As the industry evolves so will our solutions. All of our technologies are grounded in our core competency of elastic bonding, and continuous innovation is a constant to surpass the demands of our valued customers to allow freedom of imagination in their design processes.

– Greg Moran, VP, Head Global Marketing Sika Automotive. Page 46
Wales is the engine room of the UK automotive sector.

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While automotive design and technology are constantly changing, the place that leads the world in automotive manufacturing remains the same. Michigan. Home to 27 assembly plants and 63 of the country's top 100 automotive suppliers, we produce more vehicles than any other state in the country. Which makes Michigan the best place for your business to manufacture success.
Collaborative competition will steer connected and autonomous vehicles

“I’ve yet to see any problem, however complicated, which when you looked at it the right way didn’t become still more complicated.” — Poul Anderson, Call Me Joe.

Readers of this and previous issues of Automotive Industries over the past few years will be nodding their heads in agreement. It seems that the more we think we understand about connected and autonomous vehicles, the more complicated the rollout becomes. Technology is (almost) the easy part. With autonomous road-going vehicles we are not only dealing with the mechanics of self-driving vehicles — we are talking about fundamental societal changes that are the grist of the science fiction writer’s mill.

Published in 1957, the plot of “Call Me Joe” involves an attempt to explore the surface of the planet Jupiter using remote-controlled artificial life-forms. In the book one of the main characters, Ed Anglesey, escapes his wheelchair by his mind finding a new home in the machine he was controlling using a special headset.

Anderson’s award-winning books had a solid theoretical base – he received a degree in physics from the University of Minnesota in 1948.

Sixty years later the automotive industry is using artificial intelligence and a host of other technologies which, until recently, existed only in the realm of science fiction.

Only the plot is way more complicated than any science fiction writer could have dreamed up. Not only do automotive designers now need to have an in-depth understanding of the physical materials which make up the bits of the vehicle we can touch and feel, they also need to be computer programmers, connectivity experts, data miners, lawyers and actuaries — and that is just the start.

Clearly, a materials engineer who can reduce weight by joining together different materials using modern adhesives rather than welds or rivets is not going to be able to also design the information ecosystem which is needed to keep connected and ultimately autonomous vehicles on the road. Similarly, the data security specialist working on the technology required to prevent a vehicle being hacked cannot be expected to also know about optimum air-fuel mixtures.

Even within a defined field, such as battery technology for electric or hybrid, vehicles there are so many levels of complexity that no single supplier or OEM will have all the answers — or the capacity for the necessary research and development or the rollout of rapid charging stations. As Rheinmetall Automotive CEO Horst Binnig says in this edition, existing OEMs and Tier suppliers need to adopt a new business model in order to survive.

This was before it was announced that relative newcomer Tesla Motors had become the second-largest U.S. car maker in terms of market capitalization. It has overtaken Ford, and is closing the gap with General Motors. The market, it seems, has more confidence in a company which sells cars in their thousands compared to Ford’s tally of millions. Analysts say Tesla’s value lies in its intellectual property — the company is seen as a leader in the development of electric vehicles.

The new business model, according to Binnig, involves collaboration. Business gurus even have a catch phrase for it – collaborative competition. As we see in this issue Tiers are working with competitors and companies which are total newcomers to the automotive sector, and OEMs are collaborating in areas such as the provision of recharging stations. It is only combining minds and resources that the existing industry will stay ahead of newcomers like Tesla.

And the way decision-makers find out about the new technologies, solutions by companies making breakthroughs is by reading specialist publications like Automotive Industries. Our team is constantly in the field meeting with exciting and innovative companies. As we have done for more than 100 years we are helping readers to make profitable connections and to stay informed about automotive technology — in all its forms.
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Drivers and occupants are getting older on average around the world and studies are showing that safety ratings, such as those used by NHTSA, IIHS and Euro NCAP, may not tell the whole story for elderly or obese occupants. “The condition, size and shape of an individual are massively important in how severe their injuries are in any given crash,” says Dr. Stewart Wang, Director of the International Center of Automotive Medicine (ICAM) at the University of Michigan. In Europe, protection of vulnerable car occupants including elderly and overweight persons is also high on the agenda. "The specific requirements of the elderly (frailty, fragility) challenge the performance of existing safety systems that are not proven to be as effective for the systems through the implementation of assessment tools based on crash data analyses, experiments with volunteers, PMHS studies and FE human body model simulations.”

While Anthropomorphic Test Devices (ATDs), commonly known as crash test dummies, such as THOR and WorldSID, developed over the past decades, are now used for current regulatory and industry testing procedures, Humanetics has been busy developing the next generation of ATDs. Humanetics works closely with NHTSA, Euro NCAP, the SENIORS Project, ICAM and other agencies and industry groups around the world to design future crash test dummies that reflect global changes in the demographics of drivers. Over the past few decades, the driving population has changed significantly in age and weight. As lifestyles and medical advancement evolve, baby boomers are now 65 or older and often overweight and still driving. A body of research has shown that elderly occupants are more likely to sustain internal injuries during certain crash scenarios. Humanetics’ new elderly dummy will allow automakers to enhance testing to better protect this growing at-risk population group. “At Humanetics, our mission is to create products that save lives. We developed the elderly crash test dummy to ultimately provide better protection for one of the most vulnerable population groups in a vehicle crash,” says Christopher J. O’ Connor, President and CEO of Humanetics.

In addition, Humanetics is one of the only companies to undertake ATD development in parallel with detailed Finite Element computer models. By working concurrently on both the ATD and the predictive simulation models, results from the virtual testing can be used in the development of the new innovation.

Christopher J. O’Connor, President and CEO of Humanetics. 

When crash test dummies were originally designed it wasn’t envisaged that people would be driving in their 70s, 80s, and 90s.

Car interiors, seats and safety belts that can adapt to drivers of different ages, genders, and sizes could well be the next major breakthrough in reducing injuries and deaths resulting from collisions.

When crash test dummies were originally designed it wasn’t envisaged that people would be driving in their 70s, 80s, and 90s.”

innovation

Dummies for a new generation of older drivers and passengers

By: Ed Richardson

Car interiors, seats and safety belts that can adapt to drivers of different ages, genders, and sizes could well be the next major breakthrough in reducing injuries and deaths resulting from collisions.

Drivers and occupants are getting older on average around the world and studies are showing that safety ratings, such as those used by NHTSA, IIHS and Euro NCAP, may not tell the whole story for elderly or obese occupants. “The condition, size and shape of an individual are massively important in how severe their injuries are in any given crash,” says Dr. Stewart Wang, Director of the International Center of Automotive Medicine (ICAM) at the University of Michigan. In Europe, protection of vulnerable car occupants including elderly and overweight persons is also high on the agenda. "The specific requirements of the elderly (frailty, fragility) challenge the performance of existing safety systems that are not proven to be as effective for the systems through the implementation of assessment tools based on crash data analyses, experiments with volunteers, PMHS studies and FE human body model simulations.”

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Christopher J. O'Connor, President and CEO of Humanetics.
AI: Why is it important to have “older” crash test dummies?

O’Connor: When you look at the crash test rating of a car you assume it will be the same for all drivers, but in fact it may not be. Different body types may react differently to the airbags and seatbelts in a given crash event. Our newest dummies, the elderly dummy and the obese dummy, are intended to reflect those physical differences and provide additional life-saving tools for automakers to use to test their vehicles.

AI: What has changed?

O’Connor: Research and development over the past few decades has resulted in highly advanced dummies such as THOR and WorldSID for frontal and side impact applications. Like their predecessors, these dummies are based on anthropometry of what was considered a “healthy, average” adult male and small female population. When crash test dummies were originally designed it wasn’t envisaged that people would be driving in their 70s, 80s, and 90s. But they are, and the driving population has changed significantly in terms of both age and weight. As lifestyles and medical advancement evolve with time, people are living longer and more sedentary lives, resulting in an older, heavier population.

AI: Do we have an idea of the numbers involved?

O’Connor: Statistically, there were more than 40 million licensed drivers aged 65 and older in the United States in 2015 (U.S. Department of Transportation). This represents 18.4% - or nearly one in every five drivers – on the American roads. In 2014, Humanetics embarked on a project to create an ATD design to reflect the anthropometry of an elderly 70 year-old small female driver by using research conducted by ICAM and UMTRI (University of Michigan Transportation Research Institute).
more than 5,700 older adults were killed and more than 236,000 were treated in emergency rooms for motor vehicle crash injuries. This amounts to 16 older adults killed and 648 injured in crashes on average every day.

AI: Please tell us more about your elderly dummy.

O’Connor: Humanetics embarked on a project to create an ATD design to reflect the anthropometry of an elderly 70-year-old small female driver by using research conducted by ICAM and UMTRI (University of Michigan Transportation Research Institute). Utilizing the anthropomorphic data provided by UMTRI, some hardware cues from the small female WorldSID and with a newly designed organ system, our elderly dummy will allow more precise measurements of internal injuries sustained in automotive accidents for this specific occupant group.

Humanetics has also utilized 3D printing technology and manufacturing methodology to produce many of the elderly components to expedite this development initiative. By printing materials such as plastics, foams, and even metals, complex geometric designs and consistent performance characteristics can easily be obtained. This research, coupled with new production techniques, may ultimately serve to enhance the designs of the next generation of dummies by incorporating new manufacturing technologies that can produce a more humanlike anatomy. The first prototype of the elderly dummy is currently undergoing testing by OEMs and academia, such as Honda and Ohio State University, to provide a baseline for performance, durability and biofidelity for its further development.

AI: How is medical research by ICAM assisting the design of elderly dummies?

O’Connor: Humanetics is working closely with ICAM to define anatomical features and verify performance attributes with real-world injury feedback in order to understand the dynamic properties of internal human organs such as the liver and spleen. To further understand loading parameters and organ responses, comparison work is also being conducted at Humanetics using biological equivalents.

AI: What about research elsewhere in the world?

O’Connor: The company is closely involved in research programs such as SENIORS to address similar types of concerns in other regions of the world. It is Humanetics’ goal to collaborate with other safety organizations worldwide to develop products that best reflect the current population. Ultimately, we are committed to promoting vehicle safety and saving lives in every global market and geographic region until fatality rates equal zero.

Left to right: Part of the Humanetics family: Hybrid III 50th, Obese Dummy, Hybrid III 10 Year Old, and an elderly dummy.
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Gone are the days when a wiring harness just carried 12 volts to a relatively small number of points in a vehicle. Automation of a growing number of functions relies on harnesses and controllers transporting and processing megabytes of data.

To find out more about the latest technology Automotive Industries (AI) spoke to Jean-Francois Chouteau, vice president, Global ADAS Centre, Renesas Electronics Corporation. We started by asking what makes the company the market and technology leader in the fiercely competitive ADAS/AD market.

Chouteau: Very few players are seamlessly integrated at our level, mastering end-to-end solutions as we do. This, together with our proven capability to meet stringent automotive quality and reliability standards, makes Renesas one of the strongest suppliers in this segment. Customers choose Renesas firstly because we are the market leaders in both SoCs (systems on chips) and MCUs, (microcontrollers) which are both required in the ADAS segment. SoCs are used to compute and analyze a car’s surroundings based on sensor data, while the MCUs control safety-related functions like steering and braking.

The other challenge is to improve performance without overly increasing power consumption. Renesas overcomes this challenge by combining a variety of different computing engines to achieve the best possible trade-off between computing performance, flexibility and power consumption. Our systems can cope with today’s performance demands, while being scalable enough to handle the power requirements of future developments.

AI: What research and development has gone into Renesas' semiconductor solutions?

Chouteau: Back in 2014 we set up our Global ADAS Centre with the mission to develop competitive solutions serving the global market. Today, the Center has 100 staff from 15 countries working on the definition, engineering, development and support of dedicated automotive solutions. Our primary focus has been on NCAP (New Car Assessment Program) functions such as traffic signal recognition, lane keeping, and emergency braking, which typically use front cameras and radar as key sensors. Our R&D efforts have therefore been focused on developing highly competitive computer vision and radar signal processing at affordable power consumption and uncompromised functional safety. In the process we are leveraging more than a decade of R&D investments to enable MCUs to meet ASIL-D metrics. We are now reusing this technology on SoCs where existing R-Car H3 and M3 are targeted to achieve metrics for ASIL-B.

AI: What are some of the recent product launches that you think best reflect Renesas' expertise in advanced automotive computing solutions?

Chouteau: I think the biggest of these is the R-Car V3M. This is the solution for a NCAP front camera technology that manages emergency braking, lane keeping and traffic sign recognition. This product is under development at several of our top customers and will be ready for mass production in 2019. It is available with the open platform business model, so it’s ideal for Tier 1s who want to develop their own camera or vision solution on top of our device solution, as well as for companies who want to work with a partner from our ecosystem to obtain a complete camera solution to help them get to market faster.
The R-Car V3M includes dedicated accelerators for low power and high performance – our Versatile Pipeline Engine (IMP) and programmable Computer Vision Engine (CVE). We aim to achieve hardware architectural metrics values recommended for ASIL-B and ASIL-C for the real time core “safety island” with a Cortex R7 lockstep core and dedicated hardware IP. I believe we’re the only company with a working solution available today that is also available as device solution, on platform level or as a complete camera solution, depending on customer needs.

