Our customers operate all over the world and so do we. We are very experienced in successfully managing complex international projects across geographic and cultural borders. Page 42
Automotive IC solutions.

Position & Motion Detection

ASICs
- Focus on the individual needs of our customers
- Enabling technology and best-in-class IP for ASIC design offer highest performance on smallest silicon area
- Safe product launch and process corners to ensure highest quality standards

Hall-based Magnetic Encoders
- True automotive robustness proven by overvoltage protection, reverse polarity and internal short circuit monitoring
- Excellent insensitivity to external magnetic stray fields, zero calibration costs
- Patented solution for best intrinsic accuracy without calibration or temperature compensation

In-vehicle Network

Battery Management
- Unique circuit architecture allows offset-free voltage and current measurement for battery management in conventional, electric, and hybrid electric vehicles
- Cost-effective single-chip battery sensor solution for low-side and high-side systems
- Flexible, individually scalable approach for ultimate precise battery control systems

FlexRay™
- Highest network reliability on the physical layer with best-in-class output differential voltage levels
- World's first bit-stapler embedded in the FlexRay Actire Star device for next-generation network topologies
- High-end diagnostic mechanisms for reliable failure detection at the FlexRay wiring level

System Basis Chips
- Integration of application-specific features for actuator and sensor systems
- Reduces size and increases reliability
- Highest flexibility includes factory customization of device for microcontroller-less sensor & actuator modes
- Extremly fast development of device derivatives offer absolute time-to-market advantages

3D Hall

First true 3-axis differential measurement of a magnetic field for absolute linear, off/on-axis and 3-dimensional tilt sensor applications
- Absolute linear to ±40mm
- 3D points linearization feature
- Re-configurable EEPROM
- High voltage diagnostic features

Best insensitivity to external stray fields

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Imagine a world where the city is developed around the needs of people, and cars have to be designed to fit in – rather than one where whole neighborhoods are either flattened or isolated by freeways and flyovers. Well, it could be coming to a metro near you soon.

That is one of the predictions from the KPMG Global Automotive Executive Survey 2011, which distils the views of 200 senior executives from top automotive companies around the world. Three-quarters of those interviewed believe that vehicle design will be driven by urban planning – rather than the other way round. Evidence of this trend lies in the declining number of parking spaces, restricted entry, and the “proliferation” of car-free streets and neighborhoods. The city of Masdar in the United Arab Emirates takes the concept to its logical and technological conclusion, with electric-only vehicles confined to the underground.

This “game changer” will see manufacturers producing single-purpose vehicles, while motorists will still want a commuter and a 4x4 for the odd weekend in the bush. This has implications not just for branding and marketing, but also for car ownership. It is impractical for most people to possess a different car for every situation, so this need may ultimately have to be addressed by increased car sharing or other integrated multi-platform mobility solutions, says the study.

However, only nine per cent of the companies polled have included mobility solutions in their strategies. This raises the specter of the most feared competitor of all – the one that does not yet exist. Daimler, Peugeot, and BMW are named in the survey as being in the lead in the race to remodel their businesses around the concept of mobility solutions.

As for new faces on the block: “new technology and changing business models are bringing fresh entrants into the sector, resulting in greater convergence with industries such as energy, electronics and IT, with borders becoming increasingly blurred,” says Dieter Becker, KPMG’s Global Head of Automotive. Managing such interdependencies is likely to be a key success factor in the future.

Another challenge for OEMs is looming over-capacity, with China and India predicted to be “overbuilt” within five years. This at a time where export markets are shrinking as manufacturers establish plants in what were previously export-only destinations. The world’s new vehicle market will reach a point of saturation.

KPMG says the combination of these trends has “significant implications” for the automotive value chain. Half of those participating in the survey believe that, with strategic partnering so key to rapid technological innovation, the industry will see a value chain evolution with a new dynamic taking shape between original equipment manufacturers (OEMs), suppliers, new entrants and niche players. “Alliances are a good way to get access to specialized technological know-how in addition to sharing risk and cost,” says Becker. “This is particularly true with hybrid and electric powertrain technology. What is worth noting is that these joint activities may blur the differences between suppliers and manufacturers,” he says.

As always, the industry is adapting. The Thomson Reuters Intellectual Property Solutions Group’s 2010 Innovation Report reports that the Automotive industry moved up to the second position in 2010 from fourth in 2009 based on overall volume of patent activity, surpassing the Telecommunications and Semiconductors industries. It ranks in second position after Computer & Peripherals.

Of the twelve subsectors that comprise the automotive industry in the survey, Alternative Powered Vehicles drives the industry with 16% of all patent activity. All top three companies leading in the subsector of Alternative Powered Vehicles are Japanese. The number one position is held by Toyota, followed by Nissan and Honda. When it comes to innovation with Alternative Powered Vehicles, Toyota filed 2,179 patents in 2010, more than three times the amount of second-ranked Nissan, with 639 patents.

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AUTOMOTIVE INDUSTRIES and Rutgers, the State University of New Jersey, have put together a digital library of back issues of AI from the early 1900’s (high res and low res) of approximately 230,000 images of the print publication. This archive, which documents the birth of the auto industry to the present, is available to AI subscribers.

Go to AI’s homepage www.ai.com and click on the “AI Library” link or visit www.ai-online.com/100YearLibrary

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allGeicoProject is the result of Geico’s strategy of pursuing a customer-centric approach. It comprises an international network of direct branches and strategic partnerships aimed at assisting our customers through all phases of the project.

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Original coating plants for the vehicle industry
The long-term search for a gasoline alternative that meets the requirements for renewable fuel with 50% or greater reduction in total greenhouse emissions (vs. gasoline) from its production and use is now focused on biobutanol. Being readied for production by a BP/DuPont team, biobutanol both fills the technical requirements for a gasoline replacement and appears to have good economics without need for government subsidies (reported to be $6 billion/year currently for U.S. ethanol).

An industry source says that Butamax (BP/DuPont) is expected to have first production under way by the beginning of 2012. Presumably EPA’s earlier permit for 16% biobutanol in gasoline remains valid, but a new permit for use above the 16% level would be needed.

In effect, concern over corn ethanol’s use of valuable food crop, along with land, water and fertilizer, is close to a solution. Economic production systems for biobutanol are understood to be well advanced. Technical advantages of biobutanol over ethanol include a higher energy content giving close to the same mpg vehicle performance as gasoline. Another is that biobutanol can be mixed with gasoline in a pipeline, and does not have to be transported separately as required for corn ethanol (to avoid ethanol pick up of water in pipelines). Lower vapor pressure permits biobutanol to be blended with gasoline that has higher vapor pressure than that required for blending with ethanol. This, in turn, permits higher gasoline yield per barrel in refining.

The BP/DuPont team reported three years ago that its vehicle testing indicated that 16% butanol in gasoline meets EPA permit requirements. Higher than 16% biobutanol blending is, however, said to be entirely possible without changes to vehicle systems or fueling station tanks and pumps. This solves fuel retailers’ tank and pump problems and eliminates motorist confusion with pump labeling.

Another biobutanol advance was recently announced by Biology Professor James Liao at DOE’s Bio Energy Science Center, UCLA, who claims that the fuel can be produced directly from cellulose by combining biomass utilization with fermentation of sugars in a single step with clostridium.

Looking ahead, it appears to be entirely possible that biobutanol could become a major component of spark ignition engine fuel at less cost than today’s gasoline. Perhaps new, low cost methods for obtaining diesel fuel from algae and other bio sources will be the other part of a 1-2 punch for replacement of imported petroleum motor fuel. An interesting question will be how gasoline/biobutanol blends are marketed? Will a new name be created with consumer appeal?
Harnessing the power of the age of the app in the auto industry

By: Andrew Jackson, Datamonitor automotive analyst

With the rise of smartphones and apps, the automotive industry now finds itself at the threshold of the never-ending trajectory of media-storage and technology.

When the iPhone was launched in 2007, Apple single-handedly changed the way in which people use smartphones. By 2010, their market share was approximately 60%, with nearly 40 million units sold annually worldwide. Instrumental to the iPhone’s (and now the phone’s other competitors’) meteoric rise in popularity is the creation of ‘apps’ (applications) which allow the user to infinitely tailor the functionality of their phone. More than ten billion of these applications have been bought and downloaded since 2007 for Apple’s iPhones alone.

As the auto industry has historically been highly adaptable to modern trends, it is inevitable that apps and smartphone connectivity will become a prerequisite. The key question is how manufacturers will harness the power of such limitless flexibility in software design.

For the smartphone user, many manufacturers are developing or releasing applications that allow the user to interact with their vehicles like never before. Toyota’s “Entune” is one of several examples of how users are able to manipulate media in their car via an app on their phone. Other potential app functions include the monitoring of telemetry, which is ordinarily stored by their vehicle’s onboard computers, e.g. charging progress for plug-in hybrids, or service diagnostics which indicates if a vehicle requires maintenance.

Safety feature apps are also on the horizon. Some manufacturers are developing apps that would enable keyless entry, remote starting and breakdown recovery, much in the same way that Onstar has provided, except that the functions would be available on the users’ smartphone.

A number of manufacturers have taken the first steps in this area, with Fiat, Ford, GM, Kia and Toyota representing the organic evolution of the market. Their systems are based on onboard, stand-alone processing units that feature a multitude of functions such as email, navigation, internet radio, diagnostic tools and music synchronisation. From a premium segment perspective, manufacturers such as Audi and Mercedes-Benz are experimenting with Long Term Evolution (LTE or 4G in short) technology to enable internet-based infotainment, in-car WiFi hot-spotting and potentially vehicle-to-vehicle networking, much like Audi Connect.

Both systems – Smartphone and onboard based – have their advantages. Smartphones offer the faster route to market, as the software architecture is usually based upon existing platforms provided by companies such as Microsoft or Intel and can be run in a stand-alone configuration. The latter is still in testing, and the carrier network is yet to be available on the mass market. Some products are only just beginning to surface on flagship and “ halo” cars.

However, the key benefit of this system is that it would allow cloud-based computing. This means that software updates are automatically streamed to the vehicle thanks to the additional bandwidth of an LTE network. Critically, this represents a solution to the potential Achilles’ heel of the “onboard” approach: namely software compatibility or version obsolescence.

A recent example of this weakness was when Apple released iOS 4 in 2010, which was found to be incompatible with Ford’s SYNC software (which was compatible with the previous version of iPhone software). In some cases, the newer version corrupted the in-car software to an extent that required dealer attention.

Furthermore, the average age of a car in many developed country’s car parks is approximately seven years, but mobile phone technologies are radically overhauled on an annual basis. Therefore, unless the software update policies of vehicle manufacturers are synchronised with the mobile technology platform, today’s mobile technology will rapidly fall into obsolescence tomorrow.

The future has to lie beyond the in-car software/hardware approach. To be able to provide the functionality and the stability required for the proliferating smartphone industry, software architecture cannot realistically be contained within the vehicle unless a sustainable software updating policy is employed to mitigate incompatibility. LTE technology offers one such solution with the vehicle acting as a hub, ensuring that operating software updates are both scheduled and standardised.

Having such a network would allow vehicle manufacturers to concentrate on the generation of new revenue streams through the provision of their own “app stores” as opposed to fighting to keep up in the arms race of compatible in-car hardware/software.

Admittedly, this is venturing into the realm of speculation, but it represents the opportunity that vehicle manufacturers are currently presented. This technology is only in its infancy, but is fast becoming a reality, and the door is open to a world where the functionality of in-car infotainment systems is endless. All that is required is for manufacturers to take the leap - and judging by the level of activity in the market, it would seem that many are preparing to do just that.

ABOUT ANDREW JACKSON: With a research background spanning seven years, Andrew has worked in the scientific, chemical and automotive research sectors. Andrew has significant industry knowledge and has an understanding of the automotive sector from all aspects, including the business, engineering and consumer perspectives. He holds a master’s degree in chemistry and a doctorate in materials chemistry.

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Battery and hybrid-powered vehicles are making inroads into the markets faster than many predicted, with General Motors being one of the first off the start line following the launch of its Chevrolet Volt.

“Skeptics have suggested it would probably be many years before lithium-ion batteries with significantly lower cost and higher capability are available, potentially announcement today demonstrates that major improvements are already on the horizon,” said Lauckner. Other investors in Envia are Asahi Kasei and Asahi Glass, Bay Partners, Redpoint and Panagea Ventures. In a separate agreement, GM secured the right to use Envia’s advanced cathode material for future GM electrically driven vehicles.

“With our high-capacity manganese rich cathode material, Envia is addressing two key issues in the next-generation battery cells – higher capability and lower cost,” said Atul Kapadia, founding investor, chairman and CEO of Envia Systems.

“Our test results on small-format cells show that Envia’s high-capacity composite cathode material can increase the energy density of lithium-ion cells by up to one-third, at an equivalent level of reliability, safety and durability,” said Micky Bly, GM executive director for Electrical and Battery Systems. “We estimate this improvement in cell energy density and less expensive material will drive a substantial reduction in cell cost, leading to lower cost battery packs like the one in the Chevy Volt,” he said.

Looking at the end of the life-cycle, General Motors has also announced that it will work with the ABB Group to develop pilot projects for re-using the batteries from the Chevrolet Volt electric vehicle. The two companies are collaborating to determine how the Volt’s 16-kWh lithium-ion batteries can be used to provide stationary electric grid storage.

"But we're looking beyond the Volt to other electrification technologies that can help customers save money by reducing fuel consumption," said Jon Lauckner, president of GM Ventures. He was commenting on the announcement that General Motors Ventures was investing US$7-million in Newark, Calif.-based Envia Systems to provide GM’s battery engineering team with access to advanced lithium-ion cathode technology that delivers higher cell energy density and lower cost. "In fact, our limiting sales of electric vehicles for the foreseeable future," said Jon Lauckner, president of GM Ventures.
systems once the batteries have fulfilled their usefulness in customers' vehicles. "The Volt's battery will have significant capacity to store electrical energy, even after its automotive life," said Bly. "That's why we're joining forces with ABB to find ways to enable the Volt batteries to provide environmental benefits that stretch far beyond the highway. The Volt battery has an eight year warranty covering all 161 battery components, 95% of which are designed and engineered by GM.

Automotive Industries (AI) asked Bly whether the company was prepared for the reception that the motoring public has given the Volt.

Bly: We're gratified to see the great public reaction to the Volt. We're still in the initial launch phase of the vehicle but our customers who have taken delivery of their Volt are telling us the Volt has surpassed their expectations. The entire Volt engineering team continues to work hard to make sure we're delivering the best vehicle with the highest quality to our customers every day.

AI: Is the Volt just another model in the GM garage, or does it signify something bigger within the company in terms of your future direction?

