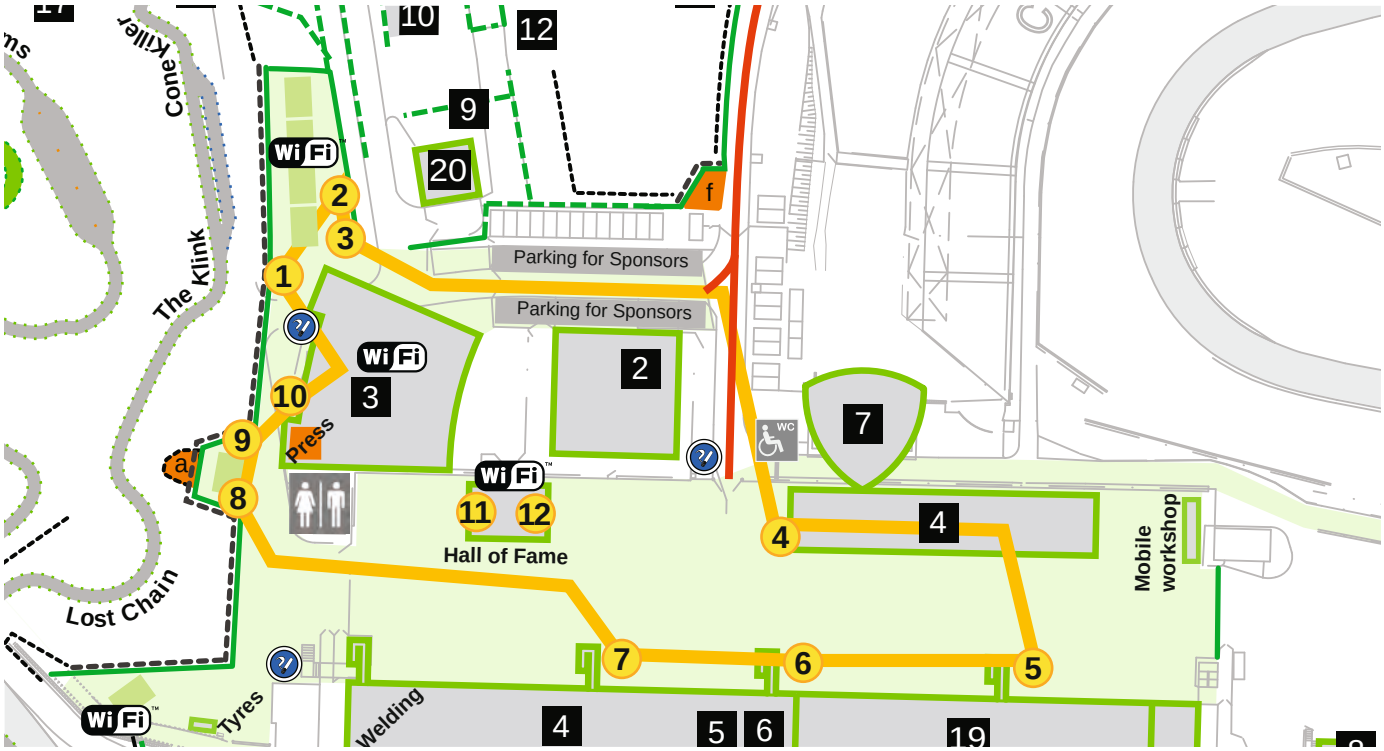
Guided Tour

A guided tour will take approximately 45 minutes. During the tour you will get a comprehensive insight into Formula Student Germany. The basic idea of the competition and its two classes, Formula Student Combustion and Formula Student Electric, will be explained. Participants get to experience the unique atmosphere in the pit lane first hand. The specific focus of the tour can be adjusted upon request of the tour group. Of course our guides will do their very best to answer all your Formula Student related questions.

Times and Location

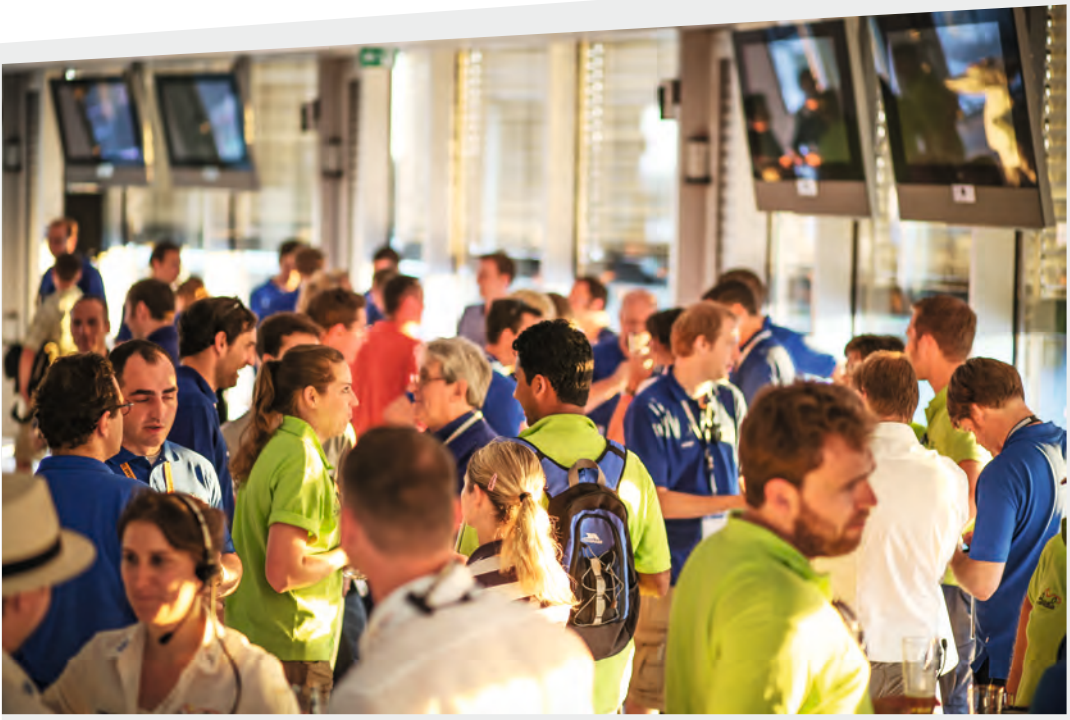
GUIDED TOURS START EVERY HALF HOUR BETWEEN 10 AM AND 5 PM FROM WEDNESDAY UNTIL SUNDAY.

Tours start from the Info counter in the FSG Forum. There you can get more information on available times.



The Volunteers of FSG

Die Ehrenamtlichen der FSG



Über 450 ehrenamtliche Helfer sind Jahr für Jahr bei der Organisation und der Umsetzung der Formula Student Germany beteiligt. Mit Leidenschaft und Engagement meistern wir die stetig wachsenden Herausforderungen, vor die uns das Event stellt. Diese Aufgabe können wir nur als eingespieltes Team bewältigen, das sich aus fünf Funktionsbereichen zusammensetzt: So gibt es die Scrutineers, die Juroren, die Redshirts und die Whiteshirts sowie das Media & IT-Team. Alle Bereiche verfügen über spezielle Expertisen und sind daher für unterschiedliche Aufgaben verantwortlich. Durch ihre verschieden farbige Kleidung lässt sich schnell erkennen, wer über welche Kompetenzen verfügt und somit der ideale Ansprechpartner bei Fragen ist.

Every year, over 450 volunteers make Formula Student Germany a reality. The team of volunteers functions like a well-oiled machine, tackling the ever-growing challenges of the annual event with honed skill and passionate dedication. The volunteers are divided into different groups by area of expertise – there are the scrutineers, the judges, the red shirts, the white shirts – these are people who handle the manifold tasks of planning, organizing, and running the event, and of helping out and answering questions. The colour of their shirt will tell you just who they are, and what their role in FSG is.

Für die ganzjährige Planung der Veranstaltung und deren reibungslose Umsetzung auf dem Eventgelände sind die Whiteshirts verantwortlich. Sie sind Ansprechpartner für Teilnehmer, Sponsoren, Medienvertreter und Besucher.

The white shirts are in charge of the yearlong task of planning the event, and of seeing these plans realized on the ground. They are the go-to people for sponsors, press, participants, and visitors, and they ensure that the competition runs without a hitch.

The red shirts have jurisdiction over event control and event support. The support team takes care of setting up and breaking down the event and making sure it all runs smoothly. They also act as the track marshals during dynamic events. The girls of the event control team serve as intermediaries between visitors, team members, sponsors, and press, so that nobody on FSG grounds is left lost or stranded. The largest group of volunteers in FSG, the red shirts are the ones who make it possible to take on whatever challenges might arise during the event.

Für die Bereiche Event Control & Event Support sind die Redshirts zuständig. Das Support-Team kümmert sich um den Auf- und Abbau und unterstützt die Whiteshirts bei der Durchführung des Events. Des Weiteren kommt den Redshirts die Aufgabe zu, die Streckenposten während der dynamischen Events zu besetzen. Die weiblichen Mitglieder des Event Control-Teams bilden die Schnittstelle zwischen Besuchern, Teammitgliedern, Sponsoren und Medienvertretern. Sie sorgen dafür, dass niemand hilflos auf dem Gelände zurückbleibt. Die Redshirts stellen insgesamt die größte Gruppe ehrenamtlicher Helfer bei der FSG dar. Nur durch ihre Hilfe ist es überhaupt möglich, die vielseitigen Herausforderungen während des Events zu meistern.

The scrutineers—the folks in green—are there to guarantee that all the vehicles are safe. They accomplish this by meticulously checking the cars for potential safety hazards and patiently assisting the teams with any technical problems. A team is not allowed to participate in the dynamic events without a green-shirted go-ahead.

Für die Sicherheit an den Fahrzeugen sind die in grün gekleideten Scrutineers verantwortlich. Sie überprüfen die Boliden der Teilnehmer auf etwaige Sicherheitsmängel und stehen den Teams bei technischen Problemen mit ihrer Expertise helfend zur Seite. Ohne eine fehlerfreie technische Abnahme erhält kein Team die Erlaubnis, an den dynamischen Disziplinen teilzunehmen.

Since FSG is essentially a design competition, a team's scoring in the static disciplines is a big factor in its overall standing. And it's the job of the judges in their blue shirts to render these scorings. They look at the design, construction, and cost planning; they consider the economics of the project and whether the business plan is a convincing one. It is in great part by their professional expertise, indispensible honesty, and constructive criticism that the teams have shown such positive development over the last ten years.

Da es sich bei der FSG um einen Konstruktionswettbewerb handelt, tragen die statischen Disziplinen wie Konstruktion & Design sowie Kostenplanung in erheblichem Maße zur Gesamtwertung bei. An ihrer blauen Kleidung sind die Juroren zu erkennen, die auch die Präsentation der detaillierten Geschäftspläne im Hinblick auf die Wirtschaftlichkeit des Gesamtprojektes bewerten. Die fachliche Kompetenz der Juroren, aber auch die ehrliche und konstruktive Kritik, haben über die vergangenen zehn Jahren hinweg zur positiven Weiterentwicklung der Teams beigetragen.

The IT experts are tasked with timekeeping during the dynamic disciples, ensuring that all teams are given a fair and equal assessment. And it's thanks to them that the officials and participants can all enjoy a high-speed internet connection.

Every year, the FSG media team treats amazed outsiders to video and image materials of exceptional quality and creativity. Their contributions allow us to relive again and again the most stunning and unforgettable moments of the event long after the race car smoke has cleared.

For the last ten years it has been our great pleasure to prepare a week of incomparable FSG excitement and entertainment for visitors and sponsors alike, for veteran participants and for those who are entering the event for the first time. This year, we are happy to once again be at hand with advice and assistance!

Die schwarzen Shirts tragen sowohl die Experten der IT & Timekeeping als auch das Media Team. Erstere führen das Timekeeping durch. Damit tragen sie dazu bei, dass eine faire und gleichwertige Beurteilung aller Teams gegeben ist. Außerdem statten sie alle Offiziellen und Teilnehmer des Events mit einer Highspeed-Internetverbindung aus.

Das Media-Team der FSG überrascht Außenstehende jedes Jahr erneut mit der Professionalität und Kreativität seines Video- und Bildmaterials. Diese Beiträge erlauben es, die schönsten und unvergesslichsten Momente der Veranstaltung auch nach ihrem Ende weiter aufleben zu lassen.

Seit nunmehr zehn Jahren ist es uns eine große Freude, langjährigen sowie neuen Teilnehmern, Besuchern und Sponsoren eine unvergleichbare, spannende und unterhaltsame Woche bei der Formula Student Germany zu bereiten. Wir freuen uns, Ihnen auch in diesem Jahr wieder mit Rat und Tat zur Seite zu stehen.

Formula Student Germany Team 2015

The team behind Formula Student Germany is divided into three groups. The board is responsible for Formula Student Germany, its operations, finances, sponsoring and overall strategy. Das Team der Formula Student Germany ist in drei Gruppen unterteilt. Das Board trägt die Verantwortung für die Formula Student Germany und ihre Kooperationen sowie für Sponsoring, Finanzen und Strategie.

TIM HANNIG
Board (Chairman)
KION Group GmbH

RAINER KÖTKE
Board (Finance), EC (Dynamics)
Volkswagen AG

DANIEL MAZUR
Board (Event Manager)
mazur | events + media

FRANK RÖSKE
Board (Rules)
Porsche Leipzig GmbH

LUDWIG VOLLRATH
Board (External Relations)

The executive committee (EC) is responsible for the design and development of the competition. Each member of the EC is responsible for one of the fields of the competition and its organisation. Das Executive Committee (EC) veranwortet die Ausgestaltung des Wettbewerbs. Jedes Mitglied ist für Vorbereitung und Durchführung eines Bereiches verantwortlich.

JÜRGEN FALB
EC (Electrical Inspection)
Falb-IT

JOHANNES KRATZEL
EC (Event Support)
Robert Bosch GmbH

TOBIAS MICHAELS
EC (FS-Electric Rules)
AUDI AG

KONRAD PAULE
EC (FS-Academy) & Pit Marshal
Dr. Ing. h.c. F. Porsche AG

TORSTEN RILKA
EC (Statics) & OT (Scoring)
Volkswagen AG

ULF STEINFURTH
EC (Mechanical Inspection)
University of Applied Sciences Stralsund

The operative team (OT) supports the board and EC in the preparation and realisation of the event throughout the year. Das Operative Team (OT) unterstützt das Board und das EC in der Vorbereitung übers Jahr und in der Durchführung des Wettbewerbs.

DANIEL AHRENS
OT (Event Control)
Dentsu Aegís Network

CATHRIN BECKER
OT (Press Office)
Verein Deutscher Ingenieure e.V.

RAPHAELA BIHR
OT (Business Plan Presentation)
MAN Truck & Bus AG

MARIA BONILLA-TORRES
OT (Electrical Inspection)
Robert Bosch GmbH

MATTHIAS BRUTSCHIN
OT (Event Support)

DAIMLER AG

BARBARA DECKER-SCHLÖGL
OT (Statics)

MAGNA Steyr Fahrzeugtechnik

RICARDA-MARIE FRIES
OT (Communications)

PETER JAKOWSKI
OT (Security)

Bosch Engineering GmbH

NORINA KURTH
OT (Registration & Ticket Centre)

SICAT GmbH & Co. KG

PETER LEIPOLD
OT (Design Event)

ZF Friedrichshafen AG

ROB OPDAM
OT (Mechanical Inspection)

RWTH Aachen University

JOST PHILIP PÖTTNER
OT (Design Event)

Volkswagen AG

KRISTINA PUTH
OT (Communications)

KLAUS SCHEUPLEIN
OT (Communications & Photographers)

Brose Fahrzeugteile GmbH & Co. KG

TIM SCHMIDT
OT (Back Office)

Mankiewicz Gebr. & Co.

KARSTEN STAMMEN
OT (Dynamics)

AUDI AG

LENA TÖPPICH
OT (Communications)

ABB AG

MATTHÄUS DECKER
OT (Event Support)

Siemens AG Österreich

LUKAS FOLIE
OT (FS-Electric)

AUDI AG

SEBASTIAN HOPPE
OT (Cost Event)

ZF Friedrichshafen AG

LEONA KÖTKE
OT (Visa)

ANKE LACHMANN
OT (VIP Lounge & Culina)

Step by Step

FABIAN LIESCH
OT (IT & Timekeeping)

IT-Service & Consulting

ALIA PIERCE
OT (Communications & FSG TV)

Zytek Automotive Ltd.

WOLF-BASTIAN PÖTTNER
OT (IT & Timekeeping)

Bosch Connected Devices and Solutions GmbH

HELENA REINKE
OT (Event Manager Assistant)

Formula Student Germany e.V.

JOCHEN SCHMIDT
OT (Dynamics)

DLR

SEBASTIAN SEEWALDT
OT (Pit Marshal)

Dr. Ing. h.c. F. Porsche AG

PATRICK STENNER
OT (Mechanical Inspection)

Technische Universität München

JULIEN VAN CAMPEN
OT (Communications & Guided Tours)

TU Delft

Judges 2015

Business Plan Presentation

BADMANN, Andre
BENNINGHOFF, Vera
BERG, Alexander
BERTRAM, Michael
BISCHOFF, Thilo
BJEKOVIC, Robert
BREWIG, Jens
BRUENN, Katja
DELLER, Uwe
DIGHELLO, Alfonso
ESSER, Klaus
FAHR, Alexander
FERSCHKE, Oliver
FICHTL, Katrin
FRANK, Detlef
GRAF, Georg-Friedrich
GREINER, Alexander
HAHN, Thomas
HARTHERZ, Patrik
HAYN, Bernhard
HEIDEMEYER, Peter
HENNECK, Manfred
HERRMANN, Jesko
HEY, Matthias
HIEBER, Frank
HODGKINSON, Philip
HODGKINSON, Raymond
KÄFER, Timo Michael
KARSCH, Ulrich
KLUG, Jens
KORIOTH, Roland
LANGE, Stephan
LENZEN, Thomas
LEYH, Michael
LIND, Dirk
LÖFFLER, Maximilian
MUELLER, Andreas
NIEMEYER, Reinhard
NUSCHELER, Barbara Christine
OPEL, Simon
OTT, Tobias
PORSCH, Stefan
RINKA, Carsten
SCHMITT, Andreas
SCHNEIDER, Isabel
TABATABAI, Stefan
TEMPLIN, Nicholas
TILLACK, Karola
VADEHRA, Bernhard Prem
WALLONER, Juliane
WAMBERA, Thomas
WENZEL, Frank

Cost Analysis

BARTH, Michael
BRECHTELSBAUER, Thomas
BUOB, Manuel
GRUNDNER, Harald
HAAS, Dietrich
HACKER, Clemens
HAGL, Markus
HERTH, Martin
HIRSCH, Jürgen
KEHR, Guenter
KOENIG, Ilja
KOLB, Walter
KURZEN, Michael
LAUCH, Kurt
LEEB, Thomas
LOVELL, Caspar
MEIER, Peter
MERKL, Julia
MÖLL, Winfried
MOREL, Romain
MÜLLER, Karsten
OPPERMANN, Thilo
PILTZING, Roger
PRINZ, Michael
RAU, Fabian
REGH, Fabian
RICHTER, Susanne
RIEDRICH, Tina Karolin
RUSH, Agnes
SCHIFFER, Wilhelm
SCHWENKE, Henning
SPAN, Benjamin
STRATEMEIER, Frank
STRAUB, Christian
STRAUBERT, Alexander
VOLLRATH, Hans
WANNEMACHER, Christoph
WEBER, Axel
WILMES, Matthias
WINKLER, Tino
ZAPF, Anna-Franziska

ADELSBERGER, Beate
AHOLA, Mikko
ASCIOGLU, Andreas
BAIER, Karlheinz
BETSCH, Jochen
BOLZ, Peter
BREMKAMP, Joerg
BURGHARDT, Daniel
CLARKE, Pat
DANIEL, Marc
DECKERS, Jean-Noel
DENCKER, Peter
DITTRICH, Rudolf
DÖLLE, Norbert
DROOGENDIJK, Cas
DYSON, Andrew
ECK, Jochen
ENE, Eduard
ENGLER, Friedhelm
ENNING, Norbert
EWERT, Sebastian
FISCHER, Raphael
FRIEDRICH, Linus
FRIES, Benedikt
FROMMER, Armin
GALGANSKI, Collin
GARDUNO, Luis
GEIGER, Oliver
GERTH, Hendrik
GESELE, Frank
GICKELEITER, Michael
GIEBENHAIN, Clenn
GOSLICH, Leonhard
GRAMS, Sebastian
HAHN, Christoph
HALSDORF, Georges
HANIGK, Martin
HANTSCHEL, Michael
HENNINGS, Thomas
HÖLZGEN, Andre
JAKOBI, Reinhard
JENS PFUND, Frank
KAUSSEN, Martin
KELLER, Michael
KERBER, Michael
KLINK, Holger
KLÖSS, Karl
KNIPP, Christian
KRAEMER, Oliver
KRAFT, Florian
KRAPPEL, Michael
KUDRITZKI, Detlef
KÜPPERS, Jörg
LADDA, Josefine
LIEBST, Fabian
LÖCHNER, Joachim
LOPEZ, Jose
MÄHLER, Mathias
MALACK, Sebastian
MAREK, Christian
MEHRING, Ulrich
MICHAELS, Tobias
MILKE, Burkhard
MISSLER, Christian
MUELBL, Gregor
MUELLER, Rolf
MÜLLER, Christoph
MUEMMLER, Rainer
MÜHL, Nils
NEERPASCH, Uwe
NILSSON, Lars
NOWICKI, Daniel
OETTLE, Gerald
PADBERG, Jochen
PETI, Philipp
PETRICH, Florian
PETZ, Andreas
REITZ, Jörg Andre
REMMLINGER, Jürgen
RITTER, Rouven
SANDER, Udo
SANDLER, Jan
SATTLER, Steve
SCHÄFER, Michelle
SCHIMANSKI, Herbert
SCHIMMELS, Juergen
SCHLICHTMANN, Tobias
SCHNEIDER, Thomas
SCHOEN, Wolfgang
SEIB, Timo
SOENS, Andreas
SPOIDA, Thomas
STAMMEN, Karsten
STOLZ, Franz
STRASSER, Roman
SUHARTO, Reza Garibaldi
TESCH, Anke Martina
TEUFEL, Simon
VÖLKL, Timo
VOLLE, Carsten
WEBER, Thomas
WEIDEMANN, Reiner
WENZEL, Daniel
WUNSCHHEIM, Lukas
ZANETTI, Igor
ZEISBERG, Marcel
ZHANG, Chen
ZINKE, Christopher
ZÖLS, Thomas

Scrutineers and Redshirts

2015

Scrutineers

ASH, Howard
BATTIGE, Sarah-Kristin
BRANDAUER, Jakob
BRECHTMANN, Nick
DENSBORN, Simon
DRAPELA, Yannick
GÖTZ, Patrick
GOYAL, Vandit
HEGEDUS, Miki
HUNDSCHELL, Johannes
ITURRALDE, Pablo
JAKOB, Dominic
KIRCHOFF, Sarah
KRUITHOF, Richard
KUSSTATSCHER, Gerd
LACHER, Martin
LAFOZ, Mireia
MAUL, Ralf
MÖLLER, Benjamin
MÜLLER, Benjamin
MÜLLER, Winfried
NOVAK, Nandor
PÄRSCHKE, Roman
PAß, Julian
PLETSCHKE, Tobias
RADEMACHER, Michael
RIXEN, Sandra
SANWALD, Michael
SCHERKE, Felix
SCHIMPITZ, Christian
SCHOLZ, Juergen
STOBER, Sebastian
THOMASSEN, Kevin
VANDENHENDE, Wouter
WITTICH, Mark
WOLFSBERGER, Stefan
WRAGE, Christian

Redshirts, Media, TK & IT

AHRENS, Andreas
BARRABAS, Sascha
BASTEN, Katrin
BAUFELD, Aaron
BERGAN, Stephanie
BORRMANN, Daniel
BOTZKOWSKI, Tim
BRANCIFORTI, Maria Denise
BRAUSER, Austin
BRINK, Stefan
BRUNGS, Yamina
BRUTSCHIN, Pascal
BUCK, Pierre
DEL GROSSO, Francesca
DEMEURICY, Paul
DIETRICH, Franziska
ESSER, Lea
FINDEISEN, Jan
FORMILAN, Vittoria
FREY, Dennis
GERNERT, Björn
GÖB, Stefan
GÖBEL, Julian
GÖTZ, Oliver
GRAMS, Richard
GREFE, Hinrich
GROH, Jonas
GRUNDNER, Sven
HEIKE, Groß
HEMER, Steffen
HENZEL, Judith
HIRVONEN, Kimmo
HOFMANN, Alina
HOFMANN, Tanja
JAGADEESH, Nitesh
JEITNER, Timo
JOSTEN, Jonas
KAMINSKI, Anna
KESHAVA REDDY SOPPAHALLI, Dhanush
KLEIN, Christian
KLEIN, Johannes
KOOSE, Lea Alessa
KRATO, Tanja
KRÖGER, Ole
KRÜGER, Stephan
KÜHNLEIN, Maximilian
KULESZ, Dawid
LANSNICKER-DIETRICH, Bärbel
LAW, Xue Ni
LERINGER, Nora
LORENZEN, Morten
MANDIC, Katarina
MARTINEZ NOGUERA, Nestor
MARTYNUS, Oliver
MAYER, Teresa
MEJLBJERG, Stig
MELLERGAARD, Simon Bach
MEYER, Philipp
MÍNGUEZ BARBERÁ, Marta
MORGENROTH, Johannes
MÜLLER, Gábor
MÜLLER, György
MÜLLER, Lars
OSTENDORFF, Alessa
PAPENHUIJZEN, Thijs
PATHNI, Charu
PATTANSHETTI, Vinayak Ramesh
PERCHALLA, Cordula
PETR, Philipp
PIßARRECK, Lea
PIßARRECK, Mona
PLAKHOTNICHENKO, Andrei
POLT, Markus
RATHSACK, Felix
RIJPERT, Marit
SAYOVITZ, Steve
SCHÄFER, Bastian
SCHALL, Marcel
SCHILDT, Sebastian
SCHINDLER, Corvin
SCHOENBERG, Christopher
SCHULLER, Markus Eduard
SCHWARZER, Johannes
SEIF, Yehia
SHETTY, Keerthan
SINGH, Manpreet
STAMPRATH, Christoph
STEINWEDE, Vanessa
STOPPLER, Alexandra
STURM, Daniel
TEWES, André
THALHÄUSER, Dana
TIMMERMANS, Tristan
UBBENJANS, Lisa-Maria
VAN DER WIJST, Hugo
VAN HEIJST, Laura
VAN LEEUWEN, Tom
VAUDLET, Oliver
VAUDLET, Philipp
VOLLRATH, Sophie
VUJICIC, Luka
WEIEN, Mira
WENNINGER, Jennifer
ZHAO, Wan

INTERVIEW
ROBERT BJEKOVIC

LOVE AT FIRST SIGHT

ES WAR WIE LIEBE AUF DEN ERSTEN BLICK

Robert Bjekovic
Chief Judge
Business Presentation

From day one of Formula Student Germany, Robert Bjekovic has participated as one of the judges for the "Business Plan Presentation" (BPP) event. He was invited to come and support the competition at a time when there was a shortage of judges. Ten years on, he is still excited to come back again and again and plans to continue with FSG for the next ten years.

Seit dem ersten Tag der FSG ist Robert Bjekovic als Juror für die Business Plan Presentation (BPP) mit dabei. Aus Not am Mann, wie er selber sagt. Jetzt, 10 Jahre später, ist er immer noch begeistert – und er plant auch die nächsten 10 Jahre der FSG erhalten zu bleiben.

Mr. Bjekovic, you have been with FSG from day one. What motivated you to become a judge for FS Germany?
It was by sheer chance. Some friends had told me about the event and that they were in need of additional judges. So I took a look at it and immediately got excited. You could say it was love at first sight. As a result, I have now been with FSG for ten years.

And what about the next ten years?
For my part, I would love to keep going. I've grown very fond of coming to Hockenheim at the end of July every year.

What can the teams learn from BPP for their future careers?
Presentation skills have generally become an increasingly important aspect of every job, including the engineering profession. Nowadays, you have to be able to present yourself as well as your results. That's an absolute must. 500 horsepower is useless if the car doesn't get on the road.

"Presentation skills have generally become an increasingly important aspect of every job including the engineering profession."

"Grundsätzlich ist das Thema Präsentieren ein ganz wichtiger Faktor, auch für einen Ingenieur. Er muss sich und seine Ergebnisse präsentieren können."

Herr Bjekovic, Sie sind seit dem ersten Tag der FSG mit dabei. Was hat Sie dazu bewogen, als Juror bei der FS Germany mitzuwirken?
Ich kam dazu wie die Jungfrau zum Kind. Freunde hatten mir von dem Event erzählt und gesagt, dass sie noch Juroren brauchen. Also habe ich es mir mal angeschaut – und war begeistert! Es war so zu sagen Liebe auf den ersten Blick. Und so bin ich der FSG bis heute erhalten geblieben.

Und werden sie auch die nächsten 10 Jahre der FSG erhalten bleiben?
Von meiner Seite aus gerne. Es ist eine liebe Gewohnheit geworden Ende Juli an den Hockenheimring zu fahren.

Was können die Teams bei den BPP für die berufliche Zukunft lernen?
Grundsätzlich ist das Thema Präsentieren ein ganz wichtiger Faktor, auch für einen Ingenieur. Er muss sich und seine Ergebnisse präsentieren können. Das ist eine Grundvoraussetzung von heute. 500 PS nutzen nichts, wenn ich sie nicht auf die Straße bekomme.

How has the quality of BPP developed over the last ten years?

The gap between the good teams and the not-so-good ones has steadily increased. The top teams are putting more effort into it and are becoming better and better. At the same time, their presentations in BPP are coming very close to those of a professional marketing company. Not only do teams support their business idea now with facts and data, but their presentation layout has also improved a lot.

What are the major factors influencing the quality of the presentations?

One factor is, of course, the time and effort invested in the presentation. But the quality also depends on the support given by the university and sponsors, as well as on the size of the team. It is always an advantage to have a cross-functional team—like what you see in the industry. Everybody on the team has their own task, such as engineering, marketing, or assembly. For this you need a critical mass of manpower. The top teams normally have at least ten team members; otherwise it would not be possible to achieve the high level of performance in the limited time.

The judges should be left with the feeling: Outstanding – this is something really new. Here is something I would like to invest my money in.

Beim Juror soll das Gefühl entstehen: Super, das gab es noch nicht. Da möchte ich gern Geld investieren.

What are the criteria on which you judge in BPP?

First of all, some basic information has to be provided. Also, it has to be clear what role the judges have been assigned in the presentation. Are they a bank being asked for a loan, a potential partner in a distribution system, or a company doing the assembly work of the product? It's up to the team to decide, but overall it has to result in a sound and logic business model.

Also, the economic aspects of the model must be realistic. Did the team think of peripheral subjects? Where is the customer going to buy the vehicle? In addition, a

Wie hat sich die Qualität der BPP im Lauf der letzten 10 Jahre verändert?

Die Kluft zwischen den guten und den nicht so guten Teams wird immer größer. Die Spitzenteams geben sich mehr Mühe und werden immer besser. Bald verschwindet der Unterschied zwischen einer professionellen Präsentation einer Marketingagentur und einer der BPP. Aber nicht nur die Marketingideen, die mit Daten und Fakten hinterlegt sind, werden immer besser, auch die optische Darstellung ist sehr professionell.

Von welchen Faktoren hängt die Qualität der Beiträge ab?

Als Erstes natürlich von der Zeit und Arbeit die investiert wird. Aber die Qualität hängt auch von der Unterstützung der Hochschule, dem Sponsoring oder der Größe der Teams ab. Wünschenswert ist, dass sich ein Team interdisziplinär zusammensetzt – wie ein Abbild eines Industrieunternehmens. Jeder ist zuständig für einen Bereich, wie Entwicklung, Marketing oder Montage. Dafür braucht es eine kritische Manpower. Die erfolgreichen Teams haben deutlich mehr als 10 Mitglieder, sonst könnte die nötige Arbeitszeit und Leistung nicht gebracht werden.

Nach welchen Kriterien werden die BPP bewertet?

Es müssen gewisse Grundinformationen vorhanden sein. Man muss erkennen können, welche Rolle den Juroren zugeteilt wird. Eine Bank, die einen Kredit geben soll, ein Vertriebspartner, der ein Vertriebsnetz hat oder eine Fertigungsfirma, die die Fertigung übernimmt. Die Teams sind da völlig frei – es muss nur ein plausibles Geschäftsmodell vorhanden sein.

Auch die betriebswirtschaftlichen Zahlen und Daten müssen realistisch sein. Ist an periphere Themen gedacht worden? Wo geht der Kunde hin, um das Fahrzeug zu kaufen? Und eine zündende Idee ist wichtig. Beim

In the BPP, judges represent a ficticious manu acturing company to which the students present the business plan for their protoype.

Bei den BPP stellen die Studenten einer fi tiven Herstellerfirma, ertreten durch die Juroren, ihren Geschäftsplan für den gebauten Prototypen vor.

captivating business idea should be included. The judges should be left with the feeling: "Outstanding – this is something really new. Here is something I would like to invest my money in."

What would you like to see from the teams in BPP in the future?
I hope that the teams in the middle are able to improve their work for BPP. These teams then should be able to collect enough points to move up eight, ten, or even twelve ranks in the scoring. In order to do that they should look at other top presentations and use them as a guide – without copying them. The top teams are aware that the BPP points are important to win the competition. Just showing up counts for nothing here.

For the teams that are just fighting to survive in the competition, for sure the most important task is getting the car ready in time for the race. Still, I would like the number of no-shows from them to decrease, because this is frustrating for everybody.

Juror soll das Gefühl entstehen: Super, das gab es noch nicht. Da möchte ich gern Geld investieren.

Was wünschen Sie sich in Zukunft von den Teams in Bezug auf die BPP?
Vom Mittelfeld erhoffe ich mir, dass sie aus wenig etwas mehr machen. So können die Teams genug Punkte machen, um 8, 10 oder 12 Plätze besser zu werden. Dazu können sie sich gute Präsentationen anschauen und sich diese als Vorbild nehmen – ohne sie zu kopieren. Die Spitzenteams wissen, dass die Punkte wichtig sind, um zu gewinnen. Sie können in keinem Event Punkte liegen lassen. „Dabei sein ist alles" hilft hier nicht.

Bei den Teams, die ums Überleben kämpfen ist die Fertigstellung des Autos das wichtigste Thema. Für die BPP bleibt wenig Zeit. Das verstehe ich, trotzdem wünsche ich mir keine „no Shows" – das ist für alle Beteiligte frustrieren.

For the Business Plan Presentation, which is one of the three static events of Formula Student, the teams try to convince the jury that their prototype can be profitably produced and marketed. Prof. Dr.-Ing. Robert Bjekovic has been a BBP judge since the very beginning, and became Chief Judge two years ago. With his background in mechanical engineering and economics, he knows what is important for a good business presentation.

Bei der Business Plan Presentation, einer der drei statischen Disziplinen der Formula Student, versuchen die Teams die Jury davon zu überzeugen, dass ihr gebauter Prototyp gewinnbringend produziert und vermarktet werden kann. Prof. Dr.-Ing. Robert Bjekovic ist seit Anfang an als Juror der BPP mit dabei. Mit seinem Hintergrund in Maschinenwesen sowie Wirtschaftswissenschaft weiß er, worauf es bei der Bewertung ankommt.

The finali ts present their BPP a second time to all the event participants.

Die Finalisten tragen ihre BPP noch einmal vor allen Teilnehmern des Events vor

Happy 10th anniversary, Formula Student Germany – and thanks for sharing our pioneering spirit!

MTU Friedrichshafen is one of the world's leading manufacturers of large diesel engines and complete propulsion systems. As one of the leading brands of Rolls-Royce Power Systems, MTU guarantees the highest degree of precision and perfect interaction of all system components.

Become a part of this success story and set your own personal milestone with us.

Whether you want to join a trainee program, begin an internship, or write your thesis: at **MTU Friedrichshafen** we offer you a great range of opportunities for starting your career. Find out more on our website **www.mtu-online.com** or visit us on Facebook: **www.facebook.com/rrpowersystems**

Welcome to MTU in Friedrichshafen, Germany.
We look forward to hearing from you.

MTU Friedrichshafen GmbH is a
Rolls-Royce Power Systems Company
HR Marketing, Yumiko Mathias
Maybachplatz 1, 88045 Friedrichshafen
yumiko.mathias@rrpowersystems.com
Phone +49 (0) 7541 / 90-3616

Power. Passion. Partnership.

Impressions
Impressionen


MAHLE


Schunk


Formula Student Combustion
Champion


109
TU GRAZ


Audi


OREGON STATE
bertrandt
Tannlin
OTH Regensburg
WETHIE
E72
E65
E21
E67


E44


Santander


AHLE
44


FSG

More pictures on: media.formulastudent.de
Mehr Bilder unter: media.formulastudent.de

Imprint

Formula Student Germany Magazine 2015

Publisher
Formula Student Germany e.V.

Editorial
Ricarda Fries
Alia Pierce
Kristina Puth
Andreas Stein
Julien van Campen
Ludwig Vollrath

Design
Janin Liermann & Alexandra Blei, einfallswinkel PartG

Photos*
Formula Student Germany:
Harald Almonat
Klaus Bergmann
Tim Botzkowski
Frank Bramkamp
Stefan Brink
Pierre Buck
Stefan Essmann
Richard Grams
Kimmo Hirvonen
Ole Kroeger
Jorrit Lousberg
Ingo Reichmann
Felix Rühland
Klaus Scheuplein
Corvin Schindler
Keerthan Shetty
Vishesh Vikram Singh
Daniel Sturm
* if without reference; excluding team profile

Team profile
Text and pictures provided by the teams (July 2015)

Advertising
mazur | events + media
Daniel Mazur
Niedersachsenstr. 8
D-30853 Langenhagen
Mobile: +49 (175) 5085001
Phone: +49 (511) 2351-8890
Fax: -8891
mazur@formulastudent.de

Print, Processing
Maul-Druck GmbH
Senefelderstraße 20,
D-38124 Braunschweig
Printed on acidfree and chlorine-free bleached paper.

Print run 8,000 copies

Date of publication
28th of July 2015

Copyright
All rights reserved. Any utilisation beyond the limits of the copyright law without permission is illegal. This applies particularly to commercial duplications and to storage and processing in electronic systems.

Disclaimer
The publisher reserves the right not to be responsible for the topicality, correctness, completeness or quality of the information provided by third parties.

Further information
www.formulastudent.de
contact@formulastudent.de

Impressum

Formula Student Germany Magazin 2015

Herausgeber
Formula Student Germany e.V.

Redaktion
Ricarda Fries
Alia Pierce
Kristina Puth
Andreas Stein
Julien van Campen
Ludwig Vollrath

Gestaltung
Janin Liermann & Alexandra Blei, einfallswinkel PartG

Fotos*
Formula Student Germany:
Harald Almonat
Klaus Bergmann
Tim Botzkowski
Frank Bramkamp
Stefan Brink
Pierre Buck
Stefan Essmann
Richard Grams
Kimmo Hirvonen
Ole Kroeger
Jorrit Lousberg
Ingo Reichmann
Felix Rühland
Klaus Scheuplein
Corvin Schindler
Keerthan Shetty
Vishesh Vikram Singh
Daniel Sturm
* wenn ohne Angabe; Teamprofile ausgenommen

Team-Profil
Text und Bilder bereitgestellt von den Teams (Juli 2015)

Anzeigen
mazur | events + media
Daniel Mazur
Niedersachsenstr. 8
D-30853 Langenhagen
Mobile: +49 (175) 5085001
Phone: +49 (511) 2351-8890
Fax: -8891
mazur@formulastudent.de

Druck, Verarbeitung
Maul-Druck GmbH
Senefelderstraße 20,
D-38124 Braunschweig
Gedruckt auf säurefreiem und chlorarm gebleichtem Papier.

Auflage 8.000 Exemplare

Erscheinungstermin
28. Juli 2015

Copyright
Alle Rechte vorbehalten. Kein Teil dieser Zeitschrift darf ohne schriftliche Genehmigung vervielfältigt oder verbreitet werden. Unter dieses Verbot fällt insbesondere die gewerbliche Vervielfältigung per Kopie, die Aufnahme in elektronische Datenbanken und die Vervielfältigung auf elektronischen Datenträgern.

Haftungsausschluss
Der Herausgeber übernimmt keinerlei Gewähr für die Aktualität, Korrektheit, Vollständigkeit oder Qualität der von Dritten bereitgestellten Informationen.

Weitere Informationen
www.formulastudent.de
contact@formulastudent.de

INTERVIEW
WILFRIED PORTH

EACH GENERATION BRINGS NEW IDEAS

JEDE GENERATION BRINGT NEUE IDEEN

Wilfried Porth
Board Member for Human Relations and Director of Labor
Personalvorstand und Arbeitsdirektor der Daimler AG

Mr Porth, Daimler is currently dominating Formula 1 with its Mercedes AMG team, while the company is also successful in the DTM. What is the attraction for your company to become involved with the Formula Student Germany, or FSG for short?
The successes enjoyed by our professional racing teams are the outcome of research, innovation and perfect teamwork. And this is also what we find to admire in the teams in the FSG. The technical expertise, the fresh ideas and the tremendous commitment of all the students involved are just so impressive. This is somewhere where we can touch base with the vehicle engineers of tomorrow. That's why, this year, we're actually supporting twelve FSG teams in all.

The engineers of tomorrow will be building vehicles that will be even more strongly characterized by information technology and networking. Is the classic profile of an engineer in the automotive industry changing?
Absolutely, yes, the automobile is being reinvented all over again. We are integrating more and more information technology, developing new and eco-friendly drive systems involving batteries or fuel cells, enhancing road safety with our assistance systems and working towards autonomous driving. These are exciting projects, and it's all happening at lightning pace.