**AI:** What cognitive computing expertise does your company offer?

**Chouteau:** For cognitive computing we differentiate between centralized and decentralized architectures. Centralized is where raw data from sensors is processed and analyzed by one central electronic control unit (ECU) that then does sensor fusion and makes a decision. A decentralized architecture means that the ECU receives “pre-processed” data – i.e data that has already been processed by an intelligent camera system, for example. In that case, the ECU only needs to do sensor fusion and decide what needs to be done, such as braking.

Renesas offers solutions for both of these architectures, depending on customer requirements. Both involve our R-Car V3M system. For a decentralized architecture it would be installed inside the intelligent camera, and for centralized it is part of the central ECU. The solution for centralized architectures is the R-Car H3, while the R-Car M3 might already deliver enough performance for decentralized architectures.

**AI:** Where is this technology taking Renesas and your customers?

**Chouteau:** Leading Carmakers and OEMs are working with Renesas to develop their front camera, radar, communication and cognitive functions, and that number is growing. We’ll also continue to develop our open platform, which we feel really differentiates us from the “take-it-or-leave-it black box” approach of some of our competitors.

We’re focusing on areas where we can sell high volumes, with the front camera segment as an example. As the market matures we’ll move into partial automation, conditional automation and full automation, as we’ll be able to build on what we’ve already achieved. We’re already designing and developing solutions for these areas in order to be ready for market maturity and high-volume sales. Another thing we’re doing is expanding our partner ecosystem. With our open platform approach, some OEMs will want to take some elements from us and some from other partners in order to build their own solution, so it’s important that we have a wide choice of competent and certified partners around the world.

Cameras read speed signs and alert the driver.

Brakes are applied automatically when the vehicle detects an obstacle.
Automotive investors are singing the praises of Wales as a destination for new and expanded plants.

According to the Society of Motor Manufacturers and Traders (SMMT) Wales has become an increasingly attractive place for investors thanks to its established automotive supply chain sector and attractive incentives. “Wales has a strong reputation for producing engines and will now become a global car producing destination. We’ve already seen the ability of automotive manufacturing to revitalise communities across the UK, particularly in the Midlands and North West, where billions of pounds of investment has helped secure jobs for tens of thousands of people,” said SMMT chief executive Mike Hawes in his comment on the growth in the Welsh automotive sector.

With the formal process of BREXIT underway, the European automotive industry is hoping that there will be an agreed zero tariff to enable the free flow of vehicles across borders. For UK vehicle manufacturers, the challenge is now even greater than before to source more componentry from companies based in the UK to sustain competitiveness.

In 2016 Toyota, Aston Martin and reborn British sports car maker TVR all announced major investments in Wales. There are currently more than 150 automotive component and system companies based in the country, employing 19,000 people and generating £3.6 billion (US$4.5 bn) for the economy.

In February 2017 Toyota Manufacturing UK (TMUK) announced that it is to build its next-generation hybrid engines at its Deeside plant in North Wales in a £7m investment supported by the Welsh Government. The new engine is the latest generation of Toyota’s hybrid powertrain technology, and will play an important role in Toyota Motor Europe’s ambitions for increasing hybrid vehicle sales.

Wales already has a strong engine manufacturing presence, with Ford and Toyota plants in the country accounting for a third of all engines built in the United Kingdom in 2016. Welsh plants were also responsible for producing two out of every five (41.3%) of engines exported from the UK during this period.

The new Toyota plant will be built alongside the current production line for petrol and hybrid petrol units for the Auris range, which is assembled by TMUK at Burnaston in Derbyshire. Engines are also exported from the plant to other Toyota manufacturing centers in Europe, South America, South Africa and Japan. The 1.8 liter hybrid engines are bound for Turkey, where the crossover Toyota C-HR is being built. The investment by Toyota Motor Europe in Deeside will be supported by £700,000 from the Welsh Government. The decision reinforces TMUK Deeside’s reputation for superior quality and productivity and helps secure around 130 existing jobs at the plant.

Jim Crosbie, Engine Plant Director, said in a media release: “Toyota has a long and successful record of building engines in North Wales. This announcement is a big vote of confidence in the high skills, quality of work and commitment of our workforce.”

Dr Johan van Zyl, Toyota Motor Europe President adds “the crossover market has been booming and will continue to grow in...
In 2016 Toyota, Aston Martin and reborn British sports car maker TVR all announced major investments in Wales. “It was a hard fight and eventually St Athan prevailed.”

Europe and elsewhere. We are entering the C-segment crossover market with a fantastic new product with a hybrid powertrain from the start. It will provide our European operations with further perspectives for sustainable growth.”

**Aston Martin**

Wales hit the first note in a field of 20 locations worldwide for the manufacture of the new Aston Martin DBX 4X4. The marque’s latest model will start to roll off a £200 million production line in St Athan, South Wales, from 2019. A new facility is needed because Aston’s plant at Gaydon in Warwickshire is planned for full capacity.

In early 2015 a management team headed up by Andy Palmer, President and Chief Executive of the luxury sports car maker and Chief Marketing Officer Simon Sproule set out on a scouting mission. “SUVs (Sports Utility Vehicles) are a new and interesting market, which has become increasingly important,” said Sproule “It’s what people want to drive and we decided this was a segment we want to be active in.”

Commenting on the decision to site the new plant in Wales, Sproule says “as a location to make a fast start to do industrial style activities, the infrastructure is all there. There is also a pool of high quality labor in the South Wales area and a government that is actively involved in attracting inward investment.” The team from the luxury brand explored 20 potential locations around the world, mainly in North America, Eastern Europe and the UK. From the start of the process, St Athan was one of the frontrunners. “It was very impressive,” Sproule says of the Welsh site. “It was a hard fight and eventually St Athan prevailed.”

The 90-acre site at St Athan has all the space the car manufacturer requires – there are three well-built and maintained aircraft hangars to house production. It has office buildings and the infrastructure needed for manufacturing projects, with parking for more than 600 employees.

**TVR**

Niche sports car company TVR proclaims that it is “roaring back” into the market with its new plant in Wales. In March 2016 it was announced that TVR would be setting up production in the Ebbw Vale Enterprise Zone in South Wales. The Welsh Government is also investing in the car maker, which plans to invest over £30 million in plant and equipment over a five year period.

The chassis and body has been designed by Gordon Murray, and will be the first production car to be manufactured using his company’s iStream® assembly process. Power is provided by a Cosworth tuned and enhanced V8 engine. The Welsh factory will be busy fulfilling orders that already run through to the end of 2018.

TVR is taking orders for its new model.

**New technology**

Wales is also gaining a foothold in developing new technologies. Riversimple, a small innovative company based in the heart of Wales has developed a zero-emission hydrogen fuel powered two seater car. The disruptive technology company was awarded the RAC Simms Medal for an Outstanding Contribution to Motoring Innovation for its Rasa hydrogen fuel cell car, which is currently believed to be the greenest car on the road for ordinary road use and emits just water. Currently undergoing extensive testing, the car is due to be launched in 2018.

In addition the University of South Wales – one of eight universities in Wales – the Centre for Automotive and Power Systems Engineering (CAPSE) is supporting a number of leading automotive OEMs to develop low carbon automotive technology for both in both passenger vehicles and motorsport.

**Wales is the engine room of the UK automotive sector.**

The Riversimple Rasa concept car.
BMW is fast filling all the niches in its fleet with electric or hybrid options.

Their new models are stylish, green – and fast. BMW’s first plug-in sports hybrid, the X5 xDrive40e, accelerates from 0 to 60 mph in 6.5 seconds using a combination of electric and petrol engines. The X5 xDrive40e combines the company’s award-winning 2.0-liter TwinPower Turbo four-cylinder engine with an electric motor.

Powered by a lithium-ion battery, the electric motor is integrated into the vehicle’s 8-speed automatic transmission. The vehicle can travel approximately 14 miles on pure electric power, ideally suited to short commutes and quick trips around town. Working in concert, the gasoline engine and electric motor puts out 308 horsepower and produces 332 lb-ft.

The BMW X5 xDrive40e is being produced at the BMW Spartanburg plant in South Carolina. This is where all other model variants of the sports activity vehicle are also built along with the BMW X6, BMW X3 and BMW X4 models. It has been over 15 years since the first-generation BMW X5 went into production. Since then, this US plant has evolved into the global center of excellence for BMW X models, according to the company.

BMW had its full North American line-up on show at the 2016 Los Angeles Auto Show. Its’ stand included the BMW 740e xDrive, BMW 330e, and BMW X5 xDrive40e. Additional featured vehicles include the BMW i8, BMW M760i xDrive, and BMW ALPINA B7 xDrive. According to the BMW blog the plan is for all BMW families to have at least one plug-in hybrid. The next steps on the road to full hybridization of the BMW fleet will include the upcoming G30 5 Series and the G01 X3.

“Our cadence will be about one (plug-in variant) per quarter,” Richard Steinberg, spokesman for BMW’s electrification program in North America is quoted as saying. “Proud i3 owners can go full electric in all vehicle classes.”

Jose Guerrero, Product Manager for the BMW i and BMW M ranges told Digital Trends in an interview at the New York Auto Show that BMW was concentrating on fit-for-purpose battery technology. “In reality, the driving and charging patterns are such that a vehicle with 80 to 100 miles is just as useful as one with 300. There’s a higher uptake rate for the range extender version because people want that piece of mind. I call it training wheels. Throughout the industry right now, brands are chasing this 200 mile range goal, but I’m curious to see if people are willing to pay for that battery technology or if a cheaper range-extender model is more aligned with the state of the market. And that’s not to discount the emissions benefits of a pure EV verses a range extender. It is purely a question of development costs.”

Harald Krüger, Chairman of the Board of Management of BMW.
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“If people are still commuting on average 30 miles a day, will it be worth the extra cost and weight to consumers? Logic and customer behavior don’t always match up,” he is quoted as saying.

The company is working with others in the auto sector to boost e-mobility. In January it was announced that BMW and Nissan had joined forces with EVgo, the US’s largest public DC Fast charging network to add 174 sites in 33 states. “BMW’s continuing collaborations with Nissan and EVgo, further demonstrate the company’s commitment to building a robust public charging infrastructure across the country. We recognized early on that meaningful partnerships like this would be essential in order to support the expansion of convenient and accessible electric vehicle charging options,” Robert Healey, Head of EV Infrastructure for BMW of North America is quoted on the BMW blog as saying.

“The expansion of the plug-in vehicle charging infrastructure will give more U.S. drivers the confidence to choose an electric vehicle, such as the BMW i3, as longer distance EV travel becomes increasingly commonplace,” he said. ChargeNow by EVgo provides no cost and low cost public charging access programs designed for BMW i and BMW iPerformance owners across the entire EVgo network.

“The pace at which we have been making charging infrastructure partnership announcements recently shows that BMW continues to aggressively pursue the company’s commitment to our e- mobility customers, with our steadfast support for growing the public charging infrastructure across the U.S.,” commented Cliff Fietzek, Manager Connected eMobility at BMW of North America in an earlier post.

BMW also recently completed the Express Charging Corridors initiative in which EV drivers can travel the most heavily-trafficked corridors on the East and West Coasts with the installation of 95 new DC Fast charging stations, spaced approximately 50 miles apart. This collaboration with Volkswagen of America and ChargePoint was designed to address the increasing demand for convenient, publicly-available EV fast chargers.

BMW is including vehicle sharing in its e-mobility rollout. In November 2016 it expanded its premium car sharing service ReachNow to include Brooklyn, New York. By March 2017 it was available in Seattle, Portland and Brooklyn. “We look forward to capitalising on this exciting transformation and the expansion of ReachNow is a great example of how we are helping shape a sustainable urban future. More than ever we are focussing on our customer’s needs by offering individual, premium on-demand mobility, exactly tailored to their demands,” said Peter Schwarzenbauer, Member of the Board of Management of BMW AG, responsible for MINI, BMW Motorrad, Rolls-Royce and Aftersales.

“The launch of ReachNow’s pilot programmes for four new mobility services demonstrates how we are putting our corporate Strategy Number ONE > NEXT into action in our daily business,” he added.

ReachNow’s Ride on-demand service began as a pilot in Seattle on December 8, 2016. The initial fleet of vehicles in Brooklyn included the BMW 3 Series and the MINI Clubman. There are nearly 800 vehicles in Seattle and Portland, including the electric BMW i3, BMW 3 series, MINI Cooper and MINI Clubman, with plans for fleet expansion. Membership gives drivers access to any available vehicle in any fleet.

BMW North America is offering what it calls “a streamlined, user-directed approach to charging station installation by easily allowing drivers to leverage a sophisticated digital platform at their convenience to identify qualified installers nearby – and then request no-cost, no-obligation quotes from one or more installers”.

“Designed to make e-mobility a pleasure right from the start, the unparalleled 360° Electric program offers smart, simple and efficient ways to conveniently and confidently drive and charge BMW i3, i8, and BMW iPerformance (BMW X5 xDrive40e, BMW 740e xDrive, BMW 530e and the BMW 330e) vehicles,” says the company.
Aston Martin’s new DBX model will roll off the production lines at St Athan in 2019. Just 100km away in Llandrindod Wells, Riversimple is developing a hydrogen fuel cell car with a carbon fibre monocoque.