Bly: Can tell you that the entire GM team is working hard to develop new opportunities to expand the reach of the Volt's innovative propulsion technology. But we're looking beyond the Volt to other electrification technologies that can help customers save money by reducing fuel consumption. We recently introduced our eAssist "light electrification" technology that will debut on the 2012 Buick LaCrosse and Buick Regal later this year—this technology uses electrification to provide start-stop functionality and electric boost capability to provide customers with world-class fuel economy of up to 37 MPG highway. We've also announced our commitment to studying full battery electric vehicles by launching demonstration fleets in Korea, Germany and China. GM is committed to electrification in a big way and we're going to lead in this technology going forward.

AI: What is expected of the supply chain to support this?

Bly: There's no doubt our supply chain has had to diversify, just like us. The technologies we're looking at require some 'out of the box' thinking and I am happy to say our suppliers have been strong partners along the way. We expect that we'll continue to forge strong bonds with our suppliers to make sure we're getting the best technologies at reasonable costs that allow us to continue to design, build and sell the best vehicles in the world.

AI: Hybrid and electric vehicles have opened the door to a number of suppliers which traditionally have not been part of the GM garage, or does it signify something bigger within the company in terms of your future direction? 

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“We expect to see major growth in the adoption of all forms of electrification going forward.”

of the motor industry. What challenges has this created, and how have you solved them?

Bly: It’s an interesting question. When we began the process of developing the Volt’s battery system it required us to look way beyond our traditional supply base. We held a competition of sorts to determine who had the best technology. We settled on LG Chem and I’ll tell you that going into this we had no idea how we were going to produce a cell that would meet the traditional automotive quality standards. Thanks to the hard work of the LG Chem and GM engineering teams we were able to develop the technology and it has exceeded all of our internal targets for quality and durability. That’s probably the biggest challenge we faced and overcame during the development of the Volt.

AI: Do you see more non-traditional suppliers entering the motor industry?

Bly: I do. Our partnership with start-up companies is a clear sign of how we’re looking outside of our traditional supply base to find ways to accelerate our technology deployment. We’re being aggressive in looking for new ways to adopt cutting edge technologies at reduced costs that will make our vehicles the best in the world.

AI: What will the major growth and demand areas within your sphere of business be?

Bly: For my team, we’re focused on expanding the deployment of electrification technologies. We expect to see major growth in the adoption of all forms of electrification going forward, from start-stop systems to hydrogen fuel cell vehicles.

GM’s Volt - how it works

GM’s Volt system uses power stored in the battery to provide electrical boost in various driving scenarios, optimizing engine and transmission operation, according to the company.

“The battery system is designed to provide power assistance to the internal combustion engine, rather than store energy for all-electric propulsion,” says Steve Poulos, global chief engineer of the eAssist system. “It’s really an extension of the conventional internal combustion engine, not a replacement for it.”

The eAssist system’s 150V air-cooled lithium-ion battery supports a 2.4L Ecotec four-cylinder engine with approximately 11 kW (15 hp) of electric power assist during heavy acceleration and 15 kW of regenerative braking power. While in fuel shut-off mode, the induction motor-generator unit continues spinning along with the engine to provide immediate and smooth take-off power when the driver presses on the accelerator.

Then, as the vehicle comes to a stop, the induction motor-generator unit spins the engine, bringing it to a smooth stop – properly positioned for a smooth restart. An auxiliary, electric-driven transmission oil pump keeps the transmission primed and the fluid flowing when the engine shuts down at a stop.

The eAssist power pack consists of a lithium-ion battery pack, an integrated power inverter and 12V power supply. It is located in a compartment between the rear seat and trunk; and weighs about 65 pounds (29 kg). Trunk space is slightly reduced when compared with 2011 models with the four-cylinder/six-speed powertrain, but still offers 11.1 cubic feet (314 liters) of storage. An electric fan cools the power pack, drawing air from a vent located in the package tray, behind the rear seat.

An electric induction motor-generator is mounted to the engine in place of the alternator to provide both motor assist and electric-generating functions through a unique engine belt-drive system. The induction motor-generator is a high-performance, compact induction motor that is liquid-cooled for increased performance and efficiency.

Power is transferred to the wheels through a “next-generation” six-speed automatic powertrain.
industries

Fallbrook - Keeping accessories operating at optimum speed

By: Steve Barclay

When San Diego-based Fallbrook Technologies Inc. launched its NuVinci® DeltaSeries™ line of continuously variable planetary or CVP transmissions, it signaled a broader entry into the transportation industry. The company is already known for the use of its NuVinci CVP technology in bicycle transmissions. NuVinci technology, however, can be used to improve the performance and flexibility of transmissions for powered vehicles and equipment, and the NuVinci DeltaSeries products are the first of their kind to increase fuel efficiency and vehicle performance with the same system.

Recent tests have shown that Fallbrook’s NuVinci DeltaSeries CVP coupled with a 210 cc air conditioning compressor, replaced a 300cc unit inside a Chengdu Ltd bus, resulting in annual fuel savings of up to US$1,500.

“Our product line enables vehicle accessories to run more efficiently by continuously optimizing their speed, regardless of what the engine is doing,” said Rob Smithson, CTO and vice president of Fallbrook. “Historically, these belt-driven accessories have been connected directly to the engine, so their speeds are tied to engine RPM. They have to be sized to meet worst case load conditions at low engine speeds, such as idle, which results in more parasitic losses than necessary. The NuVinci DeltaSeries accessory drive does away with this issue.”

Toobtainmore-in-depthinformation about the NuVinci DeltaSeries, Automotive Industries interviewed William G. Klehm: III, chairman of the board, president and CEO of Fallbrook Technologies Inc and asked him what makes the NuVinci® DeltaSeries™ unique compared to other CVPs?

Klehm: The NuVinci CVP offers a wide range of advantages over conventional transmissions. These advantages include lower manufacturing costs, stable and predictable control characteristics, compact, flexible packaging options, and the ability to accept multiple inputs while varying speed and torque.

At: Can you offer some specific examples of how the NuVinci DeltaSeries product lines will add value?

Klehm: The NuVinci DeltaSeries enables automotive accessories to operate at their optimum speed regardless of engine speeds for increased performance and fuel savings. So for instance, an air conditioning compressor can cool the car better on a hot day while stuck in traffic by running faster at low engine speeds, and the same compressor can be slowed down when less cooling is needed at higher engine speeds for improved fuel economy. Similarly, an alternator can achieve rated output power with the engine at idle. An engine crankshaft-mounted NuVinci CVP has the ability to change accessory loads and outputs instantaneously, providing accessory performance or economy on demand. Doing so optimizes accessory performance, improves fuel economy and allows for the right-sizing of components to reduce packaging and improve performance.

At: CVTs have been around for a long time. Why have they not become commonplace?

Klehm: The use of CVTs did not become widespread due to multiple problems including scalability challenges, questionable reliability and durability, high cost, weight, unappealing packaging, and other factors. Despite some obvious drawbacks, some manufacturers such as Ford, Nissan, Honda and Audi have implemented limited production with prior CVT technology because the market need was so great. However, with the development of the NuVinci CVP, enough of the technical roadblocks have been eliminated to clear the way for a wide range of CVP applications for which markets are ready and waiting.

At: Are there any design changes that automotive manufacturers must undertake to employ the NuVinci DeltaSeries line?

Klehm: Very little if any. The product’s highly flexible packaging (in-line or concentric input/output shafts) enables use of existing accessory beltlines in most cases, without the need for a dual-belt system. And their stable, predictable shift characteristics ease implementation of simple, yet innovative control, making the presence of the CVP completely transparent to the end customer.

At: What materials are used to manufacture a NuVinci CVP?

Klehm: Nothing unusual. No rare Earth elements are used to manufacture the NuVinci CVP. It is a compact, durable and low-cost offering using readily available materials.

At: Why is the technology named NuVinci?

Klehm: The name represents a "tip of the hat" to Leonardo da Vinci who, over 500 years ago, sketched what is considered to be the first concept of a continuously variable transmission.

“The NuVinci DeltaSeries enables automotive accessories to operate at their optimum speed regardless of engine speeds for increased performance and fuel savings.”

Fallbrook Technologies’ NuVinci Delta Series’ engine crankshaft.

Fallbrook Technologies’ NuVinci Delta Series’ alternator.
Extensive testing of the thousands of components that are combined to build a vehicle is needed to ensure safety of the occupants, and to protect the brand. A group which has seen the sophistication and complexity of vehicles increase exponentially over the past 60 years is London-listed Intertek, one of the world’s leading suppliers of quality and safety services. Intertek PTL is the automotive Division of Intertek. Intertek’s automotive testing facilities provide testing services to the automotive, fuel, lubricant and industrial industries. Intertek tests for engine endurance, durability and emissions. It also offers automatic transmission and specialty fluid tests, metrology services, engine deposit and wear characterization services and analytical bench laboratory testing.

Other testing services for the automotive industry include airbag testing, automotive plastics and polymers testing, audio and speaker testing, electrical and electronics testing, electric vehicle and components testing, EMC testing for automotive equipment, engine testing and qualification, engine research and development, materials testing, lighting and photometric testing, lubricant and gear oil qualification, vehicle fuel system testing, and management systems auditing and certification.

More recently, the group has introduced systems to measure performance and efficiency within the manufacturing and logistics industry, and is focusing more on increasing the value of client products and brands. It has a worldwide network of over 26,000 employees in 1,000 laboratories, offering analytical testing services ranging from advanced research and development projects to routine quality tests. Intertek Plastics Technology Laboratories is a one-stop resource for testing and inspection for plastics, elastomers, composites and film materials for every industry and application. Intertek in Pittsfield, Massachusetts was recently awarded the Nadcap accreditation for AC7122/1.

The award has opened up new markets for testing non-metallic and class A composite materials for the global aerospace and automotive industries. Intertek is also accredited by AGLA (American Association for Laboratory Accreditation) to ISO/IEC 17025:05, for over 160 tests. Intertek clients include almost all of the Fortune 500 leaders in the plastics industry.

Automotive Industries (AI) spoke to R. James Galipeau, general manager of Intertek PTL and asked him what the Nadcap accreditation means to Intertek.

Galipeau: Nadcap accreditation is all about instilling confidence in Intertek’s product. We offer test data used in specification testing, quality control, and design aspects of composite products. Nadcap accreditation assures customers that Intertek has the competence and expertise to provide test data which has been developed for the stringent requirements of the aerospace, automotive and defense industries as outlined in AC7122/1.

AI: Tell us about how Intertek PTL went about acquiring this accreditation.

Galipeau: We were already ISO 17025 accredited, so we had a solid quality system in place. In order to achieve Nadcap accreditation, Intertek added capabilities to address some of the more stringent requirements for mechanical testing required by composites test methods, such as fixture alignment requirements of ASTM D3039 on tensile testing, amongst others. Once we had the details sorted out, we performed comparison testing to determine how our data compared to others in the industry. When we were satisfied that we were producing comparable data, we scheduled the Nadcap audit.

AI: What is the future of composite materials in the automotive industry and what are the challenges associated with the use of high end materials such as carbon fiber composites?

Galipeau: Composites are an excellent replacement for existing materials because they reduce the overall weight of the vehicle. This reduces energy use and thus reduces the impact of the vehicle on the environment.

As the use of composites expands from primarily exterior applications to interior and structural applications, the types of composite materials used will increase. This is critical to the development of electric vehicles and the associated material selection considerations.

By: Steve Barclay
**Sensing the future**

By: Alan Tran

“Virtual” sensors are now helping improve the performance of vehicles. Dubbed “sensor fusion” by Swedish firm, NIRA Dynamics, the system analyses data from a number of sensors on a vehicle to compute new, virtual sensor signals.

The algorithms developed by NIRA Dynamics utilize sensors for wheel speed (for the ABS), yaw and/or roll rate gyros, accelerometers, GPS, and various engine and power train related signals. These signals are fed into a sensor integration unit, which merges the information from the different sensors and allows the computation of the virtual sensor signals. These, in turn, are used as inputs to various systems including anti-spin and adaptive cruise control systems, or in some Human/Machine Interface (HMI), for example a display on the dashboard.

One of company’s leading ranges is the NIRA Dynamics’ tire pressure monitoring system (TPMS) available. The system alerts the driver if one or more of the tires is under-inflated long before the tire breaks down. TPi is very cost effective and easy to integrate into different electronic stability control systems (ESPs) and other types of hardware. TPi is already active in over one million vehicles. The system has shown to be very robust, with no customer complaints.

Recent tests in Southern Spain have shown that the latest software from NIRA Dynamics is fully compliant with the new EU regulations (ECE-R 64) released in 2009. The regulations state among others that TPMS will be compulsory for all new cars by November 2012.

NIRA Dynamics’ product portfolio has recently been expanded with a data logger box, aimed at OEM’s development units. NIRA has started field tests with the new box which has interfaces to FlexRay, CAN, GPS etc. With the new box, data can be logged onto a small SD-Card and the whole unit can easily be fitted into a vehicle’s glove compartment.

In January this year, NIRA Dynamics appointed a new chief executive officer, Dr. Predrag Pucar. Automotive Industries (AI) caught up with Dr. Pucar and asked him a few questions. AI: Tell us about your work with Linköpings University.

**Pucar:** We always have at least one project running together with Linköpings University. I graduated, and obtained my PhD from the university, which makes contacts a lot easier. Right now, we are looking at the estimation of parameters connected to vehicle dynamics. Detection of changes in such parameters could be used for the preparation of other systems in a vehicle, for instance, the automatic cruise control and electronic stability programme.

AI: What are some of the breakthroughs in sensor technology that you can share with us?

**Pucar:** Our core expertise at NIRA is the creation of virtual signals via sensor fusion and signal processing. One way of using sensor fusion is by utilizing existing information and our knowledge of dependencies in the system to bring about intelligent conclusions. The other application is to use low performance sensors and use sensor fusion to enhance their performance.

AI: What potential do you see for your indirect tire pressure monitoring system with new EU regulations?

**Pucar:** It is already implemented in over one million vehicles with the Volkswagen Group including Audi, Seat and VW. We recently upgraded the TPi – it is fully compliant with the ECE-R 64 requirements. It was tested in February in Southern Spain, where we drove nearly 100 000 km and TPi worked beyond expectations.

AI: You won the 2008 European Automotive Chassis Product of the Year Award for TPi. What gives TPi an edge over other similar products?

**Pucar:** Our major advantage is the price. For OEMs, we offer the most cost effective system, which is not only robust, it also fulfills all legal and customer requirements. For customers, there is no fuss with maintenance, sensors not working, and expensive workshop bills for something that should simply work. The environmental footprint of TPi is zero compared to the thousands of tons of toxic and electronic waste caused by sensor-based TPMS and their batteries.

AI: Audi has introduced TPi in nearly all of its vehicles. Which other OEMs use TPi?

