AMI-C Readies Release 2 Amidst Budget Squeeze

After a four-year effort to create open standards for plug-and-play automotive multimedia electronics aboard the vehicle, the Automotive Multimedia Collaboration is again at a difficult juncture. The good news is that AMI-C is finally about to issue Release 2 specifications including interfaces for HMI (human machine interface) applications, off-board navigation applications and for various telematics services. According to AMI-C managers, Release 2 specifications should accelerate the market for entertainment and information products, including telematics. The bad news: some of the eight AMI-C carmakers who run the collaboration are finding it difficult to fit AMI-C interface specifications into their product plans, and the future direction of AMI-C very much depends on their willingness and ability to do so.

At a steering committee meeting the week of September 9 in Brussels, the committee decided to change the way AMI-C functions. Starting in 2003, a number of member carmakers will be allowed to take on some of the important Phase 3 A M I - C work in house, so the carmakers can keep secret the proprietary portion of their new product developments. While 2003 spending by carmakers on AMI-C related projects will stay nearly the same as in 2002, much of that work will be done not under the control of AMI-C staff, but by the carmakers themselves. As a result, AMI-C’s budget will decrease significantly in 2003.

Video Vision Systems by End of the Decade

First Use: Lane-Departure Warning

In the past year, some European and North American carmakers and their suppliers have begun preliminary development work on applications based on video image processing. Such systems use CMOS video camera technology to identify objects. Promising future applications include occupant sensing for more controlled airbag deployment, adaptive cruise control and obstacle detection systems where vision systems could complement radar or laser sensors. But the first application for vision systems will most likely be in lane-departure warning systems, where the CMOS camera is used to track roadway lane markings. While complex vision systems are beginning to generate serious interest in the West, carmakers and suppliers are not yet spending much money on them. Volume orders for light vehicle video-vision systems in Europe or the U.S. won’t start until the latter part of the decade, perhaps by 2007 or 2008 in luxury vehicles.

Supplier Partnerships
• Valeo with Iteris
• Motorola with MobileEye
• Delphi with Silicon Vision Systems
• In October 2002 Omnron will announce a new vision system partnership with a company making CMOS cameras.
• Bosch and a large semiconductor supplier are developing a CMOS imager and video processor.

Today, there is considerably more interest in automotive vision systems in Europe than there is in North America. Iteris, a former subsidiary of Rockwell and now a division of Odetics (Anaheim, California), has been producing lane-departure warning systems for commercial trucks since June 2000. Iteris has produced some 2,000 systems for Mercedes, its largest customer to date, all of which are currently on the road in Europe. “These systems have already logged between 200 million and 300 million kilometers and the Mercedes truck engineering group is very happy,” said Francis Memole, director of Iteris’ automotive business team. Iteris also sells a lane-departure system to MAN and expects the German truck maker will up its order volume once MAN starts promoting the product. Iteris is working with Daimler Chrysler subsidiary Freightliner on a system based on the Mercedes product, and in June 2001 struck a deal with Valeo to jointly develop and market products based on Iteris’ vision technology for cars and trucks.

Bosch and Motorola told us they too have booked vision-system orders: Motorola’s is a development contract; Bosch wouldn’t say whether its order is for development or production but did confirm that it is from an OEM. T RW is developing an occupant-sensing system that uses a stereo camera mounted in the

Related Factors for Drivers Involved in Fatal Crashes

In 2000, the latest year for which data is available, 57,090 drivers were involved in fatal crashes. The percentages below sum to more than 100, because more than one factor may be present for the same driver. Data: NHTSA

- 6.9% Inattention
- 8.5% Failure to yield
- 9.3% Too fast for conditions/speeding
- 38.5% None reported or unknown
- 31.1% Lane departure/running off road
- 42.9% Other

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overhead console, facing the vehicle cockpit. TRW’s system will be ready in the 2007 model year, according to the company, which has development contracts with three carmakers on three continents.

Making Vision Systems See: Not Easy

The simplest application of vision systems involves no computer processing at all. Rather, the camera is simply plugged into a monitor so the driver can look at his blind spot, see behind the vehicle or watch as he backs into a parking space. While these systems are quite feasible, they are prohibitively expensive for most automotive applications, given the cost of flat panel displays, unless the vehicle already has a display that is shared with other systems, such as navigation or telematics.