What are the challenges that future automotive engineers face during their studies and then later in practice?
It is clear that information technology and engineering skills are becoming closely entwined in automotive engineering, which means that, more and more often, we need an understanding of both disciplines. Work that spans more than one discipline is set to increase, so the engineers of the future will need to think and act much more in an interdisciplinary way. And this process in turn will give rise to further technological advances. Courses of study involving new combinations of subjects would

Herr Porth, Daimler dominiert mit dem Mercedes AMG-Team die Formel 1 und ist auch bei der DTM erfolgreich. Was ist der Reiz für ihr Unternehmen, sich bei der Formula Student Germany, kurz FSG, zu engagieren?
Die Erfolge unserer professionellen Rennteams sind das Ergebnis von Forschung, von Innovationen und von perfektem Teamwork. Das alles finden wir auch bei den Teams in der FSG. Uns imponieren die fachliche Expertise, die frischen Ideen und der große Einsatz der Studierenden. Hier kommen wir mit den Fahrzeugingenieuren von morgen ins Gespräch. Deshalb unterstützen wir in diesem Jahr gleich zwölf Teams der FSG.

Die Ingenieure von morgen werden Fahrzeuge bauen, die noch stärker von Informationstechnologie und Vernetzung geprägt sein werden. Verändert sich das klassische Berufsbild eines Ingenieurs in der Automobilindustrie?
Eindeutig ja, das Auto wird gerade neu erfunden. Wir integrieren immer mehr Informationstechnologie, entwickeln neue und umweltschonende Antriebe mit Batterie oder Brennstoffzelle, sorgen mit Assistenzsystemen für mehr Sicherheit und arbeiten am autonomen Fahren. Das sind spannende Aufgaben und das alles passiert in einem rasanten Tempo.

Welche Herausforderungen stellen sich an die künftigen Automobil-Ingenieure im Studium und dann später in der Praxis?
Wir sehen, dass Informationstechnologie und Ingenieurskunst im Automobilbau verschmelzen. Deshalb brauchen wir immer öfter beide Kompetenzen. Die fachübergreifende Arbeit wird zunehmen und die Ingenieure der Zukunft werden noch stärker interdisziplinär denken und handeln müssen. Das wird weitere Technologiesprünge ermöglichen. Im Studium sind meiner Ansicht nach neue Fächerkombinationen sinnvoll, etwa Maschinenbau mit Informatik.

seem to make sense to me, for example mechanical engineering with information science.

Are the universities keeping up with these changes?
We work with a wide range of universities, both here in Germany and around the world. I, for example, am myself on the supervisory board of the Baden-Württemberg Cooperative State University, or "Dual University". This is a very practical solution for both parties. We can ensure that ongoing developments in our industry are included in the course content. This of course then helps the students, because they come out of university with a top-level education. For Germany as an industrial nation it is important that we continue to lead the way in terms of training and studies. The degrees achieved here receive widespread international recognition and it's important for that to remain the case.

Are you getting enough qualified graduates?
At Daimler we are able to fill all posts with extremely well-qualified candidates. For our trainee program CAReer, for example, we get tens of thousands of applicants every year from all over the world for just a few hundred places. I'm delighted that, as these numbers go to show, we are very clearly recognized as a very attractive employer.

The technical expertise, the fresh ideas and the tremendous commitment of all the students involved are just so impressive.

Uns imponieren die fachliche Expertise, die frischen Ideen und der große Einsatz der Studierenden.

What is it, do you think, that attracts engineers to work for Mercedes?
Engineers coming to work for us will find the full spectrum of what the automotive industry has to offer: from research and development through to production. The things that we're working on today are what our customers will be driving on the road tomorrow – all over the world. The opportunity to shape the future of mobility is very appealing to well qualified and ambitious young colleagues. Just think about the first autonomous truck in the world licensed to drive on public roads: it comes from our US truck brand Freightliner.

The name Freightliner brings us to the subject of working abroad. What prospects are there for an international career at Daimler?
We have more than 170 locations on six continents. For someone who wants to gain international experience, the sky's the limit at Daimler. Whether it's design in California, the commercial vehicle business in Brazil, passenger car production in South Africa, sales and marketing in Latin America or production planning in China - we can offer interesting jobs and career perspectives

Wird die Ausbildung an den Hochschulen diesem Wandel gerecht?
Wir arbeiten mit vielen Universitäten national und international zusammen. Ich selbst bin beispielsweise im Aufsichtsrat der Dualen Hochschule Baden-Württemberg. Das ist für beide Seiten sinnvoll. So können wir die Entwicklungen in unserer Branche mit den Studieninhalten zusammenbringen. Das nützt auch den Studentinnen und Studenten, weil sie top ausgebildet aus der Uni kommen. Gerade für den Wirtschaftsstandort Deutschland ist es wichtig, dass wir bei Bildung und Studium vorne bleiben. Die Abschlüsse sind international in hohem Maße anerkannt und das muss auch so bleiben.

Bekommen Sie genügend qualifizierte Studienabgänger?
Bei Daimler können wir alle Stellen mit hochqualifi ierten Bewerbern besetzen. Für unser Traineeprogramm CAReer haben wir beispielsweise jedes Jahr zehntausende Bewerber aus der ganzen Welt für einige hundert Plätze. Bei solchen Zahlen freue ich mich, dass wir ganz offensichtlich als sehr attraktiver Arbeitgeber anerkannt werden.

Was reizt ihrer Meinung nach Ingenieure daran, bei Mercedes zu arbeiten?
Ingenieure finden bei uns die ganze Bandbreite des Automobilgeschäfts: von der Forschung und Entwicklung bis zur Produktion. Woran wir heute tüfteln, damit fahren morgen unsere Kunden auf der Straße – und das weltweit. Die Chance, die Zukunft der Mobilität zu gestalten, ist sehr attraktiv für gut ausgebildete und ambitionierte junge Kollegen. Denken Sie nur an den ersten autonom fahrenden Lkw der Welt mit Straßenzulassung: Er kommt von unserer US-Truckmarke Freightliner.

Mit Freightliner sprechen Sie das Thema Ausland an. Welche internationalen Karriereperspektiven gibt es bei Daimler?
Wir haben mehr als 170 Standorte auf sechs Kontinenten. Für jemanden, der internationale Erfahrungen sammeln möchte, gibt es bei Daimler keine Grenzen. Egal ob Design in Kalifornien, Nutzfahrzeuggeschäft in Brasilien, Pkw-Produktion in Südafrika, Vertrieb in Lateinamerika oder Produktionsplanung in China – wir können weltweit interessante Aufgaben und Karriereperspektiven bieten. Internationalisierung und das Miteinander verschiedener Kulturen sind bei uns Alltag. Allein in Deutschland arbeiten Kollegen aus rund 140 Nationalitäten zusammen. Wir sehen in dieser Vielfalt eine wichtige Basis für unseren weltweiten Erfolg.

all over the world. Internationalization and cross-cultural cooperation are part of our everyday life. In Germany alone, there are colleagues of some 140 different nationalities working together. We see this diversity as an important basis for our global success.

There's also diversity in terms of generations. I've read that there are five different generations working at Daimler …

Yes, from the post-war generation right through to younger members of staff who are not yet 20, we have colleagues of all ages working in our company. Diversity is an important factor here, too, for the different generations bring different knowledge, experience and perspectives into the mix, through which we improve our capacity to innovate. Each generation brings new ideas into the equation and the impetus to bring about change. That's a good thing, because the pulse of each new generation is what drives us forward, and is the key to a successful future.

The engineers of the future will need to think and act much more in an interdisciplinary way.

Ingenieure der Zukunft werden interdiziplinär denken und handeln müssen.

The Formula Student participants are, above all, members of the so-called "Generation Y". What can this generation of 30-somethings expect from an employer?

We think it's tremendously important to work really closely together with the generations that are now coming through, and to shape the future together. More than 25 percent of the workforce at Daimler in Germany belong to Generation Y. Only recently, we got together with colleagues from this age group. All sorts of ideas about the world of work in the future came out of that, and the best suggestions will be directly implemented around the Group. These include ideas about the flexibility of working hours and the workplace, the modern office environment and personal development opportunities, for example through an internal career network.

What advice would you give Formula Student Germany, after its first ten years, for the next decade?

The Formula Student has made excellent progress. If I could make a wish for the future, it would be for a competition in the field of autonomous driving. That, besides the already existing benchmarking of electric drive systems, would be the next step towards the future of mobility.

Vielfalt gibt es auch beim Thema Generationen. Ich habe gelesen, dass fünf verschiedene Generationen bei Daimler arbeiten …

Ja, das stimmt. Wir haben von Kollegen aus der Nachkriegsgeneration bis hin zu jungen Mitarbeitern unter 20 alle Altersklassen im Unternehmen. Auch hier ist uns Vielfalt wichtig, denn unterschiedliche Generationen bringen verschiedene Kenntnisse, Erfahrungen und Perspektiven zusammen und dadurch gewinnen wir Innovationskraft. Jede Generation bringt neue Ideen mit und will Wandel anstoßen. Das ist gut so, denn der Pulsschlag jeder neuen Generation treibt uns voran und ist entscheidend für eine erfolgreiche Zukunft.

Die Teilnehmer der Formula Student gehören vor allem der sogenannten Generation Y an. Was erwartet diese Generation der um die 30 Jährigen von einem Arbeitgeber?

Für uns ist es von großer Bedeutung, eng mit den nachrückenden Generationen zusammenzuarbeiten und die Zukunft gemeinsam zu gestalten. Mehr als 25 Prozent der Daimler-Belegschaft in Deutschland gehören der Generation Y an. Wir haben uns erst kürzlich mit Kolleginnen und Kollegen aus dieser Altersgruppe zusammengesetzt. Dabei sind viele gute Ideen zur Arbeitswelt der Zukunft entstanden. Die besten Vorschläge werden wir im Konzern direkt umsetzten. Dabei geht es unter anderem um Flexibilität bei Arbeitszeit und Arbeitsort, moderne Büroumgebungen und persönliche Entwicklungsmöglichkeiten, beispielsweise über ein internes Karrierenetzwerk.

Was würden Sie der Formula Student Germany nach den ersten zehn Jahren für die nächste Dekade ins Stammbuch schreiben?

Die Formula Student hat sich hervorragend entwickelt. Wenn ich mir für die Zukunft etwas wünschen dürfte, wäre es ein Wettbewerb zum Thema autonomes Fahren. Das wäre neben dem Leistungsvergleich für Elektroantriebe der nächste Schritt in die Zukunft der Mobilität.

Interview: Ludwig Vollrath

WORDS FROM OUR SPONSORS

Charles J Klein
Vice President of Vehicle Engineering Europe,
Member of the Management Board, Adam Opel AG

The Adam Opel AG is committed to promoting development and education of young engineers, signing a three-year contract as main sponsor of the international educational motorsport competition Formula Student.

We are delighted that Opel is now a sponsor of Europe's largest student motorsport competition. With this sponsorship, we make a clear statement regarding our long term commitment to passionate and talented people. The involvement of many Opel employees in this established student racing series has already been a valuable investment in our own future. Now, we are going a step further. In addition to the university teams Opel supports, we are also sponsoring the entire series.

We will also initiate the "Opel Style Award" which will recognize clever design and packaging solutions, and is aligned with these traditional Opel strengths.

Die Adam Opel AG baut das Engagement in der Nachwuchsförderung von angehenden Ingenieuren weiter aus und hat einen Dreijahresvertrag als Zentralsponsor der internationalen Hochschul-Rennserie Formula Student unterzeichnet.
Wir freuen uns über den Eintritt als Sponsor in den größten studentischen Rennwettbewerb in Europa. Damit setzen wir ein klares Signal für eine langfristige Förderung junger Talente. Schon bislang war der Einsatz vieler Opel-Mitarbeiter rund um diese wichtigste studentische Rennserie eine wertvolle Investition in unsere eigene Zukunft. Nun gehen wir noch einen Schritt weiter und engagieren uns zusätzlich zu den von uns geförderten Hochschulteams für die gesamte Serie.

Zudem wird der "Opel Style Award" besonders clevere Design- und Package-Lösungen prämieren und damit eine Brücke zu diesen traditionellen Stärken von Opel schlagen.

Audi

Antje Maas
Director HR Marketing, AUDI AG

The fascination of Formula Student Germany: to us, being there means being part of a truly special atmosphere that we would not want to miss for anything. This is where we meet around 3,600 young, ambitious people from all over the world who are just as enthusiastic about automotive technology as we are at Audi. When the teams work together on their cars late into the night, help and advise each other or answer questions from the judges competently and precisely, they demonstrate their pioneering spirit. We appreciate the students having the courage to try out something new and put ideas into practice. After all, this is exactly what we are looking for in our future employees. We look forward to Formula Student Germany 2015 and to many interesting discussions with the participating teams and visitors to our show stand in the FSG Forum.

Faszination Formula Student Germany: Dabei zu sein bedeutet für uns, Teil einer ganz besonderen Atmosphäre zu sein, die wir um keinen Preis missen möchten. Hier treffen wir rund 3.600 junge und ambitionierte Menschen aus aller Welt, die von automobiler Technik genauso begeistert sind wie wir bei Audi. Wenn die Teams miteinander bis spät in die Nacht an ihren Autos tüfteln, sich mit Rat und Tat zu Seite stehen oder kompetent und präzise auf die Fragen der Juroren antworten, beweisen sie uns ihren Pioniergeist. Wir schätzen den Mut der Studierenden, Neues auszuprobieren und Ideen umzusetzen. Das ist es schließlich, was wir uns auch von unseren zukünftigen Mitarbeiterinnen und Mitarbeitern wünschen. Wir freuen uns auf die Formula Student Germany 2015 und auf viele interessante Gespräche mit den teilnehmenden Teams und Besuchern an unserem Messestand im FSG Forum.

BASF
We create chemistry

Hans-Peter Beringer
Vice President, Head of Business Management
Transportation, BASF SE

For BASF it´s a pleasure to support “Formula Student Germany”, because we want to share our passion for automotive technology! Our engineering plastics are widely used in the automotive industry for example in vehicles range from bodywork and chassis to interior trim and engine components. Using plastics instead of other materials reduces vehicle weight and so helps to conserve energy and reduce emissions.
As a global chemical company BASF particularly focuses on science education, realizing that today’s students will be the thinkers, innovators, discoverers and leaders of the future. We consider “Formula Student Germany” to be a great opportunity to get in contact with ambitious and well-educated young people.
Good luck to all teams for this extraordinary competition!

Wir freuen uns „Formula Student Germany“ zu unterstützen - und so unsere Begeisterung für Technologie rund um das Automobil zu teilen! Die BASF bietet eine Vielzahl von Kunststofflösungen für die Automobilindustrie an, angefangen beim Karosseriebau, über das Fahrwerk bis hin zu Innenausstattung und Motoranbauteilen. Der Einsatz von Kunststoffen reduziert das Fahrzeuggewicht und trägt auf diese Weise zur Ressourcenschonung bei.
Als ein globales Unternehmen der Chemieindustrie schätzen wir die universitäre Forschung, insbesondere die Ingenieurswissenschaften. Hier sehen wir die Denker, Erfinder und Führungspersönlichkeiten der Zukunft. „Formula Student Germany“ bietet uns die Möglichkeit, mit ambitionierten und gut ausgebildeten Nachwuchskräften in Kontakt zu kommen.
Wir wünschen allen Teilnehmern viel Glück in diesem außergewöhnlichen Wettbewerb!

BMW GROUP Rolls-Royce Motor Cars Limited

Oliver Ferschke
Head of HR Marketing
BMW Group

The BMW Group is very enthusiastic about its involvement in the Formula Student. We have been supporting this event in Hockenheim since the FSG was started. The Formula Student offers students a unique way of linking their knowledge gained during their studies with real practice. It develops communication skills and other key competencies as well as a deepening of technical and business knowledge.

The challenges the teams face during the course of a season are also always faced by the BMW Group. We are, therefore, pleased when qualified participants from all over the world gain their first practical experience in the BMW Group. A wide variety of departments and divisions, such as R&D or IT, offer internships, degree theses and our future talent programmes. These options provide the opportunity to share passion and work on innovative solutions with us.

Mit großer Begeisterung engagiert sich die BMW Group in der Formula Student. Bereits seit Gründung der FSG sind wir Unterstützer des Events. Die Formula Student bietet Studierenden auf einzigartige Weise die Möglichkeit im Studium erlangtes Wissen mit gelebter Praxis zu verknüpfen. Dabei werden Sozial- und Schlüsselkompetenzen sowie auch weiterergehende Fach- und Wirtschaftskenntnisse erlangt und vertieft.

Die Herausforderungen, mit welchen sich die Teams im Laufe einer Saison konfrontiert sehen, beschäftigen auch uns bei der BMW Group immer wieder. Daher freuen wir uns, wenn qualifizierte Teilnehmer aus dem In- und Ausland ihre ersten Praxiserfahrungen in der BMW Group sammeln. Praktika, Abschlussarbeiten oder auch unsere Nachwuchsprogramme bieten in den verschiedensten Unternehmensbereichen, wie z.B. R&D sowie IT die Möglichkeit mit Leidenschaft an innovativen Lösungen mitzuarbeiten.

BOSCH
Invented for life

Heidi Stock
Head of Personnel Development,
Personnel Marketing and Diversity, Bosch

At Bosch, we're convinced – Diversity is both an enrichment for us and a prerequisite for our strive to excellence and exciting products. Behind these aspects stand associates with individual competencies, mindsets, experiences and working styles.

Diversity is also what we're counting on at Formula Student: it's not the fastest car that wins, but the team with the best overall combination of design, race performance, financial planning, and selling points. That's why we're glad to support talented young people who are innovative and committed, and who work together in a team to master interdisciplinary challenges.

We are looking forward to inspiring discussions with the students attending, and wish all the teams every success.

For more information visit: www.bosch-career.com

Bei Bosch sind wir davon überzeugt: Vielfalt ist Bereicherung und Voraussetzung für Spitzenleistungen und begeisternde Produkte. Dahinter stecken Mitarbeiterinnen und Mitarbeiter mit individuellen Kompetenzen, Denkweisen, Erfahrungen und Arbeitsstilen.

Vielfalt zählt auch bei der Formula Student: Nicht das schnellste Auto gewinnt, sondern das Team mit dem besten Gesamtpaket aus Konstruktion und Rennperformance, Finanzplanung und Verkaufsargumenten. Daher freuen wir uns, innovative und engagierte Nachwuchskräfte zu unterstützen, die im Team die interdisziplinären Herausforderungen gemeinsam meistern.

Wir freuen uns auf anregende Gespräche mit den Studierenden und wünschen allen Teams viel Erfolg!

Mehr Informationen auf: www.bosch-career.com

Brunel
access to excellence

Markus Eckhardt
General Manager

Automotive engineering has for more than 20 years ranked among the most important industries for Brunel, one of Germany's leading engineering service providers. In line with our keen interest in young engineering talents in this sector, we have been one of the main sponsors for Formula Student Germany since 2006. This year marks the event's tenth anniversary, and our congratulations go to all those involved. Again and again, we are thrilled to see the creativity, passion and team spirit demonstrated by the students who take part. The team members naturally need technical expertise, but also motivation and commitment if they are to master the challenges presented to them. The competition thus constitutes excellent preparation for the world of work, testifies to the students' impressive innovative skills, and powerfully demonstrates the vast potential harbored by our budding engineers.

Für uns als einer der führenden Ingenieurdienstleister Deutschlands gehört die Automobilindustrie seit über 20 Jahren zu einer unserer wichtigsten Branchen. Weil uns hier der Ingenieurnachwuchs sehr am Herzen liegt, unterstützen wir die Formula Student Germany bereits seit 2006 als einer der Hauptsponsoren und gratulieren dieses Jahr ganz herzlich zum 10-jährigen Jubiläum. Die Kreativität, Leidenschaft und der Teamgeist der teilnehmenden Studenten begeistern uns immer wieder aufs Neue! Neben dem Fachwissen kommt es vor allem auf die Motivation und das Engagement der Teammitglieder an, um die gestellten Herausforderungen bei diesem Konstruktionswettbewerb zu meistern. Der Wettbewerb ist demnach eine sehr gute Vorbereitung auf die Arbeit in Unternehmen, zeugt von hoher Innovationskraft und demonstriert eindrucksvoll das große Potenzial unserer angehenden Ingenieurinnen und Ingenieure.

Continental

Tobias Bog
Teamleader HR Marketing and Communications,
Continental AG

For over 140 years, Continental has been working on motorized individual mobility of the future. In order to continue this success story, we are constantly looking for qualified technical and management personnel.

Top talent of the kind we are seeking can be found at the Formula Student competition. There, working in teams, the students experience the values that are also indispensible for a successful career at Continental: teamwork, for one another, freedom to act and passion to win. In addition to this, a large international project like Formula Student hones the social skills that we look for in all our employees.

With this is mind, we support the teams by providing material and expertise, now and in the future, and wish everyone success at the Formula Student Germany at the Hockenheimring.

Seit über 140 Jahren arbeitet Continental erfolgreich an der individuellen Mobilität der Zukunft. Um diese Erfolgsstory weiterzuschreiben sind wir ständig auf der Suche nach qualifizierten Fach- und Führungskräften.

Diese Toptalente finden wir beim internationalen Konstruktionswettbewerb Formula Student. Durch die Arbeit in den Teams erleben die Studierenden die Werte, die auch für eine erfolgreiche Karriere bei Continental unerlässlich sind: Teamwork, Verbundenheit, Freiheit und Gewinnermentalität. Zudem schärft ein derartiges internationales Großprojekt wie Formula Student die Sozialkompetenzen, die wir bei allen unseren Einsteigern suchen.
Daher unterstützen wir jetzt und in Zukunft die Teams mit Material und Know-How und wünschen allen viel Erfolg bei der der Formula Student Germany auf dem Hockenheimring.

DAIMLER

Dr. Anna-Maria Karl
Senior Manager Global Talent Sourcing,
Daimler AG

The Formula Student participants all represent specialist expertise, teamwork and commitment. They attract attention with their innovative solutions, they put their specialist knowledge into practice and they gain important experience for their later career – an ideal extracurricular activity for future vehicle engineers. The participants always exhibit a strong sense of enthusiasm, and a passion and excitement for innovation and technology. As an employer, these are qualities that we value highly!

In all our activities surrounding the Formula Student competitions, we are developing the students‘ commitment, business acumen, their ability to work independently and their confiden e to innovate.

We look forward to meeting the teams and wish everyone all the best for the event.

Die Teilnehmerinnen und Teilnehmer der Formula Student stehen insbesondere für fachliche Expertise, Teamfähigkeit und Einsatzbereitschaft. Sie machen mit innovativen Lösungen auf sich aufmerksam, setzen Fachwissen in die Praxis um und sammeln wichtige Erfahrungen für ihr späteres Berufsleben – eine ideale studienbegleitende Aktivität für zukünftige Fahrzeugingenieurinnen und -ingenieure. Wir spüren immer wieder den großen Enthusiasmus, die Begeisterung und Leidenschaft für Innovationen und Technik bei den Teilnehmerinnen und Teilnehmern. Auf diese Eigenschaften legen wir als Arbeitgeber natürlich höchsten Wert!

Mit unseren Aktivitäten rund um die Formula Student fördern wir Engagement, unternehmerisches Denken, eigenverantwortliches Arbeiten und den Mut zur Innovation bei den Studierenden.

Wir freuen uns auf den Austausch mit den Teams und wünschen allen ein erfolgreiches Event!

DEKRA

On the safe side.

Dr. Gerd Neumann
Chairman of the board of managing directors,
DEKRA Automobil GmbH

DEKRA has been Technical Partner of FSG since its beginning in 2006. The experts use their experience in vehicle inspection, homologation and motor sports – e.g. as partner of the racing series DTM for 25 years – in order to ensure high technical standards and comprehensive safety within FSG. The check of vehicle structures previous to the event, as well as the actual scrutineering on site at Hockenheim, brings about valuable contact between the experienced engineers and the students of the racing teams – and this often benefits both sides. After all, DEKRA as an internationally leading expert organisation, has to offer very interesting job descriptions for young engineers in about 50 countries worldwide and is constantly on the lookout for highly qualified graduates.

DEKRA ist seit den Anfängen der Formula Student Germany im Jahr 2006 als Offizieller Technischer Partner dabei. Hier bringen die Experten ihre Kompetenz aus der Fahrzeugprüfung und der Homologation sowie aus dem Motorsport – etwa als Partner der DTM seit 25 Jahren – ein, um bei der FSG hohes technisches Niveau und umfassende Sicherheit zu gewährleisten. Schon bei der Überprüfung von Fahrzeugstrukturen im Vorfeld im DEKRA Automobil Test Center in Klettwitz, aber auch bei der Technischen Abnahme vor Ort in Hockenheim, entstehen wertvolle Kontakte zwischen den erfahrenen Ingenieuren und Studierenden aus den Rennteams – oftmals zum beiderseitigen Nutzen. Denn DEKRA als international führende Sachverständigenorganisation bietet jungen Ingenieuren hoch interessante Aufgabenbereiche in rund 50 Ländern der Welt und ist ständig auf der Suche nach hoch qualifiziertem Nachwuchs.

ETAS

Friedhelm Pickhard
President ETAS GmbH

Speed, high technology, and team spirit – what could be better than to measure oneself in these disciplines? ETAS is proud to be a main sponsor of Formula Student Germany. We share the thrills with our 24 teams as – with engineering skills and passion – they show their mettle under the toughest conditions.

Awards go not only to the fastest cars, but also to the best combination of design, performance, finance, and business planning. And for ETAS, these disciplines are part of everyday life. Only companies that take on global competition with commitment will continue to operate successfully and produce innovations – in our case integrated tools, tool solutions, and services for the development and maintenance of embedded systems.

We wish all teams the motivation, enthusiasm, and success required to be front-runners in the field.

Geschwindigkeit, Spitzentechnologie und Team-Spirit – was kann es Schöneres geben, als sich in diesen Disziplinen zu messen? Mit Stolz unterstützt ETAS als ein Hauptsponsor die Formula Student Germany. Wir fiebern mit unseren 24 Teams mit, wenn sie mit Ingenieurskunst und Herzblut unter den härtesten Bedingungen zeigen, was sie können.

Ausgezeichnet werden nicht nur die schnellsten Boliden, sondern die beste Kombination aus Konstruktion, Leistung, Finanzen und Businessplanung. Für ETAS gehören diese Disziplinen zum Alltag. Nur wer ihnen engagiert begegnet und sich dem globalen Wettbewerb stellt, wird auch künftig weltweit erfolgreich wirtschaften und Innovationen hervorbringen – in unserem Fall integrierte Tools, Werkzeuglösungen und Services für die Entwicklung und Wartung von Embedded Systemen.

Wir wünschen allen Teams den Spirit und Erfolg, ganz vorne mit dabei zu sein.

Janine Hempelmann
Consultant Online Communication

HARTING technology group develops innovative solutions and technologies for connectivity and networks. Highly motivated young professionals are necessary to create innovations for our customers. Formula Student is considered by HARTING as an outstanding opportunity to encourage the young generation of engineers we regularly seek as an employer. In Formula Student, the participants can prove in practice their professional knowledge and management by developing new solutions through team work.

When technical aspects of a solution are addressed, energy efficiency and conservation of resources should play a central role. Therefore, HARTING will award the team that will realise a solution with the best energy effi ient values.

Die HARTING Technologiegruppe entwickelt innovative Lösungen und Technologien in der Verbindungstechnik. Damit wir auch zukünftig unsere Kunden mit Innovationen versorgen können, braucht es junge, motivierte Menschen. Die Formula Student ist eine hervorragende Möglichkeit, um den technischen Nachwuchs zu fördern, den wir als Unternehmen suchen. Hier können die Studenten in der Praxis demonstrieren, wie sie in Teamarbeit neue Lösungen entwickeln – und dabei ihr technisches Fachwissen und betriebswirtschaftliches Know-how unter Beweis stellen.

Wenn es um neue technische Lösungsansätze geht, sollten auch immer Energieeffizienz und Ressourcenschonung eine zentrale Rolle spielen. HARTING wird deshalb einen Preis an das Team verleihen, das bei der Formula Student Electric den geringsten Energieverbrauch realisiert.

Patricia Reis e Silva
Marketing / Key Account Manager – General Industry
Germany / Swizerland

For years, global adhesives market leader Henkel has been supporting the contest, the events and the competing teams around the world.

Why? We love the energy-laden, electrifying atmosphere where young, talented people who are fascinated by technology set themselves a goal and follow their vision through with passion and dedication. They are our kind of people. We want to get to know them and perhaps even help them to start their careers at Henkel.

Above all, we want to encourage them, give them access to the latest solutions from research and development, and share our expertise with them. Advanced high-performance adhesives and sealants from Henkel have long been an indispensable part of our daily lives. The knowledge gained about them here can later inspire many of the participating young engineers to create groundbreaking engineering applications and MRO solutions.

Schon seit Jahren unterstützt Klebstoff-Weltmarktführer Henkel den Wettbewerb, das Event und die beteiligten Teams rund um die Welt.

Warum? Uns begeistert die energiegeladene, elektrisierende Atmosphäre, in der sich junge talentierte, Technik-faszinierte Menschen einer Vision verschreiben und ihr Ziel konsequent und voller Leidenschaft bis zur Umsetzung verfolgen. Solche Menschen passen zu uns. Wir möchten sie kennenlernen und ihnen vielleicht sogar den Einstieg in eine Karriere bei Henkel ermöglichen.

Vor allem aber möchten wir sie fördern und ihnen neueste Lösungen aus Forschung und Entwicklung sowie unser Know-how zur Verfügung stellen. Moderne Hochleistungskleb- und -dichtstoffe von Henkel sind aus dem Lebensalltag längst nicht mehr wegzudenken. Vielen der hier teilnehmenden Nachwuchsingenieure werden sie später als Rüstzeug für zukunftsweisende Ingenieursleistungen und MRO-Lösung.

automotive engineering iav

Christian Willenberg
Human Resources

With over 6,000 members of staff, IAV is one of the world's leading providers of engineering services to the automotive industry. The company can look back on more than 30 years of experience in developing innovative concepts and technologies for future vehicle generations. Core competencies include perfected, production-ready solutions in all fields of powertrain, electronics and vehicle development.

IAV supports Formula Student Germany and individual teams to produce interest to take part in the engineering departments of the company. To name one example from the motorsport segment: IAV was involved in developing a 2-liter four-cylinder high-speed engine for mass production. Powered by this engine, the BMW 320si went into mass production as the base vehicle for touring-car racing. For further information about IAV, go to www.iav.com.

IAV ist mit über 6.000 Mitarbeitern weltweit einer der führenden Engineering-Partner der Automobilindustrie. Das Unternehmen entwickelt seit über 30 Jahren innovative Konzepte und Technologien für zukünftige Fahrzeuggenerationen. Zu den Kernkompetenzen gehören perfekte, serientaugliche Lösungen in allen Bereichen der Antriebsstrang-, Elektronik-, und Fahrzeugentwicklung.

IAV unterstützt Formula Student Germany und einzelne Teams – auch um das Interesse an einer Mitwirkung in den Fachabteilungen zu erwecken. Um ein Beispiel aus dem Bereich Motorsport zu nennen: IAV war bei der Serienentwicklung eines 2-Liter-Vierzylinder-Hochdrehzahlmotors beteiligt. Als Grundlage für den Tourenwagensport ging der BMW 320si mit diesem Motor in Serie. Weitere Infos zu IAV erhalten Sie über unser Karriereportal www.iav.com/karriere.

MAHLE

Joachim Reichle
Director Corporate Personnel Development

The MAHLE Group is one of the top 20 automotive suppliers and the globally leading manufacturer of components and systems for the internal combustion engine and its peripherals and in the field of thermalmanagement.

MAHLE has enjoyed close ties to motor sport activities since the early days. Thus we know: if you want to do something decisive, you need a vision, topped with courage, perseverance, and drive. When the environment fits and the team is right, ambitious projects and convincing solutions emerge from innovative ideas. As a company with a passion for the automobile, we are proud to be part of the Formula Student Germany. We support formula student teams who are fascinated by the automotive world and who want to achieve more by working together – the same way we are. We are happy to support talented and enthusiastic engineers in reaching their ambitious goals and we wish all participants an successful Event!

Der MAHLE Konzern zählt zu den 20 größten Automobilzulieferern und ist der weltweit führende Hersteller von Komponenten und Systemen für den Verbrennungsmotor und dessen Peripherie sowie im Bereich Thermomanagement.

Als ein von Anfang an dem Motorsport verbundenes Unternehmen wissen wir: Wer Entscheidendes bewegen will, braucht eine Vision. Und dazu Mut, Ausdauer und Biss. Wenn dann noch das Umfeld stimmt und das Team das richtige ist, werden aus innovativen Ideen ehrgeizige Projekte und überzeugende Lösungen. Als ein Unternehmen mit einer Leidenschaft für das Automobil, sind wir stolz, ein Teil der Formula Student zu sein. Wir unterstützten Teams, die – genauso wie MAHLE – fasziniert sind vom Automobil und gemeinsam mehr bewegen wollen. Wir freuen uns, talentierte und enthusiastische angehende Ingenieure bei der Erreichung ihrer ehrgeizigen Ziele zu unterstützen und wünschen allen Teilnehmern ein erfolgreiches Event.

Anja Holtmannspötter
Head of HR Marketing & Communication
MAN Group

MAN is one of Europe's leading commercial vehicle, engine and mechanical engineering companies, generating annual revenue of around 14.3 billion euros and employing a workforce of approx. 55,900 worldwide. MAN is a supplier of trucks, buses, diesel engines, turbomachinery and special gear units, with all corporate divisions holding leading market positions.
Our corporate values reliable, innovative, dynamic and open play a key role in MAN's success on product markets and the capital market, as well as in attracting qualified employees, and in social acceptance of all our business activities.
This year marks the 10th anniversary of the Formula Student Competition. MAN is proud to be part of that heritage for so long, and support an event where talented young engineers have the opportunity to thrive on their ideas and develop the engineering concepts of the future. We look forward to an exciting event and wish all teams every success!

Die MAN Gruppe ist eines der führenden Nutzfahrzeug-, Motoren- und Maschinenbauunternehmen Europas mit jährlich rund 14,3 Mrd € Umsatz und weltweit etwa 55 900 Mitarbeitern. MAN ist Anbieter von Lkw, Bussen, Dieselmotoren, Turbomaschinen sowie Spezialgetrieben und hält in allen Unternehmensbereichen führende Marktpositionen.
Die Unternehmenswerte zuverlässig, innovativ, dynamisch und offen sind wesentliche Erfolgsfaktoren für MAN auf Produktmärkten, dem Kapitalmarkt, bei der Gewinnung qualifizierter Mitarbeiter und für die gesellschaftliche Akzeptanz aller unternehmerischen Aktivitäten.
Das 10jährige Jubiläum der Formula Student ist ein großer Moment für die Veranstaltung. MAN ist stolz, als Sponsor Teil einer Veranstaltung zu sein, in der junge Ingenieure ihre Talente entfalten können und mit Ihren Ideen die Konzepte der Zukunft entwickeln. Wir freuen uns auf spannende Tage am Hockenheimring und wünschen allen Teams vorab viel Erfolg!

Lauren Tabolinsky
Student Competition Program Specialist

Employing a Model-Based Design approach to automotive design process for the Formula Student Germany Competition enables teams to design, test, validate and share their models within one environment. Competitions like Formula Student Germany present a unique engineering challenge that requires months of intense focus and hard work. Using industry-standard tools such as MATLAB and Simulink helps students tackle real engineering problems and acquire the collaboration, time-management, and leadership skills they will need for careers in industry.
Learn more about how MathWorks support Formula Student Germany: http://www.mathworks.com/academia/student-competitions/formula-student-germany/

Durch den Einsatz von modellbasierter Entwicklung für den automobile Design-Prozess im Rahmen der Formula Student Germany können Teams ihre technischen Modelle innerhalb einer einheitlichen Umgebung konzeptionieren, testen, validieren und austauschen. Wettbewerbe wie die Formula Student Germany bieten Studententeams einzigartige technische Herausforderungen, die Monate intensiver und konzentrierter Arbeit erfordern. Industrie-Standard-Tools wie MATLAB und Simulink ermöglichen Studierenden reale ingenieurtechnische Aufgabenstellungen erfolgreich zu bewältigen. Zusätzlich erwerben die Teams wertvolle Erfahrungen in Teamwork, Leadership und Zeitmanagement, die für die berufliche Karriere in der Industrie sehr wertvoll sind. Erfahren Sie mehr über die Unterstützung der Formula Student Germany durch MathWorks: www.mathworks.de/academia/student-competitions/formula-student-germany/

Yumiko Mathias
Manager HR Marketing and Employer Branding

Pioneering spirit: the best drive of all

For the Formula Student teams, the past 12 months have brought a lot of work and many challenges. With great passion, new ideas have been developed and a lot of time invested in building their racing cars. Discipline, innovation, dynamism and team spirit have been all-important.
In exactly the same way, our engineers at MTU constantly take on exciting challenges and new tasks. Engines and drive systems carrying the MTU brand guarantee the highest degree of precision and perfect interaction of all system components. Through their dedication and commitment, the racing teams have earned our respect and we are pleased to support this event and the upcoming engineers again in 2015.
Karl Maybach, founding father of MTU and technical pioneer, would certainly love Formula Student Germany. And so do we.
We wish all participants the best of luck!

Pioniergeist – Der beste Antrieb die Dinge zu bewegen!

Ein Jahr voller Herausforderungen und Arbeit liegt hinter den Formula Student Teams. Mit großer Freude und Leidenschaft für Technik haben sie neue Ideen entwickelt und viel Zeit investiert um ihre Rennwagen zu konstruieren. Dazu gehört viel Disziplin, Innovation, Dynamik und einzigartiger Teamgeist.
Auch unsere MTU-Ingenieure stellen sich immer wieder neuen Herausforderungen und spannenden Aufgaben. Wenn es um Motoren und Antriebe geht, steht unsere Marke MTU für größte Präzision im Detail und ein reibungsloses Zusammenspiel im System. Wir wissen den Einsatz der Rennteams sehr zu schätzen und freuen uns das Event und hochmotivierte Nachwuchsingenieure erneut zu unterstützen.
Karl Maybach, MTU-Gründervater und Technikpionier wäre begeistert. Wir sind es auch!
Wir wünschen allen Teams einen erfolgreichen und spannenden Wettbewerb!

Konstanze Marinoff
Director Human Resource Marketing

Porsche stands for Intelligent Performance – for maximum power and efficiency at the same time.
With more than 30.000 victories, Porsche, as the most successful manufacturer in motorsports, also stands for extraordinary team spirit. Formula Student is also based on excellent engineering skills. Whether in Le Mans or in the Formula Student – more important than a fast car, is an intelligent package of team performance and innovative ideas.
These factors will lead to success. We are looking forward to welcome ambitious participants of the Formula Student at Porsche in line with various career entry opportunities. Define the next chapter of the future of sportscar engineering – at the Formula Student competition and at Porsche. Good luck and success. We wish good luck and success to all teams.

Porsche steht für Intelligent Performance – für maximale Leistung bei gleichzeitiger Effizienz.
Mit mehr als 30.000 Rennsiegen steht Porsche als der erfolgreichste Hersteller im Motorsport darüber hinaus für einzigartige Teamleistungen. Ob in Le Mans oder bei der Formula Student - nicht nur ein schnelles Auto ist entscheidend, sondern ein intelligentes Gesamtpaket aus Teamfähigkeit und innovativen Ideen bestimmt den Erfolg.
Wir freuen uns, engagierte Formula Student Teilnehmer im Rahmen vielfältiger Einstiegsmöglichkeiten bei Porsche begrüßen zu dürfen. Schreiben Sie mit am nächsten Kapitel der Zukunft des Sportwagens - bei der Formula Student und bei Porsche.
Wir wünschen allen Teams viel Glück und Erfolg!

SCHAEFFLER

Prof. Dr. Peter Gutzmer
Deputy CEO and Chief Technology Officer (CTO)
Schaeffler AG

Success in motorsport is closely associated with the ability of every individual, but more specifically with teamwork. The power of innovation and dynamic, commitment and courage are required in Motorsport - the same applies to the Schaeffler employees in their daily quest to further consolidate their company's position as one of the world's leading automobile suppliers. This is also why the motorsport involvement has been an integral component of Schaeffler's marketing strategy for decades.

Schaeffler has supported the Formula Student since back in 2006 - by offering our expertise, and also our products. With Formula Student Germany we are close to the talents, the very people we wish to recruit as employees later on: students who enjoy technology and gained project experience that cannot be acquired in university life.

Erfolge im Motorsport sind eng verbunden mit dem Können jedes Einzelnen, aber vor allem mit Teamwork. Im Motorsport sind Innovationskraft, Entschlossenheit und Mut gefordert - das gilt in gleicher Weise für das tägliche Streben der Mitarbeiter von Schaeffler, um sich weiter als weltweit führender Automobilzulieferer zu behaupten. Auch deshalb ist das Motorsport-Engagement seit Jahrzehnten wesentlicher Bestandteil der Schaeffler Markenstrategie.

Teams der Formula Student unterstützt Schaeffler bereits seit 2006 - mit Know-how und Produkten. Bei der Formula Student Germany sind wir dicht dran an den Talenten, die wir uns später als Mitarbeiter wünschen: Studierende, die Spaß an Technik haben und die Projekterfahrung mitbringen, die man im universitären Alltag nicht sammeln kann.

SIEMENS

Markus Prüfert
Vice President Channel, ME&S, Academics, Lic. Compliance Siemens Industry Software GmbH

Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a leading global provider of product lifecycle management (PLM) and manufacturing operations management (MOM) software, systems and services with over eleven million licensed seats and more than 80,000 customers worldwide.

Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with its customers to provide industry software solutions that help companies everywhere achieve a sustainable competitive advantage by making real the innovations that matter.