**Pucar:** So far, only OEMs within the Volkswagen Group use TPi in their vehicles. One of my main goals this year is to win at least one contract for a pre-series development that will lead to a series production contract after evaluation by the OEM.

AI: What is your mandate after taking over as CEO of NIRA Dynamics? Tell us a little about your vision for the company.

**Pucar:** My mandate is to develop the company further. We currently have one product that is a hit and so far, OEMs within the VW group have adopted it. My mission is to develop NIRA Dynamics over the next three to five years, to obtain customers for TPi outside the VW Group and to have at least one other top-selling product, with one more in an early concept phase.

I believe that customer diversification of TPi will be straightforward. The challenge is to find another best selling product. We are currently working together with Linköping University, and we will also work together with the OEMs within the VW Group to find problems to solve the NIRA way.

Cooperation with other companies to develop innovations in the car industry is another source of inspiration. We have initial contacts with several other firms, but we can discuss this in a year or two. Right now it is too early and sensitive to share with the public.

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German electric power and natural gas public utility RWE is gearing up for the electric vehicle challenge. According to Pike Research, the increasing popularity of electric vehicles (EVs) will require the roll-out of a new infrastructure for charging access at home, at work, and at public locations. “By 2015, access to vehicle charging will be available at nearly one million charging points in the United States. Vehicles in the US will be primarily charged at home as early adopters will prefer the convenience, while in the rest of the world public charging will play a more central role due to reduced access to convenient home charging. The Asia Pacific region will lead global EV charging equipment sales due to strong government incentives and directives. Bi-directional smart vehicle-to-grid charging will be slow to take off and will be limited to fleet applications through 2015,” says a Pike Research study which came out in 2010.

Daimler AG and RWE launched e-Mobility Berlin – the world’s largest joint project for environmentally friendly electric vehicles in the German city of Berlin. Daimler provided more than 100 electric cars from Mercedes-Benz, while RWE handled the development, installation and operation of the charging infrastructure. Payment was carried out through the exchange of data between a special in-car communication system and the intelligent charging point. The e-Mobility project was supported by the German Federal government. "With our capital and our know-how as Germany’s largest power and gas utility, we are able to meet this demand. By: Jon Knox

Carolin Reichert, head of electro-mobility, RWE.

The charging points were installed at the customer’s home, at the workplace and in public parking areas. Business-to-business partners such as shopping centers, car park operators and fleet customers can also be connected into the infrastructure. “The accounting system should be as simple and convenient as when using one’s mobile phone,” he added.

According to Pike Research utilities will have to prepare for the additional load on the grid by tracking vehicles sales and creating new consumer billing programs. Charging equipment sales will initially be driven by government funding of public stations, says market intelligence firm Cleantech. Pike Research estimates that at a total of 4.7 million such charging points will be installed worldwide from 2010 to 2015. “The success of hybrid vehicles in the 2000s gave drivers a taste for propulsion by electric power; and governments around the world are now highly focused on creating the charging infrastructure to support the arrival of EVs in significant numbers,” said John Gartner, senior analyst at Pike Research.

He predicted that by 2015 more than 3.1 million EVs, including plug-in hybrids and all-electric vehicles, would be sold worldwide. RWE says it has always tried to emphasize the importance of greener technologies. In 2008 the company stepped up its commitment to power generation from renewable energies. The skill resources and activities including those in Germany, France, Spain and Great Britain, which were previously pooled in various group companies, were merged in the newly created company RWE Innogy, which is headquartered in Essen.

The company was launched with 600 employees and a generation capacity of 1,500 MW. Automotive Industries (AI) asked Carolin Reichert, head of electro-mobility, RWE Germany, to tell us how the e-Mobility project in Berlin is doing – how has it grown since its inception in 2008.

Reichert: Our pilot project which we ran together with the municipality of Berlin and Daimler as our OEM partner has been a huge success. In actual fact, we installed and operate more than 200 publicly accessible charging points in the center of Berlin, and we also supplied our domestic infrastructure to pilot drivers of the Smart electric vehicle. The attendees are completely satisfied with the driving behavior of the EV, and they really like the ease of charging of our infrastructure. We have also gained extensive experience in installing public and private charging points, and familiarized ourselves with the still very complex permission process in installing street furniture. The feedback from our customers in the pilot project and the experience we have gained in the course of the project will help us to remain the market leader in Europe for charging systems.

AI: What insights have you have gained from this project, and how has it has helped to contribute and shape the RWE business model, R & D and current strategy?

Reichert: With more than 200 public charging points in Berlin at present, we are currently the only provider offering a comprehensive charging grid in a European metropolitan area. The customer pays a monthly fee of 9,99 Euro, which gives him or her access to all public charging stations at any time. The amount of energy consumption is paid by kWh.

In our experience, this subscription model is an ideal fit for the demands of the end customer (both private customers and companies). On the other hand, we have also discovered that especially in inner city areas and at ultra-fast charging stations - the demand for direct payment systems, such as systems using credit cards or Smartphones, is growing fast. Our infrastructure is also able to meet this demand.

The feedback from our customers in the pilot project and the experience we have gained in the course of the project will help us to remain the market leader in Europe for charging systems.

This expertise in establishing such business models is one of the services we now successfully offer to our infrastructure clients on an international basis, such as local authorities and local utilities. In our opinion it is a real differentiation factor to sell products and services which we are using in our own projects.

AI: How do you see this challenging new technology sector and the subsequent charging technologies required developing over the coming years?

Reichert: Almost all the major OEMs have realized that the challenge is not just developing single vehicle types, but electrifying the whole fleet systematically. As major trends, I would like to point out three movements:

First, fast and ultra-fast charging are becoming more and more important. In residential areas, we have also seen increased demand for a fast charging infrastructure. Secondly, we have observed that basic de facto standards have been established in various regions of the world. For example, in North America we see in particular AC Level 1 and 2 charging based on SAE J1772 as well as the DC ChaDeMo standard.

And thirdly, we are experiencing an increasing demand for "smart technology", which allows an integration of renewable energy into the power grid. Utilities and Municipalities in particular have realized that such intelligent systems help to avoid costly grid upgrades within the coming years.

The feedback from our customers in the pilot project and the experience we have gained in the course of the project will help us to remain the market leader in Europe for charging systems.
Almost all the major OEMs have realized that the challenge is not just developing single vehicle types, but electrifying the whole fleet systematically.

Our infrastructure offering meets all these requirements and we are happy to advise customers in choosing the right combination of technologies.

AI: How closely has RWE been working with OEMs internationally to create a standard among utilities firms?

Reichert: RWE has been deeply involved in several standardization groups ever since the beginning of the EV movement. In Europe we are one of the key players and prime movers in terms of standards and public adoption of different technical solutions. In the mean time, a number of different bodies have emerged in the world. Especially in the United States, service is one of the key demands of public infrastructure programs. We provide support in installation, maintenance, system operations, and we have defined specific service levels.

AI: What are the most important aspects that the consumer is looking for in an electric vehicle in terms of recharging?

Reichert: The core challenge is quality and convenience of charging, which means easily accessible locations as well as simple and secure payment systems. Secondly, drivers want to have the option of fast charging when it is required. And the third demand is safety. Customers are afraid of voltage and so they really have to feel comfortable with operating the equipment.

AI: How might a global standardization finally come about with regard to the technical and safety requirements for EV charging stations?

Reichert: It is quite clear that in future we will see regional standards relating to the physical connection as well as the data transfer between vehicle, infrastructure and grid. These standards will vary between Europe, North America and Asia. But it is also clear that the ongoing cooperation of the global players, such as the major OEMs, as well as the international infrastructure operators will enable international sharing of know-how and will therefore establish a minimum standard in charging technology.

AI: What are some of the different challenges regionally for the development of a comprehensive and competitive consumer charging network?

Reichert: The biggest issue around the world is the mandate to establish a comprehensive charging network which is able to serve all available Electric Vehicles. At the same time, the infrastructure system must pay attention to the specific local conditions such as traffic patterns, grid reliability, the parking situation as well as customer behavior. To combine both, the local conditions and the availability of different standards define the success of a systematic rollout of publicly accessible charging infrastructure. If we have a closer look at the regional conditions, we have to admit that there already are different strategies. The funding situation in particular is managed in different ways. In China and Japan, the Federal Government shoulders the lion’s share of infrastructure rollout projects, while in Europe and North America, the funding situation still unclear, or the governments limit their support to a few “stand alone projects”. The biggest issue in this regards is to validate the funding since this is one of the critical conditions for the success of implementing Electric Vehicles in individual transportation systems.

AI: What is RWE’s strategy in building charging stations globally?

Reichert: Since we launched in 2008, my team has developed at high speed. At present, there are almost 100 full-time employees working around the world in order to ensure that we remain one of the leaders in Electric Vehicle infrastructure. In 2010 we began to market our charging systems internationally. Our key markets in this regard are Europe and North America. Furthermore, we are keen to establish our position as a market maker, so we are continuing to build up our infrastructure in the European cities where the RWE group already has a footprint. In these areas, we work together closely with the local utilities. We will continue to develop the best available, price-optimized and flexible infrastructure system for Electric Vehicles. This is our strategy.

AI: How will the development of the EV sector impact the reliability of the grid?

Reichert: In my opinion, there is no other option than an intelligent charging infrastructure. Selecting a system which allows a grid and data management will be the only way to avoid dramatically higher costs in upgrading grids in the coming years.

AI: How has the new transport sector been accepted by the policy makers, both in USA and in EU and, in your opinion, how could they assist more in bringing this about more rapidly?

Reichert: As we can see, politicians at a federal and municipal level focus on Electric Vehicles in terms of individual transport sector. Especially with regard to local frameworks, there is a demand for clear, customer-friendly permission processes, and to establish Electric Vehicles in urban areas. Politics should stimulate the demand for EVs by offering subsidies and advanced conditions for those who are engaged in the EV value chain. To accelerate this process, it is essential that Federal politicians take a leading role and define this essential framework.
The third International MOST (Media Oriented Systems Transport) Conference and Exhibition will be held on April 5, 2011 in Frankfurt, Germany. The conference and exhibition will offer a diverse program presenting interesting and innovative MOST Technology experiences and solutions, and a sneak preview of the future of automotive technology.

The main focus of this year’s MOST Forum lies in the implementation of MOST150 and examining the various steps in the preparation for the rollout of the first vehicle based on this latest network technology. The keynote speech “Challenges of MOST in the Second Decade” is presented by Peter Häußermann of Daimler. The talk will focus on Daimler’s decade of experience in MOST development and the MOST150 integration procedures. “The MOST Cooperation is excited about the incredibly interesting conference presentations that the program committee has selected for the MOST Forum this year,” says Dr. Wolfgang Bott, technical coordinator of the MOST Cooperation. “The main focus of the next MOST Forum lies in the implementation of MOST150, examining the various steps and aspects of preparing the rollout of the first vehicle based on this latest network technology. In addition, several speakers promise to give us an outlook on the roadmap, including research results on gigabit transmission over POF (plastic optical fiber).”

Various companies will present MOST solutions and applications, including AUDI, Avago, BMW Group, Continental, Daimler AG, Elektrobit, GADV, Gorseel electronic, Hamamatsu Photonics, ICL, LeCroy, Melexis, Ontorix, Ruetz System Solutions, SMSC, Tecmovol, TTEch, Vector Informatik, Yazaki, and others. Presentations will be made by Audi, Continental, Daimler, Elektrobit, and the Research Center for Information Technology (FZI).

Automotive Industries spoke to Henry Muyshondt, head of technical liaison of the MOST Cooperation and moderator at the MOST Forum 2011 and asked him what makes this year’s MOST conference and exhibition a must-attend for automotive companies?

Muyshondt: MOST Technology has reached an exciting milestone with MOST150 moving onto the road. This year’s MOST Forum will showcase this historical step in the MOST roadmap. MOST now covers all main application domains, including Ethernet. The upcoming MOST Forum may be seen as a kickoff for the MOST future, with today’s MOST meeting tomorrow’s needs.

Another important event will be the VDI Congress held every other year in Baden-Baden, Germany. The congress brings engineers from around the world together to discuss the latest technological advancements in the automotive world. This event takes place from October 12 to 13, 2011.

The MOST Interconnectivity Conference Asia (ICA) is another important event that takes MOST Technology to Asia. This year it will be held in Tokyo, Japan, in November. The MOST ICA provides a venue for experts from that part of the world to come together to discuss the technology. MOST is already being used by Toyota and Hyundai/Kia.

AI: Tell us about the response you received for papers – what are some of the highlights?

Muyshondt: The highlight of the conference will be the keynote speech by Daimler on the ongoing MOST150 integration procedures. In addition, several carmakers and suppliers will discuss the implementation process of MOST150 from different angles including various steps and requirements for preparing the rollout of the first vehicle.

Going beyond current topics, several speakers promise to give an outlook on the future, presenting possible directions that MOST Technology could take.

AI: How many attendees and exhibitors is this year’s conference and exhibition expected to attract?

Muyshondt: Looking at the unexpectedly high number of exhibitor and attendee registrations at present, the upcoming MOST event promises to top previous years. The number of exhibitors has already hit 20, with the available space starting to reach its limits. The MOST Cooperation is very happy about this great response, which reflects the growing acceptance of the MOST standard by key carmakers worldwide.

AI: What are some of the product highlights of the exhibition?

Muyshondt: The MOST Cooperation will demonstrate various aspects and application features of MOST150. Looking at the expanding areas of automotive use cases, one focus will be on meeting the demand of the growing variety of consumer electronic...
and academia to exchange information and results regarding the features and benefits of MOST150. The conference will provide the ideal forum for discussions on MOST150 between carmakers and suppliers. Attending infotainment experts will include various backgrounds ranging from researchers, designers, engineers, system developers, to purchasers and journalists, and to the managers of the industries involved. The MOST Forum will showcase the success of MOST Technology and provide compelling arguments for MOST150. For carmakers, it will become the preferred choice for automotive multimedia technology.

MOST150 does it – meeting requirements for both traditional areas of entertainment and information, and the new domains of mobile connectivity, connected services, and driver assistance.

In addition to transporting high-definition audio and video within the car, MOST also provides an automotive-ready physical layer for Ethernet. This way, MOST is open to a broad variety of IP-based applications such as connected services and Internet access.

In addition, the flexibility of the MOST network technology will be demonstrated by showing star, daisy-chain, tree, and other topologies as well as different physical layers: plastic optical fibers (POF), COAX based electrical physical layer, and shielded and unshielded twisted pair (STP/UTP) copper wires.

Corresponding with the conference presentations, numerous suppliers will demonstrate their latest devices, tools, systems and test solutions based on MOST150.

