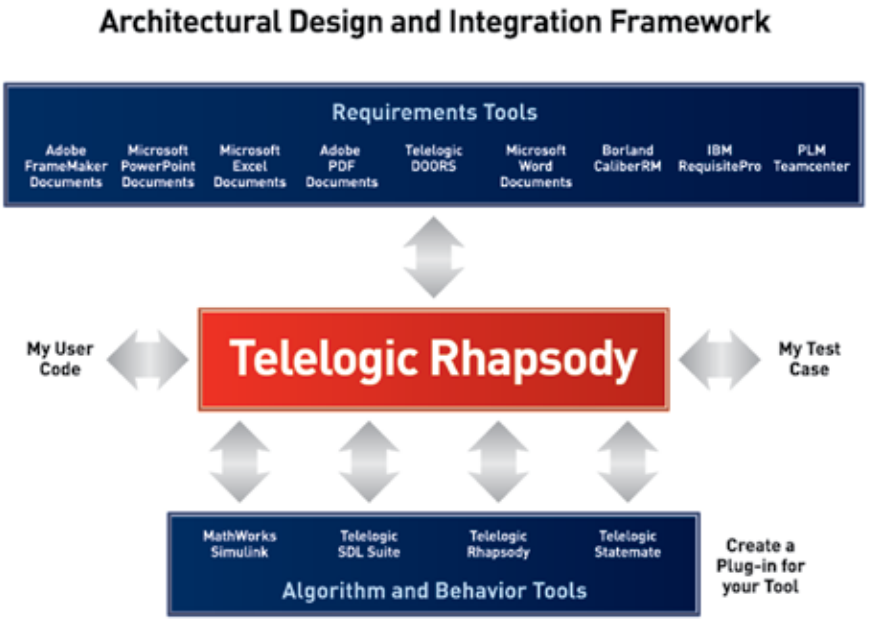
Edited by ***Kevin Jost***

Telelogic rolls out automotive platform

Increasing volumes of software and the growing complexity of hardware, coupled with the growing trends of offshoring and outsourcing, are shining the spotlight on software that helps product developers integrate the many elements in modern vehicles. **Telelogic** is addressing this area with standards-based software that helps automotive engineers and programmers use modeling software to get systems to market more quickly.



Rhapsody helps define functional, physical, and software architecture so algorithms can be inserted into the architecture and linked to the requirements, test cases, and external code.

The Swedish company's Rhapsody development software, already used by many automotive companies, is being upgraded with a version designed specifically for automotive applications. This is the second major automotive introduction in a year, following an **AUTOSAR**-compatible program that is now shipping.

Rhapsody for Automotive makes it easier for product developers to pull together information from a number of different sources, combining it to let engineers compare system requirements with models that will be used throughout the design. "Rhapsody pulls all the elements together in a coherent fashion so systems can be simulated to verify performance," said George LeBlanc, Vice President of Business Development at Telelogic.

That link between basic requirements and the model-based design techniques that are seeing rapidly rising usage should make it simpler for product developers to move from nontechnical requirements to technical specifications. "Users can map their functional architecture to the physical architecture, to see where the ECUs are, what the HVAC connects to, where its sensors are, what inputs turn on the heat or air conditioner," LeBlanc said. Rhapsody also provides a single architecture that makes it simpler to combine input coming from external companies and remote design centers, he added.

The software can also simulate a number a network interactions, letting engineers create models using abstract messages that are later mapped to the actual bus messages. It supports CAN, MOST, LIN, and FlexRay protocols. The software addresses all automotive electronic segments including powertrain and infotainment.

The program works with UML and SysML, standard languages for modeling, letting developers check to make sure that models created with **The MathWorks**' Simulink or other development tools will meet requirements. It also supports OSEK, MISRA C (created by the **Motor Industry Software Reliability Association**), and AUTOSAR.

All three are catching on, with the latter standard showing strong signs of growth. "The concept of AUTOSAR has caught on. There are still a bunch of pilots going on; several people are looking at it for next-generation designs," LeBlanc said.

On the business side, **IBM** has made a bid to acquire the company, and the Telelogic board voted unanimously to accept it.

Terry Costlow

Communications has a Michigan connection

Proponents of a new center that will serve as the operations base for testing, evaluating, and showcasing the connected vehicle make a strong case for the positive ripple effects associated with cars communicating with other cars and with the roadways.

General Motors' vehicle-to-vehicle technology uses a computer chip, simple antenna, and GPS. Vehicles equipped with the technology communicate via exchange of information such as location and speed.