Wales is full of ideas and ingenuity in business.
Electric drive units are becoming so complex and compact that they have sparked innovation in the casting industry in order to ensure that production can meet demand. A 2016 Roland Berger Global Automotive Supplier Study on page 29 predicts that there will be a significant increase in the volumes of electric and hybrid vehicles produced over the next eight years. “On the powertrain side, the development of e-mobility is gaining a lot of momentum – while technological hurdles prevail and a convincing business case for the end customer is nowhere close to accomplishment yet, tightened emission regulations by supranational and local bodies will likely have a catalytic impact over the coming years,” predicts the report.

The swing will be so marked that traditional combustion engines will lose market share. By 2025 hybrids will account for 13.2% of new vehicle sales, electric vehicles 4.6%, and plug-in hybrid electric vehicles (PHEVs) 7.1%. In 2015 the combined market share of all three types of propulsion was just 2.1%, according to Roland Berger. By 2030 the market share of internal combustion engines is predicted to fall to 60%.

At the same time the vehicle markets are still expected to grow. Lightweighting becomes more and more important in the light of powertrain electrification. Due to its preferred combination of low weight and good mechanical and physical properties the share of aluminum in electrified vehicles is being boosted, and aluminum castings, stampings, extrusions and sheet metal products are capturing a wide range of applications. New production methods are being developed and combinations of various components are built into sub-assemblies to ensure the new market requirements will be met – not only in terms of volumes but also in terms of functionality of the components.

The aluminum casting expert estimates that the industry will need to make around 455 million aluminum castings a year in 2025 – up from 319 million in 2015. Of these 109 million castings will be for hybrid vehicles, and seven million for electric vehicles. In 2015 there were just 10 million aluminum castings for electric and hybrid vehicles combined. The number of castings for internal combustion engines will flatten out at around 338 million by 2025.

According to Christian Heiselbetz, Director of Global Research and Development at Nemak, the design of electric motor housings, in hybrid electric vehicles (PHEVs) offer interesting options especially due to its variable geometrical design scope, which is appropriate for the design of inner water cooling systems.”
batteries and control units is fast approaching the complexity of components in a conventional combustion engine in response to some of the “technical hurdles” identified in the Roland Berger study. There is a significant shift away from the design of earlier e-drives. “A huge leap of development is perceptible in this area,” he says.

New production processes are being developed to meet the demand of producing high volumes of components with high power density and increasing functional integration – often accompanied by complex inner cooling configurations. “At the moment it is not clear which casting processes will be selected in future for these components,” he says.

Some of the automotive industry’s best minds are fine-tuning existing casting technology and exploring new approaches to meet the growing demand for cast aluminum components for both electric and conventional vehicles. Roland Berger sees the global demand for new cars reaching around 119 million in 2025 – of which 25% will have some form of electric drive.

Nemak has engineers in 11 product development centers around the world driving lightweight design by increasing complexity of the cast components and continuously improving the casting processes. “We are well-positioned to partner with OEMs to co-design, engineer and test components,” says Heiselbetz.

The company has been focusing on e-mobility since 2011, with serial production of some components commencing in 2013. It has developed multifaceted e-drive applications, battery housings, and e-motor components, including a single part casting process with complex shaped cores. With two-part components the challenge is to ensure the two halves will seal correctly. “During the product development phase attention must be given to the quality of the sealing surface, which is achieved by special treatments as part of the casting process, as well as an optimized machining and in-line joining procedure,” says Heiselbetz.

He says Nemak has a number of proven casting options available for serial production. The choice is determined by the complexity and the required volumes which need to be produced. Preferred processes are the low pressure die casting (LPDC) or the core package sand core casting (CPS® – Core Package System). LPDC is suitable for electric engine housings due to its nearly rotational symmetry. The laminar flow of the molten aluminum into the cavity guarantees a minimum of non-metallic inclusions and secures the required high level on quality. CPS will be selected as an alternative casting process whenever the level of integration increases, for example by joining electrical energy management components, the electric power plant and the transmission into a single housing. “CPS offers interesting options especially due to its variable geometrical design scope, which is appropriate for the design of inner water cooling systems,” he says. Nemak is adding value to its castings by providing machined components where required.

A new field of application for castings is battery housings. These housings usually have flat and broad sides which are well suited to high pressure die casting. “But some designs which have complex cooling channels which cannot be produced using the usual high pressure die casting process. For those components LPDC is the recommended process because it allows complex structures to be produced,” he says.

### Manufacturing challenges

Challenges with product and material properties, as well as manufacturing processes have to be overcome to manufacture high volumes of e-mobility powertrain components.

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Megatrends such as growing urbanization accompanied by new business models of urban mobility, the spread of interconnectivity and the greater and greater use of electromobility are transforming our world – including the automotive industry.

Over the next five years the automotive industry globally will be undergoing greater changes than over the past 100. “The auto industry is facing the greatest upheaval in its history. It must rise to the challenges if it is to continue to play a key role in the mobility of individuals. And this is only possible through a concerted effort by all concerned,” says Rheinmetall Automotive CEO Horst Binnig.

It is therefore logical that BMW, Daimler, Ford and Volkswagen have agreed to work together to set up an ultra-fast, high-power charging network along major highways in Europe. This is comparable to the 48 charging corridors which the United States is building along 25,000 miles of highways across 35 US states. It is the result of collaboration between the U.S. Department of Transportation (DOT), State authorities, auto manufacturers and utility companies. The plan is for charging stations to be located every 50 or so miles along the routes.

While it is too soon to predict with confidence whether the dominant technology will be plug-in hybrid electric vehicles (PHEVs) or battery electric vehicles (BEVs or some other technology), it can be expected that hybridization and electromobility will redefine the classical relationship between manufacturers and their suppliers – if only for technical reasons.

Hybrid and battery-powered vehicles require a large number of new vehicle components – which inevitably translates into a redefinition of the supply chain. Existing component suppliers like Rheinmetall are designing and manufacturing components for drives and storage systems which did not even exist a few years ago. The company believes that both Tier companies and their own suppliers have to reinvent themselves. They also need to work together to ensure that the new technology is environmentally sustainable and has the smallest possible footprint.

“It will help our industry move forward if we are able to master the challenges ahead. Completely new opportunities will open up of which we have no notion now. As a group we enjoy a strong
position in the international auto industry thanks to our heavy spending on R&D,” says Binnig.

Shorter development cycles are adding to the pressure on OEMs. The response to the challenges requires a well-functioning technical interlinkage at all levels between the various parties. As a drive system specialist with a history going back over more than 100 years, Rheinmetall Automotive says it has recognized these “signs of the times,” and is adapting its research and development and product portfolio accordingly.

“If I take a look at the products we currently supply for the purpose of optimizing the drive train on an internal combustion engine and compare these with what we currently have in our development pipeline for future types of drive systems, I arrive at a substantial growth in value. In terms of figures, this could be almost double our share of sales per unit. As early as 2020, electrification will account for over one-half of our sales,” says Binnig.

Among the new products being developed by Rheinmetall Automotive are castings for the battery holders of electric vehicles and highly complex, cooled aluminum housings for the electric drive units themselves. Added to these are electrically-powered auxiliary units, extremely lightweight structural parts, heat-pump components and range extenders.

Rheinmetall is also drawing on its experience in the defense sector to enhance cyber security within a vehicle and to provide 360 degree virtual reality views around a vehicle.

**The megatrends**

- **Electrification to account for more than half of sales in 2020**
- **New propulsion systems pose a huge challenge for industry**
- **Hybridization and Electromobility will redefine the classical relationship between manufacturers and their suppliers**
- **There are uncertainties, but far more rewards than risks**
- **More intense cooperation by all in the auto industry**

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**Battery box components**

A member of the Rheinmetall Automotive Group, castings specialist KS HUAYU AluTechm, has been awarded a major contract by a premium German OEM to supply battery box components made from aluminum diecastings.

Start of production for this order worth a total €65 million is mid-2018. Weighing around nine kilograms, these components serve to hold the rechargeable battery cells installed in two new electrically powered vehicles. These are a crossover SUV and a high-power sports limousine. Both feature all-electric drive and are presently destined for the European market.

Rheinmetall Automotive says it has repeatedly emphasized its intention of refocusing its product portfolio more closely on the components and assemblies that go into battery-powered vehicles.
Automotive glazing provides superior appearance, high performance, and great value. It incorporates stylish good looks, with protection and comfort. Automotive glazing innovation aims at enhancing safety, security, and consumer comfort. The safety feature enables vehicle to absorb some of energy from the impact. Moreover, after an impact the resulting glass fragments inclined to remain attached to the plastic inter-layer, diminishing the hazards of sharp projectiles during an accident,” says Grand View Research in a report entitled “The Global Automotive Glazing Market Analysis, Market Size, Application Analysis, Regional Outlook, Competitive Strategies And Forecasts, 2015 To 2022”.

There are already discernible trends: “Escalating demand to meet automobile manufacturers’ and end-user needs from comfort, safety and security perspective is expected to be the key force driving the global automotive glazing market growth over the forecast period. The need to comply with several regulations pertaining to automotive industry may also spur automotive glazing market demand. Products that provide best possible technological solutions with basic functionalities are expected to significantly drive the market over the next few years,” says the report.

“The use of smart glass in the automotive sector is driven by factors that are central to the automotive industry. More specifically, the revenue potential for specific smart glass strategies in automobiles and trucks should be appraised against four criteria: safety, comfort, fuel economy, and design/style,” predicts a 2014 report “Market Trends: Smart Auto Glass Continues Growth” by NanoMarkets.

“There is nothing new about these factors. They have not changed since the earliest days of the automobile industry, although what has changed is the degree that some of these factors are controlled by legislation. In addition, smart glass is only one of numerous technologies that will help achieve the necessary goals required for each of the factors,” says the report.

One company which has been supplying glass to the auto industry for more than 80 years, and which is a leading automotive glazing innovator is Saint-Gobain Sekurit. The French group has...
been identified as one of the hundred most innovative companies in the world for six consecutive years by Clarivate Analytics. Some two-thirds of the company’s investment in research and development is focused on innovative materials.

In 2014 the automotive world was introduced to SGS ClimaCoat at the launch of the new Passat during the Paris Motor Show. The 2014 Passat was almost entirely glazed by Saint-Gobain Sekurit – which started providing glazing for the Passat in 1973. The SGS ClimaCoat windscreen can be heated in winter, and reflects heat in summer to provide optimal thermal comfort and lower fuel consumption. ClimaCoat was developed jointly by Saint-Gobain Sekurit and Volkswagen over a period of four years.

There are two approaches to heating windshields. One diffuses heat through a network of microscopic electric filaments embedded in the laminated material between two layers of glass. The second – which is the solution developed by Saint-Gobain for ClimaCoat – uses a conductive layer that is applied to the whole surface of the glass. The advantage is that there are no wires – introduced in the United States and Europe which are designed to reduce greenhouse gas emissions and improve fuel savings by decreasing the use of air conditioning in vehicles.

ClimaCoat is also well suited to electric vehicles, where the glazing is helping to increase range while ensuring that the occupants stay comfortable. Air conditioners are major users of power and any reduction in the need for cooling is translated into more miles per charge. Thanks to the heating/cooling function, this anti-solar glazing reduces the use of air conditioning by up to 30%, according to the company. In addition, the new European driving cycle test proved that in summer, the ClimaCoat windshield can improve driving range by 3%, while inside the cabin the air temperature is 10°C less than a car with a standard windshield.

In winter, the de-icing time is three times faster than with a non-heated windshield, according to Saint-Gobain. As a result a number of OEMs are increasingly specifying ClimaCoat for both electric and conventionally powered vehicles. Car manufacturers such as Volkswagen, AUDI, Porsche, Mercedes and Skoda now all reportedly have models equipped with ClimaCoat windshields. A number of new models introduced during 2017 are also expected to have ClimaCoat windshields.

“Escalating demand to meet automobile manufacturers' and end-user needs from comfort, safety and security perspective is expected to be the key force driving the global automotive glazing market growth”

Glass being produced in a Saint-Gobain Sekurit plant.

The multi-functional ClimaCoat layer.
Holographic technology provides a sixth sense

By: John Larkin

WayRay showcased the world’s first holographic AR infotainment system for self-driving cars at CES 2017.

Heads-up displays are going high-tech and full color with the introduction of holographic augmented reality (AR).

It is being introduced to the automotive sector through collaboration between HARMAN International, a leading connected technologies company for automotive, consumer and enterprise markets and WayRay, a global company based in Switzerland. It specializes in development and production of transparent holographic displays based on HOE (holographic optical elements) and commercialization of this technology for consumer electronics and B2B markets.

WayRay’s Navion is a holographic navigation system for cars. Navion creates an AR image where a virtual route is holographically projected into the regular focal range of the driver. The driver sees the navigation signs laid out directly on the road ahead of the moving vehicle, so his/her eyes remain safely focused on the road at all times. Projection is by a compact device placed on the car’s dashboard. Other AR devices currently on the market require the use of eyewear or headgear to see the image. Navion is designed to work in bright sunlight. The system can be fully integrated into HARMAN’s end-to-end automotive connected car platforms that make the autonomous driving experience intelligent, safe and intuitive.