From the carmakers’ side, the newest car models will be presented. Attendees may expect to see some of the latest introductions, such as Audi A6, Bentley Mulsanne, BMW 6 convertible, BMW X3, Mercedes-Benz CLS, and Mercedes-Benz CLK.

AI: How will the MOST Forum help automotive OEMs decide to choose MOST150?

Muyshondt: The MOST Forum offers an exclusive platform for top professionals from the automotive electronics industry and academia to exchange information and results regarding the features and benefits of MOST150. The conference will provide the ideal forum for discussions on MOST150 between carmakers and suppliers. Attending infotainment experts will include various backgrounds ranging from researchers, designers, engineers, system developers, to purchasers and journalists, and to the managers of the industries involved. The MOST Forum will showcase the success of MOST Technology and provide compelling arguments for MOST150. For carmakers, it will become the preferred choice for automotive multimedia technology.

MOST has become the established standard for the networking of premium infotainment systems at Audi since the first implementation of MOST25 in an Audi car in 2002.

Daimler and Audi are the first carmakers to integrate MOST150 into series production vehicles. The decision to integrate MOST150 into the Audi A8 series was taken last year and the Volkswagen Group said it would roll out the technology into each series from the Volkswagen Golf to the Audi A8.

MOST150 is based on the well-proven technologies of MOST25. Therefore, the vehicle harness, existing mechanisms for the transmission of multimedia data, and established application interfaces can be reused. In addition, MOST150 has the capacity to realize infotainment systems with an up-to-date set of features and a fully-fledged multi-seat system.

With the new packet channel, which is compatible with Ethernet, MOST150 enables the seamless integration of consumer electronics systems, Internet-based services, and established standards from the IT industry.
The Ontorix Tester particularly suitable for the system integration of MOST 150 systems.

Getting the most out of MOST

By: Lenny Case

Automotive Industries caught up with Peter Ament in 2011 and asked him what innovative features can be found in the new Ontorix MOST 150 Suite.

**Ament:** The Ontorix MOST 150 Suite is a high-performance MOST 150 interface used to make all MOST 150 - respectively INIC 150 (OS81110) - features easily accessible. It is characterized by the soft-core processor NIOS II's free programmability in C/C++ in the Altera Stratix III FPGA. The programming is performed from the PC by means of an Eclipse-based development environment which communicates with the Ontorix MOST 150 Suite via a USB-adapter. The platform can easily be accessed with your MOST NetServices via ready-to-use drivers or alternatively via the Port Message Protocol (PMP). A comprehensive observation of the INIC 150 is possible because all pins of the INIC 150 are connected to the FPGA. The INIC 150 may be operated in all eight pin configurations. The control of the INIC 150 by means of the FPGA may be performed via PC as well as via MediaLB 3 pin or MediaLB 6 pin. Thus, the Ontorix MOST 150 Suite is one of the first platforms which utilizes the MediaLB 6 pin.

Apart from the support of all ports of the INIC 150, the platform provides general-purpose I/O-pins as well as 4 HF-connections which are freely connectable. With suitable connectors, the platform may be used together with SMSC’s products INC Explorer or MediaLB Analyzer. Fitted with an additional PCI bus adapter, the platform may also be integrated into a standard PC. With all these features, the Ontorix MOST 150 Suite is the ideal platform for the evaluation of MOST 150 and the INIC 150 (OS81110).

**AI:** In what kinds of projects has the new Ontorix MOST 150 Suite been used?

**Ament:** We have used the Ontorix MOST 150 Suite with numerous and diverse customer projects. A series of verification studies provides our customers with an accurate picture of the different aspects of MOST 150. We have, for example, examined the bandwidths to be expected in the asynchronous channel. In doing so, we determined the maximum data throughput with MOST Data Packets (MDP) as well as with MOST Ethernet Packets (MEP). In a Video-over-MOST project, we were able to prove the reliability of the isochronous data communication at an early stage.

**AI:** What role does MOST 150 play in comparison with an Ethernet-based communication in the vehicle?

**Ament:** In new vehicle projects, we have seen an increasing demand for TCP/IP communication. There is a major focus on vehicle diagnosis and software download as the method of choice for infotainment. MOST 150, based on the INIC 150, is a very mature platform, suitable for the next generation of infotainment systems. The new features added to MOST 150 such as higher bandwidth, the MOST Ethernet protocol, Quality of Service (QoS) and the isochronous communication, meet the requirements of future system architectures.

**AI:** Which additional products do you have in the MOST 150 environment?

**Ament:** Apart from the Ontorix MOST 150 Suite, we have the Ontorix Tester. This tester is particularly suitable for system integration of MOST 150 systems. Its strength lies in its real-time capability and highly precise time stamps across all supported buses and system interfaces.

**AI:** Where do you see the future of MOST 150?

**Ament:** The Ontorix Tester is not only ideally suited for observation but also for system stimulation. It is easy to implement a variety of stress situations for control units. The Ontorix Tester is also suited for the real prototyping of control units or device simulation.

**AI:** Where do you see the future of MOST 150?

**Ament:** The first MOST 150 systems are currently in the implementation or trial phase. The new features of MOST 150 allow completely new functionalities and experiences in the field of infotainment. We are sure that MOST 150 will gain even more acceptance in the market than MOST 25. We are looking forward to this, and want to help our customers in the automotive industry to utilize the whole potential of MOST 150.

German firm, Ontorix says there is growing demand for its MOST 150 Suite, which is being used to optimize MOST 150 applications as the industry adopts the MOST 150 standard.

"We see huge potential in the fiber-optic networking of vehicles and are specialists in this technology. We have been involved in the working groups of the MOST Cooperation for many years and have achieved outstanding expertise in all areas with regards to the MOST bus," said Peter Ament, CEO of Ontorix GmbH in an earlier interview with Automotive Industries. "This led to the development of our Ontorix MOST 150 Suite and Ontorix Tester products."

Ontorix consults to the automotive industry, offering advice on how to construct, operate, test and integrate infrastructure for telematics systems. Ontorix also offers a comprehensive suite of Media Oriented System Transport or MOST-based solutions.
Focus on MOST pioneer Ruetz System Solutions

Ruetz System Solutions is one of the pioneers in the development of MOST standards and contributed towards the development of the MOST bus system. As a MOST test house, the company supports the car industry in the certification process of new car infotainment products. It also offers a broad range of tools for standardized development processes and test routines. Ruetz can also help automotive manufacturers and suppliers prepare function catalogs in XML- or Fibex format.

Ruetz’s consultants offer clients a customized blueprint to help them develop MOST-compatible specifications and define feasible test specifications for components, networks and applications. Ruetz’s testing environment includes the fully-automated Testerlyzer system which allows for the testing of components and networks according to MOST standards. The Testerlyzer has a modular structure and consists of various system components including Testerlyzer pro Compliance (testing software) and Testerlyzer Box (measuring and automation hardware), as well as two Optolyzer modules by the company SMSC which provide an interface to the MOST bus.

The second part of the company’s testing portfolio is the TTCN-3-based test and simulation system branded TTsuite MOST, which was developed by Ruetz in collaboration with Testing Technologies IST GmbH. Both components are used for MOST compliance tests. TTsuite MOST is based on the TTCN-3 industry standard, which is maintained and further developed as a test description language for the telecommunications industry by the European standardization organization ETSI,” explained Malek. “Cross-industry application of a standard is very cost-efficient due to the scaling effect it produces.”

Automotive Industries caught up with Georg Janker, CTO, Ruetz Systems Solutions, and asked him what makes the company’s consultancy services client-friendly as far as the automotive industry is concerned?

Janker: We have a long history of involvement in infotainment systems and their components, and have been at the forefront of MOST technology from the very beginning. Since 1997, we have developed successful strategies for car manufacturers and suppliers in the fields of MOST and CAN. Our expertise is based on many years of experience working in the automotive industry.

AI: What are some of the infotainment challenges facing the automotive sector today and how does Ruetz help in meeting these challenges?

Janker: I would like to highlight just one aspect which shows the current potential. Everyone is keen on clever solutions and possibilities using MOST and CAN with already approved domains. Imagine combining this scenario with cloud computing, social computing services and driver assistance. There is ongoing discussion about the development of the best concepts and there is very little discussion about the transportation layer. There is ongoing competition over the development of the best concepts and there is very little discussion about the transportation layer. A multitude of new products have already been invented. They are being further developed at our systems integration labs to integrate with the new speed grade of MOST 150. Our main task at the moment is providing special solutions which are based on standardized test suites. A big step forward has been opening tooling for all speed grades like MOST 50 and MOST 150. Our customers also welcome the possibility of creating test cases by using the MOST Socket Protocol. One of the products that we have recently rolled out is the ready-to-go test lab, with a high degree of automation for Physical Layer testing or Core Compliance. The package includes installation, training and support.

AI: Tell us about your vision of the role MOST will play in future automotive infotainment systems.

Janker: Our main focus for the future is on technology challenges including the easy integration of consumer electronic devices, smart phones and their platforms, cloud computing services and driver assistance. There is ongoing competition over the development of the best concepts and there is very little discussion about the transportation layer. It is more focused on application-related architectures and connectivity. Although we don’t know what new developments will be around in the future, the MOST bus is the approved technology for providing a strong network for exchanging infotainment data in vehicles.

Optolyzer is a registered trademark.
In January 2011, the AUTomotive Open System Architecture (AUTOSAR) Development Partnership appointed Alain Gilberg as spokesperson. Gilberg is the expert leader for ECU development and software architecture in the electronics department of PSA Peugeot Citroën. AUTOSAR changes its spokesperson every nine months, and Gilberg took over from Dr. Stefan Bunzel of Continental with phase three of the AUTOSAR partnership well underway. Phase two was marked by the launch of Release 4.0 in December 2009.

One of Gilberg’s challenges will be the 3rd AUTOSAR Open Conference, which will be held on May 11, 2011 in Frankfurt, Germany. In 2010, the 2nd AUTOSAR Open Conference in Tokyo hosted 160 participants, with eight speeches. The presentations gave an overview of the current state and the future development of the automotive standard software environment.

A highlight of the event was the presentation by Shigeru Kurayamani, general manager, Automotive Software Division, Toyota Motor Corporation, which showed Toyota’s practice with embedded software development for automotive control systems. This was followed by a presentation by Dr Kazutaka Adachi, engineering director, Electronics Control Engineering Group, Nissan Motor Corporation, who gave an impressive view of how JasPar (Japan Automotive Software Platform and Architecture) applied the AUTOSAR specifications to build an optimized implementation that will lead to new ideas for improving the AUTOSAR standard. JasPar implements the AUTOSAR software based on AUTOSAR specifications Release 3.0 and adapted its concept to the AUTOSAR software to achieve better performance while maintaining reusability. In addition, the well-established question and answer session under the chairmanship of Kenji Nishikawa, Toyota Steering Committee member of AUTOSAR, concluded a successful conference. Furthermore, fourteen members displayed their products and solutions at the Tokyo International Exchange Center.

“More and more companies worldwide recognize that AUTOSAR is the key technology regarding infrastructure software for automotive systems. The results and the success of the second Open Conference in Tokyo in May 2010 proved that AUTOSAR has been gaining momentum in Asia, particularly in Japan,” said Stefan Bunzel, the outgoing spokesperson of the AUTOSAR Cooperation, in an earlier interview with AI.

The AUTOSAR partnership was founded in 2003/2004 by the BMW Group, Bosch, Continental, DaimlerChrysler, Ford, GM, PSA, Siemens VDO, Toyota and Volkswagen to develop an open, standardized software architecture for the automotive industry. AUTOSAR aims to improve the complexity management of integrated E/E architectures through increased reuse and exchangeability of software modules between OEMs and suppliers. The standard will serve as a basic infrastructure for the management of functions within future applications and standard software modules.

AUTOSAR Release 4.0 contains a large number of technical and functional improvements to functional safety, architecture, communication stack, methodology and templates, and application interfaces. The AUTOSAR Cooperation says that the AUTOSAR scope includes all vehicle domains focusing on body, power train and chassis domains first. Release 4.0 contains a large set of application interfaces, which are standardized by AUTOSAR. AUTOSAR is the basis for new functions, increasing the speed of their introduction and enabling the development of systems with increased complexity at reasonable costs with high quality.

Multicore systems are one of the main topics in ECU development, and AUTOSAR addresses these challenges by enhancing the support. The introduction of features for efficient energy management is an important topic, as well as functional safety. The automotive industry answered the challenge of functional safety by developing the standard ISO DIS 26262. For Gilberg, the move to Release 4.1 will give him an opportunity to further expand the AUTOSAR partnership across the globe.

Alain Gilberg, spokesperson AUTOSAR Development Partnership.

As soon as more and more AUTOSAR members bring AUTOSAR on the road the globalization of the standard will increase significantly.

Inverter Safety Unit
- Safety for electric powertrain
- Torque monitoring
- Shut off-path control
- Add-on or integrated into inverter

Electric Vehicle Control Unit
- Platform for electric powertrain control strategy
- Easy integration of customer software
- Multi-functional and customer-specific

Modular ECU-Family
- Certified for SIL 2/3 (ASIL C/D)
- Flexible configurable I/Os
- Off-the-self and customizable
Automotive Industries (AI) asked Gilberg to describe some of the goals he had defined for himself as spokesperson for the AUTOSAR Development Partnership.

Gilberg: 2011 will be challenging for AUTOSAR as we will be launching the conformance tests with Release 4.0.2. This is a big step towards the interoperability of basic software modules and the continuity of the standard. In addition, AUTOSAR will answer current market needs by integration of a new minor 3.2 Release, which will mainly update the communication stack and add partial networking functionality. Furthermore we will have to finalize the content of Release 4.1 in this phase.

AI: How do you plan to further expand the AUTOSAR Development Partnership?

Gilberg: Besides the technical achievements, AUTOSAR especially addressed the Asian market and intends to intensify links with India and China. The ongoing close cooperation with JasPar is well established. AUTOSAR is already in close contact and discussion with several Chinese OEMs, institutes and governmental organizations. The next step to intensify the links will be another conference in 2012. Furthermore, AUTOSAR also has its sights on India to address local needs, as well as in the USA to achieve a higher level of publicity.

AI: How do you hope to further globalize the AUTOSAR standard?

Gilberg: The migration plans of the AUTOSAR core partners and members are proving that it will become the standard for E/E systems in the automotive domain. Several OEMs have started the development of high volume vehicle platforms which apply AUTOSAR at one, several or most of their ECUs. This comes along with many AUTOSAR series projects at suppliers and tool providers. The advantages of AUTOSAR are so convincing that in the next years we will see a lot more car model launches with AUTOSAR ECUs on board. As soon as more and more AUTOSAR members bring AUTOSAR on the road, the globalization of the standard will increase significantly.

AI: What will be the focus of this year’s AUTOSAR Open Conference be?

