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2005 CHALLENGE X: CROSSOVER TO SUSTAINABLE MOBILITY

During the past year, 17 universities from across North America researched, compared, and selected advanced vehicle technologies to meet Challenge X goals. Students used computer-based mathematical modeling tools to objectively compare and select advanced technologies they would use in the overall design of their Challenge X vehicles. The teams also developed and used rapid prototyping and hardware-in-the-loop tools to validate their models and control systems. After their Challenge X vehicle design was approved, each team procured hardware, developed software, performed subsystem testing, and designed a plan to integrate their selected strategy into a vehicle. Before arriving at the competition, each team also submitted five technical reports and their GM Mentor performed a pre-competition inspection of the subsystems hardware that the team had assembled and tested.



Each team received the keys to a 2005 Chevrolet Equinox.

During the week of the Challenge X 2005 Competition, held at GM University in Auburn Hills, the teams squared off by delivering a Technical Presentation, Project Initiation Approval Presentation, Control Strategy Presentation, Outreach Presentation, and a variety of sponsored award presentations to panels composed of government and industry judges. In addition, each team developed a vehicle-level control strategy to optimize the fuel economy of predefined vehicle powertrain for a specific drive cycle. On June 9th the teams moved to GM's Milford Proving Grounds where Ed Wall, Program Manager for FreedomCAR and Vehicle Technologies, Office of Energy Efficiency and Renewable Energy at the U.S. Department of Energy, announced the results of this year's competition. Next, Larry Burns, GM's Vice President of Research & Development and Planning, presented the keys to a 2005 Chevrolet Equinox to each team. Later in the afternoon, the students took turns spinning the wheels of their new vehicles in the aAcceleration, Traction Control, and On-Road Emissions & AVL DRIVE Quality Event demonstrations.

Approximately \$80,000 in cash prizes and more than two dozen awards were presented at the June 8th awards ceremony. After opening remarks from Dan Hancock, GM Powertrain's Vice President of Engineering Operations, and from Doug Faulkner, Principal Deputy Assistant Secretary in the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, trophies and awards were given to the student teams for their performances

in a wide range of events.

The University of Waterloo, located in Ontario, Canada, took first-place honors, after scoring 890 out of 1000 possible points. This team created an impressive virtual advanced propulsion technology vehicle solution to improve on-road fuel economy and reduce emissions. The Waterloo team's propulsion system design is a "series" fuel cell hybrid featuring a Hydrogenics PEM fuel cell with a COBASYS 288-volt NiMH battery.



University of Waterloo takes first place in the Challenge X competition.

The University of Akron took second place with a "through-the-road" parallel hybrid design with a 1.9-liter Volkswagen TDI biodiesel-powered engine.

The Ohio State University grabbed third-place with a through-the-road parallel biodiesel hybrid design that features a Panasonic NiMH battery and a 1.9-liter Fiat 110-kilowatt CIDI engine.

Challenge X sponsors also had their share of the spotlight, with several giving out awards of their own. The National Science Foundation Outstanding Long-Term Faculty Advisor Award was presented to Douglas Nelson from Virginia Tech and the National Science Foundation Outstanding Incoming Faculty Advisor Award went to Christi Patton Luks from the University of Tulsa. Each award includes \$15,000 in funding placed in a university account to be used to enhance the integration of the student engineering competition experience into the undergraduate curriculum for the benefit of the students.

All of this took place in just the first year of the three-year Challenge X competition! In 2006 and 2007, students will integrate their advanced powertrains and subsystems into their Chevrolet Equinox, a compact SUV that already provides competitive fuel economy. The competitions will be held toward the end of both academic years to allow the teams to showcase their learning and vehicle development from year to year.

MORE INFORMATION

- [Complete Awards Listing](#)
- [2005 Score Summary](#)

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