"Making automotive vision systems that can truly ‘see’ is not nearly as easy as it sounds," explained Bill Bauson, manager of advanced vision and optical systems for Delphi. "Since vision is second nature to human beings, deceptively simple, most people feel, ‘if I can do it, the computer can too.’" With some tasks, pedestrian detection for instance, it is very difficult to write an algorithm that can distinguish a person from all of the other data in the video image. Detecting lane markings on the road is a much easier and more feasible application.

Lane Departure Warning

Lane departure warning systems use cameras and computer processing to track visible lane and road markings and warn the driver when he unintentionally strays outside his lane. Widespread adoption of lane-departure warning systems could significantly reduce the number of deaths and injuries resulting from accidents. According to data presented in Traffic Safety Facts published by the U.S. Department of Transportation in December 2001, "failure to keep in proper lane or running off the road" accounted for 31.1% of all of the related factors involving fatal crashes in 2000. Please see the graph on page one. In 2000, 41,821 people were killed in crashes in the United States. Lane-departure systems may also indirectly serve as a drowsy-driver warning system, said Iteris’ Mr. Memole.

Two Japanese CCD Vision Systems

Two Japanese carmakers already install vision systems based on CCD (charge coupled device) cameras in production vehicles, for lane keeping and parking assist. Toyota introduced a lane-departure warning system in May 2002 in its Alphard luxury minivan. The CCD camera, also used by the rearview monitoring system, is aimed at the road just behind the vehicle. For lane keeping, it measures the lateral distance from the white and yellow highway markings and sounds an alarm when that distance falls below a pre-set level. The lane-keeping system option is bundled with navigation, backup guide, blind-corner monitor, DVD and MD/CD players and an AM/FM radio. According to Toyota, about 60% of Alphard buyers have taken the ¥542,000 ($4,529) option package.

Since January 2001, Nissan has offered a rearview mirror system that uses a CCD camera and color LCD monitor as a standard feature on the Cima 450VIP and 450XV models. Nissan’s Lane Keeping Support System is available as part of a ¥425,000 ($3,551) option package that includes ACC and Preview Brake Assist. Nissan’s system goes beyond simply warning the driver that he is leaving his lane; it helps steer the vehicle back into the intended lane. Nissan estimates the take-rate for the option at about 5%.

Since lane-departure vision systems cannot be made to function perfectly every time, carmakers will be careful not to claim that such systems are "safety systems." It would be too costly to make them work unfailingly, in all situations. By defining the feature as a safety system, carmakers would be vulnerable to law suits. "These systems may provide an advisory warning so carmakers don’t have to call it a ‘safety warning’ feature," noted Don Remboski, director of Motorola Automotive Communications and Electronics Systems’ Innovation Center.

Because lane-departure warning systems work best on highways, Motorola has been proposing that its vision system be sold as an extension of cruise control. The system would only work when cruise control is switched on. If you [unintentionally] drive across a lane, the warning is issued. Roads where cruise control is used tend to be marked well enough so lane-departure warning is going to work, according to Mr. Remboski.

A s our industry has learned over the past few years from other new product and technology introductions, the majority of consumers are unwilling to pay very much for new features. “Lane-departure warning is an important feature, but it can’t be too expensive,” cautioned Mr. Remboski. “We are trying to keep the retail price down to roughly $300.” The biggest challenge is coming up with a capable lane-detection algorithm that can run on low-cost computing and memory hardware. Motorola’s $300 price target comes from the actual retail price of ultrasonic parking assistants already on the market. Developers must also learn how to make vision systems work in all conditions, regardless of weather or varying light conditions.

NHTSA

The National Highway Traffic Safety Administration has been looking at video-based lane-departure warning systems for a couple of years. Today the agency is preparing for a small, ten-vehicle road test, which will culminate in 2004 when the field test results are analyzed. The NHTSA project is part of a program called Road Departure Crash Warning Field Operations Test. Among the contributors are the University of continued on page 8
AMI-C Release 2 Specifications

Theoretically, an AMI-C interface will help reduce entry barriers for component makers, help speed up product development cycles and make it much easier for engineers to upgrade products during the vehicle's life. A multiple carmakers use components with the same interfaces, the market volume for those components will expand, helping to reduce costs. A II of this should eventually encourage the automotive multimedia market to quickly grow, like the PC market did once Microsoft, operating systems and other interface standards took effect across the industry, enabling plug-and-play interoperability for peripherals and software applications.

