V2V Needs More Work

Not Ready for Crash Avoidance

On the eve of the National Highway Traffic Safety Administration’s promised year-end decision about if and when to incorporate vehicle-to-vehicle (V2V) communications technology into the U.S. vehicle fleet, a number of serious questions are emerging in both the public and private sectors about its readiness and its effectiveness in preventing collisions.

Probably the most difficult questions concern security. A system is needed to certify that messages transmitted by vehicles, such as vehicle location, heading and speed, are valid and can be trusted. A prototype security system has been tested, but it is not ready to be deployed. In a November 2013 report to the U.S. Congress titled Intelligent Transportation Systems—Vehicle-to-Vehicle Technologies Expected to Offer Safety Benefits, but a Variety of Deployment Challenges Exist, the Government Accountability Office (GAO) listed the challenges that need to be addressed before V2V can be successfully launched.

According to experts, DOT officials, automobile manufacturers, and other stakeholders GAO interviewed, these challenges include: 1) finalizing the technical framework and management framework of a V2V communications security system, which will be unique in its size and structure; 2) ensuring that the possible sharing with other wireless users of the radio-frequency spectrum used by V2V communications will not adversely affect V2V technology’s performance; 3) ensuring that drivers respond appropriately to warnings of potential collisions; 4) addressing the uncertainty related to potential liability issues posed by V2V technologies; and 5) addressing any concerns the public may have, including those related to privacy.

A month before the GAO report’s release, Takeshi Uchiyamada, Toyota chairman, was quoted in the Washington Post saying, “The technology that will allow cars to talk to each other and coordinate their motions is far from proven.”

V2V is widely believed to be the next big step in active safety, one that will lead to a significant reduction in traffic accidents. But given V2V’s many shortcomings, NHTSA will be hard pressed to justify a mandate that would require carmakers to install DSRC (dedicated short range communications) radios in new vehicles. More likely, NHTSA will call for more research and more time to rethink V2V.

The DOT-sponsored 2,700-vehicle, real-world test of V2V technology, called the Safety Pilot Model Deployment, has been underway in Ann Arbor, Michigan, since the summer of 2012 and will run through February 2014. NHTSA planned to use the early results of the test to estimate the potential benefits of V2V to decide what’s next.

But experts familiar with Safety Pilot have doubts about that test data. Dave McNamara, industry consultant for Leidos, the technology consultancy spun off from SAIC, was blunt. “I don’t think NHTSA knows what to do with the data. What does it mean? In today’s political environment, given how much money was spent, if there was a clear cut signal in that test data, we would know about it by now.” Mr. McNamara sees NHTSA in the difficult position of not having the data to support a mandate for V2V, not having the political backing to fund more research and risking public backlash by doing nothing. Backlash over NHTSA’s continued delay in ruling on rearview cameras, as it was directed by the 2008 Cameron Gulbranson Kids Transportation Safety Act.

NHTSA could simply decide it needs to do more research. Or it could decide to begin the rulemaking process toward an eventual mandate for DSRC radios in new cars and continue research during that process.

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V2V Challenges

◆ A Sufficient Number of Vehicles Needs to Be Equipped Quickly

Cars equipped with DSRC transceivers will have little safety benefit until many other cars are likewise equipped. “Even if NHTSA required V2V on new vehicles right away, it would take at least 20 years to get to a 95% penetration level,” noted Brian Daugherty, Visteon associate director responsible for global corporate advanced development. To have a more immediate impact, V2V equipment would have to be retrofitted to existing vehicles. Making that happen is beyond NHTSA’s authority.

◆ Radio Congestion Could Limit V2V Reception

No one seems to know for sure if the radio spectrum set aside for DSRC transmissions is sufficiently wide to allow the vehicle-to-vehicle safety messages to get through when traffic is heavy and many cars are in the vicinity. Research done by CAMP, the Crash Avoidance Metrics Partnership of eight carmakers and the U.S. Department of Transportation, has yielded some promising results, but the research is still underway and won’t be completed until August 2014 at the earliest.

