

## THE INTERSECTION OF IT AND AUTOMOTIVE ENGINEERING



**Sam LaMagna**

Advanced driving technologies are delivering huge new possibilities for tomorrow's cars and trucks in terms of safety, convenience and operating efficiency. But turning the potential into reality demands fundamental changes in the way carmakers and their suppliers interact—beginning with recognition that designing a truly intelligent vehicle must begin with a discussion about all the interrelated vehicle systems that require intelligence.

### What makes this a pivotal issue today?

In the end, according to Sam LaMagna, Director of Advanced Driving Technologies, Automotive Solutions Division at Intel Corp., it comes down to a compute system problem: enabling vehicles to develop situational awareness, become smart enough to use the data being collected by their sensors to make driving safer and more convenient and do this in a way that the technology is affordable for the majority of the cars we buy.

For the past few years automobile innovation has come primarily through electro-mechanical advancements—applying electronics to mechanical systems. This trend has brought us such safety features as antilock brakes and electronic stability control.

Now we're seeing the components for self-driving vehicles coming to market in the form of advanced driver assistance systems (ADAS), which we can find in today's cars. These features include lane-keeping, adaptive cruise control and emergency braking. ADAS can significantly improve driving safety, and they are the building blocks for the self-driving vehicle.

Presently these features work primarily in isolation from each other. The next evolution in automotive technology will happen when we are able to take all the data being generated by these individual systems and "fuse" it into something useful in terms of higher-level benefits. This is no minor task: The key lies with the ability to aggregate a huge amount of raw data in a central "brain," analyze it for meaningful information and then take action. This is a very challenging computing task that will require gigabytes per second of processing speed, while simultaneously supporting the automotive industry's critical functional safety requirements and OEM requirements for power efficiency.

### Is that kind of compute capability currently available?

The technology is here now, as evidenced by the self-driving cars being tested today. But the size and cost of these systems isn't commercially viable. Nobody wants 500 pounds of cabling and a rack of servers in the trunk, and that's what it takes today to operate a self-driving vehicle. We need to figure out how to

take all of that computing power, put it in a compact package and place it somewhere in the passenger compartment.

But getting to that point means transitioning the car to a product whose features and capabilities are defined by compute technology. This means we need a new approach to supplying the components and services involved. Carmakers are going to need partners that deeply understand the compute technologies required and have the assets to support them with the production, performance, security and reliability they need.

We believe Intel's four decades of experience in developing and delivering leading-edge computing systems puts us in a good position to support this exciting next phase of automotive evolution.

### When do you expect self-driving vehicles to reach the market?

Historically, it has taken 10 years or so to achieve 70% penetration of a new technology in the automotive industry. In the case of self-driving vehicles, we think there will be a big push by end customers and governments to get these systems deployed faster. The compelling nature of the potential safety and convenience provided by these technologies is driving increasing investments across the industry. It's a real sea change in the way automakers look at what their products can do.

For carmakers, there's also a significant competitive advantage and a big point of product differentiation in offering advanced driving technologies. Everybody makes very high-quality cars today. Powertrain and suspension systems aren't enough to differentiate products anymore. What will set tomorrow's cars apart is how safe they are and how convenient they make our lives.



### How is the auto industry handling the development process?

It's still deciding how to go about this. We're in the brainstorming phase. Clearly we don't want a separate hardware and software solution for each model. The answer is something that is both modular and scalable. The more homogeneous the solution, the easier it is to apply across the product lineup, in multiple markets and at various price points.

But will carmakers do this themselves or rely on suppliers? We believe it must be a collaborative process. And we are prepared to contribute our 40 years of experience to deliver the technology and software that consumers and automakers can trust to deliver the safest and most secure advanced driving technologies.

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