

Highest Score Ever

Brazilian FSAE Electric Team sets world Formula SAE score record

The Brazilian Team UNICAMP e-Racing, sponsored by ETAS – among others – was the champion in the Brazilian and US events with the highest score ever at any Formula SAE competition. The Electric Formula SAE competition began in the purely electric category in Brazil and the United States in 2012/2013 following the example of European competitions, such as the Formula Student Electric FSE in Germany. The competition is receiving very positive reviews due to the use of state-of-the-art technologies and its strong environmental appeal.

ETAS is one of the main sponsors of the UNICAMP e-Racing team from Universidade Estadual de Campinas in São Paulo. The team won the 2012 Formula SAE Brazilian competition and was invited to participate in the International FSAE Electric in the United States, which was held in Lincoln, Nebraska. UNICAMP e-Racing took 1st Place at the inaugural 2013 FSAE Electric Class event with their 2012/2013 vehicle. The team from Campinas won seven of the eight honorable mentions awarded by the judges of the competition: Cost, design,

acceleration, autocross, endurance, energy efficiency, and skid-pad (stability test and lateral acceleration of the vehicle), scoring 985 points of 1,000 possible – the highest overall score ever at any Formula SAE competition. “The Lincoln event was a great experience and an opportunity to show that Brazilian students are able to develop high-quality engineering projects and compete overseas. The excellent results we have achieved made us really proud and motivated us for future challenges,” said the team captain Felipe Fantelli. In the meantime, their 2013/2014 vehicle won the latest 2013 FSAE Brazil event.

UNICAMP e-Racing

The team is formed by 35 students in the areas of Mechanical, Electric, and Computational Engineering. The developed vehicles are single-seaters with an advanced axial flux electric motor in a direct drive configuration. The motor uses a cutting edge technology that can deliver higher specific power than conventional motors – up to 100 kW weighing only 25 kg. The vehicles are able to go from 0 to 100 km/h in less than 3.5 seconds and are powered by a lithium iron phosphate battery pack allowing for more than 23 km of autonomy on a single charge.

ETAS inside

The UNICAMP e-Racing team benefited from ETAS’ measurement and calibration hardware and software used during development test drives and also received ETAS Engineering and Consulting Services. UNICAMP students took ETAS INCA classes and specific training on the development equipment. The open source software BUSMASTER and

the ES581 CAN Bus USB Interface Module were used to measure and analyze raw CAN data out of the controller and write a specific .dbf file. ETAS ES400 series of measurement modules allowed measurements from accelerometer, high current, tire temperature, and spring displacement sensors. The CBN400.1 high-voltage probes were useful to capture the high voltage measurements (peak voltages can reach 300 V DC). All sensor measurements were included on an INCA CAN monitoring experiment and logged with ES720 Drive Recorders, giving the team the flexibility to create smart experiments including calculated signals and complex triggers with reliability.

ETAS’ support to these future engineers helped the team successfully master the challenges to develop and validate a world-class experimental electric vehicle: “Using INCA and ETAS hardware, we were able to measure several parameters of the vehicle in a reliable way. The possibilities to work with calculated signals made the analysis of data much easier than before. Thus we could perform our validation tasks with a simple and professional approach, similarly to how it is really done in the automotive industry,” emphasized Fantelli.

The Formula SAE project is a challenge for engineering students aimed at further development and exchange of technical knowledge between future automotive professionals through practical applications and real competition between university teams. The electrical category anticipates new trends in the market and academic preparation and requires increasingly multi-disciplinary knowledge within the different areas of engineering.

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The UNICAMP e-Racing team