The new Connected Vehicle Proving Center (CVPC) in Ann Arbor, MI, can "provide a mechanism and a base for manufacturers and those responsible for the roadway infrastructure to deal with motor safety in a way we never have before," said Bob Lange, Executive Director of Structure and Safety Integration for **General Motors**, during the CVPC's 2007 dedication.

Funded by a $3.1 million grant from the state of Michigan, the CVPC is being developed by the **Center for Automotive Research** and the **Connected Vehicle Trade Association**. Additional contributions of more than $3.5 million are expected from industry and other entities. The center's network operating center will provide portals and support for cellular, satellite, short-range, and other telecommunications that will enable data storage, analysis, and information sharing.

Beyond the telecommunications pipelines, the CVPC also will provide testing and evaluation of connected vehicle systems. "As we are able to develop the test and evaluation capabilities on a more standardized basis, that will help automakers evaluate Tier 1 and Tier 2 supplier products because they will have been tested and certified by the Connected Vehicle Proving Center," said Steven Underwood, Director of the CVPC.

Connected vehicle applications include integrated safety systems, remote vehicle diagnostics, as well as real-time

traffic and parking information. For instance, Michigan-based **ParkingCarma**, using the SmartParking Information Network (SPIN), gathers, organizes, processes, and analyzes parking data before distributing that parking information to users.

"ParkingCarma is working with the CVPC and its members to develop on-board applications and user interfaces that integrate ParkingCarma's SmartParking services into vehicles using not only the VII communication network but cellular, satellite radio, and HD radio communications as well," noted Rick Warner, ParkingCarma's CEO. "Additionally, the technologies that ParkingCarma uses to collect parking data are very similar to VII technology for road and intersection information. ParkingCarma is working with the CVPC members to develop and deploy data collection networks."

According to supporters, the CVPC will act as a catalyst for taking connected vehicles from concept to production in addition to being a catalyst for jobs creation "in automotive electronics and vehicle communications as engineers, researchers, and others from companies around the world come to the CVPC to have a not-for-profit entity take an objective role in doing testing, evaluating, and eventually certifying product performance," said Underwood.

Kami Buchholz

Infiniti launches lane-departure prevention

Lane-departure-warning systems, which indicate inadvertent lane departure with a simple chime, were introduced on cars more than three years ago. The next step—actually guiding a drifting car back into its lane—appears on the new **Infiniti** EX35 crossover and M series sedans.

All manufacturers are working on systems that keep a car from drifting out of lane, typically using computer-con-

An *AEI* editor tests the Infiniti lane-departure-prevention system, drifting toward center lane marking. The opposite side brakes were gently applied by the system and the car was guided back into its lane.

trolled steering. *AEI* tested an experimental system of that type developed by **Volkswagen** AG and it worked very well. However, the new Infiniti system is simpler and proved to be almost unobtrusive, in tests we performed with the EX35.

When the vehicle drifts toward the lane marking, the warning chime does sound, but in addition, the vehicle's dynamic stability control system (including antilock brakes) pulses the brakes on the opposite side. When the wheels on the opposite side slow down, the wheels on the side closest to the lane marking run faster and steer the car away from the marking.

Although **Nissan** does have four-wheel steering in its engineering arsenal, this simpler system was chosen for its lower cost and gentle effectiveness.

A camera just above the interior rearview mirror and the computer with which it communicates assume greater importance with this active addition to a warning chime. The camera and its computer are produced by **Valeo**, using some technology licensed from **Iteris**. Although the prevention system can be turned off, the system operation still must be sufficiently robust so it does not interfere with a motorist's intent to change lanes.

Repeated testing on many roads with different markings showed that the vehicle dynamic control is sufficient to guide a car drifting from driver inattention. It is not intended (nor can it) compensate for a gross error, such as from a driver jerking the wheel while dozing. In fact, one of the computer strategies to discern driver intent to change lanes is to monitor driver operation of the steering wheel. If the wheel is turned more than 2°, the lane-departure-prevention system is disengaged. The chime still will sound, but the driver does not have to overcome any steer-away effect of the antilock brakes. Both warning and prevention are disengaged if the driver signals for a lane change.

Infiniti's lane-departure-prevention system uses a forward-view camera above the rearview mirror to analyze roads for lane markings, whether they are in-use markings or those from discontinued lanes.

Even if the computer misjudges driver intent in a very gradual lane change, the well-modulated application of the brakes is easy for the driver to overcome.

Paul Weissler