Gilberg: The objective of the AUTOSAR Open Conference is to provide a platform for researchers, engineers, academics and members to present their results and development activities relating to the AUTOSAR standard. In the present phase, the upcoming releases are of highest interest. Additionally, the presentations by AUTOSAR members will focus on the current roll-out of AUTOSAR.

AI: Why was the venue (Frankfurt) chosen?

Gilberg: After the 1st Open Conference in the USA and the 2nd Open Conference in Asia, Europe has been chosen as the venue this time as several Core Partners of AUTOSAR have headquarters in Germany.

AI: Tell us about how many participants/speakers you expect.

Gilberg: We are proud of the substantial feedback in the US and Japan where the first two AUTOSAR Open Conferences attracted a large audience. In Tokyo, more than 160 participants followed the speeches. As the conference has gained a high reputation among the target groups, we expect even more participants in Frankfurt where several of our members are located. To offer a broad thematic spectrum, the one day conference hosts as many speakers as possible within this rather short timeframe.

AI: What are some of the innovations planned in Release 4.1 and how will these prove a challenge?

Gilberg: Currently, we are still finalizing the conceptual work of Release 4.1. Several new technical concepts are jointly worked out to be incorporated in Release 4.1, scheduled for the end of 2012. It is our challenge to find a wise balance with regard to innovation, stability and backwards compatibility in any further development.

As the AUTOSAR Open Conference has gained high reputation among the target groups last year, even more participants are expected at the 3rd Conference in Frankfurt.

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A strategic partnership between two automotive software developers led to a contract with a luxury vehicle manufacturer, Audi, in July 2010.

In early 2010, Audi called for bids from suppliers of AUTOSAR basic software modules. The manufacturer’s specifications included modules for communication over CAN, LIN, and FlexRay, as well as RTE and end-to-end protection for safety-related ECUs. Under the partnership, both companies aligned their development in order to jointly work on support and delivery. Their first project was a TT Tech Automotive module that ensured communication integrity with MICROSAR – Vector’s AUTOSAR basic software. Based on their expertise, Audi awarded the contract to Vector and TT Tech in July 2010. The company said that choosing one supplier for the basic software of all ECUs benefited both Audi developers and ECU manufacturers. Other factors which counted in the partnership’s favor were its highly efficient modular hardware and software solutions based on certified safety modules, as well as effective system solutions based on the TTC standard control unit family. The company also develops reliable testing devices for bus systems such as FlexRay and CAN.

Both Vector and TT Tech have offices in the most significant automotive regions, and both are premium members of the AUTOSAR consortium. TT Tech Automotive was established a decade after Vector, with its headquarters located in Vienna, Austria. The company’s focus is on developing safe and reliable networks for the transportation industry. Its automotive division focuses on enabling safe communication and networking – up to SIL3/ASIL D. Its product range includes modular hardware and software solutions based on certified safety modules, as well as effective system solutions based on the TTC standard control unit family. The company also develops reliable testing devices for bus systems such as FlexRay and CAN.

Both Vector and TT Tech have offices in the most significant automotive regions, and both are premium members of the AUTOSAR consortium.

By: Lenny Case

Dr. Stefan Poledna, CEO of TT Tech Computertechnik, and asked him about some of the benefits of working together with Vector Informatik on the development of software modules for ECUs.

Poledna: Our company has always focused its activities on safety-relevant systems. Producing safety-related software takes a great deal of effort and the development of safety-related and non-safety-related software in the emerging market would have meant significantly higher investments on our part. Through our partnership with Vector, we can combine the best of both worlds – high-quality AUTOSAR software from Vector, and TT Tech’s cutting-edge safety software which addresses the highest ISO 26262 safety level, ASIL D.

A: Tell us about the work you are doing for Audi – what are some of the safety innovations TT Tech has brought to the modules?

Poledna: Audi is undoubtedly among our leading customers in the automotive business unit, and we are proud to have our products integrated into a number of models. The importance of the ISO 26262 standard was recognized very early on in Ingolstadt. The current A8 model uses both our Flexray communication software, and our ASIL D-compliant communication safety software. Integrating this safety communication software into the AUTOSAR specifications was the next logical step for us. The modular structure of the software, as well as its simple integration into existing AUTOSAR (as well as non-AUTOSAR) environments, makes it an ideal candidate for many safety-related ECUs.

A: Can you tell us about your other customers for the Vector-TT Tech software modules?

Poledna: The feedback from the market regarding our cooperation with Vector was very positive, and all of our existing customers continue to trust products and solutions from TT Tech. Due to our partnership with Vector, we are now in a position to address an even wider market with our safety software solutions.

Automotive Industries also spoke to Dr. Helmut Schelling, managing director of Vector Informatik, and asked him why he decided to partner with TT Tech.

Schelling: We have been developing basic software for a large number of automotive OEMs since 1992. The effort required to supply mature and complete basic software has increased once again with AUTOSAR. Not only do we need to master AUTOSAR’s large range of functional features and high complexity, we also need to support several AUTOSAR releases in parallel with OEM-specific modifications or additions. The market is still very limited, so we think it makes sense to forge partnerships wherever the specific strengths of our strategic partners complement our own strengths.

The idea for the joint venture with TT Tech came from our customers, who indicated that they would have an increasing need for safety-related AUTOSAR solutions in the future. We already cover the entire range of basic software modules. Through the partnership, we can utilize TTech’s experience to extend into the area of safety-related systems. These are ideal conditions for a strategic cooperation.

A: Tell us about Vector’s expertise in AUTOSAR and what this expertise brings to its automotive customers.

Schelling: We joined the AUTOSAR consortium as early as 2004 as a Premium Member and since then, we have contributed to the specification of AUTOSAR in several work packages. Our AUTOSAR team is made up of more than 100 engineers. A wide range of expertise and many years of experience are evident into our MICROSAR solution which we offer as a tailored product to our customers.

For many years before the AUTOSAR idea was formulated, we were working on core elements of AUTOSAR. Our basic software known as CANbridged, with a focus on communication and operating systems was being used in hundreds of ECU projects and our tool suite, DaVinci, was the first professional tool to support function-oriented software development for an ECU network.

A: What are some of the new projects the two companies are working on?

Schelling: Beyond the E2E protection, we are focusing on an environment for safety-related software components under the name, Safe Execution. The core elements are program flow monitoring and memory protection. The challenge is an efficient combination of these safety mechanisms with the operating system and the existing watchdog mechanisms for the different microcontroller platforms. This is a task where the close cooperation and the combination of the specific knowledge of our two companies can lead to optimal solutions. We already offer beta versions for use by our customers.

Both Vector and TT Tech Automotive believe that by combining the strengths of both partners, ECU developers will be offered an ideal solution for every application. Vector’s focus is on AUTOSAR basic software modules, while TT Tech Automotive puts emphasis on safety-related software modules according to ISO 26262, and provides further expertise in the area of FlexRay. Vector Informatik, a German firm founded in 1988, provides tools, software components, and engineering services for the networking of electronic systems in the automobile and related industries. The company prides itself on providing complete solutions for AUTOSAR projects, which include offering customers a comprehensive tool range. This includes ECU software MICROSAR – a product family that provides efficient and scalable basic software modules and an RTE for AUTOSAR ECUs. It also covers the entire range of AUTOSAR 3.x releases.

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Filter manufacturing and technology goes global

By: Alan Tran

German filtration specialists MANN+HUMMEL is increasing its global footprint. Over the past 10 years, the company focused on closing gaps between NAFTA and Asian countries by establishing new companies and production sites or extending existing plants in countries such as USA, Brazil, Mexico, Russia, Bosnia, India and China.

The €2 billion-a-year group has 13,000 employees in 41 locations across the globe. Production takes place at some 30 sites. The company’s strong expansion strategy is evident in the construction of two manufacturing plants in Jiading (Shanghai) and Jinhua, China, and the ground breaking for a second production site in Bawal, India – which all took place in 2010.

The company says the Jiading plant is one of MANN+HUMMEL’s largest and most advanced technical manufacturing sites in the world. It manufactures a full range of filtration products including MANN-FILTER for the independent aftermarket, in addition to complex intake manifolds systems or crankcase ventilation systems.

MANN-HUMMEL is a development partner and original equipment supplier to the international automotive and mechanical engineering industries. The group’s product portfolio includes air filter systems, intake manifold systems, liquid filter systems, cabin filters and cylinder head covers made of plastic with many integrated functions for the automotive industry, as well as filter elements for vehicle servicing and repair. The company’s aftermarket brand, MANN-FILTER, is one of the strongest filter brands in the world. The company’s product range also includes industrial filters, a series of products to reduce carbon emission levels in diesel engines, membrane filters for water filtration, as well as filter systems, complete lines and units for the conveying, dosing and drying of free flowing plastics. Automotive Industries (AI) asked Alfred Weber, CEO of the MANN-HUMMEL group, about the group’s strategy in the worldwide automotive market and how they plan to achieve it.

Weber: We are 70 years young, and full of energy. We want to achieve leadership in filtration in all our segments worldwide and we have inspired and skilled people to turn this vision into reality. It is our goal to pursue our continuous growth and to double our 2009 sales by 2018 to 3.4 billion Euros. Our customers operate all over the world and so do we. We are very experienced in successfully managing complex international projects across geographic and cultural borders. We have a high standard of quality in production process as well in the aftermarket. MANN-FILTER elements for passenger cars, trucks and the industrial sector manufactured in Europe, Asia and the Americas are highly reliable.

AI: Why are these markets so critical to MANN+HUMMEL?

Weber: There is a tremendous demand for mobility in these fast-growing countries to support their economic development. Multi-billion dollar government programs to develop infrastructure, individual and industrial needs require more vehicles, more construction machinery and more water treatment systems. There will therefore be a great demand for filters and filtration systems including servicing.

AI: What kind of growth do you expect in Asia?

Weber: Along with our sales growth we expect to shift sales share. While we will continue to grow in Europe, which generates 60% of our turnover, stronger growth will be in Asia and the Americas in the future equaling half of our European sales, with Asia and the Americas accounting for 25% each.

AI: Are you affected by the increase in industrial vehicles?

Weber: Yes. The US, the BRIC countries and the Next 11 countries are in our sights for this segment. Our customers expect the commercial vehicle market to grow about 50% by 2015. A few months ago we opened a production site in Jinan, China, where we produce mainly for our customer, China National Heavy Duty Truck Corporation (CNHTC), the biggest manufacturer of heavy trucks in China.

AI: Your Chinese headquarters in Jiading, Shanghai, has made use of the latest green technologies – why was this so important to the company?

Weber: MANN-HUMMEL owns a green logo and a green attitude. Respect for people, our planet and our environment is one of the core values in the company. We continuously improve our products, our production processes and our facilities to conserve resources and promote ‘green’ behavior. Jiading is our newest location, and therefore one of the most advanced of our production sites.

AI: How advanced are the products manufactured in this plant?

Weber: We manufacture a full range of filter products there, from spin-on filters to complex intake manifolds fitted with high pressure fuel rails. Manufactured products include air filter systems, air filter elements, oil and fuel filters, intake manifold systems, crankcase ventilation systems and coolant reservoirs. Jiading is the only location outside Germany to manufacture our cabin air filters.

AI: What is the company’s automotive products strategy?

Weber: We spend around 4% of our sales in R&D, especially in concepts, products and technologies to support e-mobility. Since the traditional engine will last for a while, we continue optimizing solutions for fuel and diesel engines; yet it is our focus to contribute to reduce emissions and weight. This means that we work on solutions made of new materials, such as on a bio base or recycled materials.

AI: Tell us how your global automotive sector strategy is modified for different regions.

Weber: We changed the global orientation of the group and strengthened the regional focus. Following the internationalization phase, we are now working on extending the regional organizations to meet the requirements of changing markets more quickly. For example, we started production in India (Tumkur near Bangalore) in 2006. In addition, we strengthened the region with the launch of MANN-FILTER, established a local R&D center for localization in Bangalore, and broke ground for a new manufacturing site in the greater Delhi area, in Bawal. It will start production in 2012 and will produce our core products. The major focus will be on components for passenger car and motorcycle segments, as well as the commercial vehicle and three-wheeler sectors. The location of the plant will improve delivery times and reduce transport costs, with improved access to OEMs in the northern part of the subcontinent.

AI: Please tell us about some of the innovations that have emerged from the R&D department at MANN-HUMMEL.

Weber: We developed a new generation of cabin air filters which was launched in Japan. The cabin filter of the future prevents particles, gases and odors, as well as allergens and micro-organisms from entering the vehicle interior. One of the next steps could be that this multifunctional product will even spread pleasant scents throughout the vehicle. A further example for innovation is an acoustic filter. When driving, sometimes you are keen on hearing the sound of the engine to improve and enhance the driving sound experience.

Innovation

“We continuously improve our products, our production processes and our facilities to conserve resources and promote ‘green’ behavior.”

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In-car information and entertainment have become one of the main differentiators at the premium end of the market. One of the vehicles on display drawing most of the attention at the 2011 Geneva Motor Show was the BMW Vision ConnectedDrive concept car.

Automotive Industries (AI) interviewed Dr. Klaus Draeger, Member of the Board of Management of BMW AG for Development and Purchasing at the Geneva Motor Show, and asked him what had driven the design of the vehicle.

Information adds to driving pleasure

By: Nick Palmen

In-car information and entertainment have become one of the main differentiators at the premium end of the market. One of the vehicles on display drawing most of the attention at the 2011 Geneva Motor Show was the BMW Vision ConnectedDrive concept car.

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Dr. Klaus Draeger, Member of the Board of Management of BMW AG for Development and Purchasing.

Draeger: The concept study, in a two-seat roadster guise, presents the automobile as a fully integrated part of the networked world in both its design and technological innovations.

AI: What is the potential of current and future in-car technology for optimizing comfort, safety and infotainment?

Draeger: Today, the BMW Connected Drive portfolio comprises more than 50 innovative functions. I don’t think we have time for all of them, but briefly, they enhance comfort while driving; they take in-vehicle infotainment to the next level; and they improve safety.

AI: How do these three layers interact to optimize comfort, safety and infotainment?

Draeger: Let me start with the comfort features. Sometimes, I have to sort out a few things while I am on the road. This often means that I need a new phone number or address. In those cases, it would be great to have someone to take care of finding the information for me. BMW ConnectedDrive can help with that.

The idea is that your Smartphone will automatically link to the vehicle as soon as you enter. In the future, the car will even synchronize your calendar and will know when and where you have an appointment. The address you have entered in your phone will instantly be transferred to the navigation system, which in turn will look for the best route. This also includes updated traffic information and parking spots close to your destination. And in case the time and place of your appointment change, ConnectedDrive makes rearranging things and notifying people so much easier – almost like a personal assistant.

