National Instruments Technology Helps Virginia Tech Win EcoCAR Competition

AUSTIN, Texas – July 25, 2011 – Virginia Tech recently was named the overall winner of EcoCAR: The NeXt Challenge, a three-year collegiate vehicle engineering competition sponsored by the U.S. Department of Energy and General Motors (GM). The Virginia Tech Hybrid Electric Vehicle Team (HEVT) designed and built an extended-range electric vehicle (EREV) that uses E85 (ethanol) and achieves fuel efficiency of 81.9 miles per gallon gasoline equivalent. With National Instruments (Nasdaq: NATI) reconfigurable software and hardware, the team used a graphical system design approach to design, prototype, validate and deploy a control strategy for the vehicle’s hybrid components.

To interface with and control the vehicle, the team chose NI CompactRIO, which acted as a hybrid vehicle supervisory controller that balanced power distribution between the vehicle’s combustion and electric systems. They programmed the controller with NI LabVIEW system design software, which also served as the runtime environment for the main driver display in the vehicle. The LabVIEW Statechart Module was used to create a high-level state machine control architecture for splitting torque between the hybrid components. Before deploying their control strategy to hardware, the team used NI VeriStand real-time testing software and NI PXI to create a hardware-in-the-loop simulation and validation system that evaluated the vehicle’s fuel and electric energy consumption and tested safety features.

First place in the 2011 EcoCAR competition was awarded to the engineering team from Virginia Tech. The awards ceremony took place Thursday June 16 at the Library of Congress, Washington D.C.

“The members of the HEVT come from a variety of engineering backgrounds and concentrations, and it was critical for us to have an easy-to-use platform that could be used by everyone and from start to finish,” said Jesse Alley, graduate advisor for the Virginia Tech HEVT. “National Instruments software and hardware streamlined our vehicle development, allowing us to rapidly develop a sophisticated hybrid control strategy that ultimately helped us win EcoCAR.”

Sixteen North American universities participated in EcoCAR and re-engineered GM-donated vehicles to minimize fuel consumption and emissions while maintaining utility, safety and performance. The competition culminated in a trip to the GM Proving Ground in Milford, Mich., where the teams put their vehicles through a series of safety and technical tests. In addition to winning the overall competition, Virginia Tech won awards for Shortest 60-0 MPH Braking Distance, Best AVL Drive Quality, Best Dynamic Consumer Acceptability and Best Fuel Consumption. The team also received the National Instruments Most Innovative Use of Graphical System Design award. National Instruments is a platinum sponsor of EcoCAR.

“We must continue to eliminate any obstacles to hands-on, project-based learning if we truly want to return to an era of experimentation within academia,” said Ray Almgren, vice president of product marketing for core platforms at National Instruments. “The EcoCAR competition does just that, and through the hard work and determination of the Virginia Tech team and the enabling power of National Instruments technology, experimentation resulted in innovation that has the power

to transform the future of transportation."

National Instruments supports numerous academic initiatives, including EcoCAR, to help students get real-world engineering experience while in school so that they are prepared for careers in industry. National Instruments equips today's students for their roles as tomorrow's innovators who are responsible for addressing the engineering grand challenges, which include improving urban infrastructure, making solar energy more economical and engineering better medicines. Many students have used the experience gained through the EcoCAR competition to secure automotive industry careers to work on sustainable mobility efforts.

Readers may visit www.ni.com/academic [1] to learn more about National Instruments academic programs. Additional information about the EcoCAR challenge is available at www.ecocarchallenge.org [2].

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