For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

Siemens PLM Software, eine Business Unit der Siemens Digital Factory Division, ist ein führender, weltweit tätiger Anbieter von Software, Systemen und Dienstleistungen für das Product Lifecycle Management (PLM) und das Management von Produktionsvorgängen (MOM) mit über 11 Millionen lizenzierten Anwendern und mehr als 80.000 Kunden in aller Welt.

Siemens PLM Software mit Hauptsitz in Plano, Texas, stellt in enger Zusammenarbeit mit seinen Kunden Industriesoftware-Lösungen bereit. Sie unterstützen Firmen weltweit dabei, entscheidende Innovationen in die Realität umzusetzen und so einen nachhaltigen Wettbewerbsvorteil zu erzielen.

Weitere Informationen über die Produkte und Leistungen von Siemens PLM Software unter www.siemens.com/plm.

Bastian Mattlener
Manager Employer Branding & Corporate Communication

The challenges in the automotive industry are diverse: The globalisation is changing the production and the markets around the world. Climate change and the shortage of fossil fuels require new and better technologies. At the same time, manufacturers must be flexible enough to meet the high demands that each customer has on individuality and comfort of a car. To face these challenges it requires courage, strength and endurance, but also creativity, teamwork and vision. Qualities that you, dear participants, demonstrate already today. We are pleased to support young students from all over the world with such an ambitious project as the Formula Student. On behalf of the SKF team, we wish all participants good luck!

Die Herausforderungen in der Automobilindustrie sind vielfältig: Die Globalisierung verändert die Produktions- und Absatzmärkte auf der ganzen Welt. Der Klimawandel und der Mangel an fossilen Brennstoffen erfordern neue, bessere Technologien. Gleichzeitig müssen die Hersteller flexibel genug sein, um die hohen Ansprüche zu erfüllen, die jeder einzelne Kunde an Individualität und Komfort eines Automobils hat. Sich diesen Herausforderungen zu stellen verlangt Mut, Kraft und Ausdauer, aber auch Kreativität, Teamarbeit und Weitsicht. Eigenschaften die Sie, liebe Teilnehmer, mit Ihrem Engagement bereits heute beweisen. Dazu möchten wir Ihnen schon jetzt gratulieren. Wir freuen uns, junge Studenten aus allen Teilen der Welt bei einem so ambitionierten Projekt wie der Formula Student unterstützen zu können. Im Namen des gesamten SKF Teams wünschen wir allen Teilnehmern viel Erfolg!

Dipl.-Ing. Thomas Albrecht
VDI-Society Automotive and Traffic Systems Technologies

If Formula Student didn't exist it ought to be invented on the spot. It epitomizes everything that makes the engineering profession so exhilarating: the cool, scientific pursuit of the optimum result, as measured against the irrefutable, objective scale of physical measurement, combined with the highly emotional values of imagination and inventiveness and the focused and frantic co-operation within a team of like-minded companions, who together will face the heat of the competition, and share the elation of success, or the burden of failure, in solidarity. VDI with its Society for Vehicle and Transport Technology have established Formula Student Germany in its beginning, and continue as its spiritual sponsors, because it provides engineering students with an opportunity to live their passion, and to strive for excellence in a very early stage of their careers.

Wenn es die Formula Student nicht gäbe, man müsste sie auf der Stelle erfinden. Sie bringt auf den Punkt, was den Ingenieurberuf so begeisternd macht: das kühle, wissenschaftliche Streben nach optimalen Ergebnissen, gemessen am unwiderleglichen, objektiven Maßstab physikalischer Größen, gepaart mit den hochemotionalen Werten der Phantasie, des Einfallsreichtums und der konzentrierten Zusammenarbeit in einem Team aus Gleichgesinnten, in dem auch hoher Druck gemeinsam ausgehalten und Erfolg wie Misserfolg zusammen errungen und ertragen werden. Der VDI mit seiner Fachgesellschaft für Fahrzeug- und Verkehrstechnik hat die Formula Student Germany etabliert und ist ihr ideeller Träger, weil sie dem Nachwuchs im Ingenieurberuf eine Chance gibt, diese Begeisterung zu leben und schon früh in der eigenen Laufbahn nach Exzellenz zu streben.

Maren Peters
Head of HR Marketing, Volkswagen AG/Leiterin Personalmarketing, Volkswagen AG

Volkswagen sticks to its tradition and is once again right in the middle of the Formula Student Event at the Hockenheimring to support and to look for an open dialogue with young talents. Alongside their expert knowledge, these aspiring engineers proved their innovative power and creativity as well as team and communication skills, which is exactly what is needed for a career and for working successfully in our company.
We are therefore happy to support highly-motivated young engineers with our expert knowledge, to inform them about the various and individual opportunities to start a career in our company and to encourage their enthusiasm for Volkswagen as an attractive employer. And we always have the same common denominator: The enthusiasm for „Das Auto".
We wish all teams a successful competition, congratulate the FSG on its anniversary and look forward to the next 10 years!

Volkswagen bleibt seiner Tradition treu und ist wieder mittendrin auf dem Hockenheimring dabei, um in dieser einzigartigen Atmosphäre junge Talente zu fördern und mit ihnen in den Dialog zu treten. In den vergangenen Jahren durften wir viele angehende Ingenieurinnen und Ingenieure mit großem Fachwissen, Innovationskraft und Kreativität sowie Team- und Kommunikationsfähigkeit kennenlernen – genau das, was für die erfolgreiche Arbeit bei uns wichtig ist.
Daher freuen wir uns, hochmotivierte Nachwuchsingenieure durch unser Expertenwissen zu unterstützen, sie über unsere vielfältigen Einstiegsmöglichkeiten zu informieren und für den attraktiven Arbeitgeber Volkswagen zu begeistern. Einen gemeinsamen Nenner finden wir immer: Die Begeisterung für Das Auto.
Wir wünschen allen Teams einen erfolgreichen Wettbewerb, gratulieren der FSG zu ihrem Jubiläum und freuen uns auf die nächsten 10 Jahre!

Martin Frick
Manager Talent Attraction

As a global leader in driveline and chassis technology as well as active and passive safety technology, ZF is permanently looking for motivated junior staff. ZF, which acquired TRW Automotive on May 15, 2015, is now represented at about 230 locations in some 40 countries with 134000 employees. ZF is one of the top three automotive suppliers worldwide.
Team players with professional expertise and well-founded knowledge in project management as well as international experience and cost optimization are just what we need. We find exactly such key qualifications with the Formula students, and as such we have been committed to those undertakings for years. Moreover, we perceive this commitment as an important contribution to enhancing the practice orientation at the universities worldwide. Finally the qualification of engineers will be enriched with the innovations & emotions of motorsports.

ZF als ein weltweit führender Technologiekonzern in der Antriebs- und Fahrwerktechnik sowie der aktiven und passiven Sicherheitstechnik bietet talentierten Nachwuchskräften attraktive Berufschancen. Mit der Übernahme von TRW Automotive im Mai 2015 sind wir mit 134.000 Mitarbeitern nun an rund 230 Standorten in rund 40 Ländern vertreten. ZF zählt damit zu den drei größten Automobilzulieferern weltweit.
Bei ZF ist Fachkompetenz gefragt, gepaart mit Teamfähigkeit, internationaler Erfahrung und soliden Kenntnissen in Projektmanagement und Kostenoptimierung. Da wir genau diese Schlüsselqualifikationen bei den Teilnehmern der Formula Student finden, engagieren wir uns seit vielen Jahren. Wir sehen darin einen wichtigen Beitrag, die Praxisnähe der Hochschulausbildung weltweit zu stärken und die Ingenieursausbildung mit den Innovationen und Emotionen des Rennsports zu bereichern.

Budding young Engineers

Nachwuchs fördern

Dr.Klaus Draeger
Member of the Board of Management of BMW Group, Purchasing and Supplier Network
Mitglied des Vorstands der BMW Group, Einkauf und Lieferantennetzwerk

I've been fascinated by the concept of young people from all over the world coming together to measure their self-constructed racing cars since the Formula Student Germany event took place for the first time in 2006. That is why it is very important to me personally to help the students bring their automotive ideas to the race track. Apart from financial support, the teams sponsored by BMW Group enjoy broad support in building and testing their self-developed racing cars and are given access to BMW Group's research and testing facilities.
As in the case of series automobiles, the formula student competitor must not focus solely on achieving the fastest lap time, design, endurance, energy efficiency and a balanced finance plan are all key factors for success. The participants gain very valuable practical experience, which would be impossible to achieve via theoretical studies alone, and this gives them the best preparation for their future careers in their chosen field. Young people with experience like this, enthusiasm and team spirit are in great demand in the labour market.
For this reason the Formula Student programme has been a door opener for a job at BMW Group for many participants in past years. Trainee programmes like "Fastlane", final papers or internships brought them to our development departments.

I consider it particularly positive that electric mobility features heavily in the Formula Student entries especially given that a separate competition for electric racing cars was established five years ago. Last year, a team sponsored by BMW Group won the first place in this series, proving again that our commitment is paying dividends.
On its tenth anniversary, the Formula Student Germany more closely reflects current mobility trends than ever before. The BMW Group is proud to be a part of this event and to support the work of budding young engineers.

Junge Menschen aus aller Welt, die zusammenkommen, um ihre selbstkonstruierten Rennwagen miteinander zu messen: Das fand ich schon 2006, als die Formula Student Germany zum ersten Mal stattfand, faszinierend. Es ist mir deshalb persönlich ein großes Anliegen, den Studierenden dabei zu helfen, ihre automobilen Ideen mit viel Leidenschaft auf die Rennstrecke zu bringen. Die von der BMW Group gesponserten Teams genießen neben finanzieller Förderung auch eine breite Unterstützung beim Bau und der Erprobung ihrer selbstentwickelten Rennwagen und können zum Beispiel die Forschungs- und Testeinrichtungen der BMW Group nutzen.
Wie bei Serienautomobilen kommt es bei der Formula Student nicht nur auf eine schnelle Rundenzeit an: Auch Design, Ausdauer, Energieeffizienz und ein durchdachter Finanzplan sind erfolgsentscheidend. Die Teilnehmer sammeln Praxiserfahrungen, die in einem theoretischen Studium nicht möglich sind – die beste Vorbereitung auf das künftige Berufsleben. Junge Menschen mit dieser Erfahrung und großem Enthusiasmus und Teamgeist sind in der Wirtschaft heiß begehrt.

Für viele Formula Student Teilnehmer war der Wettbewerb deshalb schon in der Vergangenheit ein Türöffner für einen Job bei der BMW Group. Über Nachwuchsprogramme wie „Fastlane", Abschlussarbeiten oder Praktika hat sie ihre studentische Rennsportkarriere in unsere Entwicklungsabteilungen geführt.
Besonders erfreulich ist aus meiner Sicht, dass bei der Formula Student die Elektromobilität eine immer stärkere Rolle spielt. Vor fünf Jahren wurde ein eigener Wettbewerb für Elektrorennwagen eingeführt. Im vergangenen Jahr errang zum ersten Mal ein von der BMW Group unterstütztes Team den ersten Platz in dieser Serie. Das zeigt einmal mehr, dass sich unser Engagement lohnt.
Zu ihrem zehnten Jubiläum ist die Formula Student Germany damit näher am Puls der Zeit als je zuvor. Die BMW Group ist stolz darauf, Teil dieser Veranstaltung zu sein und die jungen Entwickler bei ihrer Arbeit unterstützen zu können.

FORMULA STUDENT

An international success story

Eine internationale Erfolgsgeschichte

Lions - Team TU Braunschweig, Germany at FSAE Australasia 2003

The success story of the Formula Student began back in 1981 when the Society of Automotive Engineers found the Fomula SAE in the USA – the first design competition for racing cars exclusively for students.

The challenge was and still is to design and construct a car from scratch and to ultimately proof its design and performance at an international competition.
The idea behind it was to offer students the opportunity to transfer their theoretical knowledge into a real-life competitive product and gain the practical experience needed to excel in their future careers in the industry.

This idea kicked off a global "movement".

The rules that set the framework for the first competition in the USA, still today constitute the base of all rules for the international events that emerged over the years. However, the rules have evolved with the growth of the Formula Student and its ever-changing needs, always aiming for the best possible international applicability. This has created an essential foundation that allows for a continuously increasing international movement.

Students all over the world have formed teams to design and construct their own racing cars. At the same time more and more countries host events to provide these teams with a platform to compete and learn from one another. As of today more than 500 universities in 52 countries are actively participating in Formula Student events to present their prototypes to other teams, judges, industry representatives and the general public.

**Greenteam
TU Stuttgart, Germany
at FS China 2014**

Die internationale Erfolgsgeschichte der Formula Student begann im Jahr 1981 als die Society of Automotive Engineers (SAE) die „Formula SAE" ins Leben rief – den ersten Wettbewerb für Studenten mit der Herausforderung ein eigenes Rennauto zu konstruieren, zu bauen und im Wettbewerb auf die Probe zu stellen.

Die Idee dabei war, Studenten mit dieser Herausforderung die Möglichkeit zu geben, ihr theoretisch erlerntes Wissen in die Praxis umzusetzen und Erfahrungen für den kommenden Berufseinstieg zu sammeln.

Dies war der Startschuss für eine internationale Bewegung.

Damals schon wurden die ersten Wettbewerbsregeln festgelegt, die im Prinzip heute noch immer die Basis des Reglements für alle internationalen Events bilden. Kontinuierlich wurden und werden diese Regeln

375 combustion - teams from 51 countries
Australia, Austria, Belgium, Brazil, Canada, China, Croatia, Czech Republic, Denmark, Ecuador, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, India, Iran, Ireland, Israel, Italy, Japan, Kazakhstan, Mexico, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Venezuela

131 electric - teams from 32 countries
Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Denmark, Ecuador, Estonia, Finland, Germany, Greece, Hungary, India, Iran, Italy, Japan, Netherlands, Norway, Pakistan, Portugal, Romania, Russia, Slovakia, South Africa, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States

Czech Technical University in Prague at FS Germany 2014

Team Univ. Maribor, Slovenia at FSG 2014

weiterentwickelt und den aktuellen Bedürfnissen angepasst – aber immer mit dem Ziel der internationalen Gültigkeit. Dadurch wurde eine Basis geschaffen, die eine internationale Ausbreitung ermöglicht.
Studenten auf der ganzen Welt haben sich zu Teams zusammengeschlossen, um gemeinsam Fahrzeuge zu konstruieren. Gleichzeitig haben sich mehr und mehr Länder der Formula Student Bewegung angeschlossen und ihre eigenen Events gestartet. Zur Zeit existieren weltweit über 500 Universitäten in 52 Ländern, die mit ihren Teams an der „Formula Student“ teilnehmen und ihre Prototypen nicht nur anderen Teams und Juroren präsentieren sondern auch Vertretern der Industrie und der Öffentlichkeit.

Formula Student Events	
Australasia	http://www.saea.com.au/formula-sae-a
Austria	https://fsaustria.at/
Brasilia	http://saebrasil.org.br/eventos/programas_estudantis/formula2015/
Canada	http://formulanorth.com/
China	http://www.formulastudent.com.cn/
Czech Republic	http://www.fsczech.cz/
Germany	https://www.formulastudent.de/
Hungary	http://fshungary.hu/
India	http://www.formulastudent.in/
Italy	http://www.ata.it/content/formula-ata/
Japan	http://www.jsae.or.jp/formula/en/
Spain	http://www.formulastudent.es/
United States	http://students.sae.org/cds/formulaseries/
United Kingdom	http://events.imeche.org/formula-student/

SUCCESSFUL FROM THE START?

There are eleven teams which have participated in all ten editions of Formula Student Germany. One of these teams is Formula Student Team Delft. A team that has been performing consistently well since the beginning of FSG and made a very successful transition from Formula Student Combustion to Formula Student Electric. This raised our curiosity: can a Formula Student team be successful from the start? Therefore, we have interviewed three generations of Delft team members and their faculty advisor since the very beginning to figure out how they do it and where it all began.

FS Team Delft is considered to be one of the top teams in the competition. Has this always been the case?

Alexander de Boer, founder of the team in 2001, quotes: "In the first few years we could not compete with the top teams in the competition. We did not score very high because we had to do everything from scratch, there was no previous experience to fall back on, and we did not have any sponsors yet, nor tools, or a workshop. This resulted in a lack of testing and therefore reliability of the car.

It was sometimes really hard to get things done, just based on an idea. However, there were also some great people and companies that were enthusiastic and did help the team regardless the outcome. Thanks to these heroes the primary goal was achieved, to have a car that would actually drive at the start of the event in England. This would show it was possible to design and build a race car, making it possible to find more sponsors and more people, having knowledge and/or experience that could be used in future cars."

So what is the key to the success of FS Team Delft?

Henk Wapstra, Team Manager in 2008, explains that the passion of the students who design, build and race the car is the key to success: "The real success comes with embracing the diversity of all team members and channelling their skills towards that one goal: winning!"

Stijn Pennings, Team Manager 2015, adds that another big part of the success of FS Team Delft is in its concepts: "For years, FS Team Delft has treaded the fine Line between a good race car concept and what the rules allowed. Additionally, we let every new team member start from scratch. This means they have to think about their parts in a top level way before they start. What are the part's functions? How do they interfere with other parts? What are the requirements? This ensures that every team member has a thorough understanding of what they are designing and building."

Interviewed team members:

Alexander de Boer
founder FS Team Delft, Team manager & Chassis Manager 2001.

Henk Wapstra
Technical Manager 2007, Team Manager 2008

Stijn Pennings
Team Manager 2015

Alexander underlines the important role of the faculty advisor and the alumni. They teach the students to have their own responsibility, they keep the team focussed and (in very rare occasions) they can act as a fall back if something may totally go wrong.

Alexander de Boer in the carbon fibre

HARTING

Pushing Performance

Wir suchen Teamplayer,
die robuste Systeme entwickeln.

Mit eigenen Stärken die Zukunft gestalten

- Wir suchen junge Talente wie Sie, die mit ihren Ideen den Erfolg der HARTING Technologiegruppe weltweit vorantreiben.
- Wir sind ein Familienunternehmen mit ostwestfälischen Wurzeln.
- Unsere Stärke liegt im Entwickeln kundenspezifischer Lösungen im Bereich Verbindungstechnologien. Darüber hinaus verstehen wir uns als Wegbereiter einer Integrated Industry.
- Wir freuen uns darauf, diese Zukunft gemeinsam mit Ihnen zu gestalten!

HOCHSCHUL PRAKTIKUM FAIR company 2014 karriere.de

TOP NATIONALER ARBEITGEBER 2015

FOCUS DEUTSCHLANDS BESTE ARBEITGEBER IM VERGLEICH

In Kooperation mit: kununu

Direkt zur Karriereseite

Besuchen Sie uns jetzt unter www.karriere.HARTING.de

People | Power | Partnership

Stijn agrees: “Indeed the alumni play an extremely important role in our team.”

This year FS Team Delft exists for 15 years and it participates in Formula Student Germany for the 10th time. What impact did 10 years of participation in Formula Student Germany have on the team?

According to Stijn Formula Student Germany has become an integral part of the team’s calendar: “In our opinion, it is one of the best organized competitions in the world, and for us it is also at the perfect time, in the middle of the summer.” This means that everything has to come together at the perfect moment. FSG is where your entire year’s work should come together and be at its best. “Ten years of continuous improvement definitely increased the level of professionalism in the team,” says Henk. “The supporting facilities are all in place after all these years making it easier for the team to focus on the design.”

One of the most noticeable facilities of FS Team Delft is the Delft truck, a mobile workshop that services all teams competing at FSG. Aren’t many teams envious that only your team get to park their truck in the pit lane?

“We feel extremely lucky that we are able to have our truck parked in the pit lane, but we realize we also have a big responsibility towards other teams at FSG,” Stijn says. To which Henk adds: “Being envious does not help you in any way, it’s better to be inspired. It took the Delft team many years to collect the tools, the people and the sponsors to be able to bring a truck to the events. Alexander agrees: “Everything was obtained due to the tremendous effort of team members in the past years. Any team can have the same as the Delft Team, however, you have to put much effort into it.”

“From day one the truck has been available to all teams,” Henk adds, ”many of our team members have spent entire events in the truck helping others and have not even seen the Delft car on the track.” And FS Team Delft will continue to do so, Stijn confirms: “we will make sure that we have the manpower to work through the night if we can help out other teams.“

What impact do you think FS Team Delft had on FSG?

Henk: “I hope that Delft by always seeking the limit has made FSG think about how and where to set the limits of the competition.”

In 2008 you won FSG overall for the first time. How did this feel? Has this changed the team?

Alexander was not there at the time. However he did follow the result on social media: ”I was really happy! Even though I had not be in the team since a couple of years I still felt it was a personal achievement. I felt like a father having a son winning the world championship!” Henk: “Winning was an amazing feeling and a huge satisfaction for all team members who made such a great effort all those years. It changed the team in the sense that it raised the bar, as every team wants to do better than their predecessors.” Alexander: “Indeed, to stay at the top might even be harder than to get there. Also, because there are many other great teams wanting nothing more than to beat Delft….”

How did you manage to remain successful switching from FSC to FSE?

Stijn explains that there are two factors: “First, the team had the experience of building lightweight cars. Considering electric motors and accumulators can be extremely heavy, it was good to have a solid foundation of building lightweight cars. Second, the first goals for the first electric car the team has built were extremely clear: build a reliable, lightweight electric car. And the team succeeded in doing that in 2011.”

◂ **The finished DUT01**

▾ **DUT08 finishing the endurance in 2008**

Final question: What advice would you give to a team entering the Formula Student Competition today?

Henk: "The key to success is to get every team member doing the maximum in their part of the bigger picture. Every part of the car is equally important, just as very task that is needed around the car such as the catering. It's like a janitor at NASA once said: "my job is the help to put a man on the moon" every team member has his or her job to make the team win." Alexander: "A team should always aim for the highest and should not be afraid to to make mistakes. Furthermore it is important to be the best in all aspects of the event." Stijn: "Never underestimate how many things there are to be done. So, before you attend a competition, you have to make sure that you know what is expected of your team and cover all the things that need to be done. Only then you are able to perform at your best."

Henk Wasptra & FS Team Delft after winning FSG 2008

Faculty Advisor: Prof. dr. ir. Wim Thijs

COMMENTARY OF FACULTY ADVISOR

Professor Thijs, you have supported FS Team Delft from its very beginning. How and why did you get involved with the team?

Some students wanted to join the competition in the UK. Students are very keen in sensing which professor is crazy enough to help them with an insane idea: designing, building and racing a car within a timespan of about 9 months. I happened to be that professor and I am still helping them; fighting for them in the university, arranging working space and such things. I am not interfering in the content at all, . . .

Universities focus more and more on graduating larger groups of students in a shorter amount of time. Many would therefore argue that students should focus on their studies, instead of building race-cars. Isn't participation in Formula Student Germany counterproductive to this objective?

This is for sure a serious threat. Luckily the board in Delft is still very happy with all our so-called DreamTeams. Formula Student is only one out of 13 DreamTeams, in total some 450 students are involved each year. Solar car, solar boat, world record submarine, world record speed-bike, hydrogen cars, etc. The performances of the DreamTeams contribute positively to the image of our university in laymen's eyes. So the board is endorsing participation. Being the "godfather" of all the DreamTeams I have to be very keen in upkeeping this attitude.

Should a university get involved if its students set up a Formula Student team?

It is fun, it builds way better engineers, it builds stronger human beings, so yes, support any initiative of students, not only FS.

That is very clear. What boundary conditions should a university offer to a team?

Provide working space 24/7. Do not offer credit points. That will only attract the wrong kind of students. You need students with a strong intrinsic motivation. Stay away from extrinsic motivators.

Is there any advice you would like to give to staff at other universities regarding projects like Formula Student?

Embrace them. Give way to young upcoming engineers to explore. Let them experiment, cheer their initiatives, give them room and opportunity to grow. Trust them and do not take away any responsibility. Never patronize. Love them.

We understood you are about to retire. Will keep an eye out on the student projects in Delft?

I will retire shortly after FSG, age 70. Starting September 2015 I will not be formally related to the DreamTeams anymore; I should not interfere in any way with my successors.

I will closely follow the performances, however. After all: all our DreamTeams and their students became an important part of my life.

So, you might run into me again in future FSG-events!

Live Timing at FSG
Das FSG Live Timing

During the dynamic events a website for the FSG live timing will be available online.

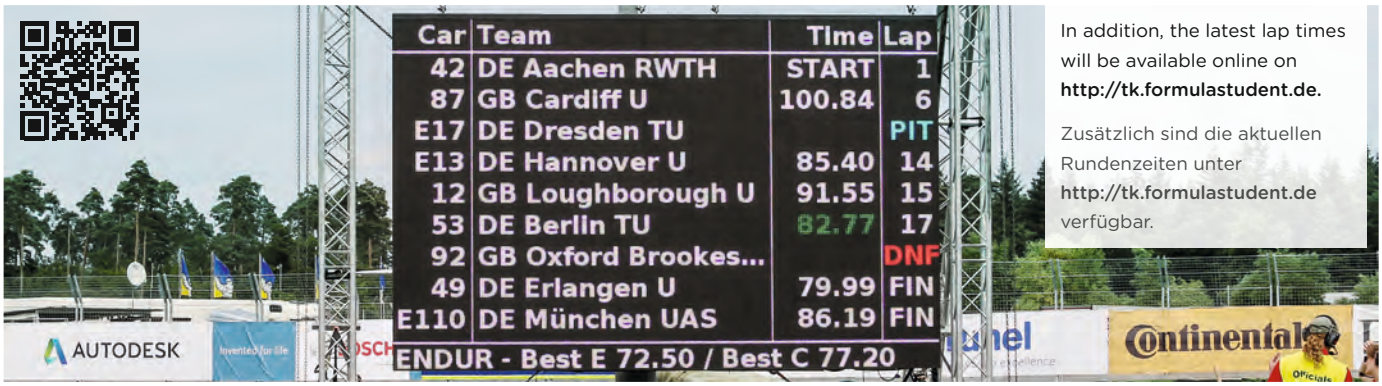
On **http://tk.formulastudent.de** you will continuously find the latest lap times, of the teams on track at that specific moment in time. The personal best of the teams will be shown in green. An overall best time in the respective class (FSC or FSE) will be displayed in pink.

To stay informed, the overall best lap times will always be shown, regardless of the level of lap times achieved at the time.

Während der dynamischen Events wird im Internet eine Webseite fürs Live Timing verfügbar sein.

Unter **http://tk.formulastudent.de** erfährt man immer die neuesten Rundenzeiten, die von den Teams zum jeweiligen Zeitpunkt gefahren werden. Dabei wird die persönliche Bestzeit eines Teams in grüner Farbe markiert. Eine neu gefahrene absolute Bestzeit in der jeweiligen Fahrzeugklasse (FSC oder FSE) wird in Pink dargestellt.

Um den Überblick behalten zu können, werden die absoluten Bestzeiten immer dargestellt, unabhängig von den aktuell gefahrenen Zeiten.



In addition, the latest lap times will be available online on **http://tk.formulastudent.de.**

Zusätzlich sind die aktuellen Rundenzeiten unter **http://tk.formulastudent.de** verfügbar.

In 2015, several displays are again available on the dynamics area. Auch in 2015 wird es wieder mehrere Displays bei den dynamischen Disziplinen geben.

Please smile –
it´s Formula Student time!

Kann man angehende Ingenieure in die Fußstapfen Rudolf Diesels treten lassen? MAN kann.

Rudolf Diesel wäre heute stolz auf Sie.1893 hat der passionierte Ingenieur bei MAN in Augsburg einen Motor entwickelt, der immer noch die ganze Welt bewegt: den Dieselmotor. Heute baut MAN weltweit Trucks und Busse, wir sind Weltmarktführer bei Großdieselmotoren und Turbomaschinen für maritime und stationäre Anwendungen und konstruieren vom Propeller bis zum Turbolader alles, was die Welt antreibt. Um den visionären Ideen Rudolf Diesels gerecht zu werden, forschen und entwickeln wir bei MAN immer weiter an noch besseren und effizienteren Antrieben. Und das zusammen mit jungen Ingenieuren, die mit frischen Ideen und jeder Menge Herzblut die Grenzen des Machbaren immer weiter verschieben. Und so in seine Fußstapfen treten. Rudolf Diesel wäre stolz auf Sie. **man.eu/karriere**

Engineering the Future – since 1758.

MAN

Participating FSC TEAMS 2015

Car	City/University	Country	Pit	Page
1	Corvallis OSU	United States	123	82
2	Stuttgart U	Germany	60	101
6	Seattle U Washington	United States	47	100
9	Pomona CSU	United States	67	98
11	Madrid TU	Spain	103	92
12	Montréal ETS	Canada	128	93
14	Wuppertal U	Germany	57	106
15	Graz UAS	Austria	124	85
16	Montréal U McGill	Canada	114	93
17	Rochester IT	United States	127	99
18	Aalborg U	Denmark	48	78
19	Roma U Sapienza	Italy	50	99
20	Magdeburg OvGU	Germany	83	92
21	Karlsruhe KIT	Germany	55	87
22	Moscow BMSTU	Russia	101	94
23	Poznań PUT	Poland	105	98
24	Liverpool U	United Kingdom	58	90
25	London UWO	Canada	119	90
26	San Sebastián TECNUN	Spain	70	100
27	Auburn U	United States	110	79
28	Kassel U	Germany	62	88
29	Islamabad PIEAS	Pakistan	129	87
30	Giza U Cairo	Egypt	109	84
31	Coventry U Warwick	United Kingdom	117	82
33	Prague CTU	Czech Republic	125	98
38	Berlin UAS	Germany	52	80
39	Toronto U	Canada	81	102
41	München TU	Germany	84	94
42	Darmstadt UAS	Germany	53	82
43	Konstanz UAS	Germany	116	89
44	Ulm UAS	Germany	64	102
45	Diepholz UAS	Germany	63	83
46	Vigo U	Spain	113	104
49	Erlangen U	Germany	106	83
50	Akron U	United States	102	79
51	Sevilla U	Spain	72	101
52	Moscow MAMI	Russia	65	94
53	Graz TU	Austria	49	85
54	Vellore VIT	India	74	104
55	Gießen UAS THM	Germany	104	84
57	Volos U	Greece	71	105
58	Paderborn U	Germany	54	95
60	Weingarten UAS	Germany	107	105
61	Dortmund TU	Germany	122	83
62	Regensburg OTH	Germany	45	99
63	Aachen UAS	Germany	100	78
66	Uxbridge U Brunel	United Kingdom	69	102
68	Karachi NUST	Pakistan	41	87
69	Lawrence KU	United States	121	118
70	Coburg UAS	Germany	75	81
71	Pittsburgh U	United States	77	96
72	Chennai SRMU	India	126	81
73	Changsha U Hunan	China	80	81
74	Brno TU	Czech Republic	43	80
75	Glasgow U Strath	United Kingdom	118	85
76	München UAS	Germany	111	95
78	Hatfield U	United Kingdom	46	86
79	Pforzheim U	Germany	76	96
80	Leiria PT	Portugal	66	90
81	Stralsund UAS	Germany	56	101
85	Padova U	Italy	130	96
88	Kempten UAS	Germany	44	88
90	Milano PT	Italy	73	93
91	Roma U Tor Vergata	Italy	68	100
92	Oxford Brookes U	United Kingdom	82	95
94	Esslingen UAS	Germany	42	84
95	Valéncia UPV	Spain	51	104
96	Hamburg UAS	Germany	79	86
98	Bangkok KMITL	Thailand	78	79
99	Karlsruhe UAS	Germany	61	88
100	Heilbronn U	Germany	120	86
103	Berlin TU	Germany	112	80
108	Loughborough U	United Kingdom	115	92
110	Wrocław TU	Poland	59	105
118	Krefeld HSNR	Germany	108	89

Stand 08.07.2015

MY PERFORMANCE. RISING TO THE PEAK AT MAHLE.

"To the limit and beyond, this is what motivates me. As a member of the racing team at the University of Stuttgart, I was able to work with MAHLE and make a lot of contacts. My start came right after the race, when I joined MAHLE's international graduate program. Which then led to an assignment in Brazil."

Rudolf Hügel, Product Development

We at MAHLE count to the top three systems suppliers worldwide for mobile applications in the areas of engine systems, filtration, electrics/mechatronics, and thermal management. With some 66,000 employees working at approximately 150 production locations and in ten major research and development centers we strive to delight our customers with innovative solutions for automotive and industrial applications. Working together, we optimize existing technologies, develop new engineering concepts and set standards. And we use this know-how to support the Formula Student teams.

jobs.mahle.com

top ARBEITGEBER AUTOMOTIVE GERMANY 2015
CERTIFIED EXCELLENCE IN EMPLOYEE CONDITIONS

Become a Fan
MAHLEKarriereDE

MAHLE

Driven by performance

Participating FSE TEAMS 2015

Car	City/University	Country	Pit	Page
E6	Osnabrück UAS	Germany	35	117
E7	Stuttgart DHBW	Germany	5	118
E11	Corvallis OSU	United States	30	110
E12	Bayreuth U	Germany	4	109
E13	München UAS	Germany	23	117
E14	Dresden TU	Germany	8	111
E15	Karlsruhe KIT	Germany	37	116
E20	Leuven KU	Belgium	21	117
E22	Vellore VIT	India	32	119
E23	Amberg OTH	Germany	14	108
E26	Stuttgart U	Germany	38	119
E33	Zürich ETH	Switzerland	12	121
E35	Wolfenbüttel UAS Ostfalia	Germany	25	120
E40	Eindhoven TU	Netherlands	36	12
E42	Darmstadt TU	Germany	19	110
E44	Deggendorf UAS	Germany	26	111
E45	Sankt Augustin UAS	Germany	29	118
E46	Turin PT	Italy	39	119
E53	Kiel UAS	Germany	27	116
E54	Barcelona UPC	Spain	9	108

Car	City/University	Country	Pit	Page
E55	Wiesbaden UAS	Germany	7	12
E60	Göteborg Chalmers	Sweden	13	114
E61	Aalen HTW	Germany	11	107
E64	Kaiserslautern TU	Germany	2	115
E65	Karachi NUST	Pakistan	40	115
E66	Beijing IT	China	15	109
E69	Augsburg UAS	Germany	34	108
E72	Bremen U	Germany	28	110
E76	Freiberg TU	Germany	31	112
E77	Quebec City U Laval	Canada	22	118
E78	Hamburg TU	Germany	16	114
E85	Delft TU	Netherlands	24	111
E90	Bratislava TU	Slovakia	3	109
E94	Esslingen UAS	Germany	17	112
E96	Zwickau UAS	Germany	18	121
E98	Helsinki UAS	Finland	6	114
E99	Aachen RWTH	Germany	1	107
E100	Wien TU	Austria	20	120
E102	Köln UAS	Germany	33	116
E103	Ingolstadt UAS	Germany	10	115

Stand 08.07.2015

SIEMENS

Italienische Leidenschaft. Virtuell entwickelt. Effizient gebaut.

Maserati steigert seine Wettbewerbsfähigkeit durch Digitalisierung der Fertigung.

Maserati schreibt gerade das vielleicht spannendste Kapitel der Firmengeschichte. Im neuen Turiner Werk zeigt die Traditionsmarke, dass sich höchste Qualität und Effizienz vereinen lassen. Vom Design über Planung und Produktion bis zur Analyse des gesamten Ablaufs ist hier alles digital.

Virtuelle und reale Welt wachsen zusammen: Steigerung der Effizienz bei höchster Qualität.

Das Ergebnis: ein gestraffter, vereinfachter Entwicklungs- und Fertigungsprozess mit mehr Raum für Flexibilität. So setzt Maserati neue Maßstäbe und macht die historische Automarke bereit für eine erfolgreiche Zukunft.

Durch die Verbindung von virtueller und realer Fertigung steigert Siemens die Effizienz und Wettbewerbsfähigkeit seiner Kunden. Gemeinsam mit ihnen elektrifiziert, automatisiert und digitalisiert Siemens die Welt, in der wir leben – und verwirklicht das, worauf es ankommt.

siemens.com/zukunft-der-industrie

Teamprofile
Combustion

2000 students

75 teams

18 nations

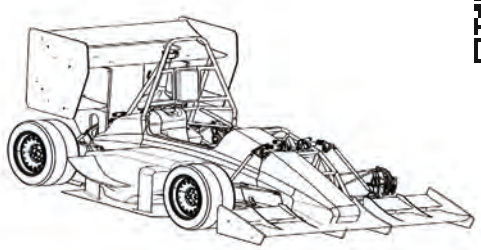
AACHEN

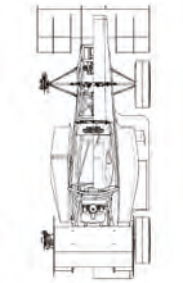
University of Applied Sciences Aachen

Car 63 **Pit 100** **WRL 148***

Germany

This year we enter the competition with the FS615. The FS615 is designed and built to insure best reliability and lap times. This season we focused on carrying out disadvantages and implementing fully new systems to our cars like aerodynamics and a new electric architecture. The E-system is focused on assisting the driver best. This year we also laid huge focus on testing and driver training.In the end the FS615 is built by students of UAS Aachen and we as a Team will show our strength at FSG.





FRAME CONSTRUCTION Tubular Space Frame
MATERIAL E235
OVERALL L/W/H (mm) 2975/1460/1250
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1750/1300/1300
WEIGHT WITH 68kg DRIVER (Fr/Rr) 130/163
SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper.
TYRES (Fr/Rr) 205/R13 Continental C14
WHEELS (Fr/Rr) 7.5x13 one pc Al rim
ENGINE Yamaha R6 Rj09
BORE/STROKE/CYLINDERS/DISPLACEMENT 65mm/45mm/4 cylinders/599cc
COMPRESSION RATIO 14.4:1
FUEL SYSTEM sequential injection
FUEL ROZ 98
MAX POWER DESIGN 12000
MAX TORQUE DESIGN 8500
DRIVE TYPE Chain
DIFFERENTIAL LSD
COOLING side mounted radiator with diffusor and nozzle
BRAKE SYSTEM 4-Disk floating, front 220mm dia, rear 200mm dia
ELECTRONICS Electronic shifting, Dashboard with shift lights, TFT display and gear sequence

AALBORG

Aalborg University

Car 18 **Pit 48** **WRL 182**

Denmark

AAU Racing is a team with a passion for racing and learning. With our 6th car we aim to keep on improving. All work is done in our spare time and everyone gains both theoretical and practical experience. The car is designed to be easy to drive and low maintenance. Using a modular intake manifold and a modified inlet port the Honda CBR 600RR delivers great performance and a wide power band. A student designed steering wheel provides selectable info and shifting actuated by a power drill motor.

FRAME CONSTRUCTION Tubular space frame
MATERIAL Mild Steel
OVERALL L/W/H (mm) 2702/1354/1070
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1221/1171
WEIGHT WITH 68kg DRIVER (Fr/Rr) 126/154
SUSPENSION Double unequal length A-Arm. Pull rod actuated horizontally oriented spring and damper
TYRES (Fr/Rr) 20.5 x 6.0-13, Hoosier R25B
WHEELS (Fr/Rr) 20.5 x 7.0-13, Hoosier R25B
ENGINE Modified Honda CBR600RR
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.2:1
FUEL SYSTEM Fartstrup
FUEL 98 octane unleaded gasoline
MAX POWER DESIGN 11000
MAX TORQUE DESIGN 8500
DRIVE TYPE 520 Chain with optimized rear sprocket
DIFFERENTIAL Thorsen Limited Slip Differential
COOLING Single side pod mounted radiator with temperature controlled fan, oil to water heat exchanger
BRAKE SYSTEM 4-Disk system, self developed rotors with 222mm diameter, adjustable brake balance, ISR calibers
ELECTRONICS Multifunctional Steering Wheel, Electric Shifting System, selfdesigned Live-Telemetry System

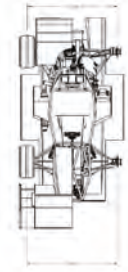
* WRL = World Ranking List, see page 106

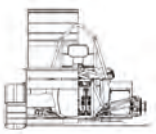
AKRON

University of Akron

Car 50 **Pit 102** **WRL 38** United States

Since the start of Zips Racing in 1990 the team has strived to present a simple yet performant vehicle at competition. Our new vehicle, the ZR15, is no exception to this philosophy. Iterating on past designs the ZR15 joins years of knowledge in development to provide the most advanced vehicle that the Zips Racing team has to offer.





FRAME CONSTRUCTION Tubular space frame with bonded composite honeycomb panels

MATERIAL 4130, CFRP, Ti, Al, Plastics

OVERALL L/W/H (mm) 2923/1473/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1250/1245

WEIGHT WITH 68kg DRIVER (Fr/Rr) 131/117

SUSPENSION Double unequal length A-arms, Pullrod actuated coilovers

TYRES (Fr/Rr) Hoosier 6.0/18.0-10 LCO

WHEELS (Fr/Rr) Kaizer shells, student designed wheel centers

ENGINE Yamaha WR450

BORE/STROKE/CYLINDERS/DISPLACEMENT 95mm/63.4mm/1 cylinders/450cc

COMPRESSION RATIO 16.15:1

FUEL SYSTEM Student designed sequential fuel injection

FUEL E85

MAX POWER DESIGN 10500

MAX TORQUE DESIGN 7500

DRIVE TYPE Chain Drive, WR450 Transmission

DIFFERENTIAL Drexler Formula Student Differential

COOLING Single side mounted radiator with controlled fan

BRAKE SYSTEM Student designed gray cast iron floating discs with radially mounted ISR calipers

ELECTRONICS Motec M150, ACL, VIM, PDM

AUBURN

Auburn University

Car 27 **Pit 110** **WRL 25** United States

AU-2015's lightweight and robust package has produced our fastest vehicle yet, while a focus on practical engineering design has yielded a vehicle with no detail left to spare, putting AU-2015 ahead of the competition on the track and in the marketplace. A special thanks to Dr. Peter Jones, Auburn University Samuel Ginn College of Engineering, Walt & Ginger Woltosz, Dwight Wiggins, Gary Martin, National Instruments, Griffon Aerospace & Barber Motorsports Museum. #WarEagle #AuburnFast #AUFSAE

FRAME CONSTRUCTION Hybrid Rear Spaceframe/Front Composite Monocoque

MATERIAL 4130 Steel Spaceframe, Composite Monocoque

OVERALL L/W/H (mm) 2603/1417/1054

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1543/1210/1190

WEIGHT WITH 68kg DRIVER (Fr/Rr) 118/128

SUSPENSION SLA. Pull rod front, Push rod rear. Double adjustable dampers with coil over springs.