Our idea of infotainment is customized information. We offer intelligent solutions by networking passengers with the surrounding...
The headlights and rear lights with their integrated sensors are monitoring the traffic and external environment feeding information directly to the driver.

world. Our goal is to provide them with the correct and most relevant information. Another important aspect is for the driver to be able to use these services easily and intuitively. There will be additional infotainment services for the front passenger. The system shows for instance that the car is passing by a museum, and which exhibit is currently on display. Drivers or passengers will then be able to purchase tickets via data transfer.

**AI:** The headlights and rear lights with their integrated sensors are monitoring the traffic and external environment, feeding information directly to the driver. How do you manage the integration of individual components to perform a number of different roles?

**Dräger:** The layering principal in the BMW Vision ConnectedDrive requires individual components to perform a number of roles. This can be seen in the headlights and rear lights with their integrated sensors monitoring the traffic and external environment which feed information directly to the driver allowing him to take appropriate action.

**AI:** What was the inspiration for the design of the BMW Vision ConnectedDrive car?

**Dräger:** The concept embodies the dynamic BMW design language with its long wheelbase, set back seating position and long bonnet, but combines it with taut surfaces and distinctive flowing lines. It results in an interesting play of light and shadow, making the car appear as if it is accelerating even at a standstill. The sliding doors, inspired by those on the BMW Z1, disappear into the body of the car. This allows the BMW Vision ConnectedDrive to be driven with the doors open, emphasizing the link between the vehicle and its environment.

**AI:** How does the Advanced Head-Up Display you showcased in Geneva compare to the one currently in production?

**Dräger:** Advanced Head-Up Display takes the technology even further with Augmented Reality, placing a three-dimensional display of key information in the direct sight line of the driver, eliminating the need for the driver’s eyes to refocus. The three-dimensional display allows the real view to be overlaid with virtual information, highlighting hazards, allowing the driver to assimilate all of the information quickly and take appropriate action.

**AI:** How does the instrument cluster assist the interaction between the driver and passengers?

**Dräger:** In addition to Advanced Head-Up Display, the BMW Vision ConnectedDrive is equipped with a freely programmable instrument cluster to provide the driver with additional information, optically emphasized to a greater or lesser degree. For the first time passengers get their own information display - out of the driver’s field of vision, allowing them to evaluate information, music or navigation details and pass them on to the driver with a simple touch of a finger.

**AI:** What is BMW's next step towards emission-free mobility?

**Dräger:** The BMW ActiveE is the group’s next systematic step towards an emission-free, mass-produced electric vehicle. Based on the current BMW 1 Series Coupé, the BMW ActiveE is

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One of the vehicles on display drawing most attention at the 2011 Geneva Motor Show was the BMW Vision Connected- Drive concept car.

the second electric test vehicle to be created by the BMW Group. With four seats and a luggage compartment of 200 liters, the BMW ActiveE is the first electric vehicle from the BMW Group to combine the space and comfort of a traditionally powered BMW with a fully electric drivetrain. Intelligent packaging ensures that the driver and all three passengers have the same head, leg and shoulder room as they would in a standard BMW 1 Series Coupé.

At the heart of the BMW ActiveE is a powerful electric synchronous motor which propels the car from zero to 60mph in just nine seconds, delivering 168hp and maximum torque of 250Nm, from a standing start. The top speed is electronically limited to 90mph. The BMW ActiveE maintains the dynamic driving style that is typical of a BMW, with a low center of gravity and 50:50 weight distribution to enhance traction and power transfer of the high torque.

Replacing the engine block, transmission and fuel tank are three large energy storage units containing lithium-ion cells, developed in conjunction with SB LiMotive. These modules are protected by a steel plate battery housing with integrated liquid cooling system, to keep the batteries at optimum operating temperature helping to increase the range. These housings also help to ensure that the BMW ActiveE meets the same stringent safety standards as the BMW 1 Series Coupé, meeting and exceeding the levels legislated.

Starting in 2011, a test fleet of over 1,000 BMW ActiveE vehicles will be trialed in the USA, Europe and China and will provide valuable insights into the everyday use of the electric vehicle. The knowledge and insights gained from the field trials of the BMW ActiveE will be fed back for the future development of the Megacity Vehicle, due to go into production in 2013. BMW UK will be leasing BMW ActiveE to select customers. Further details will be announced in due course.

AI: What were the challenges that you had to overcome to integrate the typical M characteristics for the compact vehicle market with the new BMW 1 Series M Coupe?

Dräger: In the BMW 1 Series M Coupe, we combined the technology of a high-performance car with the agility and lightness of a compact model to create a whole new dimension of sports-style driving pleasure. With this two-door model, we are now realizing for the first time in this vehicle class the concept of racing-oriented performance characteristics in a car developed for everyday use. This further extends the company’s model range, paving the way for younger target groups to be able to access the hallmark driving experience offered by an M car.

AI: What highlights can we expect from the new BMW 6 Series convertible?

Dräger: It fulfils the desires of demanding automobile connoisseurs for fascinating aesthetics, superior driving dynamics and progressive luxury in an open-top premium automobile of the upper class. The new version of this great BMW convertible has the athletic elegance of the bodywork and the soft top in the characteristic fin look. In the sophisticated interior of the four-seater, the elegantly flat, free-standing Control Display of the iDrive operating system, supplied as standard equipment, lends an exclusive touch. The driving experience is characterized by optimized comfort and a heightened level of sporting zest.
Telematics, infotainment and location-aware applications are becoming standard accessories in new vehicles. The challenge for engineers is to provide seamless integration between the infotainment system, and Smartphone features such as SMS text and e-mail – all without compromising driver safety.

One of the leaders in the field is HARMAN. Automotive Industries (AI) asked Rick Kreifeldt, vice president Global Automotive Research and Innovation at HARMAN, what he sees as one of the major challenges facing engineers in vehicle infotainment systems.

Kreifeldt: If we don’t find the way to ease the interaction between the person and infotainment system, then we can’t really bring any more content or information. I cannot read more on my display. I can’t do more with my hands. This is where we see voice as a key enabler. A solution where you have a conversation with your system. Where you can say “find me the closest gas station” the way you think it, instead of giving commands.

This is one of the big things we are working with Nuance on. We are pioneering solutions to develop intuitive, intelligent voice solutions for today’s connected In-Car Infotainment.

AI: In January 2011, you announced your intention in collaboration with Sierra Wireless to bring automotive customers the first 4G broadband connection that connects the vehicle to the people and places around it via the Internet. HARMAN uses advanced data streaming protocols to allow the car to share digital music with those in and around the BamBoo. It will provide seamless connectivity between Android-based smartphones and tablet computers from HTC Corporation, and the HARMAN in-dash head unit. Information such as e-mails and SMS texts are seamlessly converted from text-to-speech, allowing drivers to keep their eyes on the road and hands on the wheel.

And to ensure the fun doesn’t stop in the driveway, HARMAN has included a wireless DLNA connection from the HARMAN infotainment system to a HARMAN home media center – literally keeping the music going, wherever you are. HARMAN audio technologies make the electrically-propelled BamBoo a model of “ecotainment,” along with HARMAN’s GreenEdge energy efficient audio solutions and HALOsonic technologies delivering greater safety, energy efficiency, and enhanced driving enjoyment.

AI: What is the idea behind the new docking navigation system launched with Mercedes-Benz?

Kreifeldt: We wanted to make the system more upgradeable. The concept is a navigation solution that incorporates a flexible upgradeable device with the convenience of complete driver cockpit integration. We achieved this with the new Becker MAP PILOT navigation system, premiering in the new Mercedes-Benz SLK and in the new generation of C-Class. In the future we’ll have other versions of this system with other features. The system will allow customers to get new features for the car even three years down the line.

AI: What solutions do you offer for the electric and hybrid segments?

Kreifeldt: “Green” is a major focus for our company. It is not only good business, but it also is the responsible thing to do. As we go more and more into hybrid vehicles we can’t just ask for more power for the infotainment or audio system. Our first GreenEdge systems focused on audio, where we don’t want to compromise on performance but we want to really dramatically lower the power.

We have also developed GreenEdge infotainment where we have three times the computing performance for 2/3 the power. We are pioneering solutions to bring automotive customers the first 4G broadband connection that connects the vehicle to the people and places around it via the Internet. HARMAN uses advanced data streaming protocols to allow the car to share digital music with those in and around the BamBoo. It will provide seamless connectivity between Android-based smartphones and tablet computers from HTC Corporation, and the HARMAN in-dash head unit. Information such as e-mails and SMS texts are seamlessly converted from text-to-speech, allowing drivers to keep their eyes on the road and hands on the wheel.

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AI: What else can we expect from HARMAN in the near future?

Kreifeldt: The Aha subscription shows that in the future we can bring a lot more Cloud-based services. You will see a large extension of the Aha platform first and also a way to bring Internet services more quickly into the vehicles as well as downloadable applications. What we are showing in Geneva is the best of all worlds. We can either have an app to download to the head unit, or an app on the Smartphone, or SMS/e-mail – talking to your head unit, or you can push it all the way to the cloud Aha platform. We have the most comprehensive solution for bringing on-line services into the car with the right point of integration for each service.
Vehicle designers are faced with a range of connectivity challenges – including speed, reliability of signal, and ruggedness of the equipment – and all from a moving vehicle that may well be driven in areas with low signal strength. Over the next five years, we will see significant change in applications.

Automotive applications will evolve to take advantage of next generation 4G networks. Applications will range from safety applications that will become a standard in each vehicle sold years in advance. Then they need the communications equipment to be available airlink technology. When manufacturers are looking for wireless functionality involves more than just adding a celluar wireless devices for their vehicles, they need to take into consideration where the vehicles will be driven. This dictates what cellular wireless technologies will be needed.

For new infotainment applications, customers will be looking for the fastest speeds available, but they will also want seamless coverage, so manufacturers will need to select multi-mode, multi-frequency devices that stay connected as the driver moves between 3G and 4G coverage areas.

At: The end of 2010, Sierra Wireless introduced the AirPrime AR Series intelligent modules. What does the new product series offer?

**Dutronc:** The Sierra Wireless AirPrime AR Series offers manufacturers the only cellular wireless embedded modules designed from the ground up for automotive applications. The series supports telematics applications and features include: tolerance for up to 1,000 thermal shock cycles, full certification with ISO 9001:2000 quality standards and ISO/TS 16949:2002 manufacturing processes, extended operating temperature range from -40 to +85 degrees Celsius and compliance with multiple automotive manufacturing and quality processes including AQP, PPAP, PCN, and 8D. It also includes solder-down form factor and optional Embedded SIM to create a more reliable and less expensive solution. The AirPrime AR Series modules are available in four interchangeable versions, minimizing the design effort for automotive manufacturers operating globally.

**Dutronc:** What are the benefits to the OEMs and the end users?

**Dutronc:** The collaboration will ensure quality, cutting edge technology is integrated into vehicles. The technology will meet all of the required automotive specifications and work for the lifetime of the vehicle. We also support OEMs in the reduction of the total cost of ownership and provide cost-effective wireless functionality for vehicles of all price ranges.

Automotive customers will experience download speeds of up to 100Mbps, making it possible to provide a true multicolored media, office and online experience within the vehicle, including real-time mapping and traffic updates. New services such as dynamic loaded applications and content, gaming, streaming video and high speed internet access will be fully integrated into the vehicle.

**AI:** How is Sierra Wireless positioned globally to meet the demand for the new automotive technology?

**Dutronc:** From ruggedized embedded modules, gateways and routers, software suites, and development tools to services platforms, Sierra Wireless is the only company that can offer all the wireless broadband technology for building end-to-end automotive applications. It has the credibility and long-standing relationships with leading wireless carriers to facilitate network certification and connections.

**AI:** What new developments can we expect in the field of telematics, infotainment and navigation in the next few years?

**Dutronc:** Long Term Evolution (LTE) deployments are currently only in urban areas. As LTE networks roll out, it will be possible to connect vehicles to the cloud so users can download applications seamlessly. As network coverage expands, users will also experience high bandwidth access to applications in rural areas.

**AI:** In January 2011, you announced your intention to collaborate with Harman to bring automotive customers the first 4G broadband connectivity. How will this collaboration work?

**Dutronc:** Consumers are adapting to lifestyles where multi-featured smart-phones and handsets are the norm. Harman is working to address vehicle-centric demand for wireless-enabled, mobile broadband solutions and will integrate Sierra Wireless LTE modules into their in-vehicle solutions, bringing automotive customers 4G telematics, navigation and online infotainment applications.

**Dutronc:** Our customers have been very receptive. Sierra Wireless already has multiple global design awards for the AirPrime AR Series with leading automotive manufacturers.

**Datronc:** In January 2011, you announced your intention to collaborate with Harman to bring automotive customers the first 4G broadband connectivity. How will this collaboration work?

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**Datronc:** The collaboration will ensure quality, cutting edge technology is integrated into vehicles. The technology will meet all of the required automotive specifications and work for the lifetime of the vehicle. We also support OEMs in the reduction of the total cost of ownership and provide cost-effective wireless functionality for vehicles of all price ranges.

Automotive customers will experience download speeds of up to 100Mbps, making it possible to provide a true multicolored media, office and online experience within the vehicle, including real-time mapping and traffic updates. New services such as dynamic loaded applications and content, gaming, streaming video and high speed internet access will be fully integrated into the vehicle.

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**AirPrime™** is a trademark of Sierra Wireless.
Hi-tech surfaces and technology are literally changing the face of windshields. Bigger windshields have traditionally been associated with heat build-up and misting problems. A new range of products is set to change that.

Automotive Industries (AI) asked Atul Gambhir, marketing director Saint-Gobain SEKURIT International, how the company’s products were helping the visual and thermal comfort for drivers.

Gambhir: Nowadays, it is mandatory to constantly strive to improve visibility and comfort for drivers.

Driver comfort is affected by extreme weather conditions. In winter, there is icing and/or fog on the windshield, which has to be removed to allow safe driving. In summer, heat from the sun enters the vehicle, creating an uncomfortable interior temperature. Responding to these challenges, Saint-Gobain SEKURIT has developed an all-weather windshield called sgs Climacoat which provides dual functionality - improved vision and safety - and reduction in the amount of heat entering the vehicle.

Atul Gambhir, marketing director Saint-Gobain SEKURIT International.

"sgs Climacoat, the new generation of Saint-Gobain SEKURIT’s heatable glass, is a laminated glass which has a conductive multilayer coating applied on the inner side of one glass."

Windshield technology improves safety and comfort

By: Nick Palmen

At: How does your new all-weather windshield sgs Climacoat improve safety and comfort?