“HARMAN’s collaboration with WayRay is another example of our drive to deliver seamless, integrated, connected and safer experiences in the car,” says Phil Eyler, president HARMAN Connected Car. “Holographic displays offer the opportunity to make self-driving vehicles safer and more reassuring for passengers,” adds Vitaly Ponomarev, CEO and Founder, WayRay. “By providing visualizations of what is happening around the car, the road surface and relevant points of interest along the route, passengers are kept fully informed throughout the trip, even if they’re not actually driving.”

Since it was founded in 2012 the company has emerged as a premier developer in connected cars by applying aerospace technology to land navigation. The people behind WayRay are an international team of more than 100 top-ranked engineers, scientists, designers as well as professionals in finance, law, and marketing. Many are pioneers in their fields.

WayRay’s first product was Element, which is a small dongle-like gadget that plugs into any OBD port. It collects and analyzes data from the car to generate insights about the driver’s performance on the road. Drivers can see how many miles they have driven, hours spent at the wheel, average speed and fuel consumption. Element comes with an “Autoyoga” feature that works as a personal coach to help improve driving skills through a series of fun quests.

The WayRay story is woven from experiences had by its founder. “I was living in Moscow at the time, and I was driving at a low speed while also trying to adjust my brand new GPS,” Ponomarev says. “My attention got distracted just for an instant and I had my first ever car accident. The accident had a profound effect on me and I began to think about how the windshield is the perfect place to start when it comes to

Vitaly Ponomarev, CEO and Founder, WayRay.
ULTIMATE PROTECTION
EXPERIENCE

BY SAINT-GOBAIN SEKURIT

A major player in the automotive sector, Saint-Gobain Sekurit is constantly innovating to offer you exclusive solutions to improve the drivers and passenger’s safety. Whatever the materials used, mineral, or organic, the manufacture of our products meets the most demanding criteria of quality and sustainability.
improving car safety. That began this remarkable journey and inspired the creation of WayRay.”

Automotive Industries (AI) asked Ponomarev to describe the WayRay infotainment system.

Ponomarev: WayRay is the step between where we are now and the future self-driving car that is connected to a city’s infrastructure. The WayRay infotainment system seamlessly blends the real world driving (or passenger) experience with augmented reality. It’s the technology you’ve only been able to see in movies up to now, and is making the windshield a new medium for contextually relevant information for drivers and entertainment for passengers.

AI: What makes the WayRay navigation system unique?

Ponomarev: WayRay’s use of holographic optical elements keeps the system far more compact than traditional mirror and lens technology, and allows for a high-resolution projection directly in front of the driver. It is the first in-car system to use color holographic technology (previously only green) and is also the only system that will provide useful information to a driver while keeping passengers entertained. In a driverless car, both users can use the entertainment features. Furthermore, the system provides a smart driving assistant that collects your driving stats and patterns, offering up a gamified system of rewards that keeps the daily drive to work as fun as it can ever be.

AI: What about the safety aspect?

Ponomarev: A holographic display allows drivers to stay fully focused on the road, while being provided with timely route information. The system uses augmented reality to display real-time indicators for things like pedestrians in the road, displaying points of interest or alerting you to hazards like someone opening their car door in a narrow street as you approach. Add in messaging and social updates delivered when the car is stationary (or being used in auto-pilot) and the augmented reality driving experience is unparalleled.

At its heart is a smart satnav that knows when your favorite route will be jammed with traffic from a football match or concert, and will reroute you to avoid the crowds. Naturally, you can do all that hands-free, using voice and gesture controls to get you safely to your destination.

AI: What is included in the system?

Ponomarev: The core of the system is Navion - a standalone unit that uses holography to provide driving and navigation information to the driver. It eliminates the need to look away and refocus your eyes while driving, which means there is less distraction, making your trip safer. Navion is supported by Element – a premium car tracker and smart driving assistant and the WayRay app, which is used to control your infotainment system.

AI: Tell us about your partnership with HARMAN.

Ponomarev: It is a great step forward in that it provides a Tier 1 company access to our technology and provides us with the benefits of an experienced OEM with existing integration services. The win-win model allows us to develop different relationships simultaneously and bring more AR experiences to market.

AI: How do you see AR-based navigation systems growing in the future?

Ponomarev: In five years AR will be standard in every new car sold. Car companies and technology giants will cooperate to provide better AR experience for drivers and passengers — there’s already a lot of content that could be shown including navigation, updates from social networks, and even games.

AI: Why is AR technology better for navigation than other systems?

Ponomarev: We call our technology True Augmented Reality because the virtual content overlays the real-world very precisely. Virtual objects are located at the same focus distance as real objects — this means that drivers don’t need to continually refocus their eyes, thereby making driving safer through fewer distractions. It’s like having a new sense.
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This adds to the complexity of developing new vehicle and drive concepts. Adding to the challenge is the trend towards digital networking. "Schaeffler is contributing to helping the North American automotive industry respond to the major challenges the future holds," says Marc McGrath, Schaeffler’s president of automotive for the Americas. "Schaeffler's recent investments in local infrastructure and expertise will enable us to develop solutions for next generation vehicle architectures and innovations to address our customers' needs."

Schaeffler offers solutions for all requirements including a hybrid module for light duty vehicles, which make system where an electric rear axle supplements the front axle drive which comprises a conventional internal combustion engine and belt-driven 48 volt starter generator. The arrangement is a completely new combination of the conventional P0 topology and an electric axle in a P4 arrangement. The electric motor and the associated power electronics are integrated into a single unit on the rear axle. Twenty kilowatts of purely electric power is thus permanently available from the 48 volt axle drive. The Schaeffler electric axle produces a starting torque of up to 2,000 Nm.

The 48 volt architecture allows different driving strategies to be selected in order to reduce CO₂ emissions and increase driving dynamics, such as emissions-free, purely electric driving up to 35 km/h in areas where traffic is restricted. The vehicle can also cruise at speeds of up to 70 km/h. In the WLTC driving cycle, the majority of braking energy is recaptured as electrical energy and stored in the heavy-duty battery.

Another innovation is Schaeffler’s "E-Wheel Drive", which allows drive technology to be relocated to the wheels. In wheel hub drives, all necessary components, such as the electric motor, the power electronics, brakes and cooling, are located within the wheel rim. This saves space that can be used for new interior design concepts. The wheel hub drive has an obvious application in self-driving taxis or nimble, autonomously driven passenger cars which will transport residents of large cities over short distances in the future. Developers also have their sights on new "people movers." These are ultra-compact, autonomously driven vehicles will take passengers the "last mile" home after using traditional public transport systems.

"We have taken the predevelopment of the E-Wheel Drive to the point where we can now start to incorporate it into real-life applications on a larger scale," McGrath said.

Schaeffler offers solutions for all requirements including a hybrid module for light duty vehicles, which make up approximately 60% of all new registrations in the United States. In order to meet the high comfort demands from its customers, the company has combined the electric motor with an integral hydrodynamic converter. Development of a production version of the module is already underway for a U.S. automotive manufacturer. Other innovations include an electric wheel hub drive which allows small, manoeuvrable self-driving taxis to be built for the urban environment.

"We think there is a real opportunity for electric drives in the North American market," said Matthias Zink, CEO Automotive, and member of the management board of Schaeffler in a press release. To address this market Schaeffler has a new 48 volt system where an electric rear axle supplements the front axle drive which comprises a conventional internal combustion engine and belt-driven 48 volt starter generator. The arrangement is a completely new combination of the conventional P0 topology and an electric axle in a P4 arrangement. The electric motor and the associated power electronics are integrated into a single unit on the rear axle. Twenty kilowatts of purely electric power is thus permanently available from the 48 volt axle drive. The Schaeffler electric axle produces a starting torque of up to 2,000 Nm.

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projects,” said Sebastian Wielgos who leads the E-Wheel Drive development program at Schaeffler.

Automotive Industries (AI) asked Zink how the company’s “Mobility for Tomorrow” strategy has evolved and why the North American market is the mainstay of the programme.

Zink: Our “Mobility for Tomorrow” program has been running for several years with ideas and concepts for hybridized and electric driving that we have demonstrated in different concept vehicles. The implementation of our strategy has gained significant momentum during the last two years due to the programs launched by OEMs for implementing electric mobility.

AI: What are some of the challenges facing automotive manufacturers today when developing new vehicles or concept vehicles?

Zink: One of the challenges is certainly the wide range of different solutions and volume scenarios that are currently available for internal combustion engines, hybrids, and for fully electrically-driven vehicles. As a result, it is not easy to work on the right issues with the right capacities. As a system partner for the automotive industry we seek a dialog with OEMs in order to exchange ideas for products and strategies. Our products and projects are becoming increasingly complex. In addition to purely mechanical systems, we are now involved in the development of electrical and electronic systems.

AI: What will be the single biggest factor for drivers over the next few years – fuel efficiency, safety, or connectedness?

Zink: If we consider the decisions taken at the climate conference in 2015 from a purely rational point of view, the issues of fuel efficiency and the reduction of CO₂ emissions must have maximum priority. The targets confirmed at the conference can only be achieved if the technological change begins directly at the primary energy source.

Connected and autonomous driving will certainly become a priority area because the enabling conditions are being created step by step through digitalization and new drives. Safety has been a priority in the automotive industry during the last decade, but it will be given new impetus by the issues of connectedness, sensors, and data.

AI: What technologies does Schaeffler have in its portfolio that are particularly aimed at the North American market?

Zink: In general, we can supply all the global technologies in North America. In the field of engine technology we now have modern systems ranging from valve train to cylinder deactivation technology. In the transmission sector, North America is the headquarters for the torque converter and we are now significantly expanding our capacities for hybrids and electric mobility.

AI: How is this different from other regions?

Zink: America is primarily a market for large-capacity vehicles and automatic transmissions. America is also the headquarters of the “big three” OEMs, and for this reason we have a high level of local development expertise to give us close proximity to our customers.

AI: How will your company’s E-Wheel Drive concept change the way vehicles are designed?

Zink: The E-Wheel Drive enables new vehicle concepts. For example, the space previously used for the drive could now be used for the installation of battery cells.

AI: What are some of the breakthroughs Schaeffler has made in hybrid vehicle technologies?

Zink: Schaeffler is vigorously pursuing the idea of using high-voltage 48V hybrid systems which reduce fuel consumption by almost 20%. We are also carrying out intensive research on new transmission structures for so-called dedicated hybrid transmissions. Likewise, we are working on the supposedly “simple” automation of manual transmissions as preparation for hybridization.

Our “Mobility for Tomorrow” program has been running for several years with ideas and concepts for hybridized and electric driving that we have demonstrated in different concept vehicles.”
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Additive manufacturing has advanced from being an exciting and revolutionary niche technology to one where it offers real world applications that can change the world – and not just in the future, but right now.

That is the message from the success of the first Additive Manufacturing Europe expo, which was held in Amsterdam in June 2016. Organized by the Tarsus Group in association with the 3D Printing Association it attracted 2,371 visitors from 58 countries. The expo focused on the fastest growing vertical sectors - healthcare, aerospace and automotive. The conference program, sponsored by SmarTech Markets Publishing, was split into the same sectors. Visitors to the show represented leading companies such as BMW, KLM, Philips, Stryker, Rolls-Royce, Airbus, Boeing, Unilever, Adidas, Alstom, BIC, Canon, Deloitte, Konica Minolta, Médecins sans Frontières, NATO and the NHS.

The next event is the first Americas edition of the 3D printing show, which will be held in Pasadena, California from the 6-8th of December 2017, after being postponed from December 2016. Additive Manufacturing Americas 2017 has already attracted a number of companies from the automotive, aerospace, healthcare and other industries, according to the organizer Tarsus. The company says it chose Pasadena because California is ranked #1 in the United States for manufacturing output, and is at the center of international biotech developments.

Automotive Industries (AI) asked Michael Hatton, Marketing Director at Tarsus Group, why the Additive Manufacturing Americas event was postponed.

Hatton: Postponing Additive Manufacturing Americas was not an easy decision, as we had received lots of interest following the successful launch of Additive Manufacturing Europe. However, as it was so close to the first Europe edition some of the interested majors indicated that this would force them to defer that interest to 2017. We therefore decided it would be in the best interest of all to delay Additive Manufacturing Americas by 12 months.

AI: What response have you had from exhibitors in the United States and other countries in the region to your inaugural show?

Hatton: The companies we spoke to welcomed the news with enthusiasm. These are exciting times for this forward-looking sector and we wanted to create something different. Additive Manufacturing Americas is the perfect place to introduce new products. We aim to attract trade visitors from all across the industry and the region – from designers and innovators through to manufacturers and engineers. What makes our additive manufacturing expo different from 3D printing shows is that we focus on giving our exhibitors and visitors a much deeper reach into the international community and real-life manufacturing applications.

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AI: Going by the success of the Additive Manufacturing Europe, what kind of response do you expect for the second edition?