TYRES (Fr/Rr) 6.0/18.0-10 Hoosier LC0/6.0/18.0-10 Hoosier LC0

WHEELS (Fr/Rr) 7.0x10, 11.5 cm backspacing, 3 pc Al rim/7.0x10, 14 cm backspacing, 3 pc Al rim

ENGINE Modified Yamaha R6

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.5mm/42.5mm/4 cylinders/599cc

COMPRESSION RATIO 14.5:1

FUEL SYSTEM Denso injectors 240cc/min, port injected

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 13000

MAX TORQUE DESIGN 9500

DRIVE TYPE O-ringless Chain Drive

DIFFERENTIAL Drexler FSAE Salisbury LSD

COOLING Side mounted single core dual pass Aluminum radiator

BRAKE SYSTEM 4 Wheel Floating Disk

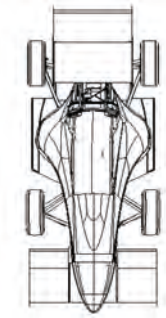
ELECTRONICS MoTec M800/PDM/ADL, Bosch ETC, Proprietary Dash

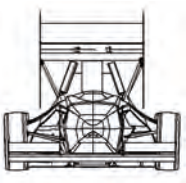
BANGKOK

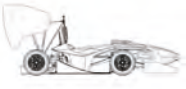
King Mongkut's Institute of Technology Ladkrabang

Car 98 **Pit 78** **WRL 308** Thailand

SCORPIO is a new car from INITIAL team Bangkok, Thailand. Their team is the collaboration between Engineering students and Industrial Design students founded in 2005. This year is their 2nd time participating in Formula Student. SCORPIO is the 9th car of the team featured with turbocharger on Suzuki LT-R450. Also we developed 10" carbon fiber wheels to replaced the previous 13" wheels.







FRAME CONSTRUCTION Space Frame

MATERIAL Steel Tube STKM13B

OVERALL L/W/H (mm) 3230/1530/1050

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1190/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 107/131

SUSPENSION Front:Double Unequal length and non parallel A-Arm , Push rod to damper

TYRES (Fr/Rr) Hoosier/LC0/18.0x6.0-10

WHEELS (Fr/Rr) 6.0x10, 35mm offset, 3 pc Al Rim

ENGINE Suzuki LT-R450 K-6 single-cylinder Turbocharger

BORE/STROKE/CYLINDERS/DISPLACEMENT 95.5mm/62.8mm/1 cylinders/450cc

COMPRESSION RATIO 11.7

FUEL SYSTEM Suzuki LT-R450 twin injection and waste spark direct coil

FUEL ethanol e85

MAX POWER DESIGN 8200

MAX TORQUE DESIGN 6900

DRIVE TYPE Chain and Spocket

DIFFERENTIAL Clutch Pack 1 way Type

COOLING single side pod mounted radiator with electric fan

BRAKE SYSTEM 4Disc system,self developed rotor front 165mm and rear 159mm,adjust brake balance and Pedal platform

ELECTRONICS DTA S60pro, ECU CAN data stream, console display, wireless data monitor, Launch&Traction control.

BERLIN

Technische Universität Berlin

Car 103 **Pit 112** **WRL 59** Germany

The FT2015, the 10th car in the history of FaSTTUBe, is a refinement of the concept developed in the last three years. Our engine performance was greatly enhanced by the use of a turbocharger. Other subsystems were optimized in terms of performance, reliability and manufacturing effort. We would like to stress our great balance between performance, cost and manufacturing quality. We're looking forward to FSG 2015 and like to invite everybody for a round of table soccer on our campground!

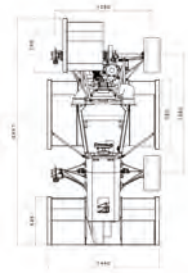
FRAME CONSTRUCTION Tubular Steel Frame
MATERIAL 25CroMo4
OVERALL L/W/H (mm) 2898/1388/1137
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1200/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 123/145
SUSPENSION Double unequal length A-Arm. Push rod actuated spring and damper.
TYRES (Fr/Rr) 7.0/16.0-10 Avon A92
WHEELS (Fr/Rr) Custom built 6.5x10 AL6061 Keizer Wheel
ENGINE 2007 BMW G 450 X
BORE/STROKE/CYLINDERS/DISPLACEMENT 98mm/59.6mm/1 cylinders/449cc
COMPRESSION RATIO 12.5
FUEL SYSTEM ECU with sequential injection and ignition, adhesive bonded fuel tank
FUEL E85
MAX POWER DESIGN 7500
MAX TORQUE DESIGN 7000
DRIVE TYPE Chain drive, original gearbox
DIFFERENTIAL Drexler differential, limited slip
COOLING Drexler differential, limited slip
BRAKE SYSTEM 4-Disk system, self developed rotors, ISR Calipers, Cockpit adjustable brake balance
ELECTRONICS Multifunctional steering wheel, electronic throttle, electronic wastegate, telemetry and many more..

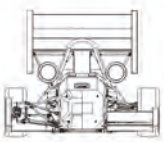
BERLIN

University of Applied Sciences Berlin

Car 38 **Pit 52** **WRL 122** Germany

The Formula Student team of the UAS Berlin was founded 10 years ago in June 2005. During that time all team members pursued one ultimate ambition: Participating at Formula Student at Hockenheimring. Starting from scratch, all departments like engine, chassis, suspension and of course the marketing aimed high. Our team is made up of members with many different academic backgrounds. We proudly present the new Berlin Race Car, the BRC15 and looking forward to compete against all the other teams.





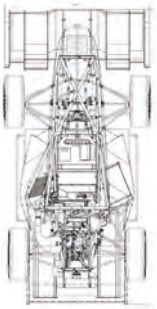
FRAME CONSTRUCTION Hybrid Monocoque
MATERIAL CFRP and Steel
OVERALL L/W/H (mm) 2932/1440/1190
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1250/1250
WEIGHT WITH 68kg DRIVER (Fr/Rr) /
SUSPENSION Unequal A-Arms, pullrod actuated vertical oriented spring and dampers
TYRES (Fr/Rr) Hoosier
WHEELS (Fr/Rr) 7x10, 12mm offset
ENGINE 2008 KTM 505 SX-F
BORE/STROKE/CYLINDERS/DISPLACEMENT 100mm/60.8mm/1 cylinders/477cc
COMPRESSION RATIO n/a
FUEL SYSTEM n/a
FUEL E85
MAX POWER DESIGN 9000
MAX TORQUE DESIGN 8000
DRIVE TYPE DID ERT3 520 chain drive
DIFFERENTIAL 2012 DREXLER, clutch pack LSD, 50Nm preload, adjustable TBR
COOLING n/a
BRAKE SYSTEM 4-Disk system
ELECTRONICS n/a

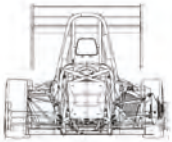
BRNO

Technical University of Brno

Car 74 **Pit 43** **WRL 86** Czech Republic

In 2015 TU Brno Racing enters its fifth season. For the car it is a season of huge changes. Up until now, we were doing an evolution of our car. Now, we are doing a revolution! Production of our former engine was stopped, therefore we made a switch to Husquarna FE501. That is a lovely engine, although it is missing something. Power! Therefore we went for turbocharging. The development of this engine is finished for now and we are ready to race!





FRAME CONSTRUCTION tubular steel spaceframe
MATERIAL steel
OVERALL L/W/H (mm) 2953/1459/1189
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1527/1260/1190
WEIGHT WITH 68kg DRIVER (Fr/Rr) 121/140
SUSPENSION Double unequal length A-Arm, pull rod actuated
TYRES (Fr/Rr) Continental
WHEELS (Fr/Rr) Continental
ENGINE Husquarna FE501
BORE/STROKE/CYLINDERS/DISPLACEMENT 95mm/72mm/1 cylinders/510cc
COMPRESSION RATIO 9.5
FUEL SYSTEM port fuel injection
FUEL E85
MAX POWER DESIGN 10000
MAX TORQUE DESIGN 7000
DRIVE TYPE chain size 520MX (DID)
DIFFERENTIAL Drexler
COOLING Sidepod mounted heat exchanger, intercooler
BRAKE SYSTEM 4 disc system, ISR brakes
ELECTRONICS Life Racing ECU, Racetech datalogger, telemetry

CHANGSHA

Hunan University

Car 73 **Pit 80** China

Hunan University Racing Team was founded in 2006 at Hunan University (HNU) as the first Formula Student team in China Mainland. Since then, the team has designed eight cars, and took part in the Formula SAE West (USA) in 2007 and 2008. From 2010 to 2014, the team participated in Formula Student China, and got the Champion of Formula Student China in 2014. In 2015, the team will take part in FSG, and our team goal is to show our strength and absorb advanced technical ideas in FSG.

FRAME CONSTRUCTION Front and rear Tubular space frame
MATERIAL 4130 steel round tubing 12mm to 25.4mm dia
OVERALL L/W/H (mm) 2928/1434/1200
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1580/1180/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 135/148
SUSPENSION Double unequal length A-Arm.Push rod actuated spring and damper
TYRES (Fr/Rr) Hoosier, R25B, 10
WHEELS (Fr/Rr) 7.7*10.20mm offset,3 pc Al Rim
ENGINE Modified Honda CBR600RR F5
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12,2:1
FUEL SYSTEM OEM,Fuel Injection
FUEL 98 octane unleaded gasoline
MAX POWER DESIGN 12500
MAX TORQUE DESIGN 10250
DRIVE TYPE Chain drive
DIFFERENTIAL Drexler V3 limited slip,30-35Nmpreload,1.4bias ratio
COOLING Twin side pod mounted radiators with thermo-static controlled electric fans
BRAKE SYSTEM 4 floating disks, adjustable brake balance, pressure sensors in brake line
ELECTRONICS TC,LC,Auto shift,MOTEC CDL3 data loger,MOTEC M84 ECU

CHENNAI

SRM University

Car 72 **Pit 126** India

Incepted in 2009, Camber Racing comprises of undergraduate students from a broad range of engineering disciplines, who apply their collective intelligence to engineer the ultimate racing machine. We have built 5 cars since the kickoff. Our team is the reigning champion of Supra SAE India for two consecutive championships now, 2012 and 2014.CR15 as we have named our car was devoloped with key importance to driveability and Serviceablity.

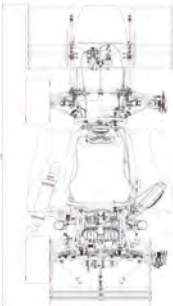
FRAME CONSTRUCTION Tubular Spaceframe
MATERIAL
OVERALL L/W/H (mm) / /
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) / /
WEIGHT WITH 68kg DRIVER (Fr/Rr) /
SUSPENSION
TYRES (Fr/Rr)
WHEELS (Fr/Rr)
ENGINE
BORE/STROKE/CYLINDERS/DISPLACEMENT mm/mm/ cylinders/cc
COMPRESSION RATIO
FUEL SYSTEM
FUEL
MAX POWER DESIGN
MAX TORQUE DESIGN
DRIVE TYPE
DIFFERENTIAL
COOLING
BRAKE SYSTEM
ELECTRONICS

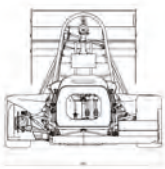
COBURG

University of Applied Sciences Coburg

Car 70 **Pit 75** **WRL 30** Germany

The Manul is a small wild cat with a broad but fragmented distribution in the grasslands and montane steppes of Central Asia. The combination of its stocky posture and long, dense fur makes it appear stout and plush. It's also the name of the 8th combustion car from the Coburger Automobile Team and successor of the C-14 Gepard. Together with his team and friends, the C-15 Manul participates at the Formula Student events in Germany, Austria and Spain. Beware of the cat!





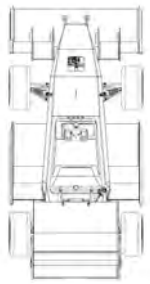
FRAME CONSTRUCTION Carbon fiber monocoque in the front and tubular steel frame in the rear
MATERIAL Carbon fiber prepreg/ Mild steel
OVERALL L/W/H (mm) 2970/1336/1192
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1555/1134/1134
WEIGHT WITH 68kg DRIVER (Fr/Rr) 120/140
SUSPENSION Double unequal length A-Arm, Pull rod actuated spring and damper. adjustable ARB
TYRES (Fr/Rr) 18x6 - 10 - LC0 Hoosier Fr & Rr
WHEELS (Fr/Rr) 7.5x10.22mm, Custom al-center, cfk shell
ENGINE Yamaha R6 RJ09
BORE/STROKE/CYLINDERS/DISPLACEMENT 65.5mm/44.5mm/4 cylinders/599cc
COMPRESSION RATIO 13.0:1
FUEL SYSTEM Multipoint fuel injection (EV14), MS4 Bosch
FUEL Gasoline 98 octane
MAX POWER DESIGN 11500
MAX TORQUE DESIGN 8500
DRIVE TYPE Chain 520
DIFFERENTIAL Limited Slip Differential preload 30Nm
COOLING Single side pod mounted aluminum radiator, electronic controlled fan
BRAKE SYSTEM Floating 4-disk-system, inside ventilated disk in the front, 148/170mm OD, adjustable brakebalance
ELECTRONICS Display with integrared logger, launch control, traction control, electropneumatic shifting & DRS

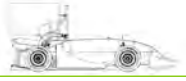
CORVALLIS

Oregon State University

Car 1 **Pit 123** **WRL 1** United States

Students from Oregon State University and Duale Hochschcule Baden-Wuerttemberg-Ravensburg together form Global Formula Racing, the world's first and only internationally collaborative FS Team.





FRAME CONSTRUCTION CFRP/Honeycomb monocoque with bolted steel main and front roll hoops

MATERIAL Toray T700 CFRP, Nomex and Al honeycomb core

OVERALL L/W/H (mm) 2835/1335/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1145/1145

WEIGHT WITH 68kg DRIVER (Fr/Rr) 94/130

SUSPENSION Unequal length non-parallel a-arms, direct actuated shock, anti roll bar

TYRES (Fr/Rr) Hoosier

WHEELS (Fr/Rr) Hoosier

ENGINE Honda CRF450X

BORE/STROKE/CYLINDERS/DISPLACEMENT 96mm/61.7mm/1 cylinders/449cc

COMPRESSION RATIO 13.5:1

FUEL SYSTEM MoTeC controlled, port injection

FUEL 98

MAX POWER DESIGN 10000

MAX TORQUE DESIGN 8500

DRIVE TYPE Chain

DIFFERENTIAL Student designed

COOLING Rear mounted water and oil coolers

BRAKE SYSTEM Ductile iron rotors, Brembo/AP calipers, Tilton MCs

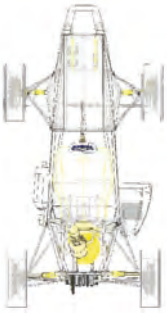
ELECTRONICS MoTeC M400 ECU, student designed wiring harness

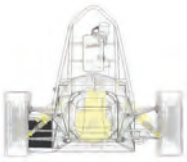
COVENTRY

University of Warwick

Car 31 **Pit 117** **WRL 278** United Kingdom

This year the structure of Warwick Racing has adapted; academic projects now serve as research projects for future developments relating to Formula Student for the purposes of Warwick Racing, giving rise multi-disciplinary expertise allowing members from all degree streams and years to join the Team. Due to an effective Sponsorship team, we were able to secure funding to keep the previous year's car; allowing a new platform for testing our new concepts and components before readying for race.





FRAME CONSTRUCTION One piece tubular space frame and bolt on Aluminium rear Bulkhead

MATERIAL 4130 chrome-moly steel and 7075-T6 Aluminium

OVERALL L/W/H (mm) 2695/1400/1182

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1658/1220/1170

WEIGHT WITH 68kg DRIVER (Fr/Rr) 109/134

SUSPENSION Double unequal length A-Arm. Direct acting Ohlins TTX 25 spring and damper.

TYRES (Fr/Rr) 20.5x7.0-13 R25B Hoosier/20.5x7.0-13 R25B Hoosier

WHEELS (Fr/Rr) 154mm wide, 3 piece Aluminium Rim/154mm wide, 3 piece Aluminium Rim

ENGINE 2014 KTM 450 SXF

BORE/STROKE/CYLINDERS/DISPLACEMENT 95mmmm/63.4mm/1 cylinders/449cc

COMPRESSION RATIO 12.6

FUEL SYSTEM KTM 450 SX-F Dual Spark ECM - Proprietary KTM Map with % Trims performed by Power Comander

FUEL 95 octane unleaded gasoline

MAX POWER DESIGN 9700

MAX TORQUE DESIGN 7400

DRIVE TYPE Internal Gearbox, 4:1 - 428 Chain Drive

DIFFERENTIAL Drexler LSD

COOLING Dual pass radiator with 342 CFM fan

BRAKE SYSTEM Floating Cast Iron Rotors with Topology optimised carriers, Adjustable bias and AP Racing Calipers

ELECTRONICS Farringdon SWIS Display Steering Wheel, Self Developed Electronic Throttle and Shifting Control

DARMSTADT

University of Applied Sciences Darmstadt

Car 42 **Pit 53** **WRL 215** Germany

F15: 10 inch, full aerodynamic package, custom engine and adjustable ergonomics. These are the words that describe this years' F15 the best! With a motivated team that mixed old and experienced members with young and spirited newcomers we are prepared to give our best on FSG2015! Unlike the other teams, we have a few years of experience with the trending single-cylinder engines which we will prove on the race track. A big thank you to our sponsors who made this beautiful car possible!

FRAME CONSTRUCTION Steel Tube Frame

MATERIAL Steel

OVERALL L/W/H (mm) 2950/1410/1195

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1206/1206

WEIGHT WITH 68kg DRIVER (Fr/Rr) 149/167

SUSPENSION

TYRES (Fr/Rr)

WHEELS (Fr/Rr) 6,25" Aluminum

ENGINE Modified KTM SX-F 450

BORE/STROKE/CYLINDERS/DISPLACEMENT 95mm/72mm/1 cylinders/510cc

COMPRESSION RATIO 14,5:1

FUEL SYSTEM dual injection, 1x port injection, 1x inside plenum

FUEL E85

MAX POWER DESIGN 9500

MAX TORQUE DESIGN 7000

DRIVE TYPE 6 speed gear box, final drive with 428 V

DIFFERENTIAL Drexler Limited Slip Differential for FSAE

COOLING 1 radiator on each side

BRAKE SYSTEM 4-disk system, self developed rotors, adjustable brake balance

ELECTRONICS ECU Syvecs S8, self-developed FPGA-Board for Data Logging and Display Control

DIEPHOLZ

University of Applied Sciences Diepholz/Oldenburg/Vechta

Car 45 **Pit 63** Germany

After 6 years in the Formula Student Electric Deefholt Dynamics e.V. is back in the combustion class. The design process was started in January, so the race car was built up from nothing in just 6 months of time. This would not have been possible without the support of our sponsors and the help of all the other Formula Student we contacted. Thank you!

FRAME CONSTRUCTION Tubular space frame

MATERIAL 25CrMo4

OVERALL L/W/H (mm) 2756/1500/1244

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1580/1300/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 138/142

SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper

TYRES (Fr/Rr) 18.0x6.0 R10, Hoosier R25B/18.0x6.0 R10, Hoosier R25B

WHEELS (Fr/Rr) 6.25x10, 47.5 mm offset, 3 pc Al rim/6.25x10, 47.5 mm offset, 3 pc Al rim

ENGINE 2003 Yamaha YZF R6 RJ05

BORE/STROKE/CYLINDERS/DISPLACEMENT 65.5mm/44.5mm/4 cylinders/600cc

COMPRESSION RATIO 12.4

FUEL SYSTEM Silent Hektik ECU with multi-point injection and lost spark ignition

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 12000

MAX TORQUE DESIGN 11000

DRIVE TYPE

DIFFERENTIAL Drexler limited slip differential

COOLING Side pod mounted radiator and electric fan

BRAKE SYSTEM 4-Disk system, self developed rotors with 190mm diameter, adjustable brake balance

ELECTRONICS n/a

DORTMUND

Technical University of Dortmund

Car 61 **Pit 122** **WRL 375** Germany

The GET racing team consists of 45 highly motivated students from different disciplines. The FS215 is the 6th car of the team and the 4th one fitted with the Yamaha R6 4 cylinder engine. The car comes along with some innovative features, like an evolutionary optimised frame. Our bodywork is manufactured from vulcanized fibre, paper honeycomb and bio-based epoxy, so it is sustainable and cost-efficient. We are optimistically looking forward to the great event and want to thank all our sponsors!

FRAME CONSTRUCTION Tubular space frame

MATERIAL S235 12 mm to 30 mm diameter

OVERALL L/W/H (mm) 3024/1364/975

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1200/1247

WEIGHT WITH 68kg DRIVER (Fr/Rr) 130/151

SUSPENSION Double unequal length A-Arm, push rod actuated nearly horizontally oriented springs and dampers

TYRES (Fr/Rr) 20.5 x 6 Hoosier R25B/20.0 x 7.5 Hoosier R25B

WHEELS (Fr/Rr) 6.0x13, 10.8mm offset, 3 pc AL Rim/8.0x13, 2.6mm offset, 3pc Al Rim

ENGINE Yamaha RJ05

BORE/STROKE/CYLINDERS/DISPLACEMENT 65.5mm/44.5mm/4 cylinders/600cc

COMPRESSION RATIO 12.4:1

FUEL SYSTEM OEM Yamaha quad coils, DTAfast ECU, sequential spar

FUEL 98 octane

MAX POWER DESIGN 10250

MAX TORQUE DESIGN 7700

DRIVE TYPE 520 roller chain, 52 links

DIFFERENTIAL Drexler limited slip multiplate/clutch pack differential, 35 Nm preload

COOLING Student developed radiator, mounted under the sidepod, ducted intake and outlet

BRAKE SYSTEM 4-disk system, self developed rotors, adjustable bias bar, 4/2 piston calipers, fixed mounting

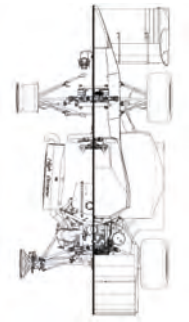
ELECTRONICS electric waterpump, live telemetry, custom build gear control unit

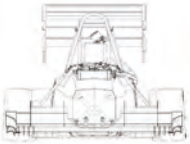
ERLANGEN

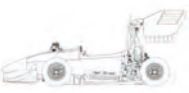
Friedrich-Alexander-Universität Erlangen-Nürnberg

Car 49 **Pit 106** **WRL 46** Germany

The FAUmax theta is our eigth car. One outstanding feature of our car is the powertrain. The modified Aprilia V2 engine is mounted longitudinally and transmits its power to the rear wheels through a bevel gear. Another speciality is the aero. This year we use a two layer setup at the rear wing with 8 elements. Furthermore, we developed our first under tray since 2011. To improve our performance we designed a new damper, anti-roll bar concept. This broadens the variety of setup adjustments.







FRAME CONSTRUCTION Monocoque dirver's cell, tubular steel rear frame

MATERIAL CFRP Monocoque, S355 and S235 steel tubings (20x1 mm to 25x2.5 mm dia.)

OVERALL L/W/H (mm) 2875/1450/1195

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1240/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 116/122

SUSPENSION Double unequal length A-Arm. Push rod actuated spring /damper. Adjustable Roll bar

TYRES (Fr/Rr) Hoosier 18x7.5-10 or Avon 16x7-10

WHEELS (Fr/Rr) 7x10, 35mm offset, 2pc CFRP/Al rim/8x10, 15mm offset, 2pc CFRP/Al rim

ENGINE Aprilia SXV550 V2

BORE/STROKE/CYLINDERS/DISPLACEMENT 80mm/55mm/2 cylinders/553cc

COMPRESSION RATIO 16.1:1

FUEL SYSTEM Self-designed fuel injection system using DTAfast S80 Pro ECU

FUEL E85

MAX POWER DESIGN 10000

MAX TORQUE DESIGN 8000

DRIVE TYPE Student designed bevel gear drive

DIFFERENTIAL Self-designed differential based on Drexler FSae, TBR 2.94/1.79

COOLING Aluminium cross-counter-flow radiator, electrical waterp, airflow opt. sidepod

BRAKE SYSTEM Self-made master cylinders, student designed stainless steel floating rotors

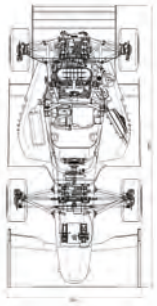
ELECTRONICS self-developed Telemtry system, dezentralized control units, custom Vehicle Information System

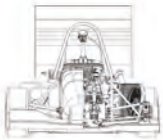
ESSLINGEN

University of Applied Sciences Esslingen

Car 94 **Pit 42** **WRL 9** Germany

The Rennstall Esslingen was founded in 2006 and is the Formula Student Combustion team at the UAS Esslingen. Stallardo'15 was developed with the goal to loose weight and keep proven parts and systems. The high efficiency aerodynamics with a strong cooling concept and an all new damper-spring system are some of the highlights.





FRAME CONSTRUCTION CFRP one piece monocoque with integrated front hoop and tubular steel rear frame

MATERIAL CFRP prepregs, Nomex Honeycomb, steel tubes

OVERALL L/W/H (mm) 2995/1426/1195

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1210/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 117/136

SUSPENSION Front and rear SLA with pushrod actuated Penske 7800 3-damper-system

TYRES (Fr/Rr) Front and rear: Hoosier R25B 7,5x10

WHEELS (Fr/Rr) Two-piece carbon fibre rim with Aluminum centre, 7,5x10

ENGINE FuT 610

BORE/STROKE/CYLINDERS/DISPLACEMENT 67,5mm/42,5mm/4 cylinders/608cc

COMPRESSION RATIO 14,1:1

FUEL SYSTEM fuel injection walbro GSL392

FUEL 98 ROZ

MAX POWER DESIGN 10000

MAX TORQUE DESIGN 8500

DRIVE TYPE 520

DIFFERENTIAL clutch pack limited slip, adjustable preload, adjustable bias ratio

COOLING student designed oil and water radiator

BRAKE SYSTEM Stainless Steel Floating, Front: 4 piston caliper, Rear: 2 piston caliper

ELECTRONICS Datarecording, CAN Logger, 2x self made A/D to CAN converter, self designed bidirectional telemetry

GIESSEN

Technische Hochschule Mittelhessen UAS

Car 55 **Pit 104** **WRL 87** Germany

THM_Motorsport is made up of 20 students from different faculties. THM- Motorsport's entry into FSG 2015 represents an improved version of the very successful concept from 2014 that gained the team 10th Place in last year's competition. The Frame was redesigned using topology optimization to reduce weight whilst increasing stiffness. The car features a modified Honda CBR 600 PC40 engine. The car has a three speed gearbox to suit formula student needs.

FRAME CONSTRUCTION tubular space frame

MATERIAL Steel

OVERALL L/W/H (mm) 2725/1360/1150

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1200/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 132/140

SUSPENSION Doulbe unequal length A-Arm, Pushrod actuated spring and damper, Adjustable anti roll bar

TYRES (Fr/Rr) 20x7.5-13, R25B, Hoosier/20x7.5-13, R25B, Hoosier

WHEELS (Fr/Rr) 7x13, 22mm Offset, Aluminium rim/7x13, 22mm Offset, Aluminium rim

ENGINE modified Honda CBR 600 RR PC40

BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42,5mm/4 cylinders/599cc

COMPRESSION RATIO 13,34

FUEL SYSTEM EFI Euro4, primary and secondary injection rail

FUEL Ron 98 octane unleaded gasoline

MAX POWER DESIGN 11500

MAX TORQUE DESIGN 9500

DRIVE TYPE Chain drive, modified stock gearbox

DIFFERENTIAL Drexler formula student differential

COOLING Left mounted water cooled radiator, 624 cfm fan mounted radiator frame

BRAKE SYSTEM 4-Disk break System with driveradjustable break balance; diameters: front 233mm, rear 210mm

ELECTRONICS multifunctional steering wheel, 7 inch display, Live telemetry system, wiring harness sealed to IP67

GIZA

Cairo University

Car 30 **Pit 109** **WRL 409** Egypt

We are the 1st ranked formula student racing team among Africa and Egypt universities since 2012 in Silverstone. It took us 2 years to build and manufacture a reliable combustion car which can carry out all the events including the endurance. Thanks to KTM single cylinder engine we achieved weight reduction which provides maneuverability, flexibility and simplicity.

FRAME CONSTRUCTION tubular space frame

MATERIAL Annealed 201 stainless steel with Mild steel hoops

OVERALL L/W/H (mm) 2925/1336/1162

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1180/1160

WEIGHT WITH 68kg DRIVER (Fr/Rr) 134/134

SUSPENSION double wishbone suspension direct acting system

TYRES (Fr/Rr) 18.0x6.0-10 Hoosier R25B/ 18x6-10 Hoosier R25B

WHEELS (Fr/Rr) 8x10, 25.4 offset 3pc keizer wheel/ 8x10, 25.4 offset 3pc keizer wheel

ENGINE 2012 KTM 450 EXC

BORE/STROKE/CYLINDERS/DISPLACEMENT 95.0mm/63.4mm/1 cylinders/494cc

COMPRESSION RATIO 11.8

FUEL SYSTEM Megasquirt system with sequential injection and wasted spark ignition

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 9000

MAX TORQUE DESIGN 7500

DRIVE TYPE sequential gearbox

DIFFERENTIAL Torsen 012000 University Special, LSD

COOLING Single side pod mounted radiator with thermostatic controlled electric fans

BRAKE SYSTEM 4 disk brake system with 170mm Mild steel rotor, adjustable brake balance bar with wilwood PS1

ELECTRONICS Megasquirt 3 with data logging on sd-card

GLASGOW

University of Strathclyde

Car 75 **Pit 118** **WRL 97** United Kingdom

USM15 brings together 15 years of the team's Formula Student experience. With more extensive aerodynamic systems and bigger composites components than ever before, we've continued to build our knowledge and capability every year. This year we're staying NA single, 10inch rims, spaceframe, wings and underbody aero. It's an evolution of the concept that took us to 15th position at FSG2014. Any other teams from the UK want to challenge us this time? 2015 is our special year...is it yours?

FRAME CONSTRUCTION Tubular Spaceframe, Student TIG welded

MATERIAL Mild + T45 steel

OVERALL L/W/H (mm) 2900/1390/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1200/1180

WEIGHT WITH 68kg DRIVER (Fr/Rr) 119/119

SUSPENSION Unequal length A-arms. Front pull rod/rear push rod actuated spring-damper units. Cane Creek DB

TYRES (Fr/Rr) Hoosier LCO 6.0/18-10

WHEELS (Fr/Rr) Hoosier LCO 6.0/18-10

ENGINE Suzuki LT-R450 2006

BORE/STROKE/CYLINDERS/DISPLACEMENT 95.5mm/62.8mm/1 cylinders/450cc

COMPRESSION RATIO 11.7

FUEL SYSTEM DTA S80 PRO ECU, Wasted spark ignition

FUEL 98 RON unleaded

MAX POWER DESIGN 9000

MAX TORQUE DESIGN 8000

DRIVE TYPE Single 520 chain

DIFFERENTIAL Drexler Formula Student LSD, clutch type

COOLING Sidepod mounted single core aluminium radiator, stock fan mounted to rear of rad

BRAKE SYSTEM Fully-floating cast iron rotors, Ø184mm, drilled, ISR 22-048/Wilwood PS-1 front/rear calipers

ELECTRONICS Custom DAQ sensor nodes, custom logger, real-time telemetry with browser based analysis, custom dash

GRAZ

Graz University of Technology

Car 53 **Pit 49** **WRL 18** Austria

TU Graz Racing Team is a team that is rich in tradition. Every year, we build on the excellent cars from the past and try to continuously improve.This year, one of the biggest challenges has been to comply with the new rules all while trying maintain or exceed performance compared to past years. We try to meet the challenges of a Formula Student season by clearly dividing the upcoming work into 5 different modules. The heads of the respective modules act as connectors and coordinators.

FRAME CONSTRUCTION one-piece CFRP monocoque

MATERIAL carbon fibre prepregs, nomex and aluminium honeycombs, structural foam, cfrp and titanium inserts

OVERALL L/W/H (mm) 2900/1450/1195

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1180/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 106/109

SUSPENSION double unequal lengh A-Arm, pullrod actuated horizontal orientated spring and damper

TYRES (Fr/Rr) 18/6 - 10 Hoosier Lc0/ 18/6 - 10 Hoosier Lc0

WHEELS (Fr/Rr) 6,5

ENGINE KTM EXC 510 compined with KTM SX-F 450 parts 1 cyl

BORE/STROKE/CYLINDERS/DISPLACEMENT 95mm/72mm/1 cylinders/510cc

COMPRESSION RATIO 12.9:1

FUEL SYSTEM inlet manifold injection

FUEL 98 oct petrol

MAX POWER DESIGN 9500

MAX TORQUE DESIGN 7000

DRIVE TYPE Chain #520

DIFFERENTIAL Drexler multiplate LSD, 49% slip

COOLING single sidepot mounted aluminum core WP radiator ,413 cfm fan mounted to suction side

BRAKE SYSTEM stainless steel, hub mounted, Front dia. 190mm drilled, Rear dia. 180mm drilled

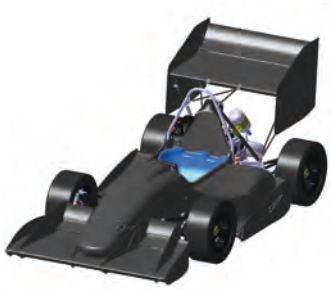
ELECTRONICS 3.2" display, multifunctional steering wheel, electric clutch actuation, live telemetry

GRAZ

University of Applied Sciences Joanneum Graz

Car 15 **Pit 124** **WRL 5** Austria

joanneum racing graz and its members - also called „The Weasels" - are building FSAE racecars since 2003. The team consists of students of the U.A.S. JOANNEUM in Graz, Austria, who are alternating every year. Since their foundation they achieved more and more, grabbing the 5th place in the world ranking in 2014. Their cars have always been super- or turbocharged. The „jr15" implements a self-developed engine in a hybrid CFRP chassis with optimized suspension and aerodynamics for the 2015 season.



FRAME CONSTRUCTION CFRP monocoque sandwich construction with tubular steel rear frame

MATERIAL High-tensile-strength carbon fibre prepregs, Rohacell and aramid honeycomb core, steel-alloy tubes

OVERALL L/W/H (mm) 2995/1434/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1540/1220/1180

WEIGHT WITH 68kg DRIVER (Fr/Rr) 128/139

SUSPENSION Double unequal length A-Arm, Pull rod actuated spring/damper (Öhlins TTX25), Adj. Roll bar

TYRES (Fr/Rr) Continental 205/510 R13 - 34M

WHEELS (Fr/Rr) 7 inch wide, one piece handlaminated CFRP Rim

ENGINE Student designed engine

BORE/STROKE/CYLINDERS/DISPLACEMENT 83mm/55mm/2 cylinders/595cc

COMPRESSION RATIO 10,2:1

FUEL SYSTEM High pressure direct injection with piezo-electric injectors (Bosch)

FUEL 100 octane unleaded gasoline

MAX POWER DESIGN 5500

MAX TORQUE DESIGN 4500

DRIVE TYPE via gearwheels, integrated in gearbox

DIFFERENTIAL 2010 DREXLER limited slip differential with tailor-made housing, integrated in gearbox

COOLING Sidewing mounted one core 92'840 mm² radiator, 802 cfm fan mounted to sidepod

BRAKE SYSTEM 4-Disk system, floating, heat-treated laser cut rotors with 230 and 210 mm diam., aluminium calipers

ELECTRONICS Multifunctional steering wheel with 2.8 in display, Motorsport ABS, Electropneumatic Shifting System

HAMBURG

University of Applied Sciences Hamburg

Car 96 **Pit 79** **WRL 13** Germany

HAWKS Racing 2015 - the eleventh couple of friends as part of the HAWKS family have built the H0XI aka „Ananya“. Each generation is different, but one thing is always the same: What else shall we do in Hamburg except building fast and beautiful racecars? Ok, there could be some other things... but we love living Formula Student! We´re glad to be part of the competition and happy to meet you - the Formula Student Family - at FSG 2015! 69... HAWKS!!! #69HAWKS #HAWKSRacing #Ananya

FRAME CONSTRUCTION Full body CFRP-monocoque with CFRP shoulder harness and support frame

MATERIAL Different thicknesses of aramid honeycomb and rohacell foam core material

OVERALL L/W/H (mm) 3066/1404/1178

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1635/1200/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 129/134

SUSPENSION Double unequal lenght a-arms with push-/pullrod actuated spring/damper-system and z-type arb

TYRES (Fr/Rr) 20 x 7.0 - 13 Continental C16 (front and rear)

WHEELS (Fr/Rr) 13 x 7.0

ENGINE Modified Kawasaki ZX636-B2(Ninja ZX-6R)

BORE/STROKE/CYLINDERS/DISPLACEMENT 66mm/43.8mm/4 cylinders/599cc

COMPRESSION RATIO 13,5:1

FUEL SYSTEM self-designed multi-point sequential fuel injection and tank with trapdoor

FUEL 98 octane unleaded

MAX POWER DESIGN 10800

MAX TORQUE DESIGN 9500

DRIVE TYPE DID Racing Chain 520ERS2

DIFFERENTIAL Drexler Formula Student Differential

COOLING side mounted radiator, electric water pump, 2 self designed fans

BRAKE SYSTEM self developed 4 piston (front) and 2 piston (rear) callipers with 250mm diameter rotors

ELECTRONICS self-designed power distribution system, mechatronic clutch,gear,rearwheel steering, live telemetry

HATFIELD

University of Hertfordshire

Car 78 **Pit 46** **WRL 189** United Kingdom

With 17 successful years of Formula Student experience, UH Racing are no stranger to the demands of producing a competitive vehicle. This year, team management consists of 7 experienced Masters students whose wide range of knowledge and expertise helped to guide the 20 undergraduate team members throughout the project.The team‘s focus on value and reliability aims to maximise the static performance of the UH18 car, whilst the reduction in mass produces dynamic benefits across all events.

FRAME CONSTRUCTION Tubular Space Frame Chassis with Bonded Composite Floor

MATERIAL Mild steel (EN10305-1 & T45)

OVERALL L/W/H (mm) 2865/1400/1185

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1580/1200/1140

WEIGHT WITH 68kg DRIVER (Fr/Rr) 117/126

SUSPENSION Double unequal length A-arms. Pull rod actuated spring and coil over dampers with adjustable ARB.

TYRES (Fr/Rr) Hoosier R25B 18.0x6.0 - 10"

WHEELS (Fr/Rr) 7x10, 3 pcs aluminium rim

ENGINE KTM 450SXF 2012

BORE/STROKE/CYLINDERS/DISPLACEMENT 97.0mm/60.8mm/1 cylinders/449cc

COMPRESSION RATIO 12.5:1

FUEL SYSTEM Custom designed single point injection using 2015 KTM 500 EXC injector

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 9000

MAX TORQUE DESIGN 7500

DRIVE TYPE 520 Single Chain

DIFFERENTIAL Salisbury type differential with custom housing and internal preload adjustment

COOLING Single side mounted 82751mm2 core, 18mm Depth HVCC radiator, 643 cfm fan

BRAKE SYSTEM 191mm floating laser cut 304SS discs with adjustable bias and AP Racing Callipers

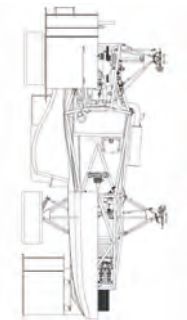
ELECTRONICS Wound Wiring harness to IP67, Steering wheel dash with Cal sensor & pneumatic shift system controls

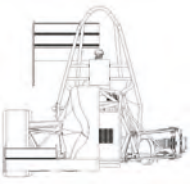
HEILBRONN

Heilbronn University

Car 100 **Pit 120** **WRL 404** Germany

HHN Racing is the redesigned Formula Student team of the UAS Heilbronn. In 2014 we finished the team reorganization with renaming the team from “KüHN Racing” to “HHN Racing”. Under the statement “Reliability first” we improved weight, agility and speed. Despite the lack of experience and many rule changes in the aero area we still risked to develop our first aero concept.





FRAME CONSTRUCTION tubular steel space frame

MATERIAL E355

OVERALL L/W/H (mm) 3035/1478/1303

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1280/1234

WEIGHT WITH 68kg DRIVER (Fr/Rr) 130/158

SUSPENSION Double unequal length A-Arm. Push rod actuated, adj. in compression and in rebound range. Adj. ARB

TYRES (Fr/Rr) 20.5x6.0 - 13 R25B Hoosier

WHEELS (Fr/Rr) Braid Formrace 16 13"x6"Et+18 4x100 ²50

ENGINE 2008 Husqvarna 510 SMR

BORE/STROKE/CYLINDERS/DISPLACEMENT 100mm/67,8mm/1 cylinders/534cc

COMPRESSION RATIO 13,5

FUEL SYSTEM Bosch MS4 ECU, double manifold fuel injection, Bosch Injectors

FUEL E85

MAX POWER DESIGN 9500

MAX TORQUE DESIGN 5000

DRIVE TYPE chain drive 520 motorcycle chain

DIFFERENTIAL Drexler FS limited slip differential

COOLING side mounted radiator with fan

BRAKE SYSTEM floating 220mm wave brake disks, AP Racing brake calipers, adjustable brake balance

ELECTRONICS self-developed Power Control Unit, multifunctional steering wheel, electropneumatic Shifting System

ISLAMABAD

Pakistan Institute of Engineering & Applied Sciences

Car 29 **Pit 129** Pakistan

The evolution of Automotive culture and immense support of PIEAS lead to the development of our team. After achieving respectable positions and recognitions in numerous National and International competitions, most of the experienced students gathered at one point to improvise the talent in Formula Student Germany.Team Formula Sprinters is highly motivated to secure good position at Formula Student Germany 2015.