Gambhir: sgs Climacoat de-ices and de-fogs the windshield in just a few minutes at the push of a button. Even at temperatures of -5°C, the heatable glazing removes ice in less than four minutes. Moreover, it prevents re-icing, which normally occurs during the first few minutes of driving the vehicle. Consequently, sgs Climacoat provides an important contribution to active safety, as this function improves driver vision. This new technology offers better thermal comfort in summer through the best heat reflecting system on the market. The benefit arises from the metallic coating in the windshield, which reflects solar energy. The solar factor is heavily reduced compared to standard green glass windshields. In fact, it is twice as effective as existing heat reflecting technologies in the market. Moreover, the vehicle with sgs Climacoat arrives at a comfortable interior temperature 30% faster than standard glazing.

At: What is the technology behind sgs Climacoat?

Gambhir: sgs Climacoat, the new generation of Saint-Gobain SEKURIT’s heatable glass, is a laminated glass which has a conductive multilayer coating applied on the inner side of one glass. A normal voltage of 14 V is applied through electrical connectors to the coating. The resulting current warms up the metallic coating and so the glazing is heated. The heat output is up to 400 W/m² with a normal voltage of 14 V. In addition, the metallic coating acts like a mirror, which reflects solar radiation and prevents heating of the car interior.

At: What are the advantages of sgs Climacoat for the OEMs?

Gambhir: There are several advantages for the OEMs to equip their new or existing car models with sgs Climacoat. OEMs can finally provide their customers with a heatable windshield, without the disadvantage of visibility of the heating wires in the windshield, which reinforces a high quality image of the car brand. Another advantage is the heating with standard available voltage of 14 V, making it easier and cost efficient for OEMs to implement this technology on their cars. Finally, the fact that sgs Climacoat decreases fuel consumption is a major competitive advantage for the OEM.

At: How would the new product help to reduce the CO₂ emissions of the vehicle?

Gambhir: sgs Climacoat decreases the additional fuel consumption caused by the air conditioning system by about 0.1 l/100km. Consequently CO₂ emission is reduced by approximately 2.0 grams of CO₂ per km. So, sgs Climacoat saves the driver fuel and money while preserving our environment.

At: When and where are we going to see sgs Climacoat first installed?

Gambhir: Saint-Gobain SEKURIT has an enviable track record of bringing unique innovations in automotive glazing to the market. The sgs Climacoat is one such innovation. SGS is in advanced discussions with several OEMs in Europe, and expects the product to be implemented in the market by early 2011. sgs Climacoat is a registered trademark of Saint-Gobain SEKURIT.

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Producing environmentally-friendly brake pads starts in the factory

By: Nick Palmen

For ITT’s brake-pad factory in Barge, Italy, the drive towards producing environmentally-friendly brake pads has started with the factory processes themselves. The company has stopped scouring its friction materials using new infrared cooking technology that it developed which lowers energy consumption and generates less carbon-carrying soot.

ITT has also installed afterburners in bonding systems to eliminate the emission of traces of formaldehyde. The system also improves environmental conditions for the workers as it collects vapors that were previously being emitted during the bonding process. Power consumption has been reduced through the installation of a system which progressively reduces the supply voltage, while keeping the levels of illumination at an optimum level.

A tri-generation system recycles energy within the plant. The heat produced by the turbines (two 3 MW units) is recovered for heating in winter and, in summer to cool the plant (by turning the heat on a cold absorber). Peak temperatures within the plant have been reduced by five to six degrees, reducing levels of discomfort for workers. In addition to saving costs and improving productivity, the system has reduced CO₂ emissions by 12,000 tons a year. The plant – the biggest producer in the ITT group - can produce more than 75 million pieces every year. ITT produces and sells about 120 million brake pads a year for car manufacturers around the world. The company sees a large portion of its manufacturing switching to pads designed to meet the demand for a new “green wave” of hybrid and electric cars.

Green aftermarket

ITT has developed “green” products free of antimony and copper specifically for the aftermarket. There is ongoing research into the development of OE materials with low amounts of copper. The objective is to define materials with less than 5% of copper by 2014. The product is being developed in partnership with a global supplier of resins and the Polytechnic University of Turin.

Automotive Industries (AI) asked Pietro Buonfico, ITT Mo.Tech. VP and Global R&D Director, what progress the company was making in the development of brake pads for electric vehicles.

Buonfico: ITT Mo.Tech. has developed a special material for electric vehicles using existing platforms and projects. An example is the Renault W10 project.

Al: Are any ITT brake pads now installed (or soon to be installed) on electric/hybrid vehicles?

Buonfico: We prefer to answer with this statement: “There are currently many open projects related to electric, or hybrid vehicles and the major European car manufacturers are focusing on these new applications, ITT Motion Technologies is on their side in these future developments and the first platforms will arrive within the next two years on the market”. Professionals within the industry will know about the projects.

Al: Are they being tested in the lab or on test tracks?

Buonfico: ITT Mo.Tech. is providing pads to some car manufacturers to develop electric and hybrid vehicles. Tests are in an experimental phase.

We are involved in a number of major projects with the likes of VW, Renault and Toyota.

Al: How does a brake pad for an electric/hybrid car differ from one for a gas-powered car?

Buonfico: Sometimes the material is the same, and is specified as such by the customer. At other times, it is necessary to reduce noise issues, such as wire brush and creep groan through a different mix or molding process.

Al: Do they have to be lighter?

Buonfico: Due to the fact that there isn’t any engine noise, the friction material has to be as quiet as possible. Electric and hybrid cars are significantly quieter than their gasoline-powered peers because they reduce or eliminate the thousands of tiny explosions that create mechanical energy and move pistons and other parts in standard engines. Having eliminated noise pollution under the hood, auto makers now need brake pads that work without, screeching, squealing or the very common “creep groan” grinding noise that is caused by the car straining forward as the brake is released.

Al: Do they have to be lighter?

Buonfico: The weight of friction material in a vehicle is pretty low, so ITT is not asked to produce lighter pads.

Al: Do they have to be configured/power differently?

Buonfico: The high weight on the rear axle due to the battery location means that the rear braking system has to have the same power as that on the front axle.

Al: What are the challenges in manufacturing these new types of brake pads?

Buonfico: The biggest challenge is to find a good compromise between the same level of performance and lower noise.

Al: What is the market potential for these types of brake pads?

Buonfico: With the ever rising concerns regarding the oil prices and the impact of global warming due to rising carbon emissions, car manufacturers are investing huge amounts of money in the development of hybrid-electric and electric vehicles.

According to a recent study conducted by JPMorgan, hybrid and electric vehicle sales are already a significant portion of the market, and sales are set to grow. Last year, some 480,000 total hybrid vehicles were sold around the world, which represents less than one percent of global sales. By 2020, JPMorgan predicts that 11.28 million hybrids will be sold annually, representing over 13% of all vehicles sold. The market for brake pads will parallel this growth.

By 2020, JPMorgan predicts that 11.28 million hybrids will be sold annually, representing over 13% of all vehicles sold. The market for brake pads will parallel this growth.

ITT produces more than 120 million brake pads a year.

Pietro Buonfico, ITT Mo.Tech. VP and Global R&D Director.

Above: ITT Motion Technologies plant in Barge, in the province of Cuneo close to Turin, is the main R&D center of the company.

Left: Brake pads rolling off the production line.

“By 2020, JPMorgan predicts that 11.28 million hybrids will be sold annually, representing over 13% of all vehicles sold. The market for brake pads will parallel this growth.”

To read full version of AI stories go to www.ai-online.com
Geico – optimizing paint shops worldwide

By: Jon Knox

OEMs are investing in new technology for their paintshops, which can be responsible for the consumption of about 70% of electricity and 80% of heating requirements during vehicle production.

One of the leaders in the field of paintshop design is Italian firm Geico, which analyzes both the painting process and the paint shops as a global integrated system. All heat sources and heat wells are used to mutually promote energy recovery, thus reducing consumption and environmental impact.

Together, these technologies allow Geico to install paint shops with a 30% reduction in environmental impact when compared with existing facilities, and with a 10% of renewable sources. Many of the eco-friendly solutions were developed together with its customers. A number Geico’s approaches can also be retro-fitted. These include a programmable rotating dipping system called J-Flex, the modular handling system J-Jump, the compact aluminum booth called Amir and the wet and dry scrubbers called Hydrospin and Dryspin.

In a major boost to its portfolio, Geico recently won two prestigious contracts. It will be working together with the PSA Group and will be involved in a joint project with Avtovaz and the Renault Nissan Alliance in Russia. The PSA Group will be implementing Geico’s J-Jump technology in Brazil. We feel very proud of this achievement.”

Arabnia, the 6-Sigma approach is imbedded into Geico’s corporate culture. “Geico’s people believe that their passion, motivation and professionalism all work together to create happy customers.”

Geico is also certified by the British Standards Institution (BSI) and its quality management system with regards to design and development activities, the supply and installation of painting plants and systems for environmental protection, is in compliance with ISO 9001:2008. The company prides itself on being a leader in the greening of paint shops.

“Arabnia: We have analyzed paint shops to identify the causes of energy consumption and have begun to develop alternative solutions to address this. Today we are in a position to develop paint shops with at least 30% less energy requirements.

“Arabnia: What are some of the new processes being developed at the Pardis Innovation Center?

“Arabnia: The alternative solutions include J-Jump, J-Flex, Dryspin, Hydrospin plus, Sliding Floor, Speedry, Newty and a ceiling application robot.

“Arabnia: With globalization in progress, it is difficult to distinguish between the challenges faced by emerging and advanced countries. All our customers are asking for paint shop solutions that require lower investments and produce higher quality results. This is possible with Geico’s alternative and innovative solutions.”
In the constant drive to improve efficiencies and reduce the carbon footprint of their fossil fuel-powered engines, motor manufacturers are shaving microns off the tolerances of rotating parts such as camshafts and crankshafts. “Over the years, the critical geometrical dimension tolerances for camshafts and crankshafts have been significantly tightened to improve engine life performance, fuel economy and reduce emissions,” says Addison D. Cole, CEO of Adcole Corporation. “In the last 25 years, crankshaft roundness tolerances have been reduced from eight microns to three microns. The green cars of the future will have high performance, small engines with very low emissions. Consequently, the production tolerances will continue to tighten which should lead to the adoption of Adcole technology by engine component manufacturing plants.”

Over 500 automobile manufacturers and auto suppliers use Adcole’s computerized inspection gages for quality control checkouts on camshafts and crankshafts. Founded in 1957, the company has established manufacturing facilities in Massachusetts and Florida and runs offices worldwide. Nearly 60% of the company’s business comes from automotive OEMs and manufacturers of agricultural and construction equipment, outboards, and other small engine manufacturers. The remaining 40% of Adcole’s business comes from the spacecraft hardware industry.

Adcole equipment has provided its customers with a technical advantage in terms of accuracy and compatibility with other Adcole gages,” said Cole in an earlier interview with Automotive Industries. “Our bigger customers use Adcole gages in their powertrain development labs, plant gage rooms or on the production floor. The companies know that their production costs are low, but their end users are getting a quality product.”

The company has more than half a century of experience in designing and manufacturing specialized machines for measuring engine components. It also makes digital sun angle sensors for space satellites, primarily for the American, European, and Japanese space industries. Adcole’s client list includes General Motors, Ford, BMW, VW, Chrylser, Toyota, Fiat, Nissan, Renault, Hyundai, Volvo, Suzuki, Caterpillar, Daimler, BMW, Honda, Cummins, FAW, Tata, MAN, John Deere, SaICG, FAW, Dong Feng, and ThyssenKrupp.

One of Adcole’s leading products for the automotive industry is the ADCOLE 1310 High-Speed Camshaft Inspection Gage. It is an end-of-line machine that measures up to 200 parts per hour for rise error and chatmark detection. This fully automated gage uses individual measuring heads for each journal and cam side, with 0.1 micron resolution, taking one data point at each 1/10 degree, or 3600 data points per revolution (see advertisement).

Early in 2011, Adcole announced that it would soon be releasing the Adcole Model 1200-10 Crankshaft gage aimed at manufacturers of diesel, marine and locomotive engines for parts up to 4.5 m long. It is also suitable for off field and power generation crankshaft makers. The product features a proprietary ball bearing spindle with <0.25 µm runout for measuring crankshafts up to 4.5 meters long, with a 560mm swing diameter, that weighs up to 2,050 kilograms.

Utilizing a laser interferometer in combination with a contact follower having a 330mm stroke, this high-precision gage can measure 3,600 data points on pin journals for roundness and straightness with 0.5 µm accuracy. Equipped with a 50cm touch-screen display and a Windows-based operating system for ease of use and output flexibility, the Adcole Model 1200-10 Crankshaft Gage can execute a full crankshaft measurement within 15 minutes. Built on a base of structural steel main cabinets with a large 63cm thick surface plate weighing 7 tons, this robust machine weighs 22 tons says the company.

Automotive industries spoke to J. Brooks Reece, vice-president at Adcole Corporation and asked him to tell us more about some of the unique features of the Adcole Model 1200-10.

Reece: Only Adcole makes such a large crankshaft gage with sub-micron accuracy. To accomplish this feat, Adcole had to design ways to handle the component weight, stroke, and length. Specifically, the granite surface plate is twice as heavy as the one used in the 3.3 meter gage shown above right. The spindle bracket has been made stronger and the technique for mounting it to the granite has been re-engineered.

A spindle motor drive has been developed in order to control the rotation start and stop of such a heavy component. The tailstock is fully programmable with a joystick control and includes a video monitor to make sure the tailstock center is properly engaged. For further safety, a pneumatic system has been added that pushes air through the headstock and tailstock centers to sense if the part has been properly loaded. Design changes have also been made to the vertical axis drive and to the laser interferometer measuring system which is the trade mark of the well known Adcole Model 1200.

AI: How would you describe Adcole in terms of being an innovator?

Reece: We have always followed the belief that our customers should have the most accurate gage possible. This means that more of their process tolerances can be reserved for the process. For example, if a gage takes 10% or more of the component tolerances, there will be less tolerance production and an increased likelihood of rejecting good components. Adcole manufactures the most accurate gages in its class, and our customers benefit from a strategic advantage.

AI: Tell us about Adcole’s continued development of state-of-the-art measurement solutions for crankshafts and camshafts.

Reece: All of the biggest automotive and large diesel engine makers depend on Adcole. Over the years, our customers have asked us to develop special measuring features for their newest designs. In some cases, our customers have asked us to develop a new machine entirely. One of our largest customers in the United States asked us to build a surface finish machine that can run the measuring sequence automatically shown above left. This was the first automatic roughness machine for crankshafts for the industry. Another unique aspect of this machine was its ability to measure the main and pin journals in each quadrant, which is vital for minimizing engine noise and increasing engine life. Our customers are increasingly choosing to use our products for both form and roughness measurement for camshafts and crankshafts.