Hatton: As last June was our launch edition, we had reasonable expectations. No-one knew us. No-one knew what to expect, but everyone was curious to see what the show was about. Of course, we worked hard with plenty of media and associations from all over Europe, and that helped to promote the show to the whole of the continent.

We had some very high-end visitors, looking for cutting edge technology - a lot of serious business was done at the show. Thanks to the quality of our exhibitors and the conference sessions, the show covered really neatly all aspects of the additive manufacturing / 3D printing ecosystem, with a rich, focused content.

We anticipate the first edition of Additive Manufacturing Americas to be larger, busier and really buzzing. We have more time to market the show to visitors, more time to engage them with the show content and more time to include a wider range of exhibitors too. The additive manufacturing / 3D printing market never ceases to surprise, so we hope that the show will reflect this in 2017.

Additive Manufacturing Americas 2017 is a really good opportunity to show off newly launched products. The conference sessions and the Product Stage will once again provide an invaluable opportunity to share the latest innovations and viewpoints with such engaged audiences. Ultimately, Additive Manufacturing Americas should be seen and recognized as the only pan-American trade show of its kind. It will form a key part of our engagement with the industry over the coming years.

AI: How important is the show for sectors such as the automotive industry?

Hatton: The automotive industry highlights the current capabilities of a broad spectrum of additive technologies for the whole product development process, which includes prototyping, tooling and production. Additive manufacturing joins the dots across the ecosystem, providing opportunities for streamlining enterprise-wide processes and communication, while providing opportunities to consider the entire supply chain optimization.

AI: How do you think disruptive manufacturing technologies will change the way cars are built in the future?

Hatton: Manufacturing technologies, such as additive manufacturing, will continue to improve time-to-market, but will also allow for more customization, not just for color, but for part specifications as well. Additive manufacturing facilitates optimization of the entire supply chain and has huge opportunities for after-sales, such as spare parts from digital archives being one of them.

AI: What are the benefits of additive manufacturing or 3D printing for OEMs?

Hatton: The benefits of additive manufacturing remain the same as they have always been — time and cost savings. However, these can now be found right through the product development process, not just in concept development, and they add up when additive manufacturing is used holistically throughout the organization not just in design, and not just for form/fit prototypes. In the instance of complex structures, additive manufacturing can minimize weight and assemblies. Both of these have huge implications, but require targeted application development.

AI: How do you see the additive manufacturing sector growing over the next five years and how do you see your exhibitions – both in Europe and in the United States, evolving?

Hatton: The trend in the additive manufacturing sector continue is to focus on manufacturing applications. There is a huge growth potential in the automotive, medical and aerospace markets, especially as partnerships and collaborations continue to multiply. We forecast more new entrants in the market as plastics and metals patents expire. Our exhibitions are set to grow alongside the industry itself, by providing a solid platform to see many competitive and complementary technologies in one place. It will become more important than ever!
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The commercial vehicle sector is taking the lead at present. In late 2016 Uber autonomously transported a tractor-trailer full of Budweiser beer across the state of Colorado. Likewise, Freightliner has had some of its commercial vehicles operating autonomously on restricted access highway systems.

“The tests illustrate an overlooked aspect of automated driving technology, namely, that its biggest impact may not be in your driveway, but instead in how goods are transported throughout the United States. A host of traditional truck manufacturers and technology companies including Uber, Caterpillar, Peterbilt, Volvo and Daimler are already engaged in initiatives to develop automated driving technology for commercial trucks, but this technology does not come without some serious hurdles that may slow advancement,” says Mike Nelson, litigation partner with Eversheds Sutherland (US). Eversheds Sutherland is a global top 40 law practice.

Automotive Industries (AI) asked Nelson what are some of the legal challenges facing the developers, manufacturers and users of autonomous and connected vehicles.

Nelson: The technology is developing more quickly than the law. This is not unusual when technological advancements hit the marketplace and then the legal system adapts. Interactions with humans is part of the development process, and further complicating the creation of laws is the fact that we as a society are still trying to figure out what the new transportation system will look like.

AI: How useful are the recent NHTSA guidelines on driverless cars?

Nelson: NHTSA’s Federal Automated Vehicle Policy is effective for what it was intended to do - establish a framework and foundation to introduce how the agency will act in the future. Some of the parties involved and the public had hoped that NHTSA would deliver the standards that manufacturers would be held to for “driverless cars.” We are still a long way off from truly autonomous driving, but many manufacturers have already introduced models that have significant automated features. As my wife likes to say about our Tesla Model S, you hold onto it more than you drive it. Turning back to the NHTSA guidance, it emphasizes safety as the priority as a matter of policy. It identifies the need for new laws and authority for DOT and NHTSA, it strongly emphasizes the need for collaboration with industry, governments and the public, and it takes a very long-term, broad view of the road ahead. It could not do more than that at this stage.

AI: How will automated driving technologies impact commercial trucking – will it cause labor unrest as truck drivers could fear being made redundant?

Nelson: This automation is premised on many types of artificial intelligence. AI is poised to disrupt some aspects of many industries and the occupations of all of us. The efficiencies that AI promises to deliver (projections of efficiency gains suggest gains of 1% per year), and those gains compounded year after year, mean we will see the elimination of many jobs in the transportation field. Our society will have to work extremely hard to have systems in place to identify potential for large-scale disruption in our work force and develop systems to retrain our workforce. We should start by identifying now what skills we will need in the future and what skills we will not. Let’s start off by looking at education programs in the transportation field, asking the tough questions, and giving guidance to those seeking educational and career advice that drives home the point that certain jobs today will no longer be needed in the future.
AI: Will trucker unions try to stop the introduction of automated delivery vehicles?

Nelson: I imagine they will. Look at what has happened in the taxi industry since it has been disrupted by Uber and Lyft. I attended the Consumer Electronics Show in Las Vegas this year, and the lines at the airport for a cab were an hour long. The taxi cab drivers have banded together to eliminate Uber pick-ups and drop-offs at the airport there. Self-preservation is understandable but the promise of safer roads, with less truck and bus related accidents along with the efficiency gains automation promises, requires us to take a healthy look at such challenges and find ways to accommodate those whose careers have been or will be displaced.

AI: How will liability be determined in cases of trucks using automated driving technology?

Nelson: Liability analysis usually starts with identifying the cause of an event. From that perspective, automated driving related accidents will not be that much different. However, determining the cause will be. And product failure will be a larger part of the paradigm. As new laws are written and case law develops, we will see how the law adapts to the new technology. And since this technology will continue to race ahead we will be in a constantly challenging environment requiring us to evaluate the legal standards that apply, how the technology functions or malfunctions, and if a human contributed to the situation. It will be an exciting time for those in the insurance and legal fields.

AI: Would a comprehensive regulatory scheme permitting nationwide operation of autonomous trucks be necessary for widespread adoption of the technology?

Nelson: In the US, the autonomous trucks will be regulated under federal and state regulatory and statutory frameworks. The design and manufacturing standards are primarily subject to top federal oversight. Traffic laws are subject to a state-by-state framework with some federal law exceptions. Then of course, the courts play a role in interpreting these standards on a case-by-case basis. The framework has been and will continue to be fragmented.

AI: What are the pitfalls and challenges the industry faces as it prepares “to re-write the rules of the road”?

Nelson: For starters, the automated technology we have today is really in its infancy. For those who operate in this sector of transportation, the laws will be somewhat of an outdated patchwork. It is difficult to operate a business in an environment where the rules of engagement are changing minute by minute.

Insurance will be significantly disrupted. The biggest question will be when that disruption will occur. For those who have evaluated those models, significant disruption will occur somewhere between the next five to 10 years, and significant disruption will occur by the end of the next decade. These models first reflect a lower number of accidents. The models show that loss cost, or what is referred to as severity, will actually increase, but that the two will begin to taper off as significant crash events lessen.

Complex legal questions around liability are triggered the moment the autopilot button is pressed. The start button on automated transport has been pressed – legal challenges may slow down its introduction.

The technology is developing more quickly than the law. It will be an exciting time for those in the insurance and legal fields.”
Founded in 2015, Tel Aviv-based otonomo provides a multi-layered security approach that includes strong encryption, layer 7 Firewall, data anonymization and field validations. Using its advanced 4x4 Real-time Policy-enforcement Engine, otonomo’s platform ensures compliance to regulations, and complete control over data privacy from both the OEM and the car owner’s perspectives. otonomo also takes care of the commercialization aspect of the car data exchange, offering comprehensive auditing and billing functionality.

Automotive Industries (AI) asked Ben Volkow, CEO and Co-Founder of otonomo, what are the benefits to the car industry to have a single platform.

Volkow: The benefits of unifying behind one common platform are that OEMs will be in a stronger position to attract partners from the information technology and data transmission. There is an added value when offering high volume and coverage for both the vehicle and the occupants. If the OEMs choose to build their own platform Silicon Valley players – who are resourceful and have a competitive advantage in software development, will have an easier time entering the auto data play. Fragmented and weak OEMs will have a hard time attracting services, as individually they represent relatively small markets.

It is estimated that by 2020 there will be nearly a quarter of a billion connected vehicles on the road, and they will change the way people use their cars.

“The increasing ability of cars to exchange data with the outside world holds great potential to revolutionize the driving experience,” says Dr Dieter Zetsche, Chairman of the Board of Directors of Daimler. His sentiments are echoed by Carlos Ghosn, Chairman and CEO of Nissan and Renault, who has stated “it’s clear that consumers expect to be connected wherever they are, and that includes the time spent in their automobiles”.

Israeli company otonomo is helping OEMs to cash in on this growth by using a cloud-based solution for the connected and autonomous car ecosystems. It has raised US$12 million in financing through Silicon Valley venture capital firm Bessemer Venture Partners and Stageone Ventures. Additional participants in the round included Maniv Mobility, and LocalGlobe.

otonomo has already started trials with car manufacturers and providers of car services. New revenue-generation opportunities have been recognised by the industry. "As our vehicles become part of the Internet of things and as consumers give permission to us to collect that data, we’ll also become an information company," says Ford President and Chief Executive Officer Mark Fields.

Innovation

Connecting the autonomous vehicle ecosystem

By: John Larkin

Co-founders of otonomo: President Avner Cohen (left) and CEO Ben Volkow.
AI: Car makers have spent billions on collecting data. How can they safely monetize this information?

Volkow: There are many challenges when monetizing car-generated data, the main one being formulating regulation around data privacy. This is where concepts like “Natural Server” are coming into their own. This will enable sharing data while meeting local government policies and different standards. We are working closely with OEMs and regulators to offer a safe and secure way for OEMs to share their data.

AI: What does market research suggest in terms of full connectivity in the automotive industry?

Volkow: We are in an age where data mobilization is transitioning to data monetization. In a digitized world one of the biggest struggles for OEMs is transforming their business model from a method of mobility to a platform that enables data-driven services. It is expected that 98% of new cars will be connected by 2020. Most new models made by the majority of OEMs are already coming out connected.

AI: How can car data services create better and safer cars and help sell new vehicles?

Volkow: Car data services need to improve the overall car ownership experience beyond traditional offerings. They can do so by introducing new features throughout the car lifecycle to meet the consumer demand for convenience, connectivity and efficiency. There are many ways in which we can utilize car generated data to meet these requirements and improve the driving experience. For example, if we can predict breakdowns before they happen and notify the owner of the issue before the component fails, getting stuck on the side of the road and waiting for a tow truck will be a thing of the past. The component can be delivered to the nearest garage or even installed in your home or office ahead of time.

A car is safer when drivers can receive real time alerts on road hazards and the local municipality can use these notifications to improve road safety and infrastructure. We have the ability today to automatically detect a crash and provide emergency services with real time information before they arrive to the scene. This data dramatically improves the actions of first responders and trauma care professionals when arriving at the scene of an accident.

AI: In the “data game” how can car makers monetize data and retain a large percentage of the revenue for themselves?

Volkow: Car makers need to be early adopters and embrace the “data game”. By monetizing data they will have a business model in place to compensate for any reduction in new vehicle volumes due to consumers in some markets focusing on mobility rather than vehicle ownership. Car data offers high margin revenues and an ability to ensure positive customer experience – all wins for OEMs.

They can achieve this getting into the game as early as possible, and by adopting Silicon Valley technology and software services business concepts. Car manufacturers already understand that this new business will more than compensate them for the possible future revenue loss in car sale revenues in the shift to autonomous cars business models.

AI: What will the connected car exchange mean for industries such as the insurance industry?

Volkow: The connected car exchange and marketplace for data will help many industries remove the operational pressures and costs of installing hardware component, and allow them to focus on their core business – which is to transform the data collected to actionable products. Sharing data will also reduce the incidence of fraud and create a more efficient claims management process. Insurers can also connect to relevant marketplace partners to increase their solution offerings and client loyalty.

AI: What has your recent round of financing meant for otonomo?

Volkow: This strong show of confidence in the company has enabled us to double our workforce, grow sales and accelerate business development.

AI: What plans do you have to ramp up operations?

Volkow: We are currently ramping up our engineering team, as well as placing professionals on the ground in the different markets to support existing customers and car on-boarding.

AI: What are your predictions for the future of autonomous and connected vehicles?

