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OU project redefining auto manufacturing

By **Jeff Samoray**, OU Web Writer

Many car owners become frustrated with dealerships when mechanics cannot replicate a recurrent car problem that occurs for the owner under "real" driving conditions. The problem goes unsolved, the customer leaves unhappy and the dealer and manufacturer stand to lose business.

But what if a car were able to diagnose its own electrical problems?

That's the question Pat Dessert of Oakland University's **Product Development Manufacturing Center (PDMC)** is answering by developing the Next Generation Electrical Architecture Project (NGEA) – a revolutionary central nervous system using new electronic and communication techniques that diagnoses vehicle problems and helps solve them.

"The auto industry is in an absolute world of hurt unless people are determined to look at things differently," said Dessert, who is the PDMC director, head of the NGEA project and an assistant professor of engineering at OU. "I don't want to be an alarmist, but all but one of the U.S. automakers lost money last year, and it was the second best year ever in terms of auto sales. Half of the auto suppliers could fold within the next year. The auto manufacturers themselves could fold before the end of the decade. Life as we know it in southeastern Michigan could be vastly different.

"I'd like to think that the PDMC can help – and developing the NGEA project is a start in getting manufacturers to think differently instead of by rote."

Unlike builders who use standardized electrical components to wire new homes or commercial structures, auto manufacturers start from scratch with each new vehicle line and develop new electrical systems and components unique to that fleet. The resulting electrical systems are not only costly to produce but lack interchangeability between fleets, Dessert said.

"The idea for developing (the NGEA) began with a business goal of reducing production cost," said Dessert, who worked on artificial intelligence systems for General Motors and consulted for DaimlerChrysler and Ford after completing his doctorate at OU. "The goal is to create a standardized set of components for a vehicle's electrical system, including harnesses and relays for commercial vehicles and trucks as well as military vehicles. Across an entire fleet, a manufacturer could save close to \$1 billion in vehicle maintenance costs by using the NGEA."

The second component of the NGEA is to develop an electronic nervous system, which would allow a vehicle to anticipate or diagnose electrical system problems and use new electronic communications technologies to help with a solution.

"There's been a lot of demand on cars to become smarter and smarter," Dessert said. "For example, with the NGEA system, a side-view mirror adjustment switch could fail, the vehicle's nervous system could sense this, automatically contact the dealer via radio frequency, order the replacement part and have it sent to the vehicle owner."

The inspiration behind the NGEA was the NTF, or "No Trouble Found," diagnoses for unsolved electrical problems related to vehicles brought to dealerships by consumers, Dessert said.

"I've been able to draw on the things I learned at OU as well as my work experience to develop the NGEA," Dessert said. "Dealers should be very happy with this development because there's a hidden cost to people coming into a dealership. With parts designed to be interchangeable, able to self-diagnose and easier to repair, the cost of supporting this new system is cheaper than operating under the old."

Dessert began working on the NGEA in 1998 with the help of PDMC staff, OU students and faculty, and with \$5 million funding obtained through the U.S. Department of Defense and other partners such as Lear Corporation, Visteon, Eaton Corporation and Compaq Computers. DaimlerChrysler became a partner in 1998, followed by the U.S. Army in 1999 and Ford last October. Negotiations also are under way with General Motors and BMW.

To cap off the project's first phase, Dessert and his colleagues displayed a demonstration vehicle at the 2002 North American International Auto Show in Detroit. Dessert's team fitted a 2002 Jeep Cherokee with the NGEA system installed. In addition, a

second NGEA-outfitted Jeep Cherokee was driven around metro Detroit to demonstrate its nervous system. Via the Internet, auto show attendees saw the vehicle keep track of its entire operating system and record any electrical faults. This system could be used to monitor an entire fleet of vehicles and has military applications, Dessert said.

Dessert and his team received enthusiastic response from the public and manufacturers at the auto show. The next step is to complete the project's second phase.

"We want to get to the point where we can introduce the NGEA to an entire fleet for testing," Dessert said. "We're aiming for starting this by late summer or early fall. A target vehicle may be one with DaimlerChrysler or perhaps some other manufacturers. We also will try to create a retrofit kit for the Army and a commercial platform. We're probably a year and a half away from completing this phase."

To this point, the most rewarding part of the project also has been the most frustrating one for Dessert.

"The most difficult thing has been breaking paradigms," he said. "The NGEA changes the way cars have been constructed. It's a very new idea and when we first introduced it, a lot of people didn't know what they were looking at. But this also has been the most rewarding thing – getting people to start thinking out of the box."

For more information on the NGEA project, visit the **Product Development Manufacturing Center** Web site or contact Pat Dessert at (248) 370-4896 or doc_detroit@msn.com.

SUMMARY

Pat Dessert of OU's Product Development Manufacturing Center (PDMC), with the help of PDMC staff, OU students and faculty, is developing a revolutionary system that diagnoses and helps solve vehicle problems by developing the Next Generation Electrical Architecture Project – a revolutionary central nervous system using new electronic and communication techniques that diagnoses vehicle problems and helps solve them.

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