AI: How does your R&D and subsequent product development reflect the growing demand for greener solutions?

Reece: Adcole measures rotating components that are critical to engine power and fuel economy performance. Consequently, these same components influence clean tailpipe emissions. Global vehicle production should increase from the current level of 75 million vehicles to 100 million vehicles over the next five years. As China and India each add 100 million vehicles to their roads, there will be infrastructure investment in highways and bridges.

During this expansion phase, there will be acute attention paid to fuel economy and emissions by the marketplace and the regulators. As in the past, Adcole will continue to do its part in contributing towards increased engine performance and reduction in manufacturing costs.
Motor car collectors are back on track — and are setting records at specialty auctions.

Russo and Steele Collector Automobiles, a leader in specialty car auctions, saw its Scottsdale auction event record sales of US$21-million from January 19 to January 21 this year. The premier auction house was hosting its eleventh Annual Sport and Muscle in Scottsdale, and reported a sales rate of just under 70% — which means that post-auction sales could push this figure up even higher.

The Scottsdale 2011 auction event was held in the new Losberger structure at Russo and Steele’s traditional site at the intersection of the Loop 101 Freeway, and Scottsdale Road, in North Scottsdale. Highlights of the auction were the sales of a 1970 Plymouth Hemi Cuda Convertible that sold for US$1,705,000, a 1965 Shelby Cobra CSX2461 street car for US$649,000. The high seller of the event was the 1971 Trans Am AMC Javelin Mark Donohue Championship Car with a sale price of US$2,422,000.

Talking about the popularity of the Monterey auction, Alcazar had attributed many reasons for the growing success of the event. “First, location. Monterey is a beautiful city that has a rich tradition in classic automobiles from racing to world-class concours d’élégances. “Keeping our sales small and intimate allows the enthusiasts to be at the center of the event. It is difficult to have any car, no matter how nice, rise above a sea of over 1,000 plus cars. From a buyer’s perspective, getting asked to move as someone takes a picture to hang on their wall or being run over by a baby stroller when one is inspecting a potential purchase compromises the integrity of the auction. Also, buyers can be easily desensitized by hundreds of vendors, fashion shows, general public mayhem and other activities that simply do not lend themselves to the collector car auction experience.”

Russo and Steele’s 11th Annual Monterey Auction will be held from August 18 to August 20, 2011. The tenth Monterey event held in August, 2010 saw sales from the three day auction cross US$88-million. Highlights from the auction event were the three world records with the sale of a 1972 Ferrari 365 GT/4/US$165,000, a 1967 Ferrari 330 GTC production for US$275,000 and the impeccable 1965 Shelby Cobra CSX2641 street car for US$649,000. The high seller of the event was the 1971 Trans Am AMC Javelin Mark Donohue Championship Car with a sale price of US$2,422,000. Talking about the popularity of the Monterey auction, Alcazar had attributed many reasons for the growing success of the event. “First, location. Monterey is a beautiful city that has a rich tradition in classic automobiles from racing to world-class concours d’élégances. Second, synergy. This particular week in August in Monterey has more events per capita for a collector car enthusiast to enjoy than any other place in the world. In fact, so many events take place that depending on what you want to participate in, your week could technically be a week and a half; with some racing events starting August 7th,” he explained in an interview to AI before the 10th Monterey auction.

Automotive Industries (AI) caught up with Andrew Alcazar, president of Russo & Steele, and asked him whether he expected records to fall at the Scottsdale sale.

Alcazar: “We are tremendously proud of the Scottsdale auction’s success. This year was our comeback year and Russo and Steele demonstrated its mettle by producing such a world class event with world record prices. It’s great because companies that have never had the opportunity to show their tenacity and spirit, but Russo and Steele has had that spotlight for over a year now (with Scottsdale 2010 auction and now Scottsdale 2011). The new auction layout and the overwhelming support we received was absolutely inspiring.

Al: What were some of the changes at this year’s event?

Alcazar: With our For Enthusiasts by Enthusiasts mantra, and as a way to say “thank you” for all the support, we opened the main tent to general admission. Registered clients still had VIP areas and seating. Another change was offering vehicles at No Reserve. “Keeping our sales small and intimate allows the enthusiasts to be at the center of the event. It is difficult to have any car, no matter how nice, rise above a sea of over 1,000 plus cars.”

Al: What is the Scottsdale auction’s impact on Russo and Steele?

Alcazar: Russo and Steele’s 11th Annual Monterey auction is August 19-20, 2011. Once again, we will have three nights and over 250 collector automobiles this year. We have a 1967 Pickett Racing 427 Corvette Historic Racer crossing the block, it won the fastest A/Production Corvette racers period and is arguably one of the finest mid-year vintage Corvette racers.

Al: How have you adapted your auctions to take trends into account?

Alcazar: We don’t adapt the auction for trends since trends are ever changing, it would be difficult to keep up. So, although we might see an increase in automobiles on offer of a specific type — we don’t change the auction for that specific trend; we always specialize in European sports, American muscle, hot rods and custom automobiles. In addition, Russo & Steele will continue to provide the highest quality of collector cars with the most exciting, visceral experience possible. We pride ourselves on selling great quality in an enjoyable atmosphere; after all, the hobby wouldn’t survive if we didn’t enjoy it.

Al: What are some of the changes you plan to make for future auctions?

Alcazar: Russo and Steele stays true to its core concept, which is the “For Enthusiasts, By Enthusiasts” motto, so as we grow and change we take into consideration our fellow enthusiasts suggestions and the new inventive ideas from my staff. So, I guess the best answer for changes in the future would be; you are going to have to join us to see. Russo and Steele is always adapting in small ways in order to better serve the enthusiast community.
Saxony-Anhalt: Germany’s heavyweight in lightweight construction

**By: Alan Tran**

Saxony-Anhalt offers low operational costs, and has a well-trained and flexible work force operating within a stable political and legal system. Nearly every car built in Germany includes a component made in the eastern state of Saxony-Anhalt, which is home to around 250 companies supplying both domestic and global car manufacturers.

Investment is growing, reaching almost 1.58-billion Euros in 2010 – the highest level in four years. The state government offers a number of subsidies – 30% for large companies, up to 40% for mid-sized firms, and up to 50% for small companies. It is estimated that the subsidies have helped create over 16,000 jobs. First stop for investors is the state-owned Economic Development Agency of the German Federal State Saxony-Anhalt (IMG). Another strength is the 250-strong MAHREG Automotive association. Founded in 1999, it is a network of excellence, service providers, equipment suppliers, research institutes and universities.

**Automotive Industries (AI) asked Carhans Uhle, CEO of IMG, about some of the benefits for automotive companies doing business in the state.**

**Uhle:** Only Saxony-Anhalt combines the advantages of doing business in Western Europe and those advantages of doing business in Eastern Europe. Saxony-Anhalt offers easy access to growing markets, an efficient infrastructure in the state. The various universities and institutes accumulate know-how throughout Saxony-Anhalt and closely collaborate with the industry. The Otto-von-Guericke University for instance focuses on three pillars of automotive research: energy conversion and drive systems, safety and comfort and virtual engineering. The Fraunhofer Institute for Factory Operation and Automation IFF with the Virtual Development and Training Centre (VDC) is another important partner, and focuses on conceiving, engineering and producing innovative and customized solutions in fields such as logistic and material handling engineering and systems, robotic systems and measurement and testing technology; and digital engineering (virtual development and training). The Creativity and Competence Center Harzgerode (CCC) with its testing facilities for the metal processing industry is another key player for the research and development infrastructure of the automotive industry. It offers a demonstration laboratory, aluminum die casting with automated die casting cell, and high quality laboratory equipment for the analysis and evaluation of components, forms and materials. The Powder Metallurgy Competence Center Thale (PMC) for the highly innovative manufacturing of metallic ferrous and non-ferrous components, “InnComposites,” as well as the Innovation Center for Fiber Composites, and the Fraunhofer Institute for Mechanics of Materials (IFW) are also located in the state. With the recently established Institute of Automotive Expertise IKAM, Saxony-Anhalt is taking a pioneering role.

**AI:** Please tell us about the research and development infrastructure in the state.

**Uhle:** The various universities and institutes accumulate know-how throughout Saxony-Anhalt and closely collaborate with the industry. The Otto-von-Guericke University for instance focuses on three pillars of automotive research: energy conversion and drive systems, safety and comfort and virtual engineering. The Fraunhofer Institute for Factory Operation and Automation IFF with the Virtual Development and Training Centre (VDC) is another important partner, and focuses on conceiving, engineering and producing innovative and customized solutions in fields such as logistic and material handling engineering and systems, robotic systems and measurement and testing technology; and digital engineering (virtual development and training). The Creativity and Competence Center Harzgerode (CCC) with its testing facilities for the metal processing industry is another key player for the research and development infrastructure of the automotive industry. It offers a demonstration laboratory, aluminum die casting with automated die casting cell, and high quality laboratory equipment for the analysis and evaluation of components, forms and materials. The Powder Metallurgy Competence Center Thale (PMC) for the highly innovative manufacturing of metallic ferrous and non-ferrous components, “InnComposites,” as well as the Innovation Center for Fiber Composites, and the Fraunhofer Institute for Mechanics of Materials (IFW) are also located in the state. With the recently established Institute of Automotive Expertise IKAM, Saxony-Anhalt is taking a pioneering role.

**AI:** What is the symbiotic relationship between the aluminum and auto industries?

**Uhle:** Saxony-Anhalt is a heavyweight in lightweight construction, so to speak. The automotive suppliers set the bar with its rapid approval procedures and fast project realization thanks to the support of the authorities and the ministries. The automotive suppliers set the bar with its rapid approval procedures and fast project realization thanks to the support of the authorities and the ministries.

**AI:** How else will you promote Saxony-Anhalt as an automotive destination?

**Uhle:** As the future of mobility is becoming increasingly electric this demands highly efficient vehicles that can be driven by alternative energies. Saxony-Anhalt is a world leader in the field of renewable energies. About 40% of the power required in Saxony-Anhalt is derived from regenerative sources. With SOLAR VALLEY, Saxony-Anhalt shows the strength of the industrial value chain. In the field of electric mobility Saxony-Anhalt is ahead of the game, especially in the field of batteries and its components. The foundations for more environmentally friendly mobility are being laid in Saxony-Anhalt. The state is already a trailblazer in the generation of renewable energy; Every third kilowatt hour is obtained from renewable sources; the largest amount is provided by wind energy. Storage concepts are needed to make green energy available on a longer term – and Saxony-Anhalt is working on it.

**AI:** What is the symbiotic relationship between the aluminum and auto industries?

**Uhle:** Saxony-Anhalt is a heavyweight in lightweight construction, so to speak. The automotive suppliers set the bar with its rapid approval procedures and fast project realization thanks to the support of the authorities and the ministries.

**AI:** What is the symbolic relationship between the automotive and auto industries?

**Uhle:** Saxony-Anhalt is a heavyweight in lightweight construction, so to speak. The automotive suppliers set the bar with its rapid approval procedures and fast project realization thanks to the support of the authorities and the ministries.
In the HEV market we are seeing a transition from NIMH to Li-ion by most (but not all) car makers. Utilization of Li-ion batteries by EV and PHEV battery developers is just at its inception. There are multiple chemistries and cell designs that are being commercialized and time will tell which (if any) of the current designs will win in the market place.

Menahem Anderman, chairman of Advanced Automotive Batteries and founder of Total Battery Consulting.
$40/bbl Algae Oil promised by new Photobioreactor

By: “AI Insider” Bob Brooks

Algae may have the potential to improve U.S. environmental quality, increase national economic health, up employment, boost energy security and decrease military expenses.

An enclosed photobioreactor system for making bio oil from algae has demonstrated a yield of 32,000 gallons/acre/year and $40/gal basic cost in pilot operation. Developed by partners Earl McConchie and Roger Stroud, an initial module of the system is being built in the U.S. for operation at a Mandalia Group plant in New South Wales, Australia this year. The partnership operates as Algae.Tec Ltd with offices in Atlanta, Georgia and Perth, Western Australia.

The system employs stacked layers of very thin passages fed with sunlight via fiber optics. The passages are sealed to eliminate any chance of contamination and also eliminate the sizeable evaporation problem associated with open pond systems. Specific strains of algae are cultivated in fresh, waste or salt water supplied with CO2 and nutrients.

Earl McConchie explains that huge supplies of waste CO2 are available at no cost from many commercial/industrial sources faced otherwise with the cost of disposing or sequestering CO2. Also, in time, CO2 credits could enter the picture with added benefit to operators of McConchie-Stroud algae-to-oil systems. In fact, algae oil production may become a financially viable business for some operations now generating significant quantities of unwanted CO2.

McConchie estimates that the capital cost is about $2 per gallon of installed capacity. He points out that the current and expected market price of petroleum may see rapid pay-back of the investment. This is helped by low algae-oil production costs, which are calculated with suitable allowance for sale of by-products including protein, glycerin, carbonhydrate and biomass. CO2 credits may also become an economic factor.

All together, the economics of the system, without need for subsidies, could be beneficial for the U.S. Construction, installation and operation of the system would account for many jobs and large investment in the U.S. rather than dollar outflow for foreign oil.

McConchie suggested the use of modified, standard sized, intermodal shipping containers as cost effective modules for algae cultivation process equipment. He says that an overall economic business unit of 500 modules each would produce 250 tons of dry algae matter per year. Favorable locations would be those with the most sunlight, located within 35 deg above or below the equator.

Along with the development of algae-based diesel fuel, new technology diesel engines are entering the picture. Featuring advanced technology including the elimination of expensive engine NOx emissions controls. This can be seen in Mazda’s Skyactive D engines. The Mazda technology further improves diesel fuel efficiency through lowered compression ratio and other enhancements.

Another new diesel is the remarkable EcoMotors opoc (Opposed-Piston, Opposed-Cylinder) engine architecture. The balanced, opposed two cylinder system with four pistons per module reduced engine size, weight and parts count by 50%. Diesel engine maker Navistar recently linked with EcoMotors for commercialization of the engine (the first single module is reported to have 100mm cylinder bore, 250-300 hp).

Diesel engine gains such as these put a new focus on compression ignition and increases the possibility of using diesel fuel made from algae rather than gasoline. In the overall picture, domestic bio fuel production has the potential to improve U.S. environmental quality, national economic health, employment, energy security and reduce the huge military expense needed for the protection of imported oil shipping lanes.

The military expense factor runs the real cost of petroleum substantially higher than the current market price of around $100/bbl; not forgetting the cost of unemployment, debt servicing and other consequences of purchased versus home-made bio oil.

AI Insider Bob Brooks is a member of the Society of Automotive Engineers and long-time automotive technology journalist specializing in powertrains and fuels.
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Samuel De Matos, project manager and roof panel expert

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