FRAME CONSTRUCTION Tubular Steel Space Frame
MATERIAL AISI 1010 Steel
OVERALL L/W/H (mm) 2720/1605/1230
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1700/1400/1350
WEIGHT WITH 68kg DRIVER (Fr/Rr) 156/192
SUSPENSION Double unequal, non-parallel length A-arm, push rod actuated springs and dampers
TYRES (Fr/Rr) 205x60 R13, Summitomo
WHEELS (Fr/Rr) 205x60 R13, Summitomo
ENGINE SUZUKI GSX R600
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.5:1
FUEL SYSTEM Mikuni Fuel Injection
FUEL 98 octane unleaded gasoline
MAX POWER DESIGN 13000
MAX TORQUE DESIGN 10500
DRIVE TYPE RK525SMOZ7Y Chain drive
DIFFERENTIAL Clutch pack Limited Slip, 60Nm preload, 2.2:1
COOLING Rear mounted 800cc radiator
BRAKE SYSTEM 4-disk system
ELECTRONICS N/A

KARACHI

National University of Sciences and Technology - Karachi

Car 68 **Pit 41** **WRL 342** Pakistan

NUST Formula Student Team holds the privilege of being the first ever Formula Student team of Pakistan. With three years of experience at FSUK, the team will be making its mark for the first time ever at FSG in 2015. The goal for this year is to produce a simple and reliable car that can compete in all events at FSG 2015. The team owes its success and achievements to its sponsors and supporters. We hope to have a great time at FSG 2015 and would like to wish all the participating teams good luck

FRAME CONSTRUCTION TIG Welded Steel Tubular Space-frame
MATERIAL Steel ANSI 1010
OVERALL L/W/H (mm) 2740/1390/1175
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1160
WEIGHT WITH 68kg DRIVER (Fr/Rr) 182/190
SUSPENSION Double unequal length A² Arm. Pull rod / Push rod actuated spring and damper
TYRES (Fr/Rr) 20.5 x 7.513, Hoosier, R25B
WHEELS (Fr/Rr) OZ Ra-cing Al rims 178 mm wide, 330 mm dia.
ENGINE 2008 / Honda CBR600RR
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12,2:1
FUEL SYSTEM Multi point injection, Denso 12-hole injec-tors (Honda OEM)
FUEL 93 Octane
MAX POWER DESIGN 7000
MAX TORQUE DESIGN 7000
DRIVE TYPE 525 chain drive
DIFFERENTIAL Drexler FSAE LSD
COOLING Sidepod mounted 2 core Aluminum Radiator , 203.2mm fan mounted to back of radiator
BRAKE SYSTEM Hub mounted stainless steel floating four disks, 206 mm dia.
ELECTRONICS Servo motors driven gear shifter, 4N.m torque, 30W

KARLSRUHE

Karlsruhe Institute of Technology

Car 21 **Pit 55** **WRL 65** Germany

KA-RaceIng is the Formula Student team of the Karlsruhe Institute of Technology, founded in 2006. Since 2010 we stand for „one team - two cars“, designing, manufacturing and competing with an FSE and an FSC car every year. KIT15c is the name of our 9th combustion car, improving upon the concept of our self-developed, two-cylinder turbocharged en-gine and using the experience from the past seasons. We would like to thank all our supporters for the enormous help throughout the season.

FRAME CONSTRUCTION Hybrid chassis assembled from a CFRP monocoque front module and a tubular space frame
MATERIAL HT and HM fibres, twill unidirectional plies, kevlar-carbon hybrid twill
OVERALL L/W/H (mm) 2905/1455/1186
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1220/115
WEIGHT WITH 68kg DRIVER (Fr/Rr) 116/147
SUSPENSION Double unequal length A-Arm. Pull-Rod actuated horizontalle oriented ZF Damper with coil spring
TYRES (Fr/Rr) Hoosier 18.0x7.5-10 R25B
WHEELS (Fr/Rr) Student design CFRP-Rim 7.5" wide, spo-kes integrated in wheel hub
ENGINE self-developed AMG FS133
BORE/STROKE/CYLINDERS/DISPLACEMENT 83mm/55mm/2 cylinders/596cc
COMPRESSION RATIO 11.9:1
FUEL SYSTEM Bosch piezo direct injection system
FUEL E85
MAX POWER DESIGN 6500
MAX TORQUE DESIGN 4500
DRIVE TYPE gearbox with spur gear stage
DIFFERENTIAL Clutch pack limited slip differential, pre-load 25 Nm, bias ratio drive: 85%
COOLING side pod mounted radiator, 2 electrical fans and water pump with student designed control
BRAKE SYSTEM 4-Disk system, self developed rotors (181mm(front)/182mm(rear)) diameter, adjustable brake balance
ELECTRONICS multifunctional steering wheel, electro-pneumatic shifting system, electronic clutch actuation

KARLSRUHE

University of Applied Sciences Karlsruhe

Car 99 **Pit 61** **WRL 169** Germany

High Speed Karlsruhe, founded in 2006, is entering its 9th season in the Formula Student combustion competition. About 50 students of the UAS Karlsruhe have been working together to build the new racecar, named F-109. A completely new concept is realized with the change to 10'' wheels, a monocoque chassis and a one cylinder engine. As a special feature the F-109 has a roll damper which is unique in the Formula Student competition. We are looking forward to the FSG, FSA and FSS competition.

FRAME CONSTRUCTION Full CFRP monocoque

MATERIAL carbon with rohacell and aramid honeycomb core

OVERALL L/W/H (mm) 2947/1358/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1570/1140/1140

WEIGHT WITH 68kg DRIVER (Fr/Rr) 102/121

SUSPENSION Double unequal length A-arm. Pull rod actuated spring/damper. 3rd spring/damper unit (roll)

TYRES (Fr/Rr) 6.0/18.0-10/6.0/18.0-10

WHEELS (Fr/Rr) 7x10, 4mm offset, 2 pc CFK-Al Rim / 7x10, 4mm offset, 2 pc CFK-Al Rim

ENGINE 2011 Suzuki Rmz 450 1 cylinder

BORE/STROKE/CYLINDERS/DISPLACEMENT 96.0mm/62.1mm/1 cylinders/450cc

COMPRESSION RATIO 12.2:1

FUEL SYSTEM Student des./built system, fuel injection, 1 injectors, full sequential

FUEL 98 octane

MAX POWER DESIGN 9800

MAX TORQUE DESIGN 9000

DRIVE TYPE Chain 520MZU with U-Ring

DIFFERENTIAL clutch pack limited slip, 10 Nm preload, adjustable ratios

COOLING self developed oil-cooling system, two cooler with radiators, mini fans for engine compartment

BRAKE SYSTEM self developed vented rotors with 189mm outer diameter, adjustable brake balance

ELECTRONICS redundant CAN connection between steering wheel and RCU (shift and clutch servo actuation))

KASSEL

University of Kassel

Car 28 **Pit 62** **WRL 43** Germany

Driven by the desire to continue our success story of the last four years, we, the Herkules Racing Team, are confidently looking forward to meet this aspiration. Regarding our principle „evolution instead of revolution", 62 students focused on enhancing and optimising the basics of the last year's car and team structures, in order to realize an ongoing improvement process. It is our ambition to make a good competition and pace. We are proud and gratefull to be part of the formula student world!

FRAME CONSTRUCTION steel spaceframe

MATERIAL E235 & 25CrMo4 steel round and square tubing

OVERALL L/W/H (mm) 3085/1400/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1620/1200/1160

WEIGHT WITH 68kg DRIVER (Fr/Rr) 135/14

SUSPENSION Double unequal length a-arm,Pushrod actuated, verticualy oriented spring and damper

TYRES (Fr/Rr) Hoosier 20.5x7-13

WHEELS (Fr/Rr) 7x13, Magnesium

ENGINE Suzuki GSXR 600

BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/43mm/4 cylinders/600cc

COMPRESSION RATIO 13.1:1

FUEL SYSTEM sequential, original Suzuki fuel pump

FUEL gasoline

MAX POWER DESIGN 11500

MAX TORQUE DESIGN 860

DRIVE TYPE 28mm x 15mm

DIFFERENTIAL clutch, pack limited slip, 80 Nm preload

COOLING One side with radiator behind, integrated oil cooler

BRAKE SYSTEM 4 Disk system, self developed rotos with 240/230 mm diameter. ISR 4/2 Piston-Caliper

ELECTRONICS ECU-build in system, used by Data logger and self developed HUD,

KEMPTEN

University of Applied Sciences Kempten

Car 88 **Pit 44** **WRL 109** Germany

Infinity Racing was established in 2007 and currently consists of about 35 students. In 2015 we present our 7th car. After it turned out that the old concept with steel tube space frame and without aerodynamic devices was pretty exhausted, it was decided to make a change in concept. Logged data, experiences and gained engineering skills resulted in designing the team's first monocoque and aerodynamic package.

FRAME CONSTRUCTION Hybrid monocoque with rear tubular space frame

MATERIAL Rohacell 71 IG-F Core sandwich panel (30mm core, sides 1.5mm each)

OVERALL L/W/H (mm) 2950/1405/1160

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 135/141

SUSPENSION Double unequal length A-Arm. Pull rod (front)/Push rod (rear) actuated spring and damper

TYRES (Fr/Rr) 205/510 R13, Continental 2015

WHEELS (Fr/Rr) 7.0X13, +30 mm offset, 1 pc AlMg OZ-Rim

ENGINE 2005 Yamaha R6 RJ 09 4 cylinder DOHC

BORE/STROKE/CYLINDERS/DISPLACEMENT 65.5mm/44.5mm/4 cylinders/599cc

COMPRESSION RATIO 12.4:1

FUEL SYSTEM Student built ,fuel injection, sequential

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 11000

MAX TORQUE DESIGN 9500

DRIVE TYPE chain drive

DIFFERENTIAL Drexler clutch pack limited slip FS 2010, 10Nm preload, 1200Nm maximum torque

COOLING AL radiator with thermostatically controlled variable speed fan,

BRAKE SYSTEM Floating, Cast Iron, hub mounted, 200 mm dia. vented

ELECTRONICS Launch Control; Bosch C50 Logger, GPS assisted; self embedded telemetry system; Highspeed CAN 2.0 B

KONSTANZ

University of Applied Sciences Konstanz

Car 43 **Pit 116** **WRL 70** Germany

Ten years of sweat, fun, long nights and 46 students with the same passion – motorsport. The Bodensee Racing Team from the UAS Konstanz celebrates its tenth anniversary and is ready to present its newest creation, the ILTIS15. It comes with an improved aerodynamic package for best possible downforce. A lower center of gravity and reduced weight increase our performance on the track. We'd like to thank our sponsors and partners for their support. Let's get FSG15 started!

FRAME CONSTRUCTION tubular space frame
MATERIAL E235JR (1.0038) round tubing 10mm to 25mm
OVERALL L/W/H (mm) 3081/1384/1159
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1585/1210/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 144/144
SUSPENSION Double unequal length CFK A-Arm with aluminium inserts. Push rod actuated.
TYRES (Fr/Rr) 205/510R13 34M, Continental/205/510R13 34M, Continental
WHEELS (Fr/Rr) 7 x 13, Mg Rim, OZ S.p.A./7 x 13, Mg Rim, OZ S.p.A.
ENGINE modified Suzuki GSX-R600 K8
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 13.1:1
FUEL SYSTEM custom designed fuel rail, sequential fuel injection
FUEL 98 octane, gasoline
MAX POWER DESIGN 11000
MAX TORQUE DESIGN 8200
DRIVE TYPE Suzuki Original gearbox 4 gears
DIFFERENTIAL Drexler LSD - Formula Student, 25-30Nm preload, TBR: drive 4/3,08/15,67;brake 2
COOLING one two core aluminium radiator , one external oil radiator, two custom made fans
BRAKE SYSTEM 4-Disk system, self developed rotos with 238mm diameter, adjustable brake balance
ELECTRONICS multifunctional steering wheel, electro-pneumatic shifting system, selfdesigned live-telemetry system

KREFELD

Hochschule Niederrhein

Car 118 **Pit 108** **WRL 203** Germany

For our fourth car, we acted after the mantra „Evolution! Not revolution." This means for us to be faithful to our simple and easy to maintain designs and to focus on the details, which can be improved. For exmaple a better selection of composite fibres, an improved frame or an optimized suspension system. Beside of this we put a lot of energy in our new team members to ensure our projects future.

FRAME CONSTRUCTION Full tubular space frame
MATERIAL E235 +C steel round and square tubing
OVERALL L/W/H (mm) 2721/1455/1065
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1625/1243/1151
WEIGHT WITH 68kg DRIVER (Fr/Rr) 124/124
SUSPENSION Double wishbone suspension, pull rod
TYRES (Fr/Rr) 18x6 R10, Hoosier LC0
WHEELS (Fr/Rr) 6x10 Al/CFRP Rim, 3pc
ENGINE KTM 500 EXC (2016)
BORE/STROKE/CYLINDERS/DISPLACEMENT 95mm/72mm/1 cylinders/510cc
COMPRESSION RATIO 11,8:1
FUEL SYSTEM Syvecs S6GP, with sequential fuel injection
FUEL E85
MAX POWER DESIGN 6000
MAX TORQUE DESIGN 5400
DRIVE TYPE Chaindrive
DIFFERENTIAL Drexler Limited Slip FS V1
COOLING Right rear side mounted radiator, student designed
BRAKE SYSTEM 3-Disk system, self designed calipers, adjustable brake balance
ELECTRONICS Electropneumatic Shifting System, cable harness planned in CAD, AIM Evo4 Datalogger

LAWRENCE

University of Kansas

Car 69 **Pit 121** **WRL 8** United States

The University of Kansas' Formula SAE Racing team, Jayhawk Motorsports, is proud to release the next vehicle in the program's legacy. Since 1994, Jayhawk Motorsports has accumulated 9 top ten finishes. Including two first place finishes in 2012 and 2014. The 2015 team consists of a record sized and experienced roster.

FRAME CONSTRUCTION monocoque with fully stressed engine
MATERIAL Carbon Fiber Composite
OVERALL L/W/H (mm) 2936/1451/1451
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1219/1168
WEIGHT WITH 68kg DRIVER (Fr/Rr) 119/134
SUSPENSION Unequal length dual A-arm suspension with Pushrod actuated bellcranks & horizontally mounted dampers
TYRES (Fr/Rr) 6X10 Hoosier LC0
WHEELS (Fr/Rr) 7x10 Carbon Fiber Rim with Aluminum Center
ENGINE Modified Honda CBR600RR
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 13.5:1
FUEL SYSTEM Port Fuel Injected, Return Style
FUEL E-85
MAX POWER DESIGN 12000
MAX TORQUE DESIGN 8500
DRIVE TYPE Chain Drive
DIFFERENTIAL TRE Quaife Torque Biasing Differential
COOLING Side mounted double pass radiator, fan mounted to fan shroud
BRAKE SYSTEM In house made and designed Monoblock dual piston calipers, with self developed master cylinders
ELECTRONICS Life Racing F88 ECU/DAQ, Electric Throttle Body

LEIRIA

IP Leiria

Car 80 **Pit 66** Portugal

FSIPLeiria is a Portuguese team from the Polytechnic Institute of Leiria. The team has 25 members from various areas of studies divided in 5 departments: Powertrain; Vehicle Integration; Chassis & Dynamics; Electronics; Communication & Logistics.Our focus is to build an affordable, light, powerful, high-torque and reliable vehicle. It will have a global electronic system for engine management, data logging and driver aided gear changes for a low cost and reliable system with high tech features.

FRAME CONSTRUCTION Steel spaceframe
MATERIAL BS EN 10305-1 : 2002
OVERALL L/W/H (mm) 3175/1450/1142
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1276/1240
WEIGHT WITH 68kg DRIVER (Fr/Rr) 118/160
SUSPENSION Double wishbone pullrod actuated, Shims on upright to adjust camber, adjustable steering tie rods
TYRES (Fr/Rr) 7.2/10.0-13/8.2/20.0-13 Avon
WHEELS (Fr/Rr) Alumminium alloy 7*13, one piece centre lock, ET22
ENGINE 2005 Suzuki GSX-R600 K5
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12,5:1
FUEL SYSTEM Injectors and rail Suzuki GSX-R600 K5 OEM; Multi-point fuel injection - Sequential
FUEL Petrol
MAX POWER DESIGN 11500
MAX TORQUE DESIGN 8000
DRIVE TYPE Chain drive 530
DIFFERENTIAL Limited Slip Diferential, 30Nm Preload (adjustable)
COOLING Twin side mounted, core aluminum radiator, twin fan, eletric water pump
BRAKE SYSTEM 4-Ddisk system 250mm, 3mm, floating steel, perfurated rotors balance bar proportioned
ELECTRONICS Student developed power distribution module, multifunctioning student designed steering wheel

LIVERPOOL

University of Liverpool

Car 24 **Pit 58** **WRL 200** United Kingdom

The University of Liverpool Formula Student Team began competitive life in 2005 and are this year showcasing their tenth race car. ULM Racing is built upon evolutionary improvement and advances are embodied in the design of the new vehicle: a car which is based upon performance, driveability, and reliability.The team, comprising primarily of third and fourth year mechanical engineering students, have focused their efforts in the areas of aerodynamics, data acquisition and mass reduction.

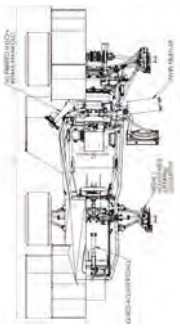
FRAME CONSTRUCTION Tubular steel spaceframe with removable rear
MATERIAL EN3B steel
OVERALL L/W/H (mm) 2982/1407/1142
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1200/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 114/179
SUSPENSION Double, unequal A-Arm, pull-rod/push-rod actuated Ohlins shock absorbers
TYRES (Fr/Rr) 20.0 x 7.2 – R13 A92 Avon
WHEELS (Fr/Rr) 13
ENGINE 2008 Yamaha YZF-R6 four stroke in line four
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 13.1:1
FUEL SYSTEM Port injection system with Cosworth SQ6 ECU
FUEL 98 RON unleaded
MAX POWER DESIGN 11500
MAX TORQUE DESIGN 11000
DRIVE TYPE Single 520 chain
DIFFERENTIAL 2010 FSAE Drexler LSD
COOLING Rear mounted dual pass radiator with EWP80 electric water pump
BRAKE SYSTEM Hub mounted 220mm dia. AP Racing, double pot front/single pot rear
ELECTRONICS Wiring harness sealed to IP67, Cosworth SQ6 ECU and integrated CompactDAQ

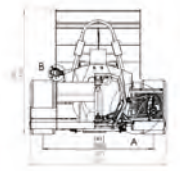
LONDON

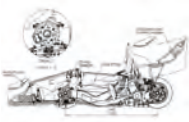
Western University

Car 25 **Pit 119** **WRL 54** Canada

From Western University in London, Canada, we begun in 1988, and have competed every year since 1996. Our team has a philosophy of Excellence, Endurance, and Enthusiasm: building highly-skilled and effective professionals; ensuring the long term success of the team; and having fun! WFR-15 features one of the skinniest cars at competition for improved driving line. We've also built our team's first monocoque and composite wheels. We continue to use 13" rims for increased grip.







FRAME CONSTRUCTION Hybrid: Front CFRP-foam monocoque; Rear chromoly tube space-frame
MATERIAL Varies by application
OVERALL L/W/H (mm) 2967/1291/1180
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1525/1050/1050
WEIGHT WITH 68kg DRIVER (Fr/Rr) 136/140
SUSPENSION Double unequal length wishbone; Pull-rod front, push-rod rear
TYRES (Fr/Rr) 20
WHEELS (Fr/Rr) 20
ENGINE Honda CBR 600 F4i
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mmmm/42mmmm/4 cylinders/599cc
COMPRESSION RATIO 12:1
FUEL SYSTEM Returnless EFI with custom aluminum fuel tank
FUEL 93 octane gasoline
MAX POWER DESIGN 11000
MAX TORQUE DESIGN 10500
DRIVE TYPE Roller chain
DIFFERENTIAL Drexler limited slip differential
COOLING Water cooled; Side-mounted radiator with thermostatically controlled fan
BRAKE SYSTEM Floating ductile iron rotors; Tilton master cylinder; Driver adjustable brake bias
ELECTRONICS AEM EMS-4 ECU, EVO3 Pro DAQ

How will people travel in the future, and how will goods be transported? What resources will we use, and how many will we need? The passenger and freight traffic sector is developing rapidly, and we provide the impetus for innovation and movement. We develop components and systems for internal combustion engines that operate more cleanly and more efficiently than ever before. We are also pushing forward technologies that are bringing hybrid vehicles and alternative drives into a new dimension – for private, corporate, and public use.
The challenges are great. We develop the solutions.

Join us and let's shape the mobility of tomorrow.

www.schaeffler.com/career

SCHAEFFLER

LOUGHBOROUGH

Loughborough University

Car 108 **Pit 115** **WRL 210** United Kingdom

LUMotorsport is made up of 20 dedicated undergraduate Automotive, Electrical, Aeronautical and Mechanical Engineers from Loughborough University. LFS15 is the team's 13th car with a large focus on the refinement of our 2014 design, with the aim of improving reliability. The 2015 Design features a fully structural composite floor, aerodynamic performance advances and a new intake aimed at improving driveability. Suspension development has resulted in the implementation of Anti-Roll bars.

FRAME CONSTRUCTION Hybrid Steel Space frame with CFRP bodywork

MATERIAL T45/Mild Steel with CFRP-Aluminium Honeycomb Sandwich Panel Floor

OVERALL L/W/H (mm) 2950/1479/980

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1300/1181

WEIGHT WITH 68kg DRIVER (Fr/Rr) 140/140

SUSPENSION Double Unequal length A-Arm, Pull Rod Actuated Ohlins Cane Creek Dampers, Front and Rear ARB's

TYRES (Fr/Rr) Hoosier R25B 20.5 x 7.0 – 13

WHEELS (Fr/Rr) Braid Formrace 16

ENGINE 2010 Honda CBR600RR

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc

COMPRESSION RATIO 12.5:1

FUEL SYSTEM Custom MoTeC System with Denso Injectors

FUEL 98 RON Unleaded

MAX POWER DESIGN 11000

MAX TORQUE DESIGN 8000

DRIVE TYPE Renthal RR4 520 Road Race SRS Chain

DIFFERENTIAL 2010 Drexler FSAE LSD

COOLING Side Mounted Radiator Airflow by 2x 610CFM Axial Spal Fans

BRAKE SYSTEM AP Racing 4-Piston (Front)/2-Piston (Rear) Calipers, Custom Mild Steel Laser Cut Floating Discs

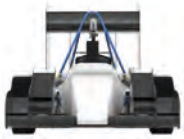
ELECTRONICS MoTec ECU, Datalogger and Dash Display, electronic gear shift, traction control and launch control

MADRID

Technical University of Madrid (UPM)

Car 11 **Pit 103** **WRL 311** Spain

UPM Racing is the FSC Team of TU Madrid. Our team consists of 20 competitive and racing car lover students from various degrees. This year, UPM Racing sets its twelveth car, the UPM 12 C, introducing some important changes. With them and a wonderful teamwork along the year, we are highly motivated to take a leap in the ranking, with the -always pleasant- support of our Sponsors and Collaborators.



FRAME CONSTRUCTION Tubular space frame/Carbon fiber and honeycomb floor/Aluminium backplate

MATERIAL AISI 4130 Alloy steel/Aluminium 7075 T6

OVERALL L/W/H (mm) 2975/1380/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1547/1190/1160

WEIGHT WITH 68kg DRIVER (Fr/Rr) 139/151

SUSPENSION Double unequal length A-Arm. Push rod actuated. Springs and revalved dampers Öhlins TTX25

TYRES (Fr/Rr) 7.0x13, -13 mm offset, 3pc Al&Mg

WHEELS (Fr/Rr) 7.0x13, -2mm offset, 3 pc Al/Mg Rim

ENGINE Modified 2003 Yamaha R6

BORE/STROKE/CYLINDERS/DISPLACEMENT 65.5mm/44.5mm/4 cylinders/600cc

COMPRESSION RATIO 12.4:1

FUEL SYSTEM Student designed/built fuel injection, sequential system controlled via Performance 3

FUEL 98 octane gasoline

MAX POWER DESIGN 11000

MAX TORQUE DESIGN 10500

DRIVE TYPE 520 roller chain

DIFFERENTIAL Drexler limited slip differential 30 Nm preload

COOLING Vertical crossflow one step radiator with thermostatic controlled by electricfan

BRAKE SYSTEM 4 floating disks system with self developed rotors (220 diam), AP Racing CP4226 2 piston

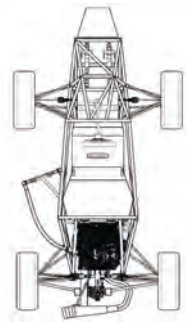
ELECTRONICS Electropneumatic clutch&shifter, Launch control, Traction control, AiM EVO4, Performance 3 ECU

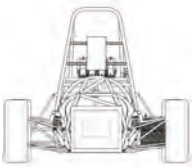
MAGDEBURG

Otto von Guericke University of Magdeburg

Car 20 **Pit 83** **WRL 438** Germany

We are the UMD Racing Team, the Formula Student Team of the Otto-von-Guericke University Magdeburg. Last year we laid the foundations by designing a solid base to build upon this season.Our new mass reduced frame and the use of Aluminium wishbones is thenext step to optimize the car, as well as data acquisition and driver radio. We would like to thank all of our sponsors and looking forward to the Event.





FRAME CONSTRUCTION Tubular and square profile space frame

MATERIAL Steel - S355

OVERALL L/W/H (mm) 2750/1450/1350

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1700/1250/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 155/165

SUSPENSION Double A-Arm, Front pull rod, Rear push rod, adjustable camber/toe/spring rate/damper rate

TYRES (Fr/Rr) Pirelli DM 540x200-13/Pirelli DM 540x200-13

WHEELS (Fr/Rr) 7.0x13, 22mm offset, Al Rim/7.0x13, 22mm offset, Al Rim

ENGINE Suzuki GSR 600 K6

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc

COMPRESSION RATIO 12,5:1

FUEL SYSTEM Open-source MegaSquirt system with sequential injection

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 10500

MAX TORQUE DESIGN 8200

DRIVE TYPE 520 Chain

DIFFERENTIAL Drexler Formula SAE Limited Slip Differential 2010

COOLING Left side mounted radiator with 254mm electric fan

BRAKE SYSTEM 4-Disk system, self developed brake bodys/rotors/pedalry, AP Racing master zylinders

ELECTRONICS Custom wiring harness, multifunctional carbon steering wheel, electric actuated clutch and gearshift

MILANO

Polytechnic University of Milan

Car 90 **Pit 73** **WRL 280** Italy

Dynamis PRC finally takes part in FGS! Born in Politecnico di Milano in 2004 the team is going to race its new prototype, the DP7. Built by 50 students from mechanical, aerospace, automation and electronic degrees, DP7 features a carbon fiber front monocoque coupled to an aprilia RXV550 engine. Dynamis PRC main innovatons are a unique sigle shock absorber suspension layout that allows us decoupled setup on roll and pitch, and our electroactuated clutch and gearshift systems.

FRAME CONSTRUCTION Carbon fiber reinforced polymer monocoque (front); tubolar spaceframe (rear)

MATERIAL High strenght carbon fiber,epoxy resin,Nomex®,Al honeycomb (front);25CrMo4 steel

OVERALL L/W/H (mm) 2675/1378/1107

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1200/1160

WEIGHT WITH 68kg DRIVER (Fr/Rr) 128/135

SUSPENSION Double Wishbone, Pull-Rod, Single Shock Absober at the front, seiame sys with Push-Rod at the rear

TYRES (Fr/Rr) Pirelli 180 - 530 R13 DSS front and rear

WHEELS (Fr/Rr) 7.0 x 13 (30 mm offset) Mg front and rear

ENGINE Aprilia RXV 550

BORE/STROKE/CYLINDERS/DISPLACEMENT 80mm/55mm/2 cylinders/552cc

COMPRESSION RATIO 12.5:1

FUEL SYSTEM Aprilia - Walbro remapped stock ECU, Port fuel injection, 2 bottom injectors

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 9800

MAX TORQUE DESIGN 7000

DRIVE TYPE Chain drive

DIFFERENTIAL Drexler Motorsport Formula Student LSD. Lock-up 88/51% acceleration/deceleration

COOLING 3.4 m^2 air side area per 1 core mounted on left sidepod, 413 cfm @max airflow

BRAKE SYSTEM Floating AISI420 rotors 230x164x4 mm, Brembo M4 4 pistons for front, 2 for rear. EBB regulation

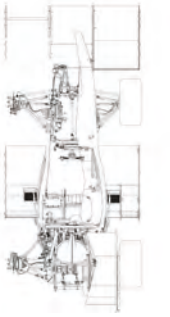
ELECTRONICS Electroacutated gear shifter anf clutch, multifunctional steering wheel, launch control

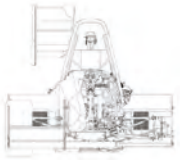
MONTRÉAL

McGill University

Car 16 **Pit 114** **WRL 73** Canada

The vehicle targets were based on a point mass lap time simulation. As a result, the MRT16 features a CFRP monocoque for the first time, a re-designed aerodynamics package (front, mid, and rear wings),and an E85-powered naturally aspirated single cylinder engine. Alongside vehicle development, the McGill Racing Team focused on increasing documentation of the design process including simulation, analysis, and testing, as well as improving project management and team communication.





FRAME CONSTRUCTION CFRP monocoque chassis with integral joint layup, tubular steel roll bars.

MATERIAL Textreme Plain Weave/Unidirectional Tape, Aluminum/Nomex/Polyurethane foam core

OVERALL L/W/H (mm) 2917/1328/1181

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1118/1118

WEIGHT WITH 68kg DRIVER (Fr/Rr) 103/126

SUSPENSION Double Unequal A-Arm F/R, Pullrod F, Pushrod R, Coilover Double-Adjustable Damper, ARB F/R

TYRES (Fr/Rr) 18x6-10 Hoosier LC0 F/R

WHEELS (Fr/Rr) 7x13, 3 pc Aluminum

ENGINE BRP-Rotax GmbH, Type 449

BORE/STROKE/CYLINDERS/DISPLACEMENT 97mm/60.8mm/1 cylinders/449cc

COMPRESSION RATIO 13.6:1

FUEL SYSTEM Port Injection, Manifold-Pressure Regulated, TPS, MAP, IAT, ECT, EGT, AFR

FUEL E85 Ethanol

MAX POWER DESIGN 9000

MAX TORQUE DESIGN 8000

DRIVE TYPE 5-speed sequential

DIFFERENTIAL Drexler limited slip, fixed preload, adjustable ramp angles

COOLING 2x Side mounted 25mm core aluminum radiator

BRAKE SYSTEM Front 4-piston calipers, rear 2-piston calipers, AP racing calipers & master cylinders.

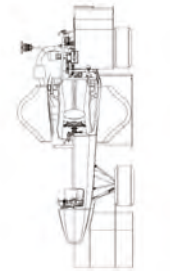
ELECTRONICS Traction control, Shift-without-lift, Launch-Control and Auto-up shift, Motec M130, AIM Dashlogger

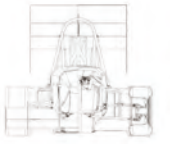
MONTRÉAL

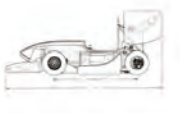
University of Québec - ETS

Car 12 **Pit 128** **WRL 67** Canada

The team from ETS has always had one goal, victory. Every car that comes out ofour facilities reflects our mentality. We pay special attention to design and detailsto ensure that the car reaches its peak performance. For those reasons, the Formulateam from ETS is perceived as one of the leaders in their field, which allowsthem to promote Engineering excellence from Quebec around the world.







FRAME CONSTRUCTION Carbon Fiber Single piece monocoque

MATERIAL Steel, aluminium, carbon, blood, sweat and tears

OVERALL L/W/H (mm) 2984/1346/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1581/1371/1092

WEIGHT WITH 68kg DRIVER (Fr/Rr) 96/123

SUSPENSION Monoshock with a pick-up truck ARB

TYRES (Fr/Rr) Hoosier 10in

WHEELS (Fr/Rr) 2 part carbon fiber wheel

ENGINE WR480SS - ETS custom block

BORE/STROKE/CYLINDERS/DISPLACEMENT 98mm/63.4mm/1 cylinders/480cc

COMPRESSION RATIO 12.5:1

FUEL SYSTEM Motec with single injector

FUEL E85

MAX POWER DESIGN 8500

MAX TORQUE DESIGN 4500

DRIVE TYPE Small chain drive coupled to a lightweig

DIFFERENTIAL Drexler salisbury

COOLING Electric water pump,radiators in lateral pro-downforce sidepods

BRAKE SYSTEM Steel Disk with AP racing pistons

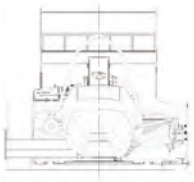
ELECTRONICS Magic rope conducting smoke, hopes and dreams

MOSCOW

Bauman Moscow State Technical University

Car 22 **Pit 101** **WRL 283** Russia

We present our third car brt-3 which is further development of brt-2 concept. In this season our team pay more attention to quality of assembling and reliability. Following rule changes we implement new wing design, electronic throttle, new intake layout for forced induction in addition to full steel-CFRP hybrid frame, paddle shifter controlled clutch, dry sump system, aluminum wheel hubs with steel tripod inserts, multi-functional steering wheel and more.



FRAME CONSTRUCTION Two-piece hybrid steel-CFRP space frame.

MATERIAL C22 steel tubes, filament wounded CFRP tubes.

OVERALL L/W/H (mm) 3210/1405/1190

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1565/1205/1165

WEIGHT WITH 68kg DRIVER (Fr/Rr) 130/158

SUSPENSION Double unequal length A-Arm. Pull rod actuated in front, push rod in the rear.

TYRES (Fr/Rr) 20.5 x 7.0-13, Hoosier R25B/20.5 x 7.0-13, Hoosier R25B

WHEELS (Fr/Rr) 7x13 offset 31mm, Aluminium, one piece/7x13 offset 31mm, Aluminium, one piece

ENGINE Supercharged Yamaha YZF-R6 with dry sump system

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc

COMPRESSION RATIO 13.1:1

FUEL SYSTEM Motec M400

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 12000

MAX TORQUE DESIGN 8500

DRIVE TYPE #520 chain drive

DIFFERENTIAL Drexler clutch type LSD

COOLING Water cooling system with left sidepod mounted radiators.

BRAKE SYSTEM 4-Disk system, self developed 220mm rotors, adjustable brake balance, self designed pedal box

ELECTRONICS Multifunctional Steering Wheel, Electro-pneumatic Shifting System, selfdesigned Live-Telemetry Syste

MOSCOW

Moscow State Technical University (MAMI)

Car 52 **Pit 65** **WRL 196** Russia

FDR MAMI team enters in new season of Formula Student competition with Iguana G8. It is not a new kind of reptilian. It is a real wild racecar that was designed by 11 people which are extremely "HUNGRY FOR VICTORY". In combination of some risky technical solutions and well-optimized operation of the systems, Iguana G8 is looking forward to demonstrate its performance on FSG 2015. And are you ready to try to tame Iguana G8?

FRAME CONSTRUCTION Tubular space frame

MATERIAL 1020 steel round tubing

OVERALL L/W/H (mm) 2411/1128/1100

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1525/950/920

WEIGHT WITH 68kg DRIVER (Fr/Rr) 131/131

SUSPENSION Double unequal length A-Arm, push rod actuated

TYRES (Fr/Rr) 19.5x7.5-10, Hoosier R25B/19.5x7.5-10, Hoosier R25B

WHEELS (Fr/Rr) 7.1x10 , 35mm offset , 3 pc Al Rim/ 7.3x10 , 54mm offset , 3 pc Al Rim

ENGINE 2006 Honda CBR 600F4i

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.0mm/4 cylinders/599cc

COMPRESSION RATIO 12.0:1

FUEL SYSTEM OEM, fuel injection, sequential

FUEL 98 Octane

MAX POWER DESIGN 1000

MAX TORQUE DESIGN 8500

DRIVE TYPE Chain 520, light-weight

DIFFERENTIAL Clutch pack limited slip, Pre load: 20-25 Nm on delivery and 10 Nm after initial setting

COOLING One side pod mounted radiator with thermostatic controlled electric fan

BRAKE SYSTEM 4-Disk system, Front - floating, 189mm diameter/ Rear - non-floating, 180mm diameter

ELECTRONICS wiring harness, steering wheel mounted DTAfast SX-Dash dash panel, Electropneumatic Shifting System

MÜNCHEN

Technische Universität München

Car 41 **Pit 84** **WRL 40** Germany

The TUfast Racing Team from Munich consists of 70 team members who design and build two racecars each season (electric + combustion) as one team. One crew – Two cars – Tufast. The main goals designing the TUfast nb015 are lightweight, reliability and an aerodynamic package well-balanced between high downforce and efficiency. To achieve these goals: KTM 500 EXC one-cylinder engine, full CFRP- monocoque, Hoosier LC0 on CFRP Rims, reduction of risk-carrying complexity.

FRAME CONSTRUCTION Full CFRP monocoque

MATERIAL CFRP: Spread toe, twill weave, unidirectional, aluminium honey comb- /foam core

OVERALL L/W/H (mm) 2850/1375/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1580/1240/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 104/122

SUSPENSION Double unequal length A- Arm. Front: Pull rod actuated. Rear: Push rod actuated

TYRES (Fr/Rr) 6.0/18.0-10 Hoosier LC0

WHEELS (Fr/Rr) 7.0x10; offset: -3mm; 3pc ; SMC- CFRP Shells with AL-Center

ENGINE KTM EXC 500 (2014/15)

BORE/STROKE/CYLINDERS/DISPLACEMENT 95mm/72mm/1 cylinders/510cc

COMPRESSION RATIO 13,6:1

FUEL SYSTEM ASNU port fuel injector, electric actuation, controlled via ECU map

FUEL E85

MAX POWER DESIGN 9000

MAX TORQUE DESIGN 7000

DRIVE TYPE 5-speed sequential gearbox

DIFFERENTIAL Drexler Formula Student limited Slip differential

COOLING Separated oil-/water- cooling each equiped with electrical fan

BRAKE SYSTEM Drilled and floating rotors, tilton series 77 master cylinders, ISR calipers

ELECTRONICS MoTeC ADL3 DashLogger, Shift Light Module, Traction Control adjustment, Engine adjustment

MÜNCHEN

University of Applied Sciences München

Car 76 **Pit 111** **WRL 37** Germany

PassionWorks - not only the name of our cars but also our guiding principle! Last season - our most successful one - we took a big step forward in terms of driving performance and reliability of the car. This year, we're happy to announce that we designed a car that signifies a evolutionary step. New solutions make us more efficient, lighter and faster. Combined with many testing kilometers and a strong team, we want to improve upon last year's results.

FRAME CONSTRUCTION hybrid construction: front CFRP monocoque, rear tubular space frame

MATERIAL Monocoque:CFRP, mild Rohacell core; TSF: Steel tubing 16 to 25mm dia

OVERALL L/W/H (mm) 2855/1428/1191

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1540/1203/1182

WEIGHT WITH 68kg DRIVER (Fr/Rr) 118/138

SUSPENSION Double unequal length A-Arm. Pull rod actuated horizontally oriented spring and damper

TYRES (Fr/Rr) Hoosier 18x6 R10/ Hoosier 18x6 R10

WHEELS (Fr/Rr) 7,5 x 10, CFK Rim/ 7,5 x 10, CFK Rim

ENGINE Modified Honda CBR600RR (PC40)

BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42,5mm/4 cylinders/599cc

COMPRESSION RATIO 13,5:1

FUEL SYSTEM student designed and built, cylinder selective fuel injection with 2 injectors per cylinder

FUEL E 85

MAX POWER DESIGN 9500

MAX TORQUE DESIGN 8500

DRIVE TYPE chaindrive 428# chain

DIFFERENTIAL Drexler, clutch pack limited slip, 30-35Nm preload, adjustable bias ratio

COOLING Twin side mounted self designed radiator with ECU controlled electric fan

BRAKE SYSTEM 4 floating Disks (Fr/ Re 190/180 dia.) System, AP Racing Caliper, adjustable brake balance

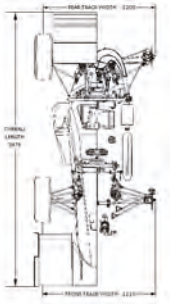
ELECTRONICS wiring harness IP67, Mosfet-switches, self-designed dashboard, electropneumatic shifting, telemetry

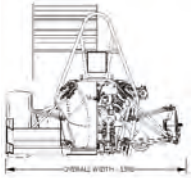
OXFORD

Oxford Brookes University

Car 92 **Pit 82** **WRL 78** United Kingdom

Oxford Brookes Racing team is bigger and hungrier than ever this year, with a wide range of students from foundation year to masters level supporting the project in many different ways. Oxford Brookes Racing aims to produce its best overall finish to date. We would like to say a massive thanks to all of our existing and new sponsors who have made our dreams possible and as ever, the continuous support of our University and Alumni.