Volkow: The rollout of autonomous and connected vehicles is growing at such a rapid pace that it may exceed many of the current predictions. Car data facilitates the evolution of technologies for both connected and autonomous cars. The importance and size of this market will grow rapidly, with connectivity being a standard feature in all new cars. Car data will, ultimately, pave the future of autonomous cars and OEMs.

Road travel will be made safer when platforms from different manufacturers share data on road hazards and other dangers.

Connectivity is now standard in most modern cars rolling off the assembly line. The opportunity for OEMs is to monetize the data.
The future of lighting is to not only allow the personalization and customization of vehicles, but to have it as a key element in vehicle connectivity, says Techniplas, a leading provider of lighting technology to the automotive industry. Techniplas technology featured in a number of displays at CES 2017. Faraday Futures’ new concept vehicle, the FF 91, which was unveiled at CES 2017, featured Techniplas’ external lighting. In addition, Techniplas partnered with renowned automotive think-tank Rinspeed to create Oasis, which also debuted at CES 2017.

The self-driving Swiss vehicle is intended to push the envelope on autonomous thinking. In a recent review of exterior lighting on the Faraday FF 91 clearly accomplishes that, it takes lighting to a much higher level by becoming a key part of the vehicle’s ability to communicate; to other vehicles, to pedestrians, and to the outside world."

Techniplas creates planar light sources by combining LEDs with creatively shaped light guides and then uses proprietary software to create specific brightness distributions to achieve unique effects such as illuminated seat inserts in the Rinspeed ΣTOS where certain symbols appear between the seat back and headrest only when the back light is on, or extremely thin and practically invisible light guides serving as a hidden third brake light in the rear window.

Automotive Industries (AI) asked Korth what solutions the company is developing for connected vehicles.

Korth: Techniplas has been involved in lighting for years. We have worked with think-tanks like Rinspeed to advance lighting concepts, and then we take the concepts and make them production ready in a very short period of time. We work with most of the premium OEMs on a regular basis to push the envelope in terms of design applications. We are at the forefront of using lighting on the exterior of the vehicle. Examples include the FF 91 front fascia lighting, the Rinspeed Budii front grille embedded LED-arrays or the multi-layer lights in the tailgate.

AI: What Techniplas lighting was used on the Faraday Future FF 91 and Rinspeed Oasis?

Korth: In the FF 91 we used Techniplas’ two key technologies (microstructure elements and proprietary simulation software) to provide ultra-thin light modules with the minimum number of LEDs. On the Rinspeed Oasis the use of an embedded microstructure in a multi-layer planar light-guide was shown for the first time.
AI then asked Steffen Reuter, VP of Innovation for Techniplas, how Techniplas is helping spur the transformation happening in vehicle lighting.

**Reuter:** Techniplas is a leader in lighting technology as demonstrated by the new lighting on the Faraday FF 91. We are always looking for technologies and innovations which enable the technology to go in new and different directions.

**AI:** What role does lighting play in the autonomous vehicle?

**Reuter:** Lighting will be at the core of the changes the autonomous vehicle represents. A few examples:

- To signal to pedestrians when a vehicle is in autonomous mode. Today, pedestrians make eye contact with the driver before entering the street. Having a color displayed when the vehicle is in autonomous mode replaces that interface.
- Interior lighting will assist the driver/passenger to deal with certain circumstances while driving. Particularly the handover from the autonomous to the non-autonomous driving mode would be the most critical and sensitive phase. Lighting makes this maneuver more intuitive and safer.

**AI:** What are some of the lighting applications you envisage for autonomous vehicles – such as for safety, security and communication with a car’s environment?

**Reuter:** The applications include:

- Illuminated front fascia / light panels embedded in the front grille
- Door claddings
- Tailgate light panels
- Exterior accent covers with visible communication features
- Side / rear windows

**AI:** Tell us about the Techniplas cognitive products and systems that are enabling connected and autonomous vehicles.

**Reuter:** There are numerous potential lighting applications. We are working on, for example, the ability to connect your smartphone with the embedded electronics in your vehicle so you can download your own patterns and colors to the system.

**AI:** Bottom line – will lighting help sell more cars?

**Reuter:** The car is becoming an extension of personal brand. People identify with their car like they do their smart phone—expecting it to be highly customized and personalized. Light creates atmosphere, enhances familiarity, and conveys a sense of elegance and quality. With the rapid evolution of the automotive industry, designers need innovative, customized solutions based on advanced products and superior technologies. Techniplas has extensive experience in lighting and other forms of vehicle personalization, and works closely with its customers to develop solutions for the most demanding applications. With a long history of collaboration with premium OEMs, we are able to develop creative solutions for many different requirements. Techniplas is a strong partner whose ideas are often ahead of the market.
The auto industry is faced with the challenge of remaining relevant and profitable in a society which is transitioning from being ownership-centric to one of a sharing society, offices and even homes. In order to help the motor industry to reinvent itself test tracks have taken on a whole new form in Michigan. The state has positioned itself as a leader in the development of technologies that are disrupting the automotive status quo. At the Michigan test facilities the focus turns from speed, handling and endurance to how people, vehicles and the rest of the urban and suburban environment will interact.

The tracks are part of the “Planet M” public-private partnership which includes over 300 R&D companies and what is claimed to be “the nation’s highest concentration of engineers”.

This year Michigan will be the only state in the United States with two permanent and purpose-built autonomous vehicle testing sites.

**Mcity**

Working with the Michigan Department of Transportation, University of Michigan (U-M) researchers have designed Mcity, a 32 acre test facility for evaluating the capabilities of connected and automated vehicles and systems. Opened in 2015 at the university’s North Campus Research Complex, the site simulates urban and suburban environments and is in high demand. It includes approximately five lane-miles of roads with intersections, traffic signs and signals, sidewalks, benches, simulated buildings, street lights, and obstacles such as construction barriers.

**American Center for Mobility**

The United States Department of Transportation (USDOT) has designated the American Center for Mobility at Willow Run as one of the first national proving grounds in the country.

“Our global center for testing, education and product development for connected and automated vehicles (CAV) and future mobility fits seamlessly with the USDOT’s vision and we are honored to have been selected,” said John Maddox, President and CEO of the American Center for Mobility (ACM) in a media release.

“The state of Michigan has already established a robust connected vehicle ecosystem by bringing manufacturers, researchers, government officials and other stakeholders together – and ACM will play a central role in this continuing partnership,” said Gov. Rick Snyder. Located on 530-plus acres at the famous Willow Run site, the Center will offer access to a range of driving environments and infrastructure including a 2.5-mile highway loop, a 700-foot curved tunnel, two double overpasses, intersections, roundabouts, and a dedicated cellular LTE network provided by AT&T.

In addition the center’s location supports experimentation in varying weather conditions due to Michigan’s dynamic climate. It is close to the University of Michigan’s Mcity, which was designed for early-stage CAV research and teaching. With complementary but varied programs, the organizations can share best practices to the benefit of both facilities.
The American Center for Mobility is a joint initiative with the State of Michigan founded in partnership with the Michigan Department of Transportation, the Michigan Economic Development Corp., the University of Michigan, Business Leaders for Michigan and Ann Arbor SPARK.

Automotive Industries (AI) asked Matt Gibb, Deputy County Executive, Oakland County, what or where is “Planet M”.

Gibb: Planet M is in Ann Arbor, Michigan. It’s a test track for autonomous vehicles.

AI: Why the focus on the connected vehicle?

Gibb: It’s a natural location for the US connected mobility industry to develop. The Automotive Industry is already here in Southeast Michigan. Most of the R&D is done in Oakland County, Michigan. We are home to over 70 of the top 100 Global Automotive TIER 1 suppliers. In addition we have the electronics, Information Technology, sensor technology and the big data companies here already. Google’s Waymo R&D Center is in Oakland County, Uber’s R&D Center is in Oakland County, Several navigation technology companies are already here too, such as NNG and TomTom. In short, we have all the elements already – including the engineering force needed to build this industry.

AI: Why should companies be investing in Michigan?

Gibb: The engineering talent ecosystem is here and growing; the simpler and lower tax structure compared to other states; access to the automotive industry (domestic and transplants). Their North American headquarters and R&D ers are all in Southeast Michigan.

AI: Is this an exclusive Michigan initiative?

Gibb: No, but Michigan is far ahead of any other state in the USA in the assets that we already have here in the connected mobility space.

AI: How can “outsiders” make use of the facilities and expertise?

Gibb: We can help them. They can contact us at info@advantageoakland.com and we can help them connect to all the assets in Michigan and plug right into our Nation’s Largest Mobility Industry.

AI: When will Michigan allow the vehicles which have been tested in the simulated environments onto its roads?

Gibb: It’s already allowed. Michigan was the first state in the nation to pass the most progressive laws allowing testing of autonomous vehicles on its roads – and it’s already happening in Oakland County and throughout the state. Autonomous passenger cars, military and commercial trucks are all being testing today right here in our community! This is the place to be!

AI: What about the skills needed for this brave new world?

Gibb: Oakland County was the first in the Nation to identify the skills needed for this future workforce. We surveyed this industry and presented the results to the educational institutions throughout Michigan (K-12, community colleges and universities). We are the first to identify a specialized engineer for this autonomous/connected mobility industry. It’s the “Connected Systems Engineer”. You can see the results of the survey here: https://www.oakgov.com/edca/resources/Documents/wd_2017SkillsNeedAssessment_ConnectedMobility_web.pdf.

Companies took the opportunity at the launch of the Skills Needs Assessment Project on Connected Mobility (SNAP) to show educators what connected mobility technology actually looks like.

SNAP is part of a series produced by Oakland County to help shape k-12, college, and university curriculum and content, to better prepare students of all ages to make career decisions.

Uber’s R&D Center is in Oakland County.
OEMs and Tier suppliers are navigating their way through a “perfect storm” where the industry is being made to take responsibility for a wide range of issues not directly related to the manufacture and sale of passenger and commercial vehicles.

Governments are putting increasing pressure on the industry to find solutions to reduce emissions and congestion, and to raise safety standards. According to the “Vehicle-to-Vehicle Communications: Readiness of V2V Technology for Application”. It states “a significant number of accidents could potentially be addressed through expanded use of more advanced crash avoidance technologies. The agency estimates there are approximately five million annual vehicle crashes (in the US), with attendant property damage, injuries, and fatalities. While it may seem obvious, if technology can help drivers avoid crashes, the damage due to crashes simply never occurs”.

V2V technology is being replaced by V2X – “vehicle to everything”. In addition to improving safety V2X connected cars will help reduce traffic congestion which, according to Texas Transportation Institute, wastes 3.1 billion gallons of fuel a year in the United States alone. This wastage translates into greenhouse gas emissions and air pollution.

V2X communication connects vehicles to other vehicles (V2V), infrastructure (V2I), motorcycles (V2M) and pedestrians (V2P) within wireless range for safety and mobility applications. It adds a new layer of confidence and certainty for drivers as it provides an early-warning system. It complements the information of other sensors, especially in non-line-of-sight, rough weather or poor lighting conditions. It also helps improve mobility as it enables traffic coordination, resulting in higher road utilization and lower emissions.

The year is 2008. On his way back from work, Onn Haran, Autotalks’ CTO and co-founder, saw a vehicle in front of him slam on its brakes suddenly. Onn was forced to brake hard in order to (successfully) avoid an accident. “Immediately I thought to myself: ‘Why can’t I get an early warning in such a situation?’”, says Haran. That was the birth of Autotalk.

World Health Organization around 1.25 million people are killed in road accidents every year. Half of those killed are “vulnerable road users” – pedestrians, cyclists and motorcyclists.

Vehicles which alert drivers to the potential dangers and hazards are seen as part of the solution. As far back as 2014 the U.S. National Highway Traffic Safety Administration (NHTSA) published a paper “Vehicle-to-Vehicle Communications: Readiness of V2V Technology for Application”. It states “a significant number of accidents could potentially be addressed through expanded use of more advanced crash avoidance technologies. The agency estimates there are approximately five million annual vehicle crashes (in the US), with attendant property damage, injuries, and fatalities. While it may seem obvious, if technology can help drivers avoid crashes, the damage due to crashes simply never occurs”.

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“Autotalks’ vision is to prevent crashes and save lives on the way to a world of driverless cars. We are doing this by offering OEMs a low-cost safety-grade V2X solution for installation in each vehicle,” said Hagai Zyss, Autotalks’ Chief Executive Officer in a media release.

Automotive Industries (AI) asked Zyss how V2X will affect autonomous cars.

Zyss: The automotive industry is witnessing a perfect storm, as autonomous functionality coupled with connectivity capabilities enables new vehicle driving models. A global interdisciplinary effort is taking place to bring the autonomous vision to reality. DSRC-based V2X communication increases the level of certainty regarding a vehicle’s surroundings, and serves as an essential element for reliable driving. V2X allows the vehicle to better understand the intentions of surrounding vehicles and to receive guidance from infrastructure. Autonomous vehicles are expected to be always connected, with V2I (Vehicle to Infrastructure) adding supplementary cloud access.

AI: How closely has your company worked with automotive OEMs and Tier Is?

Zyss: Autotalks has worked with almost all the OEMs and Tier 1s in pre-development and testing phases.