The communications protocols that would support large-scale deployment without compromising V2V performance have not yet been finalized. “When a DSRC radio detects the channel is getting congested it could make adjustments such as transmitting at a lower power or it could transmit the safety message at a lower frequency, say at five times a second rather than its usual ten times a second,” said Richard Bishop, an ITS expert.

According to Ygomi chairman and ITS World Congress board member, Russ Shields, the protocol requiring each vehicle to send its message ten times a second is unnecessary and adds to the congestion problem. “Sending the message ‘here I am, here is my speed and here is my direction,’ ten times a second just clogs the spectrum. If your speed and direction don’t change there is no need to send them again and again. You could send them maybe once a second because everybody can calculate where you are going to be.”

Adding urgency to the possible congestion problem is the U.S. Federal Communications Commission’s (FCC) Notice of Proposed Rulemaking requesting comments on allowing unlicensed devices to share the 5.9 GHz band with DSRC-based applications such as V2V. It remains to be seen if and to what degree this would add to the congestion challenge.

◆ GPS Not Accurate Enough

To be used for crash avoidance, DSRC devices will need to determine when a potential conflict exists. Each vehicle’s safety message must include accurate data about its speed, heading and location. The location data must be precise enough to determine if a vehicle is a threat so collision avoidance maneuvers can be undertaken. But a number of collision avoidance use cases require accuracies not presently available in the GPS receivers widely used in vehicles today.

“You can buy accurate GPS receivers, but you pay a lot of money for them and even then there are situations where they don’t work, like in the urban canyons between big buildings,” pointed out Mr. Daugherty.

“Given the problems with GPS accuracy, DSRC by itself is insufficient to guarantee a level of safety that is acceptable,” warned Graham Hellestrand, CEO of Embedded Systems Technology. Mr. Hellestrand’s company has run computer simulations to test the viability of V2V communications.

Not only is the accuracy of GPS a concern, but the security of the signals is as well. According to an article in the October 29, 2013, issue of Defense News, a group of students at the University of Texas figured out how to send ships off course using fake GPS signals.

“By the time signals from GPS satellites reach the earth they are pretty weak and subject to interference,” said Mr. Shields. “Somebody could sit at some freeway intersection and send wrong GPS information to cars that rely on it for safety and they’d all crash. We don’t have an answer for that.”

◆ Security Credential Management Research Still Underway

CAMP is conducting research that would lead to the design of a security credential management system that would wirelessly certify that V2V messages are trustworthy and prevent hacking. It has not yet been established what such a system would cost, how it would be financed and who would manage it. Over the air security credential management would add
to the cost of V2V implementation since it would require an embedded cellular modem and a data plan or an extensive DSRC infrastructure to link vehicles to back-end security services.

A security system capable of detecting, reporting and revoking the credentials of vehicles found to be sharing inaccurate information is complicated, but would be less so if it employed a technology more robust than 802.11p. That enhancement to 802.11, or Wi-Fi, supports ITS applications including data exchange between vehicles. Russ Shields would like to see 802.11p replaced by something more in the mainstream. “802.11p is an isolated technology left over from the 20th century, with no other uses other than for ITS.” As part of an overall connectivity structure, Mr. Shields would like the industry to instead consider using LTE Direct technology, which enables device-to-device communications without going through a network. “The point of going to LTE is you would then have one modem that can do both the 5.9 GHz direct and regular cellular to get security warnings.”

LTE Direct is currently being standardized in 3GPP, Release 12. It is backed by public safety services as a means to communicate when networks are down, for example, during severe weather events or natural disasters. Because it can locate other devices, the standard has potential commercial applications in social networking or location-based advertising.

Will Drivers Respond Appropriately to V2V Warnings?