FRAME CONSTRUCTION hybrid full monoque CFRP + Ali skins

MATERIAL Varied thickness CFRP inner skin with 0.7mm 6082 Ali skins. 20 & 15mm aluminium Honeycomb

OVERALL L/W/H (mm) 2976/1388/1285

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1210/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 114/124

SUSPENSION Double unequal length wishbones w/ pushrod actuated spring-dampers. U-Bar ARB

TYRES (Fr/Rr) Hoosier R25B 20.5x7.0-13

WHEELS (Fr/Rr) 2pc Home Made Carbon Rim 6' wide with 8-spoke aluminium centre, 14.2mm offset

ENGINE KTM/530 EXC - 2010

BORE/STROKE/CYLINDERS/DISPLACEMENT 100mm/72mm/1 cylinders/570cc

COMPRESSION RATIO 11.9:1

FUEL SYSTEM Student designed single point port injection system

FUEL 98 RON Unleaded

MAX POWER DESIGN 8000

MAX TORQUE DESIGN 6000

DRIVE TYPE Single 520 chain

DIFFERENTIAL Drexler Formula SAE Limited slip differential

COOLING side mounted 2r12 core radiator , 850 cfm fan mounted to ducting

BRAKE SYSTEM 4-disk ISR radial mount, dual opposing piston front calipers with AP racing radial mount rears

ELECTRONICS Electropneumatic Shifting system, Bosch DDU7 Datalogger

PADERBORN

University of Paderborn

Car 58 **Pit 54** **WRL 257** Germany

The UPBracing Team e.V. was founded in 2006. Nowadays we consist of approximately 200 members of which about 45 ones actively worked on this year's race car: the PX215. This is the 9th step in the ongoing process of increasing performance of our race cars. Definitely the most outstanding feature of the PX215 is our Full CFRP Monocoque. Within the last two years we made use of a hybrid solution but now decided to make the next step. Our sponsors form an indispensable part of this project.

FRAME CONSTRUCTION CFRP full monocoque

MATERIAL CFRP sandwich construction with honeycomb core, aluminum front hoop, steel main hoop

OVERALL L/W/H (mm) 3020/1405/1080

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1160/1140

WEIGHT WITH 68kg DRIVER (Fr/Rr) 127/140

SUSPENSION double wishbone push rod suspension at front and rear

TYRES (Fr/Rr) 7,5x18,0-R10 Hoosier

WHEELS (Fr/Rr) 10 x 7 wide, 3 pc Al Rim

ENGINE modified Suzuki GSX-R 600

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42,5mm/4 cylinders/600cc

COMPRESSION RATIO 12, 8:1

FUEL SYSTEM Bosch EV12 and student designed rail

FUEL RON 95 unleaded

MAX POWER DESIGN 10000

MAX TORQUE DESIGN 9500

DRIVE TYPE chain drive

DIFFERENTIAL Drexler Formula Student Differential (1,5 way limited slip differential)

COOLING McCord Air-Liquid Heat Exchanger; stream simulation through engine and oil water plate heat exc..

BRAKE SYSTEM self-developed rotors, adjustable brake balance

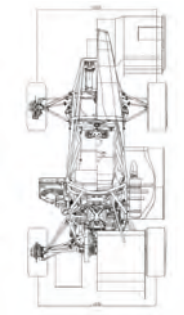
ELECTRONICS self-build ECU, light-weight wiring harness, electronic clutch and shifter, CAN-Bus

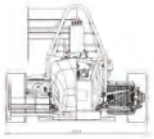
PADOVA

University of Padova

Car 85 **Pit 130** **WRL 53** Italy

Race UP Team started participating in Formula SAE ruled competitions in 2003. This year the team is coming back to Formula Student Germany with its 10th car, starting from the experience of the reliable project of last year. The biggest design innovation is the complete aero-pack. All the components are designed to be as light as possible and to reach the best integration in the car. The goal of this year is to gain the maximum performance from the new car with an efficient testing phase.





FRAME CONSTRUCTION Tubolar spaceframe
MATERIAL Steel AISI4130 (25CrMo4)
OVERALL L/W/H (mm) 2983/1464/1212
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1260/1230
WEIGHT WITH 68kg DRIVER (Fr/Rr) 101/104
SUSPENSION Double unequal length A-Arm. Pull-rod actuated. Longitudinally oriented spring and damper.
TYRES (Fr/Rr) 20.5 x 7.0 R13 Hoosier/20.5 x 7.0 R13 Hoosier
WHEELS (Fr/Rr) 7.0 x 13"/7.0 x 13" magnesium
ENGINE Honda CBR 600 RR PC40 2007/2008
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.5:1
FUEL SYSTEM Single injector per cylinder, low pressure.
FUEL 98 octane unleaded gasoline.
MAX POWER DESIGN 12000
MAX TORQUE DESIGN 9000
DRIVE TYPE Original engine gearbox.
DIFFERENTIAL Limited slip, 15 Nm Preload, 51% drive - 29% decel interlock value.
COOLING Left mounted 30 core long 360mm aluminum radiator , 735 cfm electric fan.
BRAKE SYSTEM AP Racing calipers, 4 floating disks system, 220 diameter, adjustable brake balance.
ELECTRONICS self made power distribution, use of microcontrollers, TE SPEC55 wires, sizes from AWG18 to AWG26.

PFORZHEIM

Pforzheim University

Car 79 **Pit 76** **WRL 193** Germany

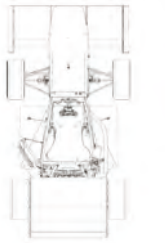
FRAME CONSTRUCTION Steel tube space frame
MATERIAL tubular steel E355
OVERALL L/W/H (mm) 2649/1400/1130
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1990/1400/1330
WEIGHT WITH 68kg DRIVER (Fr/Rr) 115/131
SUSPENSION Double unequal length A-Arm. Push rod actuated spring/damper. Adj. Anti Roll bar.
TYRES (Fr/Rr) Hoosier 18 x 6 R10
WHEELS (Fr/Rr) 18 x 6.0 - 10/LC0 /Hoosier
ENGINE KTM SX-F 450 Single Cylinder
BORE/STROKE/CYLINDERS/DISPLACEMENT 95mm/63.4mm/1 cylinders/449cc
COMPRESSION RATIO 12.83:1
FUEL SYSTEM Bosch MS4 ECU,fuelpump,pressure-regulator, self desinged injector mounting
FUEL 98 octane
MAX POWER DESIGN 9500
MAX TORQUE DESIGN 7000
DRIVE TYPE chain drive 520 chain
DIFFERENTIAL Drexler limited slip differential
COOLING aluminium radiator with controlled cooling fan
BRAKE SYSTEM 4-Disk system, self developed disks with 183mm diameter, adjustable brake balance,
ELECTRONICS wiring harness, multifunctional steering wheel, Custom built dual-band telemetry system...

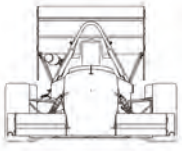
PITTSBURGH

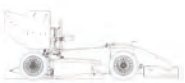
University of Pittsburgh

Car 71 **Pit 77** **WRL 233** United States

Panther Racing is proud to present its new FSAE vehicle prototype, PR-027. Weighing in at 435lbs without aerodynamics, PR-027 boasts a 29lb weightloss compared to its predecessor. This is the 27th car in Pitt FSAE history which features a steel tube space frame chassis, Honda CBR600RR engine, 13" wheels, and a full aerodynamics package.







FRAME CONSTRUCTION Steel Tube
MATERIAL
OVERALL L/W/H (mm) 2982/1458/1195
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1280/1177
WEIGHT WITH 68kg DRIVER (Fr/Rr) 159/228
SUSPENSION Fully independent SLA, pull-rod actuated coil over dampers, drop-link anti-roll mechansim.
TYRES (Fr/Rr) 20.5X7.0, R25B, Hoosier
WHEELS (Fr/Rr) 20X7.5,R25B, Hoosier
ENGINE Honda CBR600RR
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.2
FUEL SYSTEM Stock Injectors, Sequential Injection
FUEL 93
MAX POWER DESIGN 10500
MAX TORQUE DESIGN 8500
DRIVE TYPE Chain driven, 428 chain
DIFFERENTIAL Drexler Limited-slip
COOLING Left-side-mounted cross-flow dual-pass radiator , 844 cfm fan mounted to shroud on radiator
BRAKE SYSTEM Slotted Floating Rotors
ELECTRONICS MoTec Power Distribution Module (PDM 32), Solid-state relay control with current monitoring, Stock C

Typical engineer?

Ulrike Krafft
ESP-Applicator
Bosch Engineering

Racing Driver
FIA ETCC-Series

Strong characters with versatile interests make a career at Bosch. You also prefer dynamics, team spirit and flexible possibilities? Then you will find a modern working culture with plenty of room for personality.

Every success story has a beginning. Start yours with us, here and now.
www.bosch-career.de

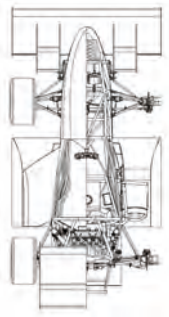
BOSCH
Invented for life

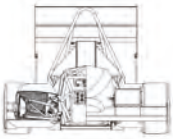
POMONA

California State Polytechnic University, Pomona

Car 9 **Pit 67** **WRL 20** United States

The Cal Poly Pomona Formula SAE Team has been competing since 1988. The Southern California based team had its most successful year in 2014, placing 14th in Michigan, 4th in Lincoln, and 9th in Germany. With ten inch tires and a new power plant, the 30 person team is eyeing the podium. Featuring a suspension system that can be adjusted in more ways than you can count, the 2015 car, lovingly named "Eric," represents a reevaluation of the existing formula.





FRAME CONSTRUCTION Steel Spaceframe
MATERIAL 4130 Chrome-Moly Steel
OVERALL L/W/H (mm) 2930/1480/1150
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1245/1220
WEIGHT WITH 68kg DRIVER (Fr/Rr) 111/148
SUSPENSION Push/Pull Rod, Adjustable Roll Centers, Camber Curves, Anti-dive, Anti-squat, 4 way Damping
TYRES (Fr/Rr) 18 x 7.5 x 10 R25B Hoosier
WHEELS (Fr/Rr) 7.5in x 10 Aluminum 2 piece shells

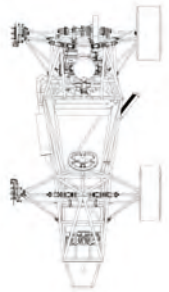
ENGINE 2008-12 YZF-R6
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 13
FUEL SYSTEM Student design fuel injection muti port
FUEL E85 Ethanol
MAX POWER DESIGN 10500
MAX TORQUE DESIGN 8000
DRIVE TYPE Chain Drive
DIFFERENTIAL Drexler (Salisbury)
COOLING Side mounted single core 25.4cm x 30.5cm radiator, 755 cfm fan mounted to rear
BRAKE SYSTEM 1018 Steel, Floating, 190mm OD, 5.1mm thick
ELECTRONICS AEM Infinity, Modular wiring harness

POZNAŃ

Poznan University of Technology

Car 23 **Pit 105** Poland

First time in Formula Student, first car ever built. Goal - build well performing, reliable car allowing to score in every event. We have used simple solutions, nonetheless there are number of adjustable features on the car to allow tuning the vehicle for different events and driver's preference. We are first year team, so our additional task was to build a solid base for further development - we have built a professional workshop and an engine dyno at our University.



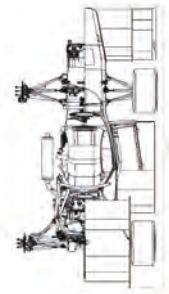
FRAME CONSTRUCTION Single piece tubular welded spaceframe
MATERIAL Cro-Mo 25CrMo4 precision tubing
OVERALL L/W/H (mm) 2872/1500/1193
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1300/1260
WEIGHT WITH 68kg DRIVER (Fr/Rr) 151/152
SUSPENSION Push-road actuated spring and damper acting in single plane, oriented horizontally. Double A-arms of
TYRES (Fr/Rr) 20.5x7.0-13/20.0x7.5-13 Hoosier R25B
WHEELS (Fr/Rr) 7"x13" single piece aluminium OZ Racing
ENGINE 2011 HONDA PC40 (CBR 600RR) four stroke in line fo
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.2:1
FUEL SYSTEM Low presure MPI
FUEL 95 RON Unleaded
MAX POWER DESIGN 10000
MAX TORQUE DESIGN 7000
DRIVE TYPE Single 520 Chain
DIFFERENTIAL Drexler Motorsport FSAE limited slip differential
COOLING Single side mounted radiator, in-line electric pump
BRAKE SYSTEM ISR Brakes calipers with floating discs. F: 4 piston/Ø240 mm; R: 2 piston/Ø220 mm
ELECTRONICS

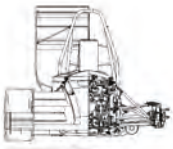
PRAGUE

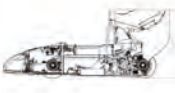
Czech Technical University in Prague

Car 33 **Pit 125** **WRL 22** Czech Republic

For the FS.07 we seek inspiration in dreams. Thanks to extensive application of astrology and tibetan pulsing with crystals, we have reached synergy of the chassis silhouette and race track. Wing shape, influenced by orientation of Uranus, encourages you to take a magical journey around universe. Engine, driven by happiness of our powertrain group, emits only good vibrations into the chassis which is welded to the perfection by Yin and Yang method.







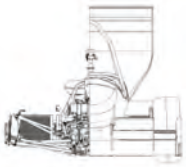
FRAME CONSTRUCTION Hybrid monococque-space frame
MATERIAL Prepreg, foam and Alu-honeycomb cores (Monocoque)+ 25CrMo4 tubes (Frame)
OVERALL L/W/H (mm) 2874/1490/1180
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1560/1240/1200
WEIGHT WITH 68kg DRIVER (Fr/Rr) 124/144
SUSPENSION Double unequal length A-Arm. Pushrod actuated transversely oriented spring and damper.
TYRES (Fr/Rr) Hoosier 18x7.5-10
WHEELS (Fr/Rr) Selfmade composite rims 7.5x10
ENGINE Yamaha YZF R6
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.8:1
FUEL SYSTEM Fuel injection, ECU EFI Euro 4, sequential
FUEL RON 98
MAX POWER DESIGN 10200
MAX TORQUE DESIGN 7500
DRIVE TYPE 520 x-ring chain
DIFFERENTIAL Drexler, limited slip
COOLING Side mounted custom made radiator, 2x 225mm fan
BRAKE SYSTEM Self-developed calipers, adjustable brake balance
ELECTRONICS self-developed shifting system, complex data aquisition system, telemetry system

REGENSBURG

Ostbayerische Technische Hochschule Regensburg

Car 62 **Pit 45** **WRL 89** Germany

The Dynamics e.V. was founded in 2006 and is now competing in the Formula Student Germany Event for the 8th time. The clear goal for the season of 2015 is to reach the Top Ten at FSG to become one of the German top teams. With a highly motivated and experienced team and a very innovative concept of our combustion race car RP15c we are able to meet our target. The last 2 years have already shown that we are on the road of success. Our mission statement:"Is there a better motivation than success?"



FRAME CONSTRUCTION Full CFRP monocoque, separated front monocoque and engine carrier

MATERIAL CFRP: twill prepreg and UD prepreg; shaped Rohacell core

OVERALL L/W/H (mm) 3020/1420/1210

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1200/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 119/129

SUSPENSION Double unequal length A-Arms with pushrod actuated horizontal oriented damper, ARB

TYRES (Fr/Rr) Continental 205/510 R13

WHEELS (Fr/Rr) 7.5x13", 22mm offset 1 pc carbon rim

ENGINE Honda CBR600RR PC37

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42,5mm/4 cylinders/599cc

COMPRESSION RATIO 13,5:1

FUEL SYSTEM CFRP fuel tank with pressure controlled electric pump; intake-manifold fuel injection

FUEL 98 octane unleaded

MAX POWER DESIGN 10000

MAX TORQUE DESIGN 9500

DRIVE TYPE Belt drive with carbon fiber reinforced

DIFFERENTIAL self designed semiactive limited slip, quick adjustment

COOLING two sidepod mounted radiators with PWM controlled waterpump and fan

BRAKE SYSTEM 4 piston AP calipers with 247mm steel disc; rear: 2 piston AP calipers with 243mm steel

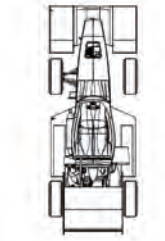
ELECTRONICS 2 vehicle controllers for cooling and transmission management, data aquisition and dashboard visuali

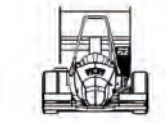
ROCHESTER

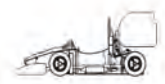
Rochester Institute of Technology

Car 17 **Pit 127** **WRL 149** United States

The RIT Formula Racing team is back in Germany since 2013. F23 is the culmination of the team's monocoque design efforts of the last four years. The main goals of this year's design were reliability and simplicity. F23 has more driving time on it than the lat three cars combined, and as already had a strong competition finish in Michigan this year. RIT Racing is looking to do even better here at Hockenheim!







FRAME CONSTRUCTION 1 piece composite monocoque

MATERIAL CFRP

OVERALL L/W/H (mm) 2941/1359/1173

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1143/1143

WEIGHT WITH 68kg DRIVER (Fr/Rr) 111/120

SUSPENSION Double unequal length A-Arm. Front Pull Rod and Rear Push Rod actuated coil overs

TYRES (Fr/Rr) 18x6-10 Hoosier R25B/18x6-10 Hoosier R25B

WHEELS (Fr/Rr) 7.0x10, 50mm offset 3 pc Al RIT custom center

ENGINE Turbocharged Yamaha WR450F

BORE/STROKE/CYLINDERS/DISPLACEMENT 95.0mm/63.4mm/1 cylinders/450cc

COMPRESSION RATIO 12.3:1

FUEL SYSTEM RIT developed injection, MoTeC M400 ECU, Speed Density calibration

FUEL E85

MAX POWER DESIGN 8000

MAX TORQUE DESIGN 6500

DRIVE TYPE Single Reduction Chain Type

DIFFERENTIAL Drexler

COOLING Side mount Mishimoto with CFRP shroud

BRAKE SYSTEM RIT Custom Design, Dual Piston , Internal Fluid Crossover, 28.3 mm bore, 2024 Aluminum

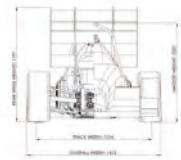
ELECTRONICS Racepak Smartwire; programmable current protection, logic based relays, 30 outputs, 12 inputs

ROMA

Sapienza University of Rome

Car 19 **Pit 50** **WRL 152** Italy

Sapienza Corse represents the mixture of engineering and passion for motorsport. In its eighth year students keep Gajarda fire burning. Many steps have been walked, and there are still many things to learn and improve. Every year a new team collects what's left from the past and improves what has been learned. New challenges are accepted every year, and there is no limit to what we want to reach. We just keep pushing, dreaming of a future in the automotive professional world.



FRAME CONSTRUCTION CFRP Monocoque

MATERIAL Carbon fibre lay-up with aluminum honeycomb core (10mm) and structural foam core (20mm)

OVERALL L/W/H (mm) 3072/1412/1197

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1595/1215/1162

WEIGHT WITH 68kg DRIVER (Fr/Rr) 119/146

SUSPENSION Double unequal lenght A-Arm. Pull rod actuated spring/damper. Adj. Roll bar

TYRES (Fr/Rr) 18.0 x 6.0 - 10 R25B Hoosier/20.5 x 7.0 - 13 R25B Hoosier

WHEELS (Fr/Rr) 6.0x10, -10mm offset, 2 pc carbon rim/7.5x13, -20mm offset, 2 pc carbon rim

ENGINE Modified Honda CBR600F

BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc

COMPRESSION RATIO 13:1

FUEL SYSTEM Electronic Injection Mectronik MKE6

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 11000

MAX TORQUE DESIGN 10500

DRIVE TYPE 4/8

DIFFERENTIAL Open Diff., Electronic self-locking control, Dinamically variable bias ratio

COOLING One radiator, mechanic pump, electronc flow controller

BRAKE SYSTEM Disk System, Steel, 212 mm diam. front hub mounted/190 mm diam. rear diff housing mounted

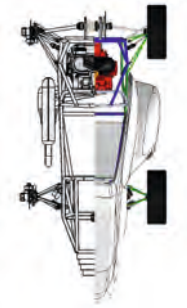
ELECTRONICS Mectronik MKE6 ECU, Electronic Shifting System, Electronic Differential Control

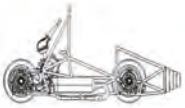
ROMA

University of Rome Tor Vergata

Car 91 **Pit 68** **WRL 241** Italy

Three years are passed from the establishment of Scuderia Tor Vergata and for the third year the team has decided to join FSG competition. The experience gained during the 2013 and 2014 events at FSG and FSAE Italy has been of fundamental importance in the design of the new vehicle. The team is so intentioned to improve the result achievede until now, introducing important news on the vehicle that will allow our drivers to reduce the time lap.





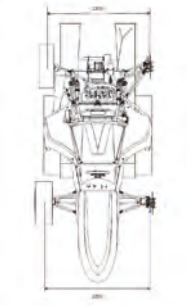
FRAME CONSTRUCTION Tubular space frame
MATERIAL AISI 4130 Steel
OVERALL L/W/H (mm) 2610/1390/1100
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1216/1176
WEIGHT WITH 68kg DRIVER (Fr/Rr) 134/164
SUSPENSION Double unequal length A-Arm. Pull rod. actuated spring/damper. Adj. Roll bar
TYRES (Fr/Rr) 200x72 R13, A90, Avon
WHEELS (Fr/Rr) 13", Pansini
ENGINE Honda CBR RR year 2007 4 cylinder
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 13.0:1
FUEL SYSTEM Injector 60mm before intake valve. Fuel Pressure 3.5 bar. 3-D map, RPM and Throttle position
FUEL 98 octane unloaded gasoline
MAX POWER DESIGN 11500
MAX TORQUE DESIGN 10000
DRIVE TYPE DID 520 steel chain
DIFFERENTIAL Drexler Limited Slip Differential V1
COOLING left side pod mounted radiator with ECU controlled electric fan
BRAKE SYSTEM 4-Disk system with 220mm diameter rotors, adjustable brake balance, AP Racing push master cylinder
ELECTRONICS gps, accelerometer, linear potenziometers, giroscope, electroactuated shift system, launch control

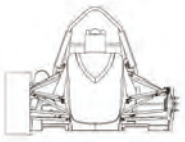
SAN SEBASTIÁN

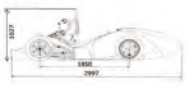
TECNUN - University of Navarra

Car 26 **Pit 70** **WRL 307** Spain

Tecnun Motorsport is a team of 46 students located in San Sebastian, northern Spain. The fstec15 is the 6th prototype developed by the team. As main improvements there is a considerable weight reduction, an improvement in handling and the addition of diffusers as a first step for developing aero packages. The team has developed new intake system with our partners Pixel Sistemas and Omega Composites. The drivetrain has been optimized in cooperation with GKN Driveline.







FRAME CONSTRUCTION Tubular space frame
MATERIAL Steel
OVERALL L/W/H (mm) / /
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1580/1250/1200
WEIGHT WITH 68kg DRIVER (Fr/Rr) /
SUSPENSION Double unequal and non parallel A-Arms. Push rod actuated in both axles.
TYRES (Fr/Rr)
WHEELS (Fr/Rr)
ENGINE Suzuki GSX-R 600 K6/K7
BORE/STROKE/CYLINDERS/DISPLACEMENT 62mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.5:1
FUEL SYSTEM
FUEL 98 octane
MAX POWER DESIGN
MAX TORQUE DESIGN
DRIVE TYPE
DIFFERENTIAL Salysbury type Drexler LSD
COOLING
BRAKE SYSTEM 4 outboard disk system with Galfer rotors. Adjustable brake balance
ELECTRONICS

SEATTLE

University of Washington

Car 6 **Pit 47** **WRL 31** United States

The UWashington Formula Motorsports team is proud to present a new and improved car for the 2015 season. The car features a modified 2014 Yamaha YFZ-450R engine, has a unidirectional carbon fiber monocoque chassis, integrated CV/hubs, a full aerodynamics package with a dynamic drag reduction system, a two-way telemetry system for real-time data acquisition, a tightly packaged drivetrain system that focuses on ease of manufacture and assembly, and new carbon fiber wheel shells are displayed.

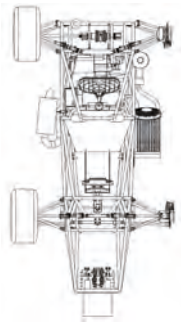
FRAME CONSTRUCTION Full carbon fiber monocoque chassis with aluminum honeycomb
MATERIAL Toray T700/2510 CFRP Prepreg, Hexcel CR-III 5056 Al Honeycomb
OVERALL L/W/H (mm) 2890/1469/1187
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1537/1270/1194
WEIGHT WITH 68kg DRIVER (Fr/Rr) 102/110
SUSPENSION Double unequal length a-arm, pull rod actuated in front, push rod actuated in rear.
TYRES (Fr/Rr) Hoosier 6.0/18.0-10 LC0 (front & rear)
WHEELS (Fr/Rr) Single piece graphite epoxy wheel shells with aluminum centers
ENGINE Modified 2014 Yamaha YFZ-450R
BORE/STROKE/CYLINDERS/DISPLACEMENT 99.0mm/68.5mm/1 cylinders/527cc
COMPRESSION RATIO 13.5:1
FUEL SYSTEM Student Developed Algorithm, Siemens Deka VII Injector (2-4 Cone Elliptical)
FUEL 98 octance unleaded gasoline
MAX POWER DESIGN 8200
MAX TORQUE DESIGN 6000
DRIVE TYPE 520 Chain Drive
DIFFERENTIAL Salisbury Type Differential With Replacable Ramps for Different Angles
COOLING Side mounted radiator
BRAKE SYSTEM Floating Cast Iron, Hub Mounted. 4 Piston in Front, Dual Piston in Rear
ELECTRONICS Student designed dash, ECU controlled shifts, ECU controlled DRS system. Enginelab Infinity 10

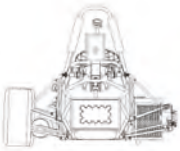
SEVILLA

University of Seville

Car 51 **Pit 72** **WRL 394** Spain

We are ARUS Andalucia Racing, the first team in the South of Spain. The team was born in November 2012, and this year we've built our second car, the ART-15. Last year our goal was to build a reliable combustion car, and we fulfilled it. This year, we want to keep the reliability but at the same time notably improve the performance!! (With the same or less money as last year). It's an ambitious target but we are working very hard to get it! By the way, now we have wings!





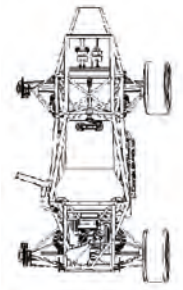
FRAME CONSTRUCTION Tubular steel spaceframe
MATERIAL Steel
OVERALL L/W/H (mm) 2942/1453/1105
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1250/1200
WEIGHT WITH 68kg DRIVER (Fr/Rr) 138/167
SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper.
TYRES (Fr/Rr) Hoosier 18x6x10
WHEELS (Fr/Rr) Braid Tenrace Fsae, 10²6
ENGINE 2006 Honda CBR600RR
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.0:1
FUEL SYSTEM Programmed single stage fuel injection
FUEL 98 octane gasoline
MAX POWER DESIGN 8000
MAX TORQUE DESIGN 7000
DRIVE TYPE Chain 525 drive to driven sprocket
DIFFERENTIAL Drexler FSAE Differential
COOLING Custom radiator and 12V electric fan
BRAKE SYSTEM Self-designed rotors, 195/187mm (front/rear) diameter, AP Racing calipers and master cylinder.
ELECTRONICS Link G4+ Storm Engine Management System

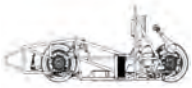
STRALSUND

University of Applied Sciences Stralsund

Car 81 **Pit 56** **WRL 171** Germany

In 1999, the first initiations of Baltic Racing were placed at UAS Stralsund. Meanwhile, it's the largest project at the university and one of the flagship projects. The "TY2015", the 16th race car from Stralsund, will start at this year's FSC. The knowledge and experience of many FS years are reflected in this car. The challenge for this year was to fix the problems of last year car and to reduce weight even more.





FRAME CONSTRUCTION tubular space frame
MATERIAL 25CrMo4
OVERALL L/W/H (mm) 2580/1364/965
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1200/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 117/127
SUSPENSION Double unequal length nonparallel A-Arm. Pull rod actuated front and rear
TYRES (Fr/Rr) 205/510 R13, Continental
WHEELS (Fr/Rr) O.Z. 7x13, 22mm offset, Al Rim
ENGINE Borossi BT 450 MX 1 cylinder
BORE/STROKE/CYLINDERS/DISPLACEMENT 96mm/62.1mm/1 cylinders/450cc
COMPRESSION RATIO 11:1
FUEL SYSTEM selfdesigned fuel injection system using EcuMaster ECU, full sequential
FUEL 98 octane unleaded gasoline
MAX POWER DESIGN 8000
MAX TORQUE DESIGN 5500
DRIVE TYPE Chain #520 MAD6
DIFFERENTIAL torque biasing Torsen B (Quaife), selfmade 7075 T6 hard-anodized housing
COOLING aluminium radiator on left side; electric fan integr. in nozzle of cooling duct
BRAKE SYSTEM 4 disc system; self developed rotors 200mm rotors; ISR brake calipers, APRacing Master Cylinders
ELECTRONICS multifunctional display with live data from various sensors; electronic shifting system

STUTTGART

University of Stuttgart

Car 2 **Pit 60** **WRL 21** Germany

The know-how of 10 years Rennteam Uni Stuttgart come together with innovative ideas in the car's development. As flexibility plays a big role for us, we have built a chassis that consists of a CFRP-monocoque and a steeltube-rearframe to ease maintenance on engine- and drivetrain parts as well as the rearframe's wiring harness. To keep the innovative engineering solutions up to date, we have developed a third-spring-suspension that assures lightweight and increases corner performance.

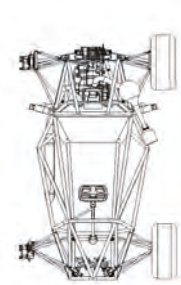
FRAME CONSTRUCTION Singlepiece Monocoque with tubular rearframe
MATERIAL CFRP Sandwich Monocoque, steel rearframe
OVERALL L/W/H (mm) 3050/1383/1190
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1630/1140/1120
WEIGHT WITH 68kg DRIVER (Fr/Rr) 121/127
SUSPENSION Double unequal length A-Arm. Heave-Spring system front and rear
TYRES (Fr/Rr) 10x7.5 - 18 R25B Hoosier
WHEELS (Fr/Rr) 10x7.5 - 18 R25B Hoosier
ENGINE Modified Yamaha YZF-R6
BORE/STROKE/CYLINDERS/DISPLACEMENT 65,5mm/44,5mm/4 cylinders/599cc
COMPRESSION RATIO 12,4:1
FUEL SYSTEM student build fuel injection system using MoTec, fully sequential
FUEL E85
MAX POWER DESIGN 10000
MAX TORQUE DESIGN 7500
DRIVE TYPE sequential 4-Speed Gearbox
DIFFERENTIAL Drexler LSD
COOLING 900 cc radiator mounted in sidepod, 2 electric fans
BRAKE SYSTEM 4-Disk system, adjustable brake balance, self designed rotors
ELECTRONICS wiring harness, single connector to rear-frame, digital multifunctional Steering Wheel

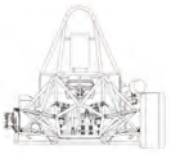
TORONTO

University of Toronto

Car 39 **Pit 81** **WRL 316** Canada

The University of Toronto Formula SAE Racing Team was founded in 1999 and has had many successful years in its 16 year history. We would like to thank our great sponsors for their support, our passion is only possible because of you.





FRAME CONSTRUCTION Lightweight steel tube space-frame

MATERIAL 1020 mild steel

OVERALL L/W/H (mm) 2254/1391/1166

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1506/1194/1168

WEIGHT WITH 68kg DRIVER (Fr/Rr) 104/127

SUSPENSION Double unequal length A-Arm, push rod actuated spring and damper

TYRES (Fr/Rr) 18x6-10 Hoosier LC0

WHEELS (Fr/Rr) 6x10, 75mm offset, 1 pc Al

ENGINE Honda TRX450ER

BORE/STROKE/CYLINDERS/DISPLACEMENT 96mm/62mm/1 cylinders/449cc

COMPRESSION RATIO 12:1

FUEL SYSTEM Student designed EFI

FUEL 95 octane gasoline

MAX POWER DESIGN 7500

MAX TORQUE DESIGN 6000

DRIVE TYPE 520 Chain

DIFFERENTIAL Drexler Clutch-type limited slip differential

COOLING Dual side-mounted radiators with thermostat and electric fan

BRAKE SYSTEM Lasercut mild steel rotors, adjustable pedal tray, adjustable brake bias

ELECTRONICS PE3 ECU, minimalistic harness, 2D datalog-ging system with 64-channel CAN capability

ULM

University of Applied Sciences Ulm

Car 44 **Pit 64** **WRL 277** Germany

The Einstein Motorsport Team was founded in 2006. The first car built by students from Ulm started at Hockenheim in 2006. The actual car for 2015 is car number nine in the team's history. Starting with the AI'06 (ALbert), every car was a continuous development with adoption of the parts which were proved in former cars. With a carbon monocoque and a Husaberg single-cylinder engine the AI'15 will be the first car with a set of aerodynamic devices - and hopefully the most competitive one.

FRAME CONSTRUCTION integral monocoque (vertical se-paration), made from carbon composite, injection molding

MATERIAL Basic Lay-Up with foam; Plies: 0/90, +45/0/-45, foam, +45/0/-45, 0/90, alu honeycomb crashbox

OVERALL L/W/H (mm) 2600/1439/1190

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1580/1215/1180

WEIGHT WITH 68kg DRIVER (Fr/Rr) 132/143

SUSPENSION Double unequal length A-Arm, Pullrod actu-ated air-damper, adjustable in comp./rebound(high/low)

TYRES (Fr/Rr) 3 pc BBS rim/1pc CFK rim

WHEELS (Fr/Rr) 20x7-13 R25B Hoosier

ENGINE Husaberg FE570,camshaft/gear sensor, mod. cyl-head

BORE/STROKE/CYLINDERS/DISPLACEMENT 100mm/72.0mm/1 cylinders/565cc

COMPRESSION RATIO 12.2:1

FUEL SYSTEM Bosch, manifold sequential fuel injection,digital electronic ignition, inductive discharge ignition

FUEL unleaded fuel 98 ROZ

MAX POWER DESIGN 7100

MAX TORQUE DESIGN 5900

DRIVE TYPE 5-Speed Gearbox with Chain Transmission

DIFFERENTIAL GKN limited slip differential, student built housing, adjustable TBR

COOLING Aluminium radiator, 246mm electric fan, tempe-rature controlled fan speed

BRAKE SYSTEM self-developed rotors (steel), 4-piston front, 2-piston rear, Floater 5x7mm diameter (per rotor)

ELECTRONICS Electronic Shifting, Electrohydraulic Clutch, Multifunctional Steering Wheel, ETC, Live-Tele-metry

UXBRIDGE

Brunel University London

Car 66 **Pit 69** **WRL 100** United Kingdom

Brunel Racing is the Undergraduate team of BEng & MEng students from Brunel University London.BR-SIXTEEN, our 17th entrant, is a big departure from previous Brunel Racing cars. Our previous concept of car was reaching a development dead-end. In order to have realistic ambitions of becoming Top UK team, and reliably being within the Top 10, the team needed a radical re-think.The result is a clean sheet design; every top level decision has been reassessed using mathematical models and competit

FRAME CONSTRUCTION Hybrid front monocoque & rear space frame, stressed engine sump, rear bulkhead

MATERIAL Al honeycomb monocoque, 4130 rear frame & roll hoops, rear Al bulkhead

OVERALL L/W/H (mm) 2940/1377/1194

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1220/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 131/137

SUSPENSION Double unequal length wishbone A-arm pull (front) push (front) actuation with ARB and third spring

TYRES (Fr/Rr)

WHEELS (Fr/Rr)

ENGINE

BORE/STROKE/CYLINDERS/DISPLACEMENT mm/mm/ cylinders/cc

COMPRESSION RATIO

FUEL SYSTEM

FUEL

MAX POWER DESIGN

MAX TORQUE DESIGN

DRIVE TYPE

DIFFERENTIAL

COOLING

BRAKE SYSTEM

ELECTRONICS

WIR BEI ZF. STUDENTEN UND MOTORSPORT-FREUNDE.

Es darf gefeiert werden – und zwar doppelt. Denn nicht nur die ZF Friedrichshafen AG, einer der weltweit führenden Technologiekonzerne in der Antriebs- und Fahrwerktechnik sowie der aktiven und passiven Sicherheitstechnik, feiert Jubiläum. Auch der von ZF unterstützte Konstruktionswettbewerb für Studenten „Formula Student Germany“ freut sich über 10 Jahre voller Leidenschaft für Rennsport und Mobilität. ZF gratuliert herzlich und freut sich, auch weiterhin bei „Formula Student Germany“ am Start zu sein.

MOTION AND MOBILITY

100 YEARS MOTION AND MOBILITY

twitter.com/zf_konzern
facebook.com/zffriedrichshafen
youtube.com/zffriedrichshafenag

Scan den Code und erfahre mehr über uns und die Arbeit bei ZF:

VALÉNCIA

Universitat Politécnica de Valéncia

Car 95 **Pit 51** **WRL 357** Spain

For the 2014-2015 season, FSUPV Team faces its second year in the competition, trying to improve the performance and reliability from last year.

FRAME CONSTRUCTION Mid carbon fiber/aramid honeycomb core and rear steel tubular space frame

MATERIAL Carbon Fiber Prepreg and aramid honeycomb sandwich panel

OVERALL L/W/H (mm) 3038/1390/1195

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1585/1200/1170

WEIGHT WITH 68kg DRIVER (Fr/Rr) 134/146

SUSPENSION Double unequal length A-arm push rod (Front and Rear)

TYRES (Fr/Rr) 20.5 x 7.0 x 13 Hoosier R25 B

WHEELS (Fr/Rr) 7.0x13 Mg Rim

ENGINE Honda CBR 600 RR

BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc

COMPRESSION RATIO 12:1

FUEL SYSTEM Student des/built, fuel injection

FUEL 98 octane

MAX POWER DESIGN 11500

MAX TORQUE DESIGN 9750

DRIVE TYPE 520 o-ring chain

DIFFERENTIAL Drexler LSD

COOLING Single fan-aided radiator

BRAKE SYSTEM 4-Disk system, self developed rotors with 220mm diameter, adjustable brake balance

ELECTRONICS Electropneumatic Shifting System, Traction Control

VELLORE

VIT University - Vellore

Car 54 **Pit 74** **WRL 313** India

Pravega Racing is one of the fastest growing formula student team in India.The word ‚Pravega' originates from sanskrit meaning ‚ACCELERATION'. With a hard working and dedicated team this year they have reduced their car weight by using smart engineering materials. They have optimized the dynamic performance of the car by tuning power train and vehicle dynamic using data acquisition.They have also used various efficient manufacturing to reduce lead time and improve performance.

FRAME CONSTRUCTION Tubular Space Frame AISI 1020 Steel.

MATERIAL AISI 1020 Steel

OVERALL L/W/H (mm) 2675/1505/1314

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1564/1150/1100

WEIGHT WITH 68kg DRIVER (Fr/Rr) 135/153

SUSPENSION Double unequal length A-Arm. Front:Pull rod actuated coil-over .Rear:Push rod actuated coil-over.

TYRES (Fr/Rr) 205/510 R13 Continental 34M / 205/510 R13 Continental 34M

WHEELS (Fr/Rr) 7x13, 22.5mm offset, 1 piece Al rim / 7x13, 22.5mm offset, 1 piece Al rim

ENGINE Honda CBR600RR

BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc

COMPRESSION RATIO 12.2:1

FUEL SYSTEM Denso High Impedence sequential Injectors, Bosch External Electric Fuel Pump.

FUEL RON 98

MAX POWER DESIGN 9700

MAX TORQUE DESIGN 9200

DRIVE TYPE Chain drive, Chain 520, pitch 5/8 inch.

DIFFERENTIAL Drexler FSAE Limited Slip Differential , 30Nm preload.

COOLING Side mounted 28x34cm aluminium radiator with thermostat controlled electric fan.

BRAKE SYSTEM 4-Disk system, self developed rotors with diameter 240 front and 220 Rear, adjustable brake balance.

ELECTRONICS Student built Pneumatic Gear and Clutch Control system with Launch and Traction Control.

VIGO

University of Vigo

Car 46 **Pit 113** Spain

We are a first year FS team composed of 14 engineering students of different disciplines. We have been working very hard the last year and a half to get sponsors, design and build our prototype. Since the beginning, we targeted reducing the car weight as much as possible, and develop electronic systems which will allow us a better understanding of the car dynamics by showing the telemetry to the driver. Our project has a reduced budget, so we have looked for the best prize/performance ratio.

FRAME CONSTRUCTION Tubular frame

MATERIAL AISI 4130 steel round tubing 25.4mm O.D.

OVERALL L/W/H (mm) 2800/1480/1080

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1200/1100

WEIGHT WITH 68kg DRIVER (Fr/Rr) 95/115

SUSPENSION Double Unequal A- Arm pull rod suspension. Coilover 52 N/mm

TYRES (Fr/Rr) 205x45 R13, Hoosier B25B/205x45 R13, Hoosier B25B

WHEELS (Fr/Rr) 7x13 ET30 Magnesium cast rim/7x13 ET30 Magnesium cast rim

ENGINE Aprilia SX55

BORE/STROKE/CYLINDERS/DISPLACEMENT 80mm/55mm/2 cylinders/553cc

COMPRESSION RATIO 12:1

FUEL SYSTEM Random-sequential electronic injection controlled by PE3 ECU with wasted-spark ignition

FUEL 98 octane unleaded gasoline

MAX POWER DESIGN 10900

MAX TORQUE DESIGN 8750

DRIVE TYPE Chain (520) with stock gearbox

DIFFERENTIAL Drexler Limit Slip Differential (LSD). Fully configurable preload

COOLING Bilateral mounted 150x240mm core radiator , 138 cfm fan mounted in each radiator

BRAKE SYSTEM 4 floating disk system, 220mm diam. Valve proportioning. Remote brake bias adjust.