No later than December 2002, an AMI-C will take a big step toward achieving those goals as it issues Release 2 specifications, which cover most interfaces within the vehicle and between the vehicle and the outside world. Release 2 will include all of the core enabling or foundation specifications necessary for carmakers to begin projects. “Carmakers will now be able to build their own proprietary devices that can talk a common language, have common physical interfaces and common electrical interfaces,” explained AMI-C program manager, Pom Malhotra.

Release 2 specs will include APIs (application programming interfaces) through which software applications can make use of standard data communications networks aboard the vehicle. Release 2 common message sets allow interoperability between in-vehicle networks. Release 2 also defines specifications for the physical layer, including specifications for connectors. Release 2 specs have been tested and validated for most of the applications now in AMI-C's scope. A II that remains—the biggest hurdle AMI-C presently faces—is to get carmakers to use the specs.

Carmakers will not immediately drop their own proprietary E/E architectures, but some will soon begin piecemeal adoption of some AMI-C specifications. Parts of the spec could be implemented in production vehicles beginning, at the earliest, in 2005 or 2006. It will take until at least 2007 or 2008 before AMI-C integrated platform architectures like the ones illustrated above are installed in any high-volume production vehicles. But none of that will happen unless carmakers immediately take a good look at what AMI-C has delivered and figure out how to integrate the specs into their own product development plans.

Without the experience gained from that process, not only will the benefits of an AMI-C integrated platform go unrealized, but carmakers won’t have developed opinions about what, if anything, they need from AMI-C in the future. “Unless carmakers start to use the specs, AMI-C’s strategic objectives cannot be met,” cautioned Mr. Malhotra. One obstacle to adoption, according to a couple of steering committee members, is that some of the member carmakers are having problems communicating within their own organizations—their AMI-C representatives have been out of sync with vehicle developers and planners.

AMI-C’s Next Steps

In these times of intense global competition, AMI-C has been under more scrutiny by carmakers concerned about how best to invest their limited resources. Expectations have fallen for the near-term telematics market, and some AMI-C carmakers want to reduce the AMI-C budget. A major item on the steering committee's agenda this month was finalizing the budget for 2003. An AMI-C managers had been operating under a provisional budget of $2.5 million for 2003, down slightly from about $2.7 million in 2002. But that will be lowered significantly now that the steering committee has changed the way AMI-C will operate. While carmakers will spend roughly the same as last year on AMI-C projects, those companies taking on Phase 3 projects in house will pay for the AMI-C work themselves. AMI-C now employs eight or nine staff members; in addition, some 25 suppliers contribute people to particular projects. Besides covering salaries for those people, suppliers sometimes cover the cost of hardware used in prototypes.

Eight carmakers are currently AMI-C members: Fiat, Ford, G M, Honda, Nissan, PSA Peugeot Citroën, Renault and Toyota. These carmakers account for 59% of light vehicles produced worldwide. The German carmakers who left AMI-C in late 2000, BMW, DaimlerChrysler and Volkswagen Group, have shown little inclination to rejoin the collaboration.

While major top-tier suppliers such as Alpine Electronics, Delphi, Denso, M otorola, Sun, Visteon and Yazaki are participating in AMI-C, several top-tier suppliers are missing, for example, Aisin AW, Bosch, Clarion, H arman International, Fujitsu-Ten, Magneti Marelli, Microsoft and Siemens VDO.
The Company Profile... Hella KG Hueck & Co.

Background

Founded in 1899 and still located in Lippstadt, Germany, the company remains a family-owned business. Today, Hella is listed 67th among the 100 largest German industrial companies. In fiscal 2001, 89% or €2,539.8 million ($2,522.5 million) of what Hella sold was for the automotive industry, including both OEMs and the aftermarket. All the world’s leading