AI: How has this cooperation helped evolve your technologies? Please give examples.

Zyss: Besides leading to recognition as a technology leader and significant mass-market design wins, this collaboration greatly contributed to the development of Autotalks’ second-generation chipset.

In 2012, Autotalks began pre-development with one of the major OEMs, and through the work process with them we got to understand what is important from their perspective, and to fit our product to their requirements. More specifically, the V2X device was embedded in their shark-fin antenna. One of their specifications was that it will be temperature tolerant and function in 105°C. In response we developed the first V2X device for such extreme conditions. It is still the only V2X chipset that can be reliably used in an antenna or headliner. Our work with OEMs and Tier 1s continues to help us enjoy design breakthroughs. Our second-generation devices are the most advanced in the market because of the feedback we receive. Autotalks is now one of the leading Tier 2 innovators. Our work with the OEMs and Tier 1s shapes the architecture of their devices: a clear win-win situation for all involved.

AI: Is the ease of integration of your V2X device a major advantage?

Zyss: Autotalks offers a complete V2X solution, which is easy and fast to integrate into any vehicle. Additionally, the solution is low-cost and self-contained – it is almost as easy as “plug and play”. The user can simply insert it and the device works at maximal security level with no additional headaches. It is due to the device’s easy integration that mass production can begin immediately. This is also very important for implementing the NPRM.

One of the leaders in the field is Autotalks, which specializes in the supply of automotive-standard chipsets that support all functions required from a V2X ECU. In 2016, Autotalks’ second-generation chipset was selected for mass production by Denso, a top global auto parts supplier and V2X ECU pioneer.

Autotalks’ V2X solution has an IEEE802.11p modem with leading communication range that works in high-mobility vehicular environment. It supports IEEE 802.11a/b/g/n/ac, enabling Wi-Fi service outside the vehicle for supplementary value-added services. It can support dual-antennas for flexible installation, and even support concurrent channel operation (Wi-Fi and IEEE802.11p).

CRATON2 was created to easily adapt to any application and vehicle architecture. Its’ high level of integration reduces development and certification effort and ensures quick time-to-market. The pre-integration provides assurance for correct functioning, secure operation and shorter development schedules. CRATON2 integrates all V2X system blocks, and includes a powerful dual ARM processor to provide the smallest V2X solution footprint.

Another main focus of the NPRM is security. Hardware Security Module (HSM) and tamper detection were requested for storing sensitive data. The chipset’s outer protection layer authenticates all messages at ultra-low latency, which assures the smallest surface of attack, thus minimizing the security risk.

TO READ THE FULL VERSION OF AI STORIES GO TO www.ai-online.com
Modern adhesive technology can help shave up to 40% off the weight of a car body according to Sika Automotive.

"In fact, the right adhesives technologies can help make vehicles not only lighter, but stronger, safer, quieter and greener too. For instance, Sika adhesives, baffles, reinforcers and dampers can help eliminate 3 dB of interior noise, while also enabling mixed-material bonding for reduction of weight,” says the company.

Sika recently opened a new adhesive and acoustic product plant in Sao Paulo, Brazil. The new factory with its adjoining technology center will manufacture adhesives and a wide range of acoustic products for the automotive market in Latin America. According to the company its products are found in more than 50% of vehicles manufactured annually.

It is also possible to down gauge or to re-spec the high performing metal by reinforcing areas locally, often resulting in 20 to 30 % mass savings. This is of particular interest to areas that are utilizing sandwich style metal reinforcements and in A/B/C pillars.

Additionally our Sikaflex® products enable selective stiffening of roof panels (through DVD bonding) on down-gauged sheet metals while maintaining performance and acoustic characteristics, and also bonding of steel to full aluminum roof panels amounting to 3-6kg savings per vehicle. Sikaflex® UHM 1C adhesive bonds the carbon fiber life module to the aluminum drive module on the BMW i3, and we also enable lighter design in sunroof and WOPR configurations, tailgates and hang on parts including same or mixed materials by also incorporating Sikaflex® and SikaForce® 2C adhesives.

AI: How do the products improve safety?

Moran: The focus is on reducing body structure intrusion into the safety cell (passenger compartment). This is made possible by limiting the collapse of car body structure sections and by limiting the local load on structural components and sheet metal to avoid rupture and collapse. “Crash resistant adhesives” or “toughened adhesives” such as SikaPower® have been developed for, and improve BiW structural adhesive performance of the vehicle.

Drop tower tests on crash rails and real crash tests on components that include SikaPower® have shown that the intrusion during crash events is significantly reduced due to the use of special tougheners built into the performance matrices of these Sika materials. Structural and toughened BiW adhesives transfer crash loads to and through specific target sections with targets of reducing impact forces in the case of crash.

Further safety enhancements are enabled through the use of SikaReinforcer® products; light, structurally engineered molded parts are strategically placed in body sections to prevent total collapse. The parts, composited of plastic and epoxy, or assembled with adhesive, combine with calculated engineering
design and targeted placement in the body, limit buckling of sections. Additional safety applications include innovative headlamp bonding technologies, and sensor potting compounds ensuring functionality of critical systems.

**AI: How can adhesives make vehicles quieter?**

**Moran:** The use of Sika products in combination can help to eliminate up to 3dB of noise from a passenger compartment. In the body shop, the general mechanical properties of adhesives provide a factor 3-5 higher strength compared to classic BiW joining techniques (spot-welding, riveting, etc.)

Our sealing technologies including bulk applied chemistries for anti-flutter applications, which isolate vibration, and our parts technologies including tapes and highly engineered baffles fully seal body cavities; blocking and isolating common noise transmission paths and eliminate the intrusion of the elements throughout the vehicle body structure and into the passenger compartment. Interior products in the passenger compartment that contribute to lower sound levels and add comfort include SikaMelt®, SikaTherm® and SikaSense®. They are used to laminate leather and fabrics to various substrates for the wrapping door panels, dash boards, arm rests, steering wheels, consoles, headliners, visors, and surfacing load floors in those beautiful interiors.

**AI: And greener?**

**Moran:** Our program “More Value Less Impact” outlines our annual sustainability goals. In our development processes we continue to innovate and introduce products with less environmental footprint. Examples include Sika® Hydroprep, our water based family of pre-treatments which eliminate an estimated 200,000 liters of solvent based VOC emissions each year, our patented i-cure technologies which emit less VOC while curing and our SF (Safety First) series of hot melts that are MDI free with no hazard classifications addressing worker safety.

Further, the use of our cold applied SikaPower® body shop adhesives, Sikaflex® and SikaForce® lessen utility costs for heated application, and directly reduce the number of spot welds introducing utility cost savings in ovens and welders. There are exponential benefits when we link the performance attributes of our products to the after application contributions including the use of thinner gauge metals, the joining of families of dissimilar materials/substrates, such as aluminum and CFRP to steel, resulting in finished assembly weight/material savings, less CO₂ generated, and better mileage.

**AI: What is the significance of your new factory in Sao Paulo, Brazil?**

**Moran:** Globalization of the automotive market as a megatrend drives selection of suppliers with global reach to establish local presence. Our investment here offers business advantages in managing shorter supply chains pre and post product, and the ability to plan to customer requirements in short order. The new design center helps customers to meet local specifications unique to the region.

**AI: Please tell us about SikaBaffle®-230.**

**Moran:** GM SikaBaffle®-230 is our latest product within the range of heat expandable tapes, and performs as both a sealant and acoustic tape for the automotive body shop. Ideal to seal small hollow body cavities, SikaBaffle®-230 represents multiple benefits for OEMs such as shorter design time, ease of application and very low investment cost.

A key attribute of this product is its versatility; while it can be used anywhere in the vehicle body, including the wet areas, it shows excellent adhesion to a wide range of steel and aluminum substrates, and thus supports lightweight initiatives. Combined with reduced VOC emissions, SikaBaffle®-230 is the product of choice for sustainable solutions. The product is available globally.

**AI: What other technology can we expect?**

**Moran:** Our future focus is on unique combinations of the best of all worlds in adhesive and sealing applications. Our technologies are in continuous development to address megatrends that drive the industry. Lightweighting is certainly a relevant one. Recent introductions include SikaPower® MBX technology (Mixed Bonding eXcellence) which solves the joining of multiple combinations of materials and addresses Delta/Alpha effects; the differing thermal coefficients of expansion and contraction of mixed materials.

Other focus areas include developing answers to changing production processes including low and high bake temperature technologies which introduce new demands on products to meet the future conditions. Technologies including Sikaflex® Ultra-High Modulus and Ultra-Low Modulus materials will provide maximum strength with engineered flexibilities and consistent performance curves over the extremes in temperature ranges. A new range of 2C products for assembly is on the way, we will soon introduce high-performance additions to our body and cavity acoustics sealing range, as well as new entries in the area of reinforcement.

As the industry evolves so will our solutions. All of our technologies are grounded in our core competency of elastic bonding, and continuous innovation is a constant to surpass the demands of our customers to allow freedom of imagination in their design processes. **AI**
Cybersecurity specialists are finding that there are fundamental differences between protecting vehicles from hackers and computers and mobile devices from attack. The good news is that there is technology that provides greater protection for vehicles than mobile devices and computers.

One of the biggest advantages for the auto industry is that systems are not user changeable, while mobile phones, laptops or servers are. Even over-the-air updates utilize the car manufacturer’s trusted channels. That means that car should always operate according to its factory settings. When hackers attack, they inject malicious messages designed to modify a vehicle’s behavior away from the factory settings. Hackers attack by targeting the car’s externally connected ECUs, like infotainment, telematics, or gateway controllers.

Karamba software “hardens” the car against hackers trying to take control of the car’s safety systems, such as brakes and airbags.

“We give car manufacturers and Tier-1 system developers the tools to seal their code and to stop attackers before they can ever get started,” says Ami Dotan, CEO and co-founder, Karamba Security. Karamba’s autonomous security software is embedded during the ECU software build process as part of the regular development cycle.

Automotive Industries (AI) spoke with Dotan.

AI: Can you describe your approach and how it’s so effective?

Dotan:

Karamba Security’s technology team has worked extensively with industry leaders on similar technologies for hardening endpoints in the computer industry to help prevent malware on laptops, servers and browsers. The effectiveness of this approach was limited by the open and changeable nature of those devices. On the other hand, such hardening technologies are highly suitable for cars, which are not user changeable. Any change to factory settings – unless provided by the car company – is indicative of a hack.

AI: What is Karamba’s cybersecurity solution?

Dotan:

It is a software solution, designed to address the industry’s constraints, and here’s why:

- The car industry cannot accept false positives, as they may create safety issues (i.e. a false alarm may block airbags from deploying in a crash). Karamba’s autonomous security product automatically generates factory settings-based policy, which prevents cyberattacks with zero false positives.

- Unlike PCs, cars are not regularly updated. Even with OTA, the industry doesn’t expect cars to be updated on a daily basis – as are anti-virus solutions – to address newly discovered malware. Karamba’s software doesn’t require any update at all, and it doesn’t need to keep track of new malware signatures.
How Karamba’s Carwall blocks malware.

- Time-to-market is an issue for a tiered industry, such as the automotive sector. Karamba’s software generates the policy automatically and is embedded automatically into the ECU. No developer know-how is required, and there are no production delays.

**AI: What work are you doing with OEMs and Tier-1 suppliers?**

**Dotan:** We can’t disclose the names of the automotive manufacturers and Tier-1s that we are working with. I can only say that the message of prevention with zero false positives is very compelling to them. They usually test the product after it is embedded into their ECU of choice. Then they run thorough tests on the ECUs that are protected by Karamba’s software to ensure that it prevents attacks of many sorts, and that there are zero false positives and zero false negatives.

**Automotive Industries then asked David Barzilai, Executive Chairman and co-founder of Karamba Security, what are the biggest threats facing connected and autonomous vehicles.**

**Barzilai:** Hackers are looking for newly-connected platforms. If they use a car’s points of connectivity to control the vehicle, the biggest threat is loss of control, which can result in loss of lives. In platforms that are regularly updated – like laptops, servers and mobile phones – vendors continuously search for newly-reported malware, neutralize them and send malware remedies to their already deployed cybersecurity solutions. However, the danger is that the relatively infrequent update cycles in the automotive industry may give hackers more time when they start hacking into connected and autonomous cars.

**AI: Why are Karamba’s cybersecurity solutions a good answer to these challenges?**

**Barzilai:** Karamba has taken the approach that the programming of cars is not user changeable. Car software can be changed only by authorized vendors. Should a change to factory settings be introduced to the car by someone, who is not the car’s vendor, then it must be a hacker. Karamba’s software automatically hardens the car’s connected ECUs according to factory settings and prevents the hacker from compromising the ECU to take control of the car.

**AI: Tell us a little about CES 2017 and the technologies Karamba showcased.**

**Barzilai:** The focus of the demo of real-life hacking attempts was to sharply distinguish Karamba’s ECU hardening approach from that of intrusion detection systems that monitor the onboard communication bus (CAN). In particular, we showed how Karamba and FEV eliminate the risks of false positives or false negatives. The response from OEMs and Tier-1s was overwhelmingly positive, and we were booked with back-to-back demos and presentations throughout the show.

There are going to be more and more connected cars on the road.