ELECTRONICS Electric assisted gear switch. 7" touch-screen dash showing telemetry. Self designed data logger

VOLOS

University of Thessaly

Car 57 **Pit 71** **WRL 269** Greece

Centaurus Racing Team is the FSAE team of University of Thessaly in Greece. The team was established in 2009 and since then it has participated in four FSAE competitions over the last four years. The founding basis of the team was innovation in racing technology and engineering, while creating a knowledge base from which all students could benefit. The team is participating in FSG for the first time with it's 2nd racecar, Nessus R, and is represented by 15 members.

FRAME CONSTRUCTION Tubular Space frame
MATERIAL 4130 steel tubing w/ 1020 steel brackets
OVERALL L/W/H (mm) 2250/1400/730
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1555/1236/1168
WEIGHT WITH 68kg DRIVER (Fr/Rr) 144/176
SUSPENSION Front: Double unequal length A-arm, Pushrod/Pullrod actuated
TYRES (Fr/Rr) Avon 7.2/20.0 R13 A45
WHEELS (Fr/Rr) 7.0x13 , ET22, Forged aluminum
ENGINE CBR600RR ,07
BORE/STROKE/CYLINDERS/DISPLACEMENT 67mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.2:1
FUEL SYSTEM CBR's stock fuel injection rail, controlled by Megasquirt ECU
FUEL 98 octane unleaded gasoline
MAX POWER DESIGN 12000
MAX TORQUE DESIGN 8500
DRIVE TYPE Stock
DIFFERENTIAL Quaife ATB helical LSD differential
COOLING Rear mounted, 390 mmx270 mm x35 al radiator, 800 cfm thermostatic fan
BRAKE SYSTEM 4-Disk System, Vented rotors w/ 223mm diam front & 206 rear, brake bias & Proportioning valve
ELECTRONICS Student Built Harness, Flatshift & Launch Control Module, Electropneumatic Shifting.

WEINGARTEN

University of Applied Sciences Ravensburg-Weingarten

Car 60 **Pit 107** **WRL 64** Germany

The Formula Student Team Weingarten consists of about 38 students, who spent one year to build their own Formula Student car. The main aim of the 2015 car, the „Stinger 15" was to improve the speed and the reliability of the car. All in all the goal was to reduce our weight, but still prevent the stability of the car. To improve our performance on the track a new aerodynamic package was developed and the driving dynamics were improved radically.

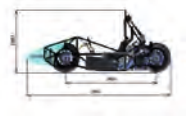
FRAME CONSTRUCTION Steel tubular space frame reinforced with CFRP panels
MATERIAL
OVERALL L/W/H (mm) 3068/1400/1180
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1200/1180
WEIGHT WITH 68kg DRIVER (Fr/Rr) /
SUSPENSION Double unequal length A-Arm. Pull rod actuated horizontally oriented spring and damper
TYRES (Fr/Rr) 205x7 R13 Hoosier R25B
WHEELS (Fr/Rr)
ENGINE Modified Honda CBR600RR PC40
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 12.2:1
FUEL SYSTEM Bosch MS4 Sport ECU with lost spark ignition
FUEL 98 octane unleaded gasoline
MAX POWER DESIGN
MAX TORQUE DESIGN
DRIVE TYPE Chaindrive
DIFFERENTIAL Drexler LSD
COOLING Sidepod mounted radiator
BRAKE SYSTEM 4-Disk system, self developed rotors, adjustable brake balance
ELECTRONICS self-developed display

WROCŁAW

Wrocław University of Technology

Car 110 **Pit 59** **WRL 180** Poland

PWR Racing Team has been established in 2008. Since then 1 virtual project and 4 physical cars have been created. The last car – RT05 – is definitely the most successful one. It is a simple construction based on steel space frame and Honda CBR 600RR engine. The idea behind the design was to create a good base for future development. With several completed events, including FSAE Italy and FSAE Michigan, the car proves to be reliable and easily serviceable, while maintaining top performance.



FRAME CONSTRUCTION tubular steel space frame
MATERIAL Chromium-molybdenum alloy steel (4130). Tube sizes of 1"x0,035" up to 1"x0,095"
OVERALL L/W/H (mm) 2550/1428/1097
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1610/1230/1230
WEIGHT WITH 68kg DRIVER (Fr/Rr) 128/156
SUSPENSION
TYRES (Fr/Rr)
WHEELS (Fr/Rr)
ENGINE
BORE/STROKE/CYLINDERS/DISPLACEMENT mm/mm/ cylinders/cc
COMPRESSION RATIO
FUEL SYSTEM
FUEL
MAX POWER DESIGN
MAX TORQUE DESIGN
DRIVE TYPE
DIFFERENTIAL
COOLING
BRAKE SYSTEM
ELECTRONICS

WUPPERTAL

University of Wuppertal

Car 14 **Pit 57** **WRL 344** Germany

After a difficult year 2014 for new generation with troubles in all kind of forms, GreenLion Racing wants to hit back and build on 2013's performance in our 4th FSG Event. With the support of first generation members and new members the base is given to mark the next step in GLR history. 10" rims, reducted weight and detailed developments: We try our best and hope to see and to beat you on track!

FRAME CONSTRUCTION Tubular steel space frame
MATERIAL E 355+N, round tubing 25mm diameter
OVERALL L/W/H (mm) 2588/1360/1059
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1560/1200/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 123/150
SUSPENSION Double unequal length A-Arm. Pushrod actuated spring and damper on front and rear suspension
TYRES (Fr/Rr) 18.0/6.0-10 Hoosier R25B 18.0/6.0-10 Hoosier WET
WHEELS (Fr/Rr) Braid Sturace 6.0x10.0, 23mm offset, Aluminium
ENGINE Modified Yamaha YZF-R6 (RJ15)
BORE/STROKE/CYLINDERS/DISPLACEMENT 67.0mm/42.5mm/4 cylinders/599cc
COMPRESSION RATIO 13.1:1
FUEL SYSTEM Student built fuel injection system using Bosch MS4 Sport
FUEL 98 octan unleaded gasoline
MAX POWER DESIGN 11800
MAX TORQUE DESIGN 11000
DRIVE TYPE X-Ring Chain
DIFFERENTIAL Pressure ring based limited slip Clutch pack differential with internal preload adjustment
COOLING Side mounted radiator, 285mm ECU controlled electric fan with ducting, electric water pump with maxi
BRAKE SYSTEM 4-Disk system, self developed rotors with 195/18mm diameter (f/r), drive adjustable brake balance
ELECTRONICS steering wheel with integrated multifunctional display

Formula Student World – Ranking List

Due to the variance of the international competitions and with respect to the growing size of the Formula SAE/Formula Student network and scene the FS-world team discussed and decided to come up with a way to consolidate the results of all competitions that are carried out with respect to the official rules of AE/ Formula Student.
The clear target was and is to allow any team to see and communicate upon its development and its success as well in comparison to teams that are due to financial and/or geographical reasons out of any reach for a team of students to step into direct competition. Additionally to that the world ranking is established in the very fir t moment with a significant hi tory over the last years. Target is to allow all teams to see how it is developing and to identify the consistency in working and developing each team's performance.

Even if the world ranking shows and respects results and points in this ranking there are no winners, only placed teams. For us, the FS-world team, any team that manages to design and build a car besides their studies, to assemble it, to test it and to show up at any event in the world is a clear winner.

$$WRP = \sum_{n=1}^{6} s_{n0} \times a_{n0} \times \mathrm{P}_n \times c_n$$

WRP = World Ranking Points

n = event index, 1 = latest event, 2 = second latest event, ...

s_{n0} = normalized season factor for event n

a_{n0} = normalized actuality factor for event n

P_n = overall Points from event n

c_n = competitiveness of event n

http://www.fs-world.org

Teamprofile
Electric

1500 students

40 teams

15 nations

AACHEN
RWTH Aachen University

Car E99 | **Pit 1** | **WRL 41** | Germany

Ecurie Aix is the Formula Student Team of RWTH Aachen University and was founded in 1999. Since then, the team has designed and built 10 cars with IC engines and 4 with electric engines. With our current car, the eace04 aka „Maren", we participate in the Formula Student competitions at Silverstone, Hockenheim and Spielberg.

FRAME CONSTRUCTION Two Piece CFRP Frame
MATERIAL Rohacell and aluminium honeycomb sandwich
OVERALL L/W/H (mm) 2980/1380/1175
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1250/1200
WEIGHT WITH 68kg DRIVER (Fr/Rr) 125/151
SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper
TYRES (Fr/Rr) Hoosier R25B 205x70 R13
WHEELS (Fr/Rr) 7x13, -25mm offset, 3 pc Al/CFRP Rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear/42kW each
MOTOR TYPE permanent excited transversal flux synchron
MAX MOTOR RPM 10000
MOTOR CONTROLLER ETAS ES910
MAX SYSTEM VOLTAGE 403V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY Li-Ion/6,7kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:6,39/-
DRIVE TYPE planetary gear set
DIFFERENTIAL Torque Vectoring
COOLING sidepod mounted radiotor
BRAKE SYSTEM 42CrMo4 Laser Cut, floating, outer 240mm hub mount, adjustable brake balance, recuperation
ELECTRONICS selfdesigned Live-Telemetry system, selfdesigned BMS,

AALEN
Hochschule für Technik und Wirtschaft Aalen

Car E61 | **Pit 11** | **WRL 58** | Germany

The E-Motion Rennteam Aalen was founded in 2009 at the UAS Aalen. After 2 cars and competing at FSI in 2013 and 2014, it is the first time for us to compete at FSG in Hockenheim. We had big goals for the ERT-04/15, such as loosing 70kg to last seasons car. An early Rollout at May,8th gave us the opportunity to have a long testing phase for a reliable car.Being able to participate at FSG is a huge milestone for us! We are ready...

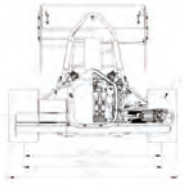
FRAME CONSTRUCTION tubular space frame
MATERIAL E355 steel
OVERALL L/W/H (mm) 2770/1370/1040
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1177/1135
WEIGHT WITH 68kg DRIVER (Fr/Rr) 139/146
SUSPENSION Double unequal lenght A-Arm. Push and Pull rod actuated. Gas Shocks adjustable compression/rebound.
TYRES (Fr/Rr) 7.0/20.0-13 Hillclimb Avon - OZ Racing Magnesium Rim 30mm offset
WHEELS (Fr/Rr) 7.0/20.0-13 Hillclimb Avon - OZ Racing Magnesium Rim 30mm offset
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/Rear Center/80kW
MOTOR TYPE Yasa 400 axial flux electric motor.
MAX MOTOR RPM 4500
MOTOR CONTROLLER SEVCON GEN 4 size 8
MAX SYSTEM VOLTAGE 400V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/6,66kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3/
DRIVE TYPE Chain drive
DIFFERENTIAL locking differential
COOLING 2 side mounted 600cc intercoolers
BRAKE SYSTEM 4-Disk system, 230mm and 4k front, 190mm and 2k rear, adjustable break balance
ELECTRONICS Multifunctional Steering Wheel, selfdesigned AMS,TSL, etc.

AMBERG

Ostbayerische Technische Hochschule Amberg-Weiden (OTH)

Car E23 **Pit 14** **WRL 30** Germany

The Running Snail Racing Team was established in August 2004 at the OTH Amberg-Weiden. After building eight combustion cars, the „RS15“ is our third generation electric powered racecar. With the RS15 the team completetly rethought the design of the car and changed almost every aspect, planning to set a whole new standard for the next seasons. Achieving a reduction of weight while simultaneously increasing the power of the car was set a target.For further information visit www.running-snail.de



FRAME CONSTRUCTION Composite CFRP/aluminium sandwich monocoque

MATERIAL Prepreg CE 8201-200-45S; IMS65 E23 24K 830tex; Plascore PAMG-XR1-4.5-1; Hardpoints: birch multiplex

OVERALL L/W/H (mm) 2920/1451/1183

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1525/1200/1180

WEIGHT WITH 68kg DRIVER (Fr/Rr) 130/137

SUSPENSION Double unequal length A-Arm, Pushrod actuated spring/damper-unit and adjustable U-type anti-roll bar

TYRES (Fr/Rr) Hoosier 18x7.5-10 R25b, Hoosier 18x6-10 LCO (front+rear)

WHEELS (Fr/Rr) 7 inch CFRP-Rim with Al-alloy Rimcenter (front+rear)

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/all 4 wheelhubs/36 kW

MOTOR TYPE Custom-built Fischer Elektromotoren

MAX MOTOR RPM 18500

MOTOR CONTROLLER Lenze Schmidhauser-Mobile DCU 30/30

MAX SYSTEM VOLTAGE 600

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo, LiCoO2 (Cathode), Graphite (Anode)/7,5 kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 13,01:1/-

DRIVE TYPE 1.5-stage planetary gearbox

DIFFERENTIAL Torque Vectoring

COOLING 2 circuits (motors/inverters), 2 radiators

BRAKE SYSTEM 4-Disk system, semi-floating, hub mounted, 175 mm diameter, 2x ISR 22-048 (fr), 2x ISR 22-049 (rr)

ELECTRONICS selfdesigned CCU, telemetry system, 3-axis gyro and AMS; driver assist system

AUGSBURG

University of Applied Sciences Augsburg

Car E69 **Pit 34** **WRL 36** Germany

Starkstrom Augsburg participates this year with the fourth race car in history of the association. The Car is named „Cedur“, after a character of the „Augsburger Puppenkiste“. This season the main target was to get a highly reliable and well tested car. Therefore we improved our construction and manufacturing process, because we are producing a huge amount of parts by ourselves. As remarkable novelties of „Cedur“ should be named the DRS, the own developed AMS and the new power train.

FRAME CONSTRUCTION One piece Composite mono-coque with tubular roll bars

MATERIAL Carbon fiber with ROHACELL foam core/S355 steel main hoop/EN AW 6061 aluminum front hoop

OVERALL L/W/H (mm) 2875/1465/1120

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1250/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 132/178

SUSPENSION Double unequal length A-Arms, Pull rod actuated horizontally oriented spring and damper.

TYRES (Fr/Rr) 205/510 R13 34 M, Continental

WHEELS (Fr/Rr) 7x13, 22mm offset, hybrid rim with carbon rim base aluminum rim star

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Left, Rear Right/40kW

MOTOR TYPE RR, RL: Enstoj Emrax 207

MAX MOTOR RPM RR,RL: 6000

MOTOR CONTROLLER Infineon Hyprid Pack 1 Pin Fin

MAX SYSTEM VOLTAGE 403V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/6.66kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 108:23/n/a

DRIVE TYPE One stage transmission gear

DIFFERENTIAL n/a

COOLING One side pod mounted radiotor cooled by airstream

BRAKE SYSTEM 4-Disk system, self developed rotors, adjustable brake balance

ELECTRONICS Multifunctional Steering Wheel, Torque Vectoring, Traction Control, selfdesigned AMS, EMC shielding

BARCELONA

PT University of Catalonia - Engineering School of Barcelona

Car E54 **Pit 9** **WRL 47** Spain

ETSEIB Motorsport is the FSE team from Barcelona. This year we are presenting our eitght car, totally new designed from scratch. New chassis, new powertain, new aero, new dynamics... Lots of effort done by the 30 members of the team, that for sure will result in the best results of the team in FS competitions. For further information you are welcome to visit our pit.

FRAME CONSTRUCTION Full CFRP Monocoque

MATERIAL 245 T2 carbon prepreg

OVERALL L/W/H (mm) 3086/1410/1178

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1200/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 127/156

SUSPENSION Double unequal length A-Arm. Push rod actuated. Horizontally oriented spring and damper

TYRES (Fr/Rr) Hoosier 18.0x6.0 R10 LCO

WHEELS (Fr/Rr) 7x10, 35 mm Offset, 1 pc, Al Rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/Rear middle/80 kW

MOTOR TYPE Enstroj Emrax 228

MAX MOTOR RPM 5000

MOTOR CONTROLLER Unitek Bamocar D3 400/400 RS

MAX SYSTEM VOLTAGE 398

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3,65/N/A

DRIVE TYPE Two-stage spur gear

DIFFERENTIAL Drexler LSD differential preload adjustment

COOLING Left side mounted radiator, 30 mm electric fans

BRAKE SYSTEM 4-Disk system, self developed rotors with 179mm diameter, adjustable brake balance,

ELECTRONICS wiring harness sealed to IP67, selfdesigned Live-Telemetry System, self-developet ECUs

BAYREUTH

University of Bayreuth

Car E12 **Pit 4** **WRL 32** Germany

Elefant Racing e.V. was founded in spring 2004 at the University of Bayreuth. Since 2010/11 we develop electrically powered vehicles. For our latest race car, the "FR15 Valkyrie", we focused on weight reduction of the chasis. Therefore we switched from a steel tube space frame to a full CFRP monocoque. Furthermore, our car features a self-developed and programmed battery management system. For further information, or to just to have a good time with us, you are very welcome to visit our pit.

FRAME CONSTRUCTION Full CFRP monocoque with tubular steel roll bars

MATERIAL CFRP prepreg (twill 2/2 and UD) with aluminum honeycomb sandwich structure

OVERALL L/W/H (mm) 2482/1406/1107

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 126/130

SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper.

TYRES (Fr/Rr) Hoosier 18x6.0-10, R25B

WHEELS (Fr/Rr) 6.0x10, 25mm offset, CFRP-Al Hybrid Rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/Rear Mid/80 kW

MOTOR TYPE Enstroj Emrax 228 MidVoltage LC

MAX MOTOR RPM 4800

MOTOR CONTROLLER Custom modified Unitek Bamocar D3

MAX SYSTEM VOLTAGE 529V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo with AL and CuNi Tabs/5.83

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3,0/

DRIVE TYPE Polychain belt drive

DIFFERENTIAL Drexler FSAE Differential

COOLING Rear mounted radiator with two 120mm fans attached to a parallel water cooling system

BRAKE SYSTEM 4-Disk system, self developed steel alloy rotors with 172mm diameter, adjustable brake balance

ELECTRONICS Sensor node system connected via ethernet, self developed ECU and live telemetry

BEIJING

Beijing Institute of Technology

Car E66 **Pit 15** China

Beijing Institute of Technology Formula Racing Studio has always been working on the target " To be a first-class formula student racing team in the world." since it was founded in October 2009 by participating in 7 competitions at home and abroad with 8 originally designed and self-manufactured formula race cars. BIT Electric Formula Racing Team was founded in 2011 inside the Studio, which is the first FSE team in China and the first Chinese electric formula racing team to take part in FSG.

FRAME CONSTRUCTION Tubular space frame

MATERIAL 4130 steel round tubing

OVERALL L/W/H (mm) 2584/1392/1138

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1180/1140

WEIGHT WITH 68kg DRIVER (Fr/Rr) 135/169

SUSPENSION Double unequal length A-Arm.Pull rod actuated horizontally oriented spring and damper

TYRES (Fr/Rr) 18X6-10 R25B Hoosier/18X6-10 R25B Hoosier

WHEELS (Fr/Rr) 7x10, 12.7mm offset,2 pc Al Rim/7x10, 12.7mm offset,2 pc Al Rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/Rear/80kW

MOTOR TYPE PMSM

MAX MOTOR RPM 12000

MOTOR CONTROLLER SKAI 2 HV 3-phase IGBT Inverters

MAX SYSTEM VOLTAGE 302V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/6.65kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:2.8/1:2.37

DRIVE TYPE Planetary reducer& Chain trainsmission

DIFFERENTIAL limited slip differential

COOLING Water

BRAKE SYSTEM 4-Disk system, self developed rotors with 190mm diameter, adjustable brake balance

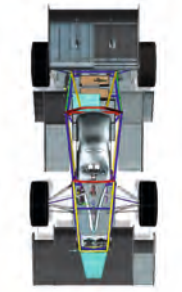
ELECTRONICS Traction control, Custom built data logger, ZIGBEE & Bluetooth, Highspeed CAN 2.0 B

BRATISLAVA

Slovak University of Technology in Bratislava

Car E90 **Pit 3** **WRL 56** Slovakia

STUBA Green Team is a Slovak student team currently consisting of about 30 members. The team was established in 2009 at Faculty of Mechanical Engineering of Slovak University of Technology and has been taking part in FSE events ever since. Our 2015 formula car represents an apparent step forward in both engineering design and aesthetics.



FRAME CONSTRUCTION Tubular space frame

MATERIAL 25CrMo4

OVERALL L/W/H (mm) 3040/1423/1268

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1570/1220/1185

WEIGHT WITH 68kg DRIVER (Fr/Rr) 202/136

SUSPENSION Double unequal length A-Arm. Pull rod actuated spring/damper. Adj. Roll bar.

TYRES (Fr/Rr) 205x44 R13 Continental/205x44 R13 Continental

WHEELS (Fr/Rr) Braid 7x13, 18mm offset

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/70kW each

MOTOR TYPE AC-Motors, permanent magnet, synchronous

MAX MOTOR RPM 6000

MOTOR CONTROLLER Unitek Bamocar-D3

MAX SYSTEM VOLTAGE 467V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/3036

TRANSMISSION RATIO (PRIMARY/SECONDARY) 4.43/N/A

DRIVE TYPE two seeparate planetary gearboxes

DIFFERENTIAL driver adjustable electronic differential.

COOLING Twin side pod mounted radiators with thermostatic controlled electric fans

BRAKE SYSTEM Stainless steel full flating rotors, 240 mm front, 220 rear,AP RACING callipers, 4 pistons FR, 2 rea

ELECTRONICS HV sealed to IP67, Multifunctional Steering Wheel, Live-Telemetry System, Traction & Launch control

BREMEN

University of Bremen

Car E72 **Pit 28** **WRL 61** Germany

It´s not what you do. It´s how you do it. And why.#WorkSmartRaceHardIntrinsic Motivation is why we never rest on achieved goals.#WorkSmarterRaceHarder

FRAME CONSTRUCTION Full CFRP-monocoque with foam sandwich structure

MATERIAL UD, Biax, twill, Coppermesh, Rohacell foam

OVERALL L/W/H (mm) 3050/1380/1170

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1540/1180/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 145/151

SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper.

TYRES (Fr/Rr) 18.0x6.0-10/18.0x7.5-10 Hoosier R25B

WHEELS (Fr/Rr) 5.75x10/7.75x10, 30mm offset. self-designed inner Al rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/80kW

MOTOR TYPE Enstroj Emrax 207 HV LC

MAX MOTOR RPM 6000

MOTOR CONTROLLER self-designed motor controller

MAX SYSTEM VOLTAGE 453V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/7.26kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3.29/n/a

DRIVE TYPE one step planetary gear drive

DIFFERENTIAL torque vectoring

COOLING watercooled motors and motor controller, twin side pod mounted radiators

BRAKE SYSTEM 4-Disk system, floating self developed rotors, adjustable brake balance

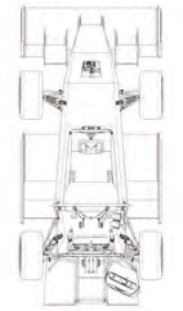
ELECTRONICS CAN-Bus, live telemetry, self-designed AMS

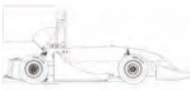
CORVALLIS

Oregon State University

Car E11 **Pit 30** **WRL 11** United States

Global Formula Racing is the first international collaboration of its kind. In 2010 the teams from Duale Hochschule Baden-Württemberg Ravensburg and Oregon State University have combined forces to compete as a single entity. The two universities share physical and intellectual resources to create highly competitive vehicles. Design, manufacturing and testing occurs at both schools. Together two race cars are designed - one powered by a combustion engine and one by two electric motors.





FRAME CONSTRUCTION CFRP Monocoque

MATERIAL TORAY T700 plain weave/TORAY T800 plain weave/Nomex and aluminum core

OVERALL L/W/H (mm) 2835/1335/1200

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1125/1125

WEIGHT WITH 68kg DRIVER (Fr/Rr) 111/166

SUSPENSION Double unequal length a-arms/ Direct actuated push rod spring and damper

TYRES (Fr/Rr) Hoosier

WHEELS (Fr/Rr) Hoosier

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/2 x 55kW

MOTOR TYPE PMSM

MAX MOTOR RPM 24000

MOTOR CONTROLLER Brusa DMC 514

MAX SYSTEM VOLTAGE 400

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/7.5kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 12.98/n/a

DRIVE TYPE Constant ratio gearbox

DIFFERENTIAL electronic torque vectoring

COOLING Rear mounted, two-circuit water cooling system

BRAKE SYSTEM Brembo Front Calipers/AP rear calipers/ ductile iron rotors

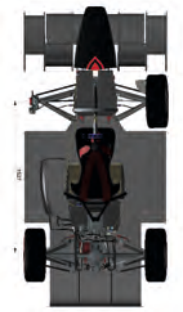
ELECTRONICS motorsport grade wiring, DCDC, student developed BMS and Power Distribution Module

DARMSTADT

Technische Universität Darmstadt

Car E42 **Pit 19** **WRL 21** Germany

DART Racing is thrilled to be in Hockenheim for the tenth time! While building our car, the kappa2015, the team didn't primarily focus on making groundbreaking changes to previous car designs, but instead on building upon them. Many parts have been redesigned to be easier to manufacture and flawed components have been reengineered. All changes contribute to an overall increase in performance and reliability. We are looking forward to a great competition at FSG 2015!



FRAME CONSTRUCTION CFRP-Honeycomb Sandwich Monocoque

MATERIAL UD CFRP, Aluminum Honeycomb

OVERALL L/W/H (mm) 2977/1416/1150

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1525/1220/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 97/106

SUSPENSION Double signle pc wishbone (short-long Arm), pull rod, air spring

TYRES (Fr/Rr) 185/40 R15 Pirelli

WHEELS (Fr/Rr) 6.0x15 15mm offset, 2pc CFRP-Al Hybrid Rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/rear right, rear left/55kW

MOTOR TYPE Brusa/DART PSM

MAX MOTOR RPM 24000 RPM

MOTOR CONTROLLER Brusa DMC514

MAX SYSTEM VOLTAGE 420V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiFePO - graphite/7.02 kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:18.7/-

DRIVE TYPE dual spur gear, single housing

DIFFERENTIAL Electronic Differential

COOLING Water cooling, side mounted radiator, Vestamid 8000 series coolant lines

BRAKE SYSTEM 4-Disk floating hybrid rotors (self developed), 220/200 mm dia (fr/re), adj. self designed bias bar

ELECTRONICS Plug-and-play dashboard with integr. radio, live telemetry, automated error and data logging

DEGGENDORF

University of Applied Sciences Deggendorf

Car E44 **Pit 26** **WRL 26** Germany

Fast Forest represents the Deggendorf Institute of Technology on Formula Student events. With FF07 we revised the design of FF06. The construction contains a CFRP full-monocoque, a new battery and a new damping geometry. With our telemetry system we will be able to check all functions of our car, for example the new VCU, in real time. The new aero-package strikingly increases the vehicle's performance on the track. These and many other changes will make Jenny7e ready to race in Hockenheim!

FRAME CONSTRUCTION CFRP monocoque with roll hoops

MATERIAL Monocoque: preimpregnated fibres; aluminium honeycomb ; Roll Hoops: E355

OVERALL L/W/H (mm) 2849/1420/1120

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1208/1212

WEIGHT WITH 68kg DRIVER (Fr/Rr) 153/165

SUSPENSION Double unequal length A-Arm; spring and damper linked on lower wishbone; U-Torsion-Bar

TYRES (Fr/Rr) Continental C15 Slick

WHEELS (Fr/Rr) 7x13, 30 mm offset, 1 pc Mg OZ-Rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/middle-rear/2 x 40 kW

MOTOR TYPE Continental BAS+

MAX MOTOR RPM 14000

MOTOR CONTROLLER Continental EPF2-3

MAX SYSTEM VOLTAGE 353V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiP/8,7 kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:8.91/n/a

DRIVE TYPE 2x spur gear

DIFFERENTIAL n/a

COOLING 2 side mounted radiators

BRAKE SYSTEM self developed rotors, adjustable brake balance, ISR front and self-developed rear calipers

ELECTRONICS selfdesigned Live-Telemetry System with self-developed log format

DELFT

Delft University of Technology

Car E85 **Pit 24** **WRL 2** Netherlands

Formula Student Team Delft is a team of over 60 students from over 6 faculties of the TU Delft. The team is divided into six technical departments and a management team of four people. The DUT15 is the car of anniversaries: the teams 15th car, 5th electric car and 4th 4WD car. Delft is known for engineering extremely light weight and agile cars and the DUT15 continues this trend.

FRAME CONSTRUCTION Single-piece CFRP monocoque with honeycomb core with Aluminium CNC'd front hoop

MATERIAL Plascore 5052 aluminium honeycomb sandwich panel, cell size 3.2mm, 25micron foil thickness, 72kg/m3

OVERALL L/W/H (mm) 2834/1426/1195

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 112/116

SUSPENSION Double anti parallel unequal length CFRP A-arms. Fr pull rod, Rr push rod actuated, vertical SDS

TYRES (Fr/Rr) 368 x 209.5 - R10 Apollo

WHEELS (Fr/Rr) 214 x 254mm, 21mm offset, 2 pc CFRP rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/Inside each wheel/32.5kW

MOTOR TYPE 4x AMK DT5-14

MAX MOTOR RPM 20000

MOTOR CONTROLLER AMK KW 26-S5

MAX SYSTEM VOLTAGE 600V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2 - aluminium and copper/7.2kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:10.8/-

DRIVE TYPE Single Stage Planetary Gearbox

DIFFERENTIAL Self-developed slip ratio and yaw-rate controller

COOLING Two side mounted radiators

BRAKE SYSTEM Metal matrix composite aluminium brake disks with half the brake caliper integrated into the upright

ELECTRONICS Self-developed ECU, ECU nodes and AMS. Self developed software and vehicle dynamics controller.

DRESDEN

Technische Universität Dresden

Car E14 **Pit 8** **WRL 43** Germany

In 2015 we proudly present our 5th electric car which is the result of 7 years of Formula Student experience and the hard work of 60 highly motivated students from Dresden. This year's technical concept combines valuable experiences from past seasons with new solutions, like reworked suspension kinematics and a 2 staged planetary gear. With these developments we achieve our two main goals of a reliable car and a maximum weight of 190kg.

FRAME CONSTRUCTION CFRP-Monocoque

MATERIAL wet lay-up carbon, aramid honeycomb and foam sandwhich

OVERALL L/W/H (mm) 2991/1405/1137

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1200/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 129/129

SUSPENSION double unequal length A-arm, pushrod actuated air spring-damper system

TYRES (Fr/Rr) 205/510 R13 Continental

WHEELS (Fr/Rr) 205/510 R13 Continental

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear right and left/24kW

MOTOR TYPE Siemens permanent excited synchronous motors

MAX MOTOR RPM 40000

MOTOR CONTROLLER Sinamics S120

MAX SYSTEM VOLTAGE 600V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY polymer lithium-ion/7 kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 38:1/-

DRIVE TYPE 2 stage planetary gear

DIFFERENTIAL N/A

COOLING 2 cooling circuits, radiators located in sidepods

BRAKE SYSTEM 4 Disk system, selfdeveloped rotors, AP Racing calipers

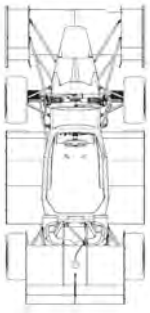
ELECTRONICS Data-logging via National Instruments sbRIO, live monitoring via WLAN

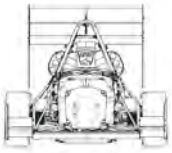
EINDHOVEN

Eindhoven University of Technology

Car E40 **Pit 36** **WRL 19** Netherlands

Universtiy Racing Eindhoven stands for technological innovation, teamwork and a passion for engineering. By competing in the Formula Student competition, we try to push ourselves and our cars to new limits!The URE10 is the teams first four-wheel driven electric racecar which features a completely self-developed powertrain, fully adjustable suspension and semi-floating active aerodynamics. The stakes are high!





FRAME CONSTRUCTION CRFP sandwich full monocoque

MATERIAL Textreme M30SC/CPV4 prepreg, NTPT M40J UD, Bi and Triax. Al 5056 core

OVERALL L/W/H (mm) 2925/1356/1155

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1180/1139

WEIGHT WITH 68kg DRIVER (Fr/Rr) 114/140

SUSPENSION Unequal length double wishbone, pushrod actuated horizontal placed spring/dampers

TYRES (Fr/Rr) Apollo R&D 205/50R10 custom compound and rain profile

WHEELS (Fr/Rr) 7x10 inch, 35 mm offset Aluminum

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/One in each wheel/4 x 30 kW

MOTOR TYPE Self-developed, URE&AE PMSM

MAX MOTOR RPM 18000

MOTOR CONTROLLER 2x Custom dual motorcontroller

MAX SYSTEM VOLTAGE 400V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/7.03 kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:12/-

DRIVE TYPE Planetary gearbox with stepped sun gear

DIFFERENTIAL Electronic torque vectoring differential

COOLING Rear mounted single radiator, water cooled

BRAKE SYSTEM Floating, steel hub mounted, 182x3 mm, vented student designed rotors; 2 piston calipers

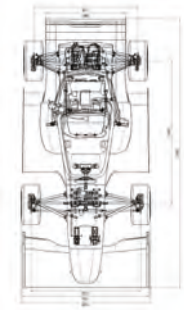
ELECTRONICS Self-developed 300W DC/DC converter, IO Nodes, 12 way fusebox settable via CAN, Live telemetry

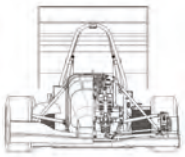
ESSLINGEN

University of Applied Sciences Esslingen

Car E94 **Pit 17** **WRL 15** Germany

The E.Stall Esslingen was founded in 2012 and is the electric team of the UAS Esslingen aside of the cumbustion team Rennstall Esslingen. Our new car EVE ,15 supports a one piece carbon fiber monocoque, self developed ECU and a spring and damper system completely new to formula student.





FRAME CONSTRUCTION CFRP one piece monocoque, integrated fronthoop, tubular steel mainhoop

MATERIAL prepreg carbon fiber/nomex honeycomb

OVERALL L/W/H (mm) 2995/1422/1195

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1600/1200/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 118/139

SUSPENSION SLA with pushrod actuated Penske 7800 3-damper-system

TYRES (Fr/Rr) Hoosier R25B 18x7.5-10/Hoosier R25B 18x7.5-10

WHEELS (Fr/Rr) Keizer 10

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/rear/75kW, 75 kW

MOTOR TYPE Enstroj EMRAX 207 LC

MAX MOTOR RPM 5500

MOTOR CONTROLLER Unitek Bamocar D3

MAX SYSTEM VOLTAGE 470

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/7,7kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3/-

DRIVE TYPE Epicyclic gearing

DIFFERENTIAL -

COOLING 2x Student designed radiator

BRAKE SYSTEM floating stainless steel disc, Front: 4 piston ISR caliper, Rear: 2 piston ISR caliper

ELECTRONICS self developed ECU and 12 other self developed control units

FREIBERG

TU Bergakademie Freiberg

Car E76 **Pit 31** **WRL 8** Germany

With our 9th entry at the FSG we are once again looking forward to a great season. The RTo9 is the 4th electric race car, combining new ideas like aerodynamic parts manufactured of magnesium-sandwich with proven concepts like the casted rear frame. Our focus on remarkably improved vehicle dynamics and reliability as will hopefully give us the chance to achieve great results at the upcoming events.

FRAME CONSTRUCTION tubular steel space frame with CFRP reinforcements

MATERIAL 25CrMo4 and CFRP

OVERALL L/W/H (mm) 2926/1400/1140

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1160

WEIGHT WITH 68kg DRIVER (Fr/Rr) 139/139

SUSPENSION Double unequal length A-Arms, Pull rod actuated spring/damper, ARB with exchangeable blades

TYRES (Fr/Rr) Continental C15 205/510 R 13

WHEELS (Fr/Rr) Continental C15 205/510 R 13

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/40kW

MOTOR TYPE Bosch SMG 138/80

MAX MOTOR RPM 15000

MOTOR CONTROLLER Bosch INV 2.2

MAX SYSTEM VOLTAGE 400V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/6.7kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 8.8:1/

DRIVE TYPE self designed two-stage gearbox

DIFFERENTIAL torque vectoring

COOLING motors and motor controllers are seperatly watercooled, Twin side pod mounted radiators

BRAKE SYSTEM self designed casted calipers and rotors with 210mm diameter, adjustable brake balance

ELECTRONICS self developed VCU, VDCU, BMS, driver information system

Audi
Vorsprung durch Technik

A thrilling 24 hours crystallised in that one second when I realised: Audi just made history.

From an early age, I wanted to become an engineer. Even as a little girl growing up in India, I disassembled and then reassembled our radio. I have since become an Audi racing engineer. I blend not only technology but also strategic and organisational skills in the name of Audi. The objective remains the same: ensuring that even the tiniest details are perfect. Doing so allows us to rewrite motorsport history. After all, the Audi R18 e-tron quattro was the first hybrid vehicle to ever win Le Mans.

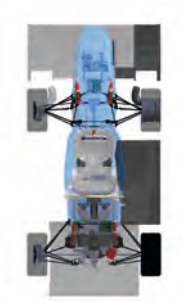
Leena Gade
Racing engineer for Audi Sport Team Joest
Degree: Aerospace Engineering

GÖTEBORG

Chalmers University of Technology

Car E60 **Pit 13** Sweden

Chalmers Formula Student bridges the gap between Engineering Education and Industry by training students in a real-life project where they independently Design, Analyze and develop Technology solutions by making Data-Driven Decisions throughout the Design, Manufacturing and Testing of a full-fledged Formula Racing automobile, and finally put their skills to the test in competitions with various other teams from the rest of the world.



FRAME CONSTRUCTION Carbon fiber monocoque made aluminum honeycomb sandwich structure

MATERIAL Hexcel M49 Carbon fiber and Hexcore Aluminum honeycomb core (25.4mm)

OVERALL L/W/H (mm) 2928/1415/1180

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 530/1200/1200

WEIGHT WITH 68kg DRIVER (Fr/Rr) 124/139

SUSPENSION Double unequal length and non-parallel wishbones. Push rod actuated longitudinally mounted dampers

TYRES (Fr/Rr) Hoosier 6.0/18.0-10 LC0

WHEELS (Fr/Rr) Keizer 10" 7" wide two piece rim-shells. CNC milled centrepieces in 7075T6 Aluminium

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Left, Rear Right/45 kW, 45 kW

MOTOR TYPE RL, RR: IRO AB - CTHFS15

MAX MOTOR RPM 12000

MOTOR CONTROLLER Aros Electronics AB - AROS HPC_HT

MAX SYSTEM VOLTAGE 400V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2 - graphite/7kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:8.04/1:1

DRIVE TYPE Two stage single gear transmission

DIFFERENTIAL Software implemented torque distribution to separate motors

COOLING 300ml rear mounted radiator with electric fan

BRAKE SYSTEM Cross Drilled Rotors (Toolox Steel) F: 195 OD, R: 190 OD, Ventilated Disc (Inconel)

ELECTRONICS Self designed sensor control units, torque vectoring and traction control,data logging over CAN bus

HAMBURG

Hamburg University of Technology

Car E78 **Pit 16** **WRL 35** Germany

e-gnition is the FSE team of the TU Hamburg. Founded in 2011 the egn15 will be our fourth car. Instead of an evolutionary design we opted for a revolution. The egn15 is our first car to feature a CFRP monocoque as well as a full aerodynamic package. Front and rear wings have a DRS system installed which helps directing air to the cooling system on straightaways. We developed our telemetry system in cooperation with our main sponsor NXP. It features state of the art V2X communication technology.

FRAME CONSTRUCTION Carbon Fiber Monocoque with sandwich structure

MATERIAL Sandwich PET core with HTS 45 carbon fibre layers

OVERALL L/W/H (mm) 2960/1406/1166

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1560/1200/1150

WEIGHT WITH 68kg DRIVER (Fr/Rr) 130/158

SUSPENSION Double unequal length A-Arm. Push rod actuated spring and damper

TYRES (Fr/Rr) Front and Rear - 520.7 x 177.8-330.2 Hoosier Tyres (Model 43163)

WHEELS (Fr/Rr) 13" OZ Magnesium 4H Rims, with Offset 30mm.

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear right and rear left/80 kW, 80 kW

MOTOR TYPE RR, RL: Emrax 207

MAX MOTOR RPM 6000

MOTOR CONTROLLER Unitek bamocar d3 400-400

MAX SYSTEM VOLTAGE 404

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCo2/6,7kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:4,5/

DRIVE TYPE Single Speed Spur Gear

DIFFERENTIAL Electronic, Torque vectoring using two motors

COOLING Two 180x122mm passive radiators

BRAKE SYSTEM Steel, floating Hub mounted, 214 diameter Brake Discs; automated adjustable Brake Balance

ELECTRONICS Ground Low Voltage System self designed including telemetry und BMS, Multifunctional Steering Wheel

HELSINKI

Helsinki Metropolia University of Applied Sciences

Car E98 **Pit 6** **WRL 50** Finland

Helsinki UAS's third Electric FS racer, built by highly motivated Engineering students from the cold and dark north. High torque motors with compact and durable drivetrain makes the car fly. Very lightweight Aramid Fibre bodypanels with precisely calculated and manufactured wings and underbody keeps the car's 10" wheels strictly on the ground with very low air resistance at the same time. Low and centered gravity point added with perfect steering and suspension system makes the car the fastest.

