

Edited by **Kevin Jost**

## Standards needed for software

As the amount of software on vehicles continues to rocket upward, automakers and their suppliers are hoping that standards can help to trim the labor hours needed to add new features and functions. As the industry adds safety systems and grapples with the rapid development cycles of consumer items while adding features in safety and other fields, the need for reuse and standards are common refrains.

Software impacts every segment of the vehicle, ranging from improving fuel efficiency to linking iPods and the like to the vehicle. That made "Challenges and Opportunities in Supplier and OEM Cooperation in the Field of Embedded Electronic Software Controls" a tone-setting opening panel session for Convergence 2006.

Presenters from around the globe were far more succinct than that session name as they highlighted several trends in software. One of the looming challenges is consumers' desire to bring the latest consumer technologies into the car. Vendors are scrambling to find ways that they can facilitate this trend.

"Whether we enable it or not, it's going to happen," said Jeffrey J. Owens, President of **Delphi** Electronics & Safety.

One of many difficulties is that, compared to makers of consumer products, automakers do not have the volumes to dictate trends. "The bad news is we will not be able to influence developments; we have zero impact in this industry," said Karl-Thomas Neumann, Head of **Continental** AG's Automotive Systems Division.

Panelists also addressed the growing demand for safety systems, which range from electronic stability control to vehicle-to-vehicle communications that let cars warn each other about potential issues. "Avoiding crashes is the next dynamite market," Owens said.

A key driving force behind all these developments will be software, so the challenge becomes getting reliable programs written in a timely fashion. Panelists note that using standards such as the Automotive Open System

Architecture (AUTOSAR) frees engineers and programmers from the time-consuming tasks of writing low-level code such as hardware interfaces.

"AUTOSAR is driven primarily by the fact that there are not enough software or electronic engineers. That's what standards are about—to make innovation possible by freeing up people so they can develop new things," said Hans-Georg Frischkorn, Executive Director of Global Electrical Systems at **General Motors**.

Others noted that standards can help vendors meet both time and quality requirements. "At the end of the day, we need to be the quickest provider. In the future, we will need standardized processes to develop high-quality software," said Wolfgang Runge, Executive Officer of the Steering Gears Division at **ZF**.

These quality levels are far more demanding than those of the consumer field, where resetting PCs is fairly routine. In all types of programs, vendors are also looking for ways to use software that has proven reliability. "If we can reuse software that has been qualified, we can transfer the good quality of that software," Neumann said.

*Terry Costlow*

## Automakers predict the future

High-level electronics officials from six automakers at Convergence 2006 agreed that iPod and USB in-vehicle connectivity is the wave of the future. But when it came to other specifications for future technologies, they could not agree on what specific protocols will be the norm in the industry.

"The basic principles are pretty good, but it's not mature enough to put in production yet," Woong-chul Yang, Vice President of the Automotive Electronics Center for **Hyundai** said about AUTOSAR (Automotive Open System Architecture) during the "Car Makers Speak" panel.

Representatives from **Nissan**, **General**

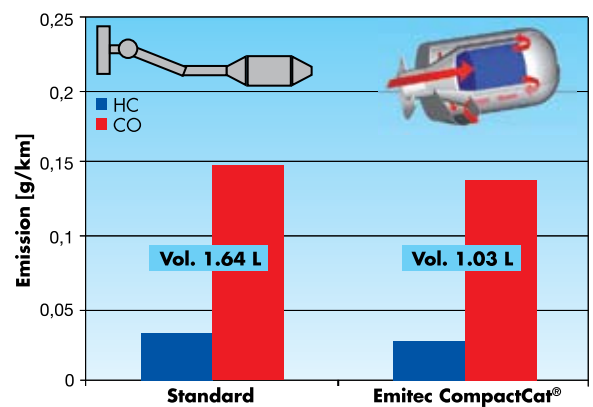


General Motors' Hans-Georg Frischkorn believes that AUTOSAR was born out of a lack of software and electronic engineers.