Navigant Research estimates there will be 188 million connected vehicles with built-in telematics on our roads by 2020; and that completely autonomous cars will account for 15% of all cars shipped globally each year by 2025; and 70% of all shipped cars in 2030.

Gartner predicts that 220 million connected vehicles will be on the roads by 2020.

Whether you go with 188 million or 220 million by 2020, that’s a lot of connected cars driving around. Karamba Security is working in partnership with the industry and public sector to reduce risks and liabilities and foster trust in connected and autonomous vehicles of the future.
Taking the automotive route at CES 2017

By: Clinton Wright

CES 2017 gave car manufacturers a chance to prove that they are ahead of the technology curve.

Staged from January 5-8, CES 2017 hosted more than 3,800 exhibiting companies and attracted over 175,000 delegates from around the world.

Ford used the event to announce that Toyota would be using Ford software to connect smartphones to dashboards and join Ford in promoting the SmartDeviceLink system to other automakers. General Motors CEO Mary Barra used her keynote speech to introduce the 2017 Chevrolet Bolt EV, a fully electric vehicle that can travel over 200 miles on a single charge. It is due to go into production in 2017. “The Bolt EV is driving the rapid pace of self-driving innovations. The panelists agreed that the industry needs to fully solve the convergence of Internet of Things (IoT) and artificial intelligence (AI) if it is to reach the goal of having self-driving cars on the road by 2020.

Nissan chairman and CEO Carlos Ghosn shared the company’s vision for a zero-emission, zero-fatality world. “The destructive triangle of autonomous drive technology, electric vehicles, connected cars and services means we will see more change in the next 10 years than we did in the last 50,” said Ghosn. He announced that the next-generation Nissan Leaf electric vehicle will come with the semi-autonomous ProPilot system, along with the company’s plans to launch its Seamless Autonomous Mobility (SAM) system. Developed from NASA technology, SAM enables a “human in the loop” approach to autonomous driving, which monitors a vehicle’s path from a distance, providing peace of mind to drivers. However, Gill Pratt, CEO of the Toyota Research Institute, said the industry was “not even close” launching fully autonomous Level 5 cars. He added that it “will take decades to have a significant portion of US cars operate at Level 4 autonomy or higher.”

Mitsubishi Electric Automotive America showcased its new generation of FLEXConnect.AI® In-Vehicle Infotainment systems which incorporate a multi-display Android user interface, LTE connectivity with over the air (OTA) update capability and ADAS integration on one platform. “As the automotive industry continues to evolve, innovative relationships are critical to delivering a safer, more connected driver experience,” said Doug Ray, director of Car Multimedia for Mitsubishi Electric Automotive America in a press statement. Built on the latest Android OS, FLEXConnect.AI gives original
equipment manufacturers the power of the Android ecosystem and provides users access to a wide variety of choices. The processor powering the new platform is the Qualcomm® Snapdragon™ 820Am.

Velodyne introduced the VLP-32 sensor platform, which improves performance and range for those seeking the best data for Level 2 through Level 5 self-driving programs. Velodyne sensors provide a 3D model of the world around the vehicle, including calibrated reflectivity data for precise localization, segmentation, and object tracking and classification within the environment. In December 2016, the company announced a ground-breaking design for a solid-state LiDAR sensor that can deliver a subsystem cost of under US$50 when sold in high-volume manufacturing scale. “Our new design approach creates a true solid-state LiDAR sensor, while significantly raising the bar as to what can be expected from LiDAR sensors as far as cost, size, and reliability,” said David Hall, founder and CEO, Velodyne LiDAR.

The technology is expected to speed up the use of LiDAR sensors in multiple industry sectors, including autonomous vehicles, ridesharing, 3D mapping, and drones. LiDAR sensors that leverage this new design will be less expensive, easier to integrate due to their smaller size, and more reliable as a result of fewer moving parts. The technology can also be integrated in Velodyne LiDAR’s existing Puck form factors. Each integrated circuit is less than 4mm square, which just covers George Washington’s nose on the U.S. quarter. According to Dr. Alex Lidow, CEO and co-founder of Efficient Power Conversion Corporation, “As LiDAR technology continues to gain widespread adoption, GaN technology brings higher performance resulting in higher image resolution, all while offering enhanced integration of key functions that ultimately lead to reduced overall cost for LiDAR-based system solutions.”

According to General Motors the Bolt EV will be the first practical rechargeable car for the masses.

Clarion was named a CES 2017 Innovation Awards Honoree for its revolutionary Full Digital Sound (FDS) high-resolution automotive audio system.
Clarion Corporation of America, a leader in automotive infotainment and advanced driver safety and assistance systems, was named a CES 2017 Innovation Awards Honoree for its Full Digital Sound (FDS) high-resolution automotive audio system. Products entered in this prestigious program are judged by a panel of independent industrial designers, engineers and members of the trade media to honor outstanding design and engineering in cutting-edge consumer electronics products across 28 product categories.

Clarion’s Full Digital Sound audio system is the industry’s first in-car audio system to maintain a digital audio signal from the source to the speaker voice coils, resulting in pristine sounding audio with zero loss in quality and no added noise from analog connections. “Clarion has been a leading innovator in the automotive audio and infotainment space for more than 75 years and has been the driving force behind several of the in-car technologies we find standard today,” said Allen H. Gharapetian, Vice President of Marketing and Product Planning at Clarion. “We are honored to be a part of CES year after year and thrilled to be recognized by their world class team for our dedication to advancing the state-of-the-art in in-car entertainment technology.”

Clarion has also been working on mass production of products using technologies that can help acceleration, steering and braking of autonomous vehicles. The company has been working in collaboration with Hitachi Automotive Systems to develop vehicle peripheral perception technologies based on in-vehicle cameras and image processing capabilities which Clarion has developed over the years. These advanced sensor fusion technologies combine cameras with other in-vehicle sensors to enable more accurate peripheral monitoring.

Clarion is also developing an automatic parking function using its Overhead View Monitor and vehicle peripheral view monitoring technology. The size and layout of the parking space is determined using image recognition. If a pedestrian or an inanimate object is detected during automatic parking, automatic braking is employed to pause the vehicle’s movement. This system’s image recognition performance has been enhanced through the use of Clarion’s newly developed high-resolution cameras.

BlackBerry QNX outfitted a Lincoln MKZ to demonstrate a self-driving vehicle. The Lincoln MKZ is much more than a demonstration vehicle — it is an engineering prototype that allows BlackBerry QNX engineers to experiment with and develop new technologies for the autonomous vehicle market, according to the company. QNX Software Systems also launched acoustics software for hands-free communication in 2016. Nearly 20 leading automakers now use QNX acoustics software to enhance the user experience of their vehicles, in products such as Chrysler Uconnect®, Ford SYNC® 3, GM OnStar® and Honda BlueConnect®. On average, QNX® acoustics software is shipped in an automotive system every 2.5 seconds.

“Today’s drivers expect to hear — and to be heard — clearly when they call from their cars. Moreover, the smartphone is driving expectations for better call quality through support for Voice-over-IP calling and Voice-over-LTE (VoLTE) technologies. To meet these expectations in the harsh acoustic environment of the car, automakers rely on QNX Acoustics for Voice, which provides patented algorithms for echo cancellation, noise reduction and other voice-enhancement technologies, and on the expert tuning, testing and software support provided by QNX Software Systems worldwide,” says the company.

Clarion has also been working on mass production of products using technologies that can help acceleration, steering and braking of autonomous vehicles. The company has been working in collaboration with Hitachi Automotive Systems to develop vehicle peripheral perception technologies based on in-vehicle cameras and image processing capabilities which Clarion has developed over the years. These advanced sensor fusion technologies combine cameras with other in-vehicle sensors to enable more accurate peripheral monitoring.

Over 175,000 delegates visited more than 3,800 stands at CES 2017.
Karamba Prevents Automotive Cyberattacks with Zero False Positives

**Autonomous Security**
ECUs protect themselves

**Negligible Performance Impact**
No change to ECU hardware or software

**No Updates Required**
Zero-day protection

**No Developer Intervention**
Automatic hardening process

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Most Innovative Product in the Automotive Industry for 2017
The 2017 Lincoln MKZ comes equipped, from the factory, with all the necessary drive-by-wire capabilities. All of the driving systems (throttle, gearbox, steering and braking) can be completely controlled electronically. By using this capability as a starting point, BlackBerry QNX and its partners are able to focus on adding other self-driving capabilities such as the sensors, route planning, and maneuvering,” says Kerry Johnson, Sr. Product Manager, BlackBerry QNX in his blog.

According to BlackBerry QNX, its goal was to build an autonomous vehicle using commercial embedded processors and safety certified embedded operating system (OS). At the core of the design was QNX’s safety certified OS, which powers all of the intelligent software modules. QNX’s middleware serves to integrate radar, LiDAR sensors, multiple camera inputs and vehicle networking. BlackBerry QNX provided a port of the OpenCV library to help with the vision processing functions delivered by Cognet.

The Corning booth included a breath-taking, glass-enabled concept car that showcased how the company is redefining the automotive experience through thin, tough, and optically advantaged Corning Gorilla Glass and other glass technologies – inside and out.

“We have an opportunity this year to share our evolving Glass Age vision, inspiring consumers, customers, and partners to engage with us and help build the ecosystems for innovative solutions enabled by precision glass that can redefine everyday activities,” said Dr. Jeffrey Evenson, senior vice president and chief strategy officer in a press release. “Simply put, we believe glass components can be as vital to the next 50 years as silicon components have been to the last 50 years”. By using Gorilla instead of conventional glass an automaker removed 12 pounds from the car and significantly lowered its center of gravity, says the company.

Microsoft, NXP Semiconductors, IAV, and auto mobility partners Cubic Telecom, Esri and Swiss Re showcased their collective vision of safe and secure end-to-end mobility through a highly automated driving demonstration and experience. Attendees got a chance to take a test drive in the vehicle to understand how the cloud and artificial intelligence can enable personalized in-car experiences, and how cars can securely “talk” to one another. NXP showcased improved road safety and traffic flow via secure communications between vehicles (V2V) and between vehicles and the surrounding infrastructure (V2I). Use cases included collision warnings, intelligent traffic lights and vulnerable road-user detection at intersections — all based on NXP’s automotive RoadLINK products. NXP cooperates with Delphi and Savari for the onboard and roadside units.

Chip maker ON Semiconductor showcased how effective the implementation of its USB Type-C applications has been. It is the rapidly-emerging default industry standard for wired smart and rapid charging and high-speed data transmission to support applications such as high definition video and augmented and virtual reality. The default USB 3.1 protocol is capable of achieving data rates of up to 10 Gbps, theoretically twice as fast as USB 3.0 – crucial to ensuring the viability of today’s always connected, feature packed, high use portable devices.

At the CES 2017, the company demonstrated how the USB Type-C super speed wireless audio can transfer data of a movie to a phone from a PC with wireless audio playback to a pair of battery powered speakers featuring ON Semiconductor’s PowerBank controller and the highest power density class D power amplifier currently available on the market. A mobile application processor will manage Bluetooth communications, time alignment between the two audio streams and the audio tuning functions.

Israeli firm otonomo is a leading cloud-based security platform which enables car manufacturers, drivers, services and application providers to be a part of a connected ecosystem. It recently raised US$12 million to help start trials with automotive companies, and has since started working with Daimler. “In order for cars to provide the best connected service for drivers, car manufacturers need a platform they trust to share and negotiate data between them and application providers while meeting different data and privacy regulations that respect and accommodate drivers’ privacy,” says Ben Volkow, CEO and Co-Founder of otonomo.

Delta ID, a leader in consumer-grade iris scanning technology, introduced its iris scanning technology for automotive. Delta ID and Gentex have entered into a strategic partnership in which Gentex’s rearview mirrors will integrate Delta ID’s Active IRIS® technology. The companies believe the iris scanner is the right modality for in-car biometric identification and authentication, and rearview mirrors are the right place to place the scanner. “Driver identification will play a critical role in car sharing, in-car payment and the autonomous driving space,” said Steve Downing, Senior Vice President at Gentex Corporation.

In another security-related development Irdeto, a world leader in digital platform security, announced a partnership with Tata Elxis, a key global player in the automotive ecosystem, to provide automakers with secure in-car display systems for automobiles. Irdeto has combined its Cloakware for Automotive security solution with Tata Elxis’ award-winning design and engineering expertise to offer secure user interface and connected cockpit solutions to automotive clients around the world. The Tata Elxis and Irdeto solution works with Vehicle-to-X (V2X), connected cars and Advanced Driver Assistance Systems (ADAS) technologies. Tata Elxis and Irdeto are also addressing security issues related to mobile companion applications. The partnership secures the application, any data generated by the app and the communication between the vehicle and mobile phone using the Remote Vehicle Interaction (RVI) specification.

CES 2018 will be hosted in Las Vegas from January 9-12.
CONNECTED VEHICLES

Products and solutions for the autonomous car

IN-CAR NAVIGATION

eCALL AND TELEMATICS

AUTONOMOUS DRIVING

STOLEN VEHICLE RECOVERY

ROAD PRICING

CONNECTED CAR (ENTERTAINMENT)