FRAME CONSTRUCTION Tubular steel frame with composite stress panels

MATERIAL Ruukki Form 500 High strength steel, Carbon fiber and aluminium honeycomb composite

OVERALL L/W/H (mm) 2969/1405/1198

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1525/1200/1160

WEIGHT WITH 68kg DRIVER (Fr/Rr) 146/153

SUSPENSION Double unequal lenght A-arms. Pushrod and rocker actuated dampers. Rear ARB

TYRES (Fr/Rr) 6.0/18.0-10, Hoosier, LC0/6.0/18.0-10, Hoosier, LC0

WHEELS (Fr/Rr) 7.25x13, 35mm offset 3 pc Al Rim/7.25x13, 35mm offset 3 pc Al Rim

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear/44kW, 44kW

MOTOR TYPE RR, RL: Siemens 1FE1-1082

MAX MOTOR RPM RR, RL: 8000

MOTOR CONTROLLER ABB ACSM1

MAX SYSTEM VOLTAGE 588V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY Polymer Lithium-ion/6,63kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:4,56/-

DRIVE TYPE One stage

DIFFERENTIAL Eletrically controlled

COOLING Rear mounted radiator and thermal controlled 5" electric fan

BRAKE SYSTEM 4-Disk system, self developed rotors 190 mm (front), 185 mm (rear), balance bar

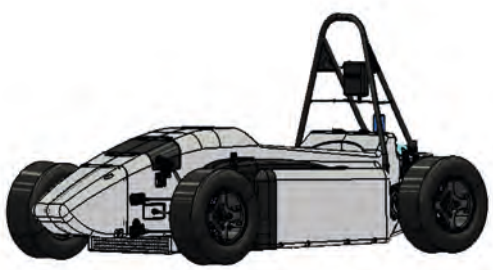
ELECTRONICS System simpified to maximize reliability, wiring harness sealed to IP67, min. amount of connections

INGOLSTADT

Technische Hochschule Ingolstadt

Car E103 **Pit 10** **WRL 12** Germany

The FS Team "Schanzer Racing Electric" will participate for the fourth time in the FS Germany. Students from all faculties have already designed and built up the 4th race car in Schanzer history. With this new formula car the team wants to tie with the really good results of the last three seasons. This year's success will be placed in a weight decrease of about 34 kg, a carbon fiber monocoque, torque vectoring, revised battery, optimized engine and other new developments. SCHANZER POWER!



FRAME CONSTRUCTION CFRP Monocoque
MATERIAL carbon fibre reinforced plastic
OVERALL L/W/H (mm) 2454/1426/1134
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1214/1176
WEIGHT WITH 68kg DRIVER (Fr/Rr) 127/138
SUSPENSION Double equal length A-Arm. Push rod actuating horizontal orientated spring-damper
TYRES (Fr/Rr) 18.0 x 6.0 R10, Hoosier R25A/18.0 x 6.0 R10, Hoosier R25A
WHEELS (Fr/Rr) 10.0 x 6.0, aluminium machined/10.0 x 6.0, aluminium machined
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/80kW, 80kW
MOTOR TYPE Enstroj Emrax 207
MAX MOTOR RPM 7000
MOTOR CONTROLLER Infineon Hybrid Kit 1 (Pin Fin)
MAX SYSTEM VOLTAGE 378V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiNiCoAlO2/6,48kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:4,36/
DRIVE TYPE
DIFFERENTIAL Torque Vectoring
COOLING Rear mounted, one Radiators with two 25w Pumps
BRAKE SYSTEM 4-Disk system, self developed rotors with 195mm diameter, adjustable brake balance
ELECTRONICS Selfdesigned LV-Battery, Multifunctional Steering Wheel, Data Logging and Live Telemetry

KAISERSLAUTERN

Kaiserslautern University of Technology

Car E64 **Pit 2** **WRL 55** Germany

The Kaiserslautern Racing Team was founded by students of the technical university of kaiserslautern and the university of applied science of kaiserslautern in 2007. This year we focused on building a more stable electrical system without gaining to much extra weight. The Electronyte e15 has got an aerodynamic kit comprising front and rear wings. It is driven by two self-designed rotary current synchronous motors placed in the back of our carbon fiber monocoque.

FRAME CONSTRUCTION Full Monocoque and external Accumulator Container, Hoops made of steel
MATERIAL CFRP with 20 and 10 mm thick aramid honeycomb as core material
OVERALL L/W/H (mm) 2714/1150/1167
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1150/1100
WEIGHT WITH 68kg DRIVER (Fr/Rr) 107/151
SUSPENSION Double unequal length A-Arm. Pullrod actuated, horizontally oriented spring and damper
TYRES (Fr/Rr) Hoosier/18.0 x 6.0-10/R25B
WHEELS (Fr/Rr) Hoosier/18.0 x 6.0-10/R25B
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear internal/80.04 kW
MOTOR TYPE KaRaT/VSM Antriebstechnik AFW507D
MAX MOTOR RPM 7500 1/min
MOTOR CONTROLLER Infineon - Infineon Hybrid Kit 1 Pi
MAX SYSTEM VOLTAGE 360V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCO2/7.2 kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:4.9/N/A
DRIVE TYPE onestage spur gear
DIFFERENTIAL torque vectoring
COOLING water based coolant system, one radiator each side above rear suspension, no fan
BRAKE SYSTEM self developed rotors with 196/180mm, adjustable brake balance
ELECTRONICS 12 LED (error/status) and two buttons dash mounted. Two bottons for Push-to-Pass and Launch Control

KARACHI

National University of Sciences and Technology - Karachi

Car E65 **Pit 40** Pakistan

Our team was founded in October 2014. Since then we have worked tiredlessly to make our dream turn into reality Formula Electric Racing NUST is the first and only Pakistani team to design Pakistan's first formula student electric vehicle. The car is agile fast and attractive as far as its mean characteristics are concerned. Our main aim is to initiate the manufacturing of electric vehicles so that in long term the cars can become cost effective in Pakistan , regenerating our automobile industry.

FRAME CONSTRUCTION Front and rear Tubular space frame
MATERIAL AISI 1010 steel round(avg 25mm) and square(avg 25mm)
OVERALL L/W/H (mm) 2850/1530/1277
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1588/1170/1080
WEIGHT WITH 68kg DRIVER (Fr/Rr) 165/185
SUSPENSION Double unequal A-arm,push rod actuated
TYRES (Fr/Rr) 177x520 R13 Hoosier 43163/177x520 R13 Hoosier 43163
WHEELS (Fr/Rr) 7.0x13/7.0x13
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/rear left/20kW
MOTOR TYPE Golden Motor BLDC HPM20KL
MAX MOTOR RPM 2560 rpm
MOTOR CONTROLLER VEC 700 Series Sine Wave Controller
MAX SYSTEM VOLTAGE
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY /5.76
TRANSMISSION RATIO (PRIMARY/SECONDARY) /
DRIVE TYPE 530 Chain Type
DIFFERENTIAL Chain drive limited slip, 100 Nm perload
COOLING
BRAKE SYSTEM 4-Disk system, altered rotors with 212mm diameter,
ELECTRONICS

KARLSRUHE

Karlsruhe Institute of Technology

Car E15 **Pit 37** **WRL 3** Germany

KA-RaceIng is the Formula Student team of the Karlsruhe Institute of Technology, founded in 2006. Since 2010 we stand for „one team - two cars", designing, manufacturing and competing with a FSE and a FSC car every year. „Dual X-Drive" is the name of the concept of our 5th electric car, KIT15e. Due to the new arrangement of our four self-developed motor-gear-units, we improved driving performance a lot! We would like to thank all our supporters for the enormous help throughout the season.

FRAME CONSTRUCTION CFRP sandwich monocoque, motor-gear-units mounted underneath
MATERIAL HT and HM fibres, twill and unidirectional plies, kevlar twill
OVERALL L/W/H (mm) 2907/1455/1566
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1220/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 130/136
SUSPENSION Double unequal length A-Arm. Pull rod actuated KAZ damper with coil spring
TYRES (Fr/Rr) Hoosier 18.0x7.5-10 R25B
WHEELS (Fr/Rr) Hoosier 18.0x7.5-10 R25B
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/Mounted on the chassis/23kW
MOTOR TYPE internal permanent magnets synchronous motor
MAX MOTOR RPM 30000
MOTOR CONTROLLER
MAX SYSTEM VOLTAGE 588V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY Lithium-Polymer/6.5kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) /
DRIVE TYPE
DIFFERENTIAL
COOLING Three Radiators, Motor controllers water cooled, Motors cooled with oil and battery by airflow
BRAKE SYSTEM 4 floating disks and two piston calipers on each wheel
ELECTRONICS Live-Telemetry, Traction Control, Active Yaw Control, Torque Vectoring, modular hardware design

KIEL

University of Applied Sciences Kiel

Car E53 **Pit 27** **WRL 24** Germany

„Raceyard is Germany's northernmost Formula Student team. It was founded in 2005 at the UAS Kiel. Nowadays students from all three universities in Kiel join the team to build an electric race car from scratch. The variation of less and more experienced developers are the reason for an on-going innovation. The reorientation back in 2012 towards an electric drivetrain proves the ability of the team to adjust to the ravages of time.This year the team is celebrating its 10. anniversary.

FRAME CONSTRUCTION one piece tubular spaceframe with aluminium rear end
MATERIAL steel/aluminium
OVERALL L/W/H (mm) 2777/1364/1117
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1565/1150/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 140/140
SUSPENSION Double unequal length A-Arm, Pull rod system
TYRES (Fr/Rr) 18x7.5-10 Hoosier R25B
WHEELS (Fr/Rr) 7.25x10 inch Keizer rim, self developed rim star
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/rear/80 kW
MOTOR TYPE EMRAX 228
MAX MOTOR RPM 5880
MOTOR CONTROLLER Unitec Bamocar
MAX SYSTEM VOLTAGE 600V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/
TRANSMISSION RATIO (PRIMARY/SECONDARY) /
DRIVE TYPE
DIFFERENTIAL Limited slip bevel gear differential
COOLING 2 cooling circuits
BRAKE SYSTEM Front: 4 piston AP Racing, rear: 2 piston AP Racing, adjustable brake balance
ELECTRONICS self designed AMS, ECU, Live-Telemetry System

KÖLN

University of Applied Sciences Köln

Car E102 **Pit 33** **WRL 31** Germany

eMotorsports Cologne is the Formula Student Team of the UAS Cologne. Our main purpose is to be sustainable and promote and develop the electric drivetrain. With our concept we like to spread the idea of an environmental friendly drivetrain. The Team consists of 40 students of the UAS Cologne, who are studying a huge variety of different subjects. Besides the general development of the eMC15, there are two huge improvements this ear. We are building a full carbon monocoque and an aero monocoque.

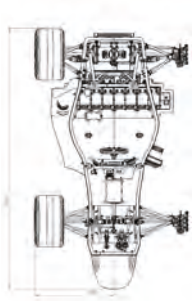
FRAME CONSTRUCTION Monocoque
MATERIAL carbon fibre
OVERALL L/W/H (mm) 3000/1450/1034
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 134/134
SUSPENSION Standing dampers
TYRES (Fr/Rr) 7x13 Avon
WHEELS (Fr/Rr) OZ racing 13
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/Rear/80kw
MOTOR TYPE enstroj emrax 228
MAX MOTOR RPM 6000
MOTOR CONTROLLER Unitec Bamoca D3
MAX SYSTEM VOLTAGE 600V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPO/6,4kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 4,6/
DRIVE TYPE 2 stage gear box
DIFFERENTIAL Drexler Formula Student Differential
COOLING Water cooled
BRAKE SYSTEM ISR Brakesystem
ELECTRONICS

LEUVEN

KU Leuven - Group T Campus

Car E20 **Pit 21** **WRL 38** Belgium

Formula Electric Belgium is the one and only Formula Student team in Belgium. These two teams are merged now and became one, namely Formula Electric Belgium (FEB). FEB focuses on weight reduction and reliability. Weight reduction throught optimization of every single component. The second Belgium formula student monocoque weighs 30% less than the first one.



FRAME CONSTRUCTION CFRP Monocoque
MATERIAL Aluminium Honeycomb
OVERALL L/W/H (mm) 2400/1480/1090
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1525/1200/1200
WEIGHT WITH 68kg DRIVER (Fr/Rr) 115/152
SUSPENSION Short-long arm, push rod/Short-long arm, pull rod
TYRES (Fr/Rr) 18 x 7,5-10 R25B Hoosier
WHEELS (Fr/Rr) 7,5
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/2 motors, middle most rea/120kW
MOTOR TYPE Permanent magnet motor
MAX MOTOR RPM 14000
MOTOR CONTROLLER BRUSA DMC514
MAX SYSTEM VOLTAGE 400V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY Li-ion/LCO /7.56kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 10.36/
DRIVE TYPE Planetary gearbox
DIFFERENTIAL Electronic differential
COOLING self made made housing with integrated gearbox and cooling
BRAKE SYSTEM 4-Disk system, adjustable brake balance
ELECTRONICS Optimized cable loom, Multifunctional dashbaord & steering wheel

MÜNCHEN

University of Applied Sciences München

Car E13 **Pit 23** **WRL 5** Germany

PassionWorks - not only the name of our cars but also our guiding principle! Last season - our most successful one - we took a big step forward. This year, we're happy to announce that we designed a car that signifies a revolutionary step. Many new solutions can be found on our car with the four wheel drive being the most obvious one. Combined with many testing kilometers and a strong team, we want to improve upon last year's results.

FRAME CONSTRUCTION Monocoque with tubular front & mainhoop
MATERIAL CFRP sandwich structure, rohacell core
OVERALL L/W/H (mm) 2854/1374/1338
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1540/1150/1128
WEIGHT WITH 68kg DRIVER (Fr/Rr) 123/131
SUSPENSION double unequal lenght A-Arm, push-rod actuated, horizontally oriented spring & damper
TYRES (Fr/Rr) 18.0x6.0-10 R25B Hoosier, 6x10, 2pc CFRP/Aluminium hybrid rim
WHEELS (Fr/Rr) 18.0x6.0-10 R25B Hoosier, 6x10, 2pc CFRP/Aluminium hybrid rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/4WD/32kW
MOTOR TYPE AMK/DT5-14-10-POW
MAX MOTOR RPM 20000
MOTOR CONTROLLER AMK/KS26-S5-FSE-4Q
MAX SYSTEM VOLTAGE 579V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LINiMgCoO2/7.45KWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:12.66/n/a
DRIVE TYPE planetary gearbox with step planets
DIFFERENTIAL torque vectoring
COOLING seperate cooling ciruits for each side, radiators with controlled electric fans
BRAKE SYSTEM AP racing four/two piston callipers, AP racing master cylinders, self developed rotors
ELECTRONICS 4x highspeed CAN, live telemetry via wlan, recuperation, traction control

OSNABRÜCK

University of Applied Sciences Osnabrück

Car E6 **Pit 35** **WRL 18** Germany

The design goals for our 5th electric car excess are reliability and efficiency. We strived for a weight reduction of 12% in comparison to the car of the last season and achieved this by exchanging the tubular steel frame structure with a carbon fibre monocoque and reducing the rim rize from 13" to 10". In addition to that we implemented rear wheel steering to improve our agility and driving performance.The IRTe would like to thanks all supporters and is looking forward to exciting FS events.

FRAME CONSTRUCTION Carbon Fibre Monocoque
MATERIAL carbon fibre and 25CrMo4
OVERALL L/W/H (mm) 2643/1400/1200
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1535/1190/1150
WEIGHT WITH 68kg DRIVER (Fr/Rr) 128/157
SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper
TYRES (Fr/Rr) 18.0 x 6 - 10, Hoosier LCO/18.0x6 - 10, Hoosier LCO
WHEELS (Fr/Rr) 6 x 10, 25,4mm offset, three piece Al rim/6x10, 25,4mm offset, three piece Al rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/rear/100kW
MOTOR TYPE Yasa 750
MAX MOTOR RPM 2000 [1/min]
MOTOR CONTROLLER Sevcon Gen4Size8
MAX SYSTEM VOLTAGE 378V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2-graphite/6,66kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) -1,86/-
DRIVE TYPE Planetary gear drive
DIFFERENTIAL Limited slip differential
COOLING oil cooling. Rear mounted radiator
BRAKE SYSTEM 4-Disk system, 4 pistons fr, 2 pistons rr, adjustable brake balance
ELECTRONICS Traction Control, Active power counting, Individual position controlled rear wheel steering

QUEBEC CITY

Université Laval

Car E77 **Pit 22** Canada

The ULaval Racing team is proud to present its first ever electric prototype for its first participation at FSG! Built and designed from the ground up with our 5 guiding principles in mind, we present you a 4WD, steel space frame, 185kg racecar. Simulations tools were used from the beginning to guide our design choices in order to achieve the highest score possible.This car is simple, easy to drive and requires very low maintenance. Yet, it'll definitely give the driver a shot of adrenaline!

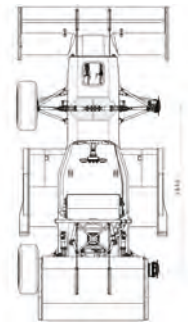
FRAME CONSTRUCTION Tubular steel space frame
MATERIAL 1020 and 4130 steel tubes
OVERALL L/W/H (mm) 2920/1410/1195
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1180
WEIGHT WITH 68kg DRIVER (Fr/Rr) 125/125
SUSPENSION Double unequal length A-Arm. Front: push rod actuated. Rear: pull rod actuated.
TYRES (Fr/Rr) 18.0x6.0in R10, Hoosier LC0/ 18.0x6.0in R10, Hoosier LC0
WHEELS (Fr/Rr) 6.25x10in, 23mm offset, 3 pc Alu Rim/7x10in, 13.5mm offset, 3 pc Alu Rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/In the wheels/17kW, 17kW, 25kW, 25kW
MOTOR TYPE Self-design and built
MAX MOTOR RPM 15500 RPM
MOTOR CONTROLLER Fuji IPM with custom electronics
MAX SYSTEM VOLTAGE 378
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo (LiCoO2)/6.6kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 11.52/n/a
DRIVE TYPE self designed 2 stage planetary gearing
DIFFERENTIAL n/a
COOLING Twin side mounted oil radiators
BRAKE SYSTEM 4 fully floating 198mmOD ductile iron discs, ISR and AP Racing calipers, driver adjust. brake bias
ELECTRONICS Self designed and built motors, inverters, ECU, live-telemetry, dash display, traction control,

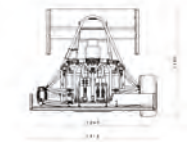
SANKT AUGUSTIN

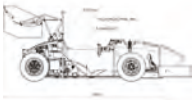
University of Applied Sciences Bonn-Rhein-Sieg

Car E45 **Pit 29** **WRL 17** Germany

BRS Motorsport is the Formula Student team of UAS Bonn-Rhine-Sieg with 70 students of all faculties, who share their love for designing, developing and manufacturing a racecar every year. The team was founded in 2007 and has built 4 combustion and 1 electric racecars so far. With their first electric racecar the team entered the world ranking list on p16 after FSItaly14 with p1 in Skidpad and p3 Overall. 2015 the team is building their first monocoque with the goal to finish within the top 25%.







FRAME CONSTRUCTION full monocoque
MATERIAL CFRP
OVERALL L/W/H (mm) 2935/1414/1180
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1240/1220
WEIGHT WITH 68kg DRIVER (Fr/Rr) 119/150
SUSPENSION Double A-Arm, push rod actuated springs and dampers
TYRES (Fr/Rr) 18.0x6.0 R10, Hoosier R25B/18.0x6.0 R10, Hoosier R25B
WHEELS (Fr/Rr) 6.5x10, 0mm offset, 1pc Al Rim/6.5x10, 0mm offset, 1pc Al Rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/rear middle/80
MOTOR TYPE Enstroj Emrax 228 High Voltage LC
MAX MOTOR RPM 4000
MOTOR CONTROLLER Unitek Bamocar-D3
MAX SYSTEM VOLTAGE 588
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY Li-Po/7408
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3.6/n/a
DRIVE TYPE single stage chain drive, 520 DID Chain
DIFFERENTIAL cluth pack limited slip differnetial (GKN)
COOLING radiator mounted in rear monocoque, controller and motor liquid cooled
BRAKE SYSTEM 4-Disk system, self developed rotors with 176mm diameter,adjustable brake balance,AP Racing calipers
ELECTRONICS redundant GLV supply,6 self-designed ECUs,mainboard-concept, multifuncional steering wheel

STUTTGART

Baden-Württemberg Cooperative State University Stuttgart

Car E7 **Pit 5** **WRL 10** Germany

The eSleek15 was designed under a few general decisions. At first was designed to be reliable and well-balenced in order to compete well in all disciplines at FSE. Furthermore the target weight was reduced to 171kg. Focusing an mechanical innovations the elctric systems should only undergo minor changes. All in all the main focus of the design process was the improvement of the vehicles dynamics. Therefore a completely new kinematic was combined with improved software and an aerodynamic package.

FRAME CONSTRUCTION CFRP Monocoque structure
MATERIAL CFRP with Aluminium honeycomb sandwich panel and rohacell sandwich panel
OVERALL L/W/H (mm) 2840/1366/1187
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1150/1100
WEIGHT WITH 68kg DRIVER (Fr/Rr) 122/117
SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented spring and damper (coil-over).
TYRES (Fr/Rr) 18x6.0-10 R25B
WHEELS (Fr/Rr) 18x6.0-10 R25B
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/40kW
MOTOR TYPE AMK DT5-26-10-POW
MAX MOTOR RPM 16000
MOTOR CONTROLLER AMK KW26-S5-FSE-4Q
MAX SYSTEM VOLTAGE 600V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/6,6kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3,07/1:2,87
DRIVE TYPE Edrive, 2WD, one motor per wheel
DIFFERENTIAL electrical
COOLING Two side mounted 1400cc (1x 600, 1x800) radiators
BRAKE SYSTEM 4-Disk system, self developed rotors, balance bar, ISR caliper (FA), AP Racing caliper (RA)
ELECTRONICS Self developed, platform independend Live-Telemetry with data analysis tool, Self-diagnosis on ECU

STUTTGART

University of Stuttgart

Car E26 **Pit 38** **WRL 7** Germany

Six years full of passion for Formula Student and the participation at Hockenheim as a firm tradition: The GreenTeam continues last year's successful story with the E0711-6, our 6th generation car that combines the benefits of its predecessor with new convincing innovations. This year's highlights are the aerodynamic package, 4WD, rear wheel steering and many more. The overall focus for the E0711-6 was set on performance and reliability.

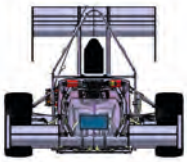
FRAME CONSTRUCTION composite monocoque
MATERIAL CFRP/ PBO and aluminium honeycombs
OVERALL L/W/H (mm) 2920/1388/1200
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1160/1160
WEIGHT WITH 68kg DRIVER (Fr/Rr) 114/119
SUSPENSION Double unequal length, unsymmetrical A-Arm, Push-rod actuated, front U bar-ARB, rear T bar-ARB
TYRES (Fr/Rr) 10", Hoosier 18.0 x 7.5-10 R25B
WHEELS (Fr/Rr) 10"x8" offset 50mm, hybrid (Al, CFRP), self made
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/attached to upright/30kW/Motor
MOTOR TYPE AMK DT5-14
MAX MOTOR RPM 20000
MOTOR CONTROLLER AMK-KW26
MAX SYSTEM VOLTAGE 600V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/6,8kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:12,7/n/a
DRIVE TYPE 2-stage planetary gearbox
DIFFERENTIAL electric torque vectoring
COOLING Undertray radiator, independent cooling cycles
BRAKE SYSTEM selfmade steel rotors, Diameter 175mm, ISR 22-049
ELECTRONICS selfdesigned ECU, telemetry system, sensors and dashboard

TURIN

Polytechnic University of Turin

Car E46 **Pit 39** **WRL 45** Italy

Team SquadraCorse of Politecnico di Torino, from Italy, has a new project for the 2015: „SCXV".This is our third full electric vehicle and it shows some completely new assemblies and some updates of technologies already tested in the past. The first ones are very interesting for example the new powertrain, the way we placed the new motors and a lateral aero-pack, never used before. For the second ones we just increased the potentiality of those parts which were well designed.



FRAME CONSTRUCTION Carbon fiber monocoque with aluminum sandwich panels
MATERIAL Carbon and honeycomb
OVERALL L/W/H (mm) 3000/1370/1200
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1580/1210/1200
WEIGHT WITH 68kg DRIVER (Fr/Rr) 143/155
SUSPENSION Double wishbone pushrod
TYRES (Fr/Rr) Pirelli 180/530-13
WHEELS (Fr/Rr) 7.5 x 13 OZ
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/Outboard/35kW
MOTOR TYPE AMK PM synchronous
MAX MOTOR RPM 20000
MOTOR CONTROLLER Inverters/ PDK_205481_KW26-S5-FSE-4
MAX SYSTEM VOLTAGE 600V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPO/6,7kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:3/1:5
DRIVE TYPE N/A
DIFFERENTIAL Electric Torque Vectoring
COOLING Radiators and water jackets on each motor
BRAKE SYSTEM 4 discs system self developed
ELECTRONICS All control system self developed

VELLORE

VIT University - Vellore

Car E22 **Pit 32** **WRL 80** India

OJAS, the Sanskrit word for energy, perfectly captures the tough Indian competitive spirit which all the members on our team aim to bring to this competition. We aim for innovation with a simplistic design. Moving from a hybrid car to an electric car in 2013, we continue to build electric cars. Qualifying for FSG 2015 makes us the first Indian Electric team to do so! TOR1.0 has undergone weight reduction, with changes for the better to the motor. We are on the continuous lookout for innovation.

FRAME CONSTRUCTION Front and rear Tubular Space Frame
MATERIAL 1020 Steel, Round Tubing, 26mm Dia with 1.5mm, 1.75mm and 2.5mm thickness, Square tubing 25x25x2.5mm
OVERALL L/W/H (mm) 2980/1355/1372
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1650/1210/1180
WEIGHT WITH 68kg DRIVER (Fr/Rr) 166/202
SUSPENSION Double unequal length A-Arm,Push rod actuated horizontally oriented spring, damper with anti rollbar
TYRES (Fr/Rr) 6x13inches, 27mm OFFSET, Die cast alloy Steel rim
WHEELS (Fr/Rr) 6x13inches, 27mm OFFSET, Die cast alloy Steel rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear left/52kW , 52kW
MOTOR TYPE PMDC
MAX MOTOR RPM RR, RL: 4800
MOTOR CONTROLLER Kelly HVM14501C
MAX SYSTEM VOLTAGE 134V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiFePO - graphite/7.57 kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:7.03/1:1
DRIVE TYPE Chain Sprocket System
DIFFERENTIAL Torsen limited slip Differential (Quaife)
COOLING Air cooled with perforated casing
BRAKE SYSTEM 4-disk system, self developed brake disc with 220mm diameter, adjustable brake balance
ELECTRONICS Safety Circuit protecting the tractive system, dashboard, data logging during discharge

WIEN

Vienna University of Technology

Car E100 **Pit 20** **WRL 42** Austria

TUW Racing participates in Formula Student since 2008.We changed 2014 from combustion to electric drive. The edge7 is our second electric car and is an evolution of the edge6.We use our self-developed electric motors in the second generation. The edge7 has a lot of carbon fiber parts, e.g. A-Arms, monocoque, bodywork, aeropackage, rims. We would like to thank every sponsor who helps us to realise this project.

FRAME CONSTRUCTION one piece CFRP monocoque
MATERIAL sandwich structure with aluminium honeycomb and rohacell core
OVERALL L/W/H (mm) 2845/1395/1118
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1200/1160
WEIGHT WITH 68kg DRIVER (Fr/Rr) 109/128
SUSPENSION double unequal length A-Arm, Pull rod actuated horizontally oriented spring and damper
TYRES (Fr/Rr) 18.0 x 7.5 - 10
WHEELS (Fr/Rr) 7.0x10, 25mm offset, one piece CFRP rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear/40kW
MOTOR TYPE TUWR-E2 self developed
MAX MOTOR RPM 16000
MOTOR CONTROLLER Infineon Hybrid Kit
MAX SYSTEM VOLTAGE 380V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/6,2kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:11,8/
DRIVE TYPE 2-seperate, 2-stage spur gear units
DIFFERENTIAL electric differential
COOLING radiator with electric fan, electric waterpump
BRAKE SYSTEM 4-Disk system, self designed brake discs, adjustable brake balance, AP calipers F/R,
ELECTRONICS TTC200 ECU with PDM Function, Live-Telemetry System, Dashboard with LED Display

WIESBADEN

University of Applied Sciences RheinMain

Car E55 **Pit 7** **WRL 49** Germany

Scuderia Mensa, team of 35 students at the UAS Rhein Main is presenting their 8th racecar, the SPR15E. A new aerodynamic package, magnesium rims and the advanced 3rd generation planetary gear are only some of our developments this season. Events in Germany, Spain and Czech Republic encourage our appearance and form the season to an unforgettable time of hard work, processing and success. The progress is every year more voluminous, more effective and more intensive. This is formula student!

FRAME CONSTRUCTION Steel Spaceframe
MATERIAL S235JR G2 and E355 steel round tubing
OVERALL L/W/H (mm) 2910/1430/1148
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1575/1218/1181
WEIGHT WITH 68kg DRIVER (Fr/Rr) 115/185
SUSPENSION Double unequal length A-Arm. Push rod actuated almost horizontally oriented spring and damper.
TYRES (Fr/Rr) 20.5x7.0-13 R25B C2500 Hoosier
WHEELS (Fr/Rr) 20.5x7.0-13 R25B C2500 Hoosier
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 1/Middle Rear/100kW
MOTOR TYPE YASA 750
MAX MOTOR RPM 2000
MOTOR CONTROLLER Sevcon Evolution 5
MAX SYSTEM VOLTAGE 378
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/6,6
TRANSMISSION RATIO (PRIMARY/SECONDARY) -1.5:1/n/a
DRIVE TYPE Electric motor with a selfmade Planetery
DIFFERENTIAL Drexler formula student differential
COOLING Rear mounted, continuously bled by swirlpot, air tunnel, no electric fan
BRAKE SYSTEM 4-Disk system, self developed rotors with 220mm diameter, adj. brake balance, BREMBO calipers
ELECTRONICS Live Telemetry via Wlan or UMTS, Traction control, Dashboard with remaining range

WOLFENBÜTTEL

University of Applied Sciences Ostfalia

Car E35 **Pit 25** **WRL 20** Germany

The Team wob-racing is now in its 12th year. The Ostfalia University for Applied Science is located in Wolfsburg, Wolfenbüttel, Salzgitter and Suderburg. 2015 is the year of our new racecar, the WR-XI. It has a completely new designed suspension and saved about 20 kg in comparison to its predecessor. We thank all of our sponsors and supporters!

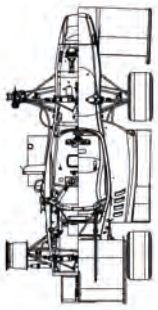
FRAME CONSTRUCTION tubular steel space frame
MATERIAL S355
OVERALL L/W/H (mm) 2905/1436/1061
WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1550/1250/1230
WEIGHT WITH 68kg DRIVER (Fr/Rr) 144/154
SUSPENSION Double unequal length A-Arm. Push rod actuated horizontally oriented coilover
TYRES (Fr/Rr) 18x6 R10, Hoosier LC0/18x6 R10, Hoosier LC0
WHEELS (Fr/Rr) 6.4x10, 6.4 mm offset, 3 pc Al Rim/6.4x10, 6.4 mm offset, 3 pc Al Rim
NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/40 KW each
MOTOR TYPE PSMS SEW Eurodrive
MAX MOTOR RPM 12000
MOTOR CONTROLLER 2x BRUSA DMC514
MAX SYSTEM VOLTAGE 420V
ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/7.4 kWh
TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:8.66/-
DRIVE TYPE 2 stage spur gear
DIFFERENTIAL Independently electronically controlled
COOLING 2 rear mounted radiators, water-cooled motors and inverters
BRAKE SYSTEM 4-disk system, self-designed steel rotors (D=195 mm), ISR 22-50 front caliper, AP 4226 rear caliper
ELECTRONICS self-developed decentralized control-unit system, incl. multifunctional dashboard and telemetry

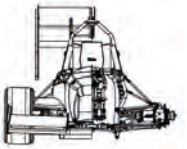
ZÜRICH

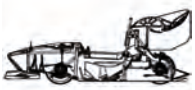
Swiss Federal Institute of Technology Zurich

Car E33 **Pit 12** **WRL 1** Switzerland

The AMZ Racing team was founded in 2006 by students of ETH Zurich. After three combustion cars, the AMZ switched to electric racing cars in 2010 and started an ongoing collaboration with the University of Lucerne. The active team counts approximately 35 people, backed by the crucial support of their alumni. In 2014 the AMZ was not only able to achieve its most successful season so far but also grew up to the new challenge as „official" raclette (swiss molten cheese) provider of FSG, FSA and FSS.







FRAME CONSTRUCTION CFRP single piece monocoque with integrated suspension brackets

MATERIAL Intermediate and high modular CFRP-prepreg (twill and UD) with aluminium honeycomb core

OVERALL L/W/H (mm) 2870/1438/1139

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1188

WEIGHT WITH 68kg DRIVER (Fr/Rr) 111/125

SUSPENSION Double A-Arm Pushrod actuated by spring with self developed air chamber and adaptive damper.

TYRES (Fr/Rr) 465 x 191-254 Hoosier R25B (both)

WHEELS (Fr/Rr) 10" self developed single piece carbon rim, centerlocked (both)

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 4/wheelhub mounted/4x 37kW

MOTOR TYPE AMZ M5, self-developed brush-less inrunner

MAX MOTOR RPM 20000

MOTOR CONTROLLER Lenze Schmidhauser Dual DCU

MAX SYSTEM VOLTAGE 470

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiPo/6.46kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 14.5:1/-

DRIVE TYPE planetary gear with staged planets

DIFFERENTIAL None

COOLING Single serial cooling circuit with two radiators mounted in the sidepods.

BRAKE SYSTEM Self developed floating rotors, 190mm diameter, adjustable brake balance

ELECTRONICS self programmed VCU and telemetry system, CAN communication via self developed mini can modules

ZWICKAU

University of Applied Sciences Zwickau

Car E96 **Pit 18** **WRL 6** Germany

This season we build the sixth car with an electric drive. Our aim is to keep good German traditions like engineering and knowledge at a very high level to design a competitive and well-engineered race car made in Saxony! We rated a high efficient, lightweight concept with 4 steered wheels plus a big-sized energy storage with a high energy density, coupled with a well developed vehicle dynamics control program featuring a high efficient aerodynamic package.

FRAME CONSTRUCTION CFRP two-to-one-piece Monocoque with tubular steel roll bars

MATERIAL CFRP-prepreg and Al-honeycomb sandwich panel (5mm-20mm core)

OVERALL L/W/H (mm) 2919/1416/1134

WHEELBASE (mm)/TRACK (Fr/Rr) (mm) 1530/1200/1140

WEIGHT WITH 68kg DRIVER (Fr/Rr) 112/121

SUSPENSION Double unequal length A-Arm.; Push rod actuated spring/damper; Adjustable roll bar

TYRES (Fr/Rr) 18.0x6.0 R10, Hoosier LC0/18.0x6.0 R10, Hoosier LC0

WHEELS (Fr/Rr) 6.5x10, 2pc: self made CFRP rim bed and alumnium star, 51 mm pos.

NUMBER OF MOTORS/LOCATION/MAX MOTOR POWER 2/Rear Right, Rear Left/45kW, 45kW

MOTOR TYPE self build permanent magnet synchronous motor

MAX MOTOR RPM 19000rpm

MOTOR CONTROLLER Lenze/Schmidhauser MOBILE DCU 60/60

MAX SYSTEM VOLTAGE 600V

ELECTRODE MATERIALS/COMBINED ACCUMULATOR CAPACITY LiCoO2/7,5kWh

TRANSMISSION RATIO (PRIMARY/SECONDARY) 1:12,8/-

DRIVE TYPE spur gear

DIFFERENTIAL electric differential

COOLING cooler with cooling channel mounted behind the driver, optional electric fans

BRAKE SYSTEM 4-disk-system, self developed internal cooled steel disk, hub mounted, 190mm front, 170mm rear

ELECTRONICS self developed Vehicle Dynamic Drive Control and Central Electric Unit, motorsport wiring harness

LAST BY NOT LEAST ...THERE ARE NO KANGAROOS IN AUSTRIA

In 2006 the team of TU Graz won the First Formula Student Germany Championship on TANKIA

What are the folks now up to??

Barbara (Teamcaptain Orga) serves as Head of Department for "World Class Manufacturing" at Magna Steyr

Michael (Teamcaptain Tech) left automotive and is in resposibility of a logistic company in Austria

David (Suspension) is further very often „on the road" being in charge for vehicle dynamics at Magna Steyr

Lukas (Electonics) is still in motor sports at Audi Sport

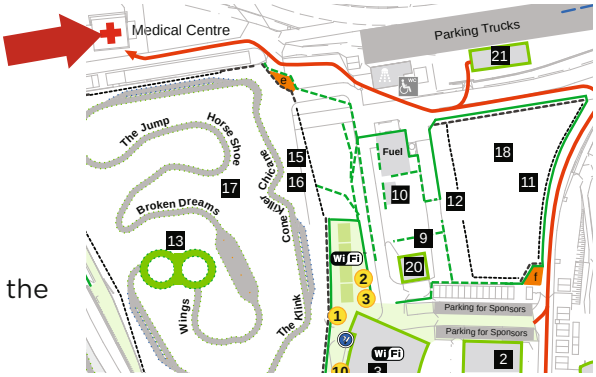
Andreas (Head of Design, Chassis) founded with a teammember their company „Bionic Surface Technology", also active in motorsports

Gregor (Drivetrain) started his academic career at TU Graz

EMERGENCY INFORMATION

Minor Injury

Medical Centre:
Please accompany the injured person to the Medical Centre.
Emergency aid is provided there.
The Medical Centre is occupied each day round-the-clock.



Severe Injury

Contact someone with a two-way radio:
Every Official and Security has two-way radio. Ask them to call the Medical Centre or an ambulance on channel 11.

Call an ambulance:
Call an ambulance yourself if someone is severely injured and needs urgent help. The Emergency Number for every phone and mobile phone is **112**.

During dynamics:
On Saturday and Sunday an ambulance is on site during the dynamic events. To contact them ask someone with a two-way radio (Official, Security) to call them.

Hospital:
Main Hospital, Kreiskrankenhaus (Schwetzingen), Bodelschwinghstrasse 10, 68723 Schwetzingen
phone: +49 (0) 6202/84-30

Emergency Numbers

In case of an emergency beyond competition times call 112. This number works with each phone, also with mobile phone or coin-operated telephone as international GSM-standard. It is alway free of charge.

112

Officials

Pit Marshal Konrad Paule:	+49 (160) 9670 4515
Pit Marshal Sebastian Seewaldt:	+49 (160) 9675 1593
Event Control Daniel Ahrens:	+49 (160) 9675 3763
Event Control Tim Schmidt:	+49 (160) 9679 1225

(In case of an emergency please call one of them, no matter what time it is.)

Emergency Call Contents

The emergency control centre will ask you some questions to ensure proper help for you. To support you at your call, here are some standard questions and some hints for your answers in English and German.

Who is calling? (Wer ruft an?)
Say your name and your telephone number for callbacks. Digits in German: 0 (null), 1 (eins), 2 (zwei), 3 (drei), 4 (vier), 5 (fünf), 6 (sechs), 7 (sieben), 8 (acht), 9 (neun)

Where did it happen? (Wo ist es passiert?/Wo ist es geschehen?)
the event site has the adress "Hockenheimring, Sachshaus, Am Motodrom", make it more precise!:
pit lane (Boxengasse), dynamic area (Fahrerlager);
the adress for campsite C2 near the Motodrom Hotel " Hockenheimring, Zeltplatz C2 beim Motodrom Hotel"
and for campsite C3 on the other site of the highway "Hockenheimring, Zeltplatz C3 an der Continental Straße"

What happened? (Was ist passiert?/Was ist geschehen?)
accident (Unfall), traffic accident (Verkehrsunfall), fire (Feuer), fall (Sturz), explosion (Explosion)

How many people are affected? (Wie viele Personen sind betroffen?)
1 (eins), 2 (zwei), 3 (drei), 4 (vier), 5 (fünf), 6 (sechs), 7 (sieben), 8 (acht), 9 (neun), 10 (zehn)

What kind of injury has happened? (Welche Verletzung liegt vor?)
fracture (Knochenbruch), bleeding (Blutung), unconsciousness (Bewusstlosigkeit), burn (Verbrennung), electric shock (Stromschlag), suffocation (Ersticken), heart attack (Herzinfarkt), shock (Schock)

Don't hang up after answering these questions! Wait to hear if the control centre has further questions!

Thank you for 10 years of...

Congratulations to Formula Student Germany!

10 years of pure adrenaline, team spirit and top performance.

For us, cars are more than just a means of transport. They embody passion, cutting-edge technology and the power of the entire team. That is why we are a partner of Formula Student. And one of the most fascinating employers.

FORMULA STUDENT GERMANY 2015

Opel
Audi
BASF We create chemistry
BMW GROUP
MINI
Rolls-Royce Motor Cars Limited
BOSCH Invented for life
Brunel access to excellence
Continental
DAIMLER
DEKRA On the safe side.
ETAS
HARTING
Henkel
automotive engineering iav
MAHLE
MAN
MathWorks
mtu
PORSCHE
SCHAEFFLER
SIEMENS
SKF
ZF
in cooperation with VDI

Supporter: fishfarm netsolutions | Hockenheimring | Kautex Textron | Linde Material Handling | Maxim Integrated | RIEDEL Communications | SLV Mannheim

Media Partner: audimax MEDIEN | campushunter media | HI:TECH Campus