Some industry experts see a role for DSRC-based V2V as an augmentation of ADAS systems, an additional sensor that contributes to improved active safety systems. Bob Denaro, chair of the DOT’s ITS Federal Advisory Committee and the Transportation Research Board’s Road Vehicle Automation Joint Subcommittee, observed, “With other vehicle sensors you have only line of sight detection. V2V is a predictive sensor that sees around the curve, over the hill or through the vehicle beside you. That is where the real value is, not as a standalone solution but as an augmentation to other sensors. Then you are not so dependent on it.”

Visteon’s Brian Daugherty agrees that DSRC would add a long range sensor to ADAS systems enabling earlier warnings of a possible collision. “And DSRC is an economical warning system for lower end vehicles that can’t afford a full suite of radar and vision sensors,” he said.

Going Forward: Another Look at V21 and New Communications Media

According to the GAO report, from fiscal years 2003 through 2012 the U.S. Department of Transportation (DOT) spent about $445 million on V2V and vehicle-to-infrastructure (V2I) research. Initially DOT’s work was focused on V2I communications, but in 2009 the focus switched to V2V in part because the billions of dollars needed to fund the infrastructure was not forthcoming. Even though in today’s political climate it seems even less likely that infrastructure funding would be authorized, the GAO reports that the Department of Transportation plans to increase its focus on V2I technologies starting in 2015.

Originally V2X planners at the DOT had the view that 5.9 GHz DSRC would be the one medium used to connect vehicles to each other and to the infrastructure. They now believe that is no longer realistic and want to explore what role all communications media should play.

With that in mind, the DOT’s Intelligent Transportation Joint Program Office (JPO) is planning what it is calling Southwest Michigan 2014, with a couple of million dollars in funding, the project would bridge to the JPO’s next big connected-vehicle activity, scheduled for 2015 and 2016.

The SE Michigan 2014 project is an opportunity to help the DOT define what the connected vehicle will look like and help it decide how it should direct its resources to its next large scale trial. The project will consider all possible communications media that could play a role in V2X including DSRC, LTE Wide Area Network Cellular, Wi-Fi and other packet-based media, Bluetooth, Zigbee, and other options.
Background

Fairchild Semiconductor was organized in 1957 by some of the original founders of the Silicon Valley semiconductor industry, including Robert Noyce and Gordon Moore, who went on to found Intel a decade later. Fairchild began manufacturing transistors, and in 1961 Robert Noyce was awarded the first patent for an integrated circuit. The company developed innovative process and manufacturing improvements and dominated the IC industry during the 1960s.

The Fairchild Semiconductor business was acquired by Schlumberger Ltd. in 1979 and then by National Semiconductor in 1987. In March 1997, National spun off Fairchild as an independent company that included the logic, discrete and non-volatile memory businesses of National. In December 1997, Fairchild acquired Raytheon Semiconductor, which brought with it high-performance analog and mixed-signal semiconductors. Following a 1999 IPO, Fairchild shares (FCS) traded on the New York Stock Exchange until October 31, 2013, when the company transferred its listing to the NASDAQ.

Among Fairchild’s strengths is a healthy balance sheet: the company paid just 0.4% of sales in interest payments in 2012. Long-term debt was $200 million as of September 29, 2013.

Fairchild employs roughly 9,500 employees worldwide, with seven production facilities, including three in the United States, and six regional sales headquarters. The company is segmented in three product groups organized by their end markets: Mobile Computing, Consumer and Communication (MCCC), Power Conversion, Industrial and Automotive (PCIA) and Standard Products (SDT). Major competitors include Analog Devices, Linear Technology, Maxim Integrated Products, Micrel, ON Semiconductor, ST-Microelectronics, Intersil, International Rectifier, Infineon Technologies and Texas Instruments.

