

Who's Behind Autonomous Vehicle Technologies? Key Companies to Watch in 2016

Vision Systems Intelligence (VSI) identifies the top autonomous vehicle technology providers and predicts the up-and-comers in Safety and Control, Sensors, Sensor Fusion, Simulation and Processing to watch in the year ahead.

Minneapolis, MN ([PRWEB](#)) December 22, 2015 -- When it comes to autonomous cars everyone is familiar with advances [Google](#), [Tesla](#), and other Silicon Valley constituents are making, but the elements of autonomous control are incredibly complex and there are hundreds of other companies that provide key building blocks according to [Vision Systems Intelligence](#) (VSI). VSI provides research and analysis to organizations designing, developing or investing in autonomous vehicle solutions.

Many of these companies will be showcasing their innovations at [CES 2016](#) in Las Vegas in January. VSI Founder and Principal Advisor Phil Magney and the VSI team have identified the key companies and technologies providing the building blocks for autonomous vehicle systems. Here is a rundown for those seeking partners, suppliers or investment in the space.

Sensor Fusion:

“Building an autonomous car is hard, but developing an autonomous car is even harder,” says Phil Magney, founder and principal advisor for Vision Systems Intelligence, LLC.

“For example, combining signals from multiple sensors (a.k.a. sensor fusion) is one of the most complex elements of autonomous control systems. Sensor fusion can be done with 'objects' or with raw data depending on how much control you want over the algorithms. [Elektrobit](#) and Vector Informatik are leaders in this space as both offer toolkits for sensor fusion, but newcomers are coming into the scene like AdasWorks, Harbrick, Intempora, and BASELABS.

Processing:

Autonomous control systems require massive computing resources because of image processing, sensor fusion and decision making. Furthermore, stringent safety standards demand safety mechanisms, like dual-core lockstep processors.

Nearly every semiconductor supplier has solutions for autonomous control—many of which have processors specialized for scene and object recognition. These are the familiar names in automotive such as Renesas, NXP, [Nvidia](#) and TI, but there are a handful of others developing solutions such as, Altera, Analog Devices, Xilinx, CEVA, Videantis, Ambarella, and Cadence.

Sensors:

Sensors are another critical area for autonomous solutions. There are the traditional name brands and many newcomers who claim better price performance. Take LiDAR for example, where companies such as [Quanergy](#), Phantom Intelligence, TriLumina, and LeddarTech, purport lower priced, solid state solutions. Meanwhile, Velodyne and Ibeo are leaders in LiDAR systems, particularly those that map the environment.

In the image sensor space there are dozens of new products from Toshiba, Sony, ON Semiconductor and Melexis that provide the image sensor itself. Then there are the module makers like Mobileye who integrate the sensors into modules and preconfigure it with processor and algorithms.

Most of the traditional automotive suppliers like Delphi, Valeo, Continental and Bosch are building the sensor modules plus the control technologies. “Applying control technologies with by-wire steering, brake and chassis is a strength the traditional suppliers bring to the table,” says Magney.

Safety and Control:

Safety and control is another big challenge to those building autonomous vehicles as you need robust systems that are fault tolerant. The underpinning of an autonomous control system is the embedded operating system. Companies such as QNX already have certified their operating systems to the highest level (ASIL D) according to the ISO 26262 standard. Other players who offer solutions include Green Hills Software, Mentor Graphics, and Wind River, all of whom develop embedded operating systems with built-in safety mechanisms.

In the interest of safety, software components should also adhere to AUTOSAR standards that provide a means for standardizing ECU interfaces. AUTOSAR provides a consistent and repeatable ECU design methodology, which helps to support the requirements of ISO 26262. Elektrobit, Vector Informatik, ETAS, dSPACE, Mentor Graphics and KPIT Technologies offer code generation tools to meet AUTOSAR standards.

Furthermore, practicing Functional Safety according to ISO 26262 also requires additional software tools that verify that production software meets the requirements of the Motor Industry Software Reliability Association (MISRA). These products examine the quality of the production software code. Examples of these companies include IAR Systems, LDRA, TASKING, and PRQA.

Simulation

Nowadays, everything can be simulated due to the software tools available. Even new processor designs can be virtualized long before the chip is available for production. Synopsys is a leader in this space, particularly for those developers who seek the latest, most advanced processor designs.

Simulation is vital for developing autonomous control systems because it is the only practical way to test before going into prototyping or production. “Simulation of autonomous solutions has many facets depending on where you jump into the value chain,” says Magney. MathWorks, National Instruments, dSPACE and Realtime Technologies are leaders in this area with tools for development and simulation.

But the simulation process covers many steps from generating virtual ECUs and testing their interaction with other ECUs, to behaviors when using environment models. When it comes to simulation you have dozens of companies with environmental models including TESIS DYNAware, IPG Automotive, BASELABS, and TASS International.

About Vision Systems Intelligence, LLC.

Vision Systems Intelligence (VSI) is a technology research firm that examines the building blocks of autonomous control. VSI offers a syndicated database as well as advisory services for companies that design,



develop or manufacturer autonomous solutions. VSI's Vision Systems Profiler is a database covering processors, sensors, development kits, data fusion tools, controllers, and more.

The Vision Systems Profiler is designed to meet the needs of organizations designing, developing, or investing in autonomous vehicle solutions. VSI also includes practical insight and analysis on the latest technology trends for active safety and autonomous control.

For more information, please visit www.VisionSystemsIntelligence.com. Registered visitors will also receive "The Anatomy of Autonomous Vehicles" – a white paper that details the building blocks of autonomous control.



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