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**Motors, DaimlerChrysler, Honda, and Ford** were more open to the possibility that AUTOSAR will become the preferred open and standardized automotive software architecture in the next five to seven years for high-volume vehicle applications.

Likewise, all but one of the panelists see FlexRay, a high-bandwidth network, as being a staple on 200,000 unit vehicle volumes in five to seven years. "I'm going to pass on commenting," said Ford's Graydon Reitz, Director of Electrical, Electronics, and Systems Engineering. Reitz was the lone panelist not raising his hand to indicate a hearty expectation for FlexRay.

William Mattingly, Vice President of Electrical/Electronics Engineering Core at DaimlerChrysler, called on the industry to consider a global-wide radio frequency standard. "I'd like to see that standard come about," said Mattingly.

Beyond their opinions on standards acceptance, the panelists were quizzed on a number of other electronics issues. For instance, the topic of what electronics component will likely go the commodity



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route had Ronn Jamieson, Director of GM North America HVAC, suggesting that the electronic control unit may become a commodity—essentially a family of ECUs—within a given automaker's portfolio.

As for the future, the panelists expressed that vehicle safety features will continue to benefit from electronics. Meanwhile consumer electronics will continue to influence how automakers respond in terms of market pressures to provide compatibility and connectivity—as is presently being experienced with iPod and USB. "These things just keep coming at us," said GM's Jamieson.

*Kami Buchholz*

## Reinventing the auto

The incredible number of technology options available today lays the framework for engineers to create future vehicles that are sustainable from a number of measurement perspectives, including energy usage, safety, and affordability.

"Achieving sustainability is a huge challenge, but it is also a great opportunity," Larry Burns, Vice President of Research and Development and Strategic Planning for **General Motors**, said during Convergence 2006's opening keynote address. Burns stressed that now is the "time to seize this opportunity."

The wide swath of technologies that could be utilized in creating sustainable vehicles runs the gamut from advanced engine and transmission technologies to alternative fuels, fuel cells, electrical and electronic systems and controls, as well as lightweight materials.

"Individually, these technologies prom-

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ise to significantly increase industry growth," said Burns. "But with their convergence, a new automotive DNA is emerging. And this new DNA gives us the ability to completely reinvent the automobile."

For decades, the automobile was primarily a mechanical device. Now with electrical systems and electronics establishing a pervasive on-vehicle presence, that technology shift has put forth a connected automobile "that is fundamentally better by every measure, whether you are talking about performance, design, ride and handling, functionality, energy efficiency, emissions, safety, accessibility, or affordability," Burns said.

GM's **Chevrolet Sequel** is an advanced technology demonstration vehicle that utilizes hydrogen fuel-cell technology, three electric motors, and a lithium-ion battery as well as electronically controlled and actuated braking, steering, and damping. "The result of combining these technologies into a purpose-built vehicle is the world's first 300-mile range, zero-emission



GM's Larry Burns believes it is imperative that the industry build vehicles that include such cues as emitting only water vapor and using renewable fuel. "You are the scientists and engineers who must make this happen," he said.

vehicle that is designed to meet crash standards and that reinvents the three basic modes of driving: acceleration, braking, and steering," said Burns.

Sequel serves as a tangible model of what is possible for vehicles of the future. It is a vehicle that "embodies the fundamental changes that can be realized with the new automotive DNA. The new DNA will ensure that our industry can continue

to extend the significant benefits of automobile ownership to many more people around the globe in a way that is sustainable," Burns said.

Electric propulsion and fuel cells are a replacement to gasoline, diesel, and hybrid systems and serve as a "single system that has many fewer overall parts and only one-tenth as many moving parts as a conventional powertrain system," said Burns, underscoring the design flexibility enabled by scalable fuel cells, batteries, as well as the electrical system and controls.

"When you connect all the dots, this is truly a compelling opportunity to reinvent the automobile and accelerate industry growth," said Burns, adding, "Automobiles of the future will not only provide personal mobility, they will be the catalyst for an even more powerful convergence as vehicles quite literally become nodes on the information highway, the electric power grid, and the transportation network."

Kami Buchholz



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