Vijay Ullal, Fairchild president and chief operating officer, joined the company in September 2012. Mr. Ullal is responsible for product lines, sales and marketing, manufacturing and technology development. Prior to joining Fairchild, he was employed by Maxim Integrated Products as president of the Consumer and Automotive Solutions Group from 2007 to April 2012.

Mr. Ullal has significant changes in mind for Fairchild operations, notably a shift to more outsourcing to contract fabs to both stabilize and bring more flexibility to the supply chain. “Fairchild had started outsourcing some of its production to foundries before I got here and we’ve accelerated that process. In five years we are...
Automotive Revenue by Region

- 2012 Total: $146 million
- North America, 27%
- Europe, 37%
- China, 14%
- South Korea, 10%
- Japan, 9%
- ROW, 4%

Fairchild’s automotive quality is “significantly less than one PPM,” according to Mr. Ullal. Its manufacturing sites are QS-9000 and TS-16949 certified.

Automotive Background

Fairchild’s automotive business, reported in the PCIA product group, accounted for just 10.4% of total revenue in 2012, but is expected to grow at a minimum of 10% per year over the next five years. In Mr. Ullal’s view, 15% annual growth is entirely possible. “I believe the automotive industry is an area where there is going to be an unprecedented amount of innovation. Even though it is a longer term play for any company, it is really a valuable investment for the future,” he said. “Typically when a market matures, mobile phones for example, it becomes all about costs, and innovation becomes less important. Automotive is a completely different market and in every aspect, automotive is changing dramatically.”

With headquarters in Munich, the automotive business unit has a strong European focus—the region accounts for 37% of automotive sales—and Bosch and Continental are among Fairchild’s top five customers. Fairchild is also expecting future growth in North America and South Korea. While Fairchild’s total sales declined by 11.5% in 2012, automotive sales increased 9% over the prior year.

Marion Limmer, vice president of Fairchild’s automotive business unit, is responsible for executing Fairchild’s product strategy for automotive. Leveraging her 20 years of industry experience, first with Texas Instruments and later National Semiconductor, Ms. Limmer took over Fairchild’s automotive product line in 2007. Since then automotive sales have grown from 5% of company revenue to a record 12% in Q3 2013. “She focused the company, pruned the product line, rationalized our prices and got control of quality,” noted Mr. Ullal. Ms. Limmer reports to the senior vice president of the PCIA Group.

In sharpening the focus of the automotive business, Ms. Limmer has targeted the power area: “We have strength in power, so we need to grow that area. You have to be good at something to allow yourself to invest in it and get even better at it.” Automotive invests a healthy 13% of sales in R&D compared with 10% for Fairchild company-wide. Although profit from the automotive unit’s P&L is not reported, Ms. Limmer observed that the company invests only in product lines that are profitable.

Fairchild has dedicated automotive sales personnel, field applications engineers, customer quality engineers and customer service staff located close to customers in North America, Europe and Asia. The main sites are in China, Germany, Japan, South Korea and the United States. Automotive product development teams are also continued on following page.

Distinctions Claimed by Fairchild

- Invented the integrated circuit, Silicon Valley pioneer
- Number one global supplier of automotive IGBTs for ignition systems with at least 40% of the market
- Number one global supplier of EPS power solutions, both modules and discretes, with at least 40% market share
- Best in class power MOSFETs for Rs(on) and EMI performance
- Automotive quality <1 PPM
Fairchild Semiconductor

located at several of these sites and close to manufacturing facilities as well. Fairchild’s automotive sales and product teams focus exclusively on automotive customers.

Automotive Strategic Focus

According to Mr. Ullal, automotive customers buy from Fairchild because “We are focused on power; we are power experts. We have everything customers need: applications knowledge, market knowledge, customer relationships, quality, process technology and packaging technology.”

“We are sharply focused on underhood applications, including electric power steering,” pointed out Ms. Limmer. “We have low-, mid- and high-voltage power technologies along with packages, either for discrete solutions or what we call combined solutions, where we package discretes, control ICs and passive components together.”

Fairchild provides power semiconductor devices to support four fast-growing automotive applications.

- Ignition
- Vehicle electrification (electrifying mechanical loads, such as power steering, water pumps, fuel pumps, oil pumps)
- Mild hybrids, 48-volt systems
- Hybrid electric and electric vehicle traction motors, inverters and converters

Ignition

Fairchild claims it is the number one ignition IGBT (insulated gate bipolar transistor) supplier, with at least a 40% share of the global market, across all ignition architectures. In the past three years unit sales of ignition IGBTs have grown 22% annually, to 110 million units in 2012.

Contributing between 25% and 30% of automotive sales, revenue from IGBTs and related components for ignition systems ranges from $2 to $10 per four-cylinder gasoline engine.

According to Joseph Notaro, Fairchild vice president for global automotive sales and applications since January 2013, there is plenty of innovation going on in the ignition area, in packaging and in silicon. “We have a new generation of ignition IGBTs coming out now in production that reduce power dissipation by 20%. With the same die size, you have 20% less power dissipation, or you could go to a smaller package and handle the same power and energy,” he said. “Not only that, but we are able to mount our ignition IGBT with a control IC and passive components inside a small igniter module. So when you have coil-on-plug a single ignition coil per cylinder directly mounted over the spark plug you can go directly with everything integrated in a small package size.”

Mr. Notaro stressed the importance of high quality and reliability in ignition systems. “If the ignition system fails, it really, really bothers you. … A 40% market share says our quality is proving out with the OEMs,” he said. According to Fairchild the company has never had a quality issue related to ignition IGBTs investigated in the field.

Fairchild believes that as carmakers continue to reduce engine size and weight and improve combustion efficiency to meet emissions and fuel economy regulations, the market for smart IGBT igniter modules will be a growth area for the company.

Vehicle Electrification

Fairchild believes it is well positioned to serve the auto industry as OEMs convert mechanical and hydraulic systems to electric in their efforts to reduce fuel consumption and CO2 emissions. Fairchild’s 30/40V MOSFETs and Automotive Power Modules (APM) provide high power density solutions for systems such as electric power steering (EPS) as well as auxiliary systems such as water pumps and fuel pumps.

Alternators

Fairchild has also been concentrating on alternator applications. “We are replacing conventional diodes that are press-fit into the alternator casing with high-efficiency diodes sized to fit the same press-fit package. The new diode leads to a several percentage point increase in efficiency at a reasonable cost,” Mr. Notaro said.

Electric Power Steering

According to Fairchild estimates, penetration of EPS systems today stands at roughly 44% and is expected to increase to more than 55% by 2018. EPS supplier Nex-
to stay with discretes but want a package with a higher current rating,” Ms. Limmer explained.

Fairchild offers those customers its new TO-Leadless power MOSFET package, technology it licenses from Infineon. Fairchild and Infineon announced the license agreement in April 2012, emphasizing to potential customers the benefit of having access to a second source for Infineon’s new technology. The packaging technology is designed for high-current automotive applications like EPS, as well as start-stop systems, battery management and active alternators. TO-Leadless is 20% smaller than the current D²PAK package it replaces and is capable of handling up to 300 amps DC with a maximum $R_{DS(on)}$ of 0.65 milliohms at room temperature. According to Mr. Notaro, “None of our competitors have such a low $R_{DS(on)}$ in a similar size package. We are best in class for $R_{DS(on)}$ per square millimeter and best in class for EMI performance as well.”

Fairchild estimates its market share in EPS, both module and discrete solutions, at roughly 40%.

Mild Hybrids, 48-Volt Systems, HEV/EV

Vehicle electrification, where electric machines replace more and more belt-driven machines in applications such as coolant pumps, fuel pumps or engine cooling fans, should see substantial growth in the next two to three years, according to Mr. Notaro. He expects to see more mild hybrids with 48-volt systems in the next five years. The market for hybrid electric and full electric vehicles is still five to seven years away from really taking off.

Fairchild feels it will benefit regardless of which way the market swings, whether toward HEVs or EVs, because the silicon building blocks it provides will be the same. Fairchild is not only focusing on silicon technology for these applications, but is also developing new, fully transfer-molded power modules. High quality transfer-molded packages provide higher reliability than silicone gel-filled power modules, according to the company.

Fairchild’s 40V to 150V MOSFETs are finding applications in alternators, starter alternators and 48-volt systems with integrated starter generators. Its 150V MOSFETs are designed into a 48-volt system that’s soon to launch in an Asian carmaker’s mild hybrid. The integrated starter generator in that application employs TO-Leadless packaging technology. The initial vehicle launch will be low volume, a proof-of-concept introduction in 2014. Over the next three years, the carmaker plans to roll out the applications to 100% of its light vehicles.

The starter generator acts as the starter motor and provides boost power under some driving conditions. It also allows for passive coasting, shutting down some cylinders at cruising speeds and allowing convenience features such as air conditioning to function during start-stop.

IGBTs for HEVs and EVs

Fairchild plans to be a player in the market for high voltage IGBTs, a crucial component in electric and hybrid vehicles. Supporting all voltages from 650 volts to 1,200 volts, Fairchild will sell packaged IGBTs or bare die. Already developing the third-generation of its field stop trench IGBT technology, Fairchild says its IGBTs can easily be customized to suit exactly what the customer wants. “We can make tradeoffs between switching performance, power losses, and breakdown voltage to fit any application thanks to our device architecture and process modularity,” said Mr. Notaro. “Other suppliers can’t do that as efficiently.”

The company has already booked a small order for high-voltage IGBTs that will be used by a carmaker in vehicles that will be sold in Europe and North America. Other customer projects in Asia, Europe and the U.S. are in development.

R&D

Top priorities for R&D, said Mr. Ulrlal, are all high-voltage products: high voltage MOSFETs, high voltage IGBTs and power modules. “We are also putting an enormous amount of effort into silicon carbide (SiC),” he added. “When I first got here, silicon carbide was in its infancy and now I am very happy with the progress we’ve made. Today we have a very robust silicon carbide BJT (bipolar junction transistor) process, and we’re going to bring this to market. The efficiency of these things is significantly better than IGBTs or MOSFETs for the same applications.”

In April 2011, Fairchild acquired TranSiC, an SiC power transistor maker based in Sweden, along with its multiple patents in SiC transistor technology. Given the highly conservative nature of the automotive industry, it is unlikely silicon carbide devices will find their way to vehicle applications until they are well proven in other markets. “But,” noted Ms. Limmer, “we see potential for SiC in HEV and EV applications, for example traction inverters and eventually even for the DC-DC converter. So we are already talking to customers and OEMs about silicon carbide. I believe the trend will be a positive one, but it will take time.”
Wi-Fi Smartphone to Head Unit Link Coming

Smartphones provide Wi-Fi, Bluetooth and USB connections, and eventually infotainment systems will add Wi-Fi to complement their Bluetooth wireless and USB wired capability. Ford appears to be headed that way as does General Motors.

“Wi-Fi has bandwidth advantages over Bluetooth. Apple used to be heavy USB for everything. They are expanding beyond that. All the operating system providers are progressively looking at multiple connection and transport methodologies,” said Doug VanDagens, global director of Connected Services at Ford.

“The trend to Wi-Fi will be very strong,” affirmed Matt Schroeder, executive director of infotainment and OnStar engineering at General Motors. “We have Wi-Fi currently in the MyLink bring-your-own-media device.”

While no one who has signed non-disclosure agreements with Apple will say so, Apple appears to be behind the move to Wi-Fi. Wi-Fi will likely be part of their iOS in the Car connectivity platform, which is coming soon. Google is also likely to soon offer a connectivity platform that includes Wi-Fi.

“Wi-Fi is obviously the right technology for content and streaming,” said Nakul Duggal, vice president of product management, responsible for Qualcomm’s automotive business. “It will complement Bluetooth, which will continue to be used for handsfree calling and to transfer your contacts from the phone to the head unit and to stream audio content. We will see a combination of Wi-Fi and USB or some similar wired technology for applications requiring high bandwidth such as projecting to the vehicle’s display or high quality audio.”

Qualcomm is the world’s leading supplier of 3G and 4G modem chipsets as well as the largest supplier of wireless modem chipsets to the auto industry. As a result of its 2011 acquisition of Atheros, Qualcomm supplies Wi-Fi and Bluetooth technology in a multichip version and individually, in a system-on-chip version.

Wi-Fi operates at a significantly higher bandwidth than Bluetooth, but its power consumption is also significantly higher. Sachin Lawande, president of Harman’s Infotainment division, isn’t convinced Wi-Fi’s greater bandwidth will be needed. “Today Bluetooth runs at more than a couple of megabits per second. That is not an inconsequential speed. With Wi-Fi you get a lot more, but hopefully you are not streaming a video conference when you are driving. In automotive I don’t see much of a need for Wi-Fi. Power will be the overriding factor.”

Regardless, with Apple (iOS) and Google (Android) smartphones accounting for 94.7% of all phones sold in the third quarter of 2013, according to Strategy Analytics, if Apple and Google are leaning in the direction of Wi-Fi for device to head-unit connectivity, carmakers will lean that way too. ✗

Autosar...

In Detroit, General Motors clearly has been the most enthusiastic about Autosar, followed by Ford, with Chrysler quite reluctant. From 2013 through 2016, GM will undertake an estimated 70 design starts of ECUs based on Autosar Release 4.x. That’s a significantly greater number of Release 4.x design starts than any other carmaker worldwide, according to numbers compiled by Mentor Graphics. Next closest is Hyundai Kia with 45 ECU design starts coming over the same period.

GM’s next software platform, Global B, will be based on Autosar 4.0.3. According to the Autosar community, at the end of 2012, except for some tweaking to come, the carmaker finished piecing together an Autosar compliant tool chain. At the beginning of this year, GM evaluated and qualified Autosar basic software vendors. In May 2013, GM began sourcing nine of its most critical Autosar ECUs, including a central gateway, an engine controller and certain safety controllers. These would be used on GM’s Autosar earlyadopter cars for which production is to begin in 2016. GM’s roll-out of Autosar ECUs across all model lines begins in 2017.

Robert Rinkus, engineering group manager for software architecture at GM, couldn’t comment on the specifics of the company’s Autosar phase-in plans. He did talk about why it takes so long for Autosar to take hold in the industry. “It takes a lot of time because we don’t want to throw away all the software assets we have developed going back a couple of decades. We want to make sure we can refactor those to Autosar. Switching from a single software component, single ECU focus over to Autosar, where we focus on system design at the vehicle level, is a very big activity. We are fully committed to Autosar and driving implementation as fast as possible.”

Ford is also committed to Autosar but is just now getting started with evaluations of possible software and tool vendors. One of the difficulties in bridging to Autosar is building a software development tool chain that uses as much of the existing tool chain as possible. Ford is targeting 2014 for coming up with a plan to introduce Autosar software into its first vehicle platform. Ford is not yet able to say when it will roll out its first Autosar platform, however.

While Chrysler has not yet decided to adopt the Autosar development platform, it is finding situations where it is forced to adopt some Autosar ECUs because doing otherwise would be too costly. Chrysler has been looking at tools that will help accommodate those exceptions. In the midst of an IPO, Chrysler was unable to comment about its Autosar strategy. According to sources, Chrysler is only in the process of evaluating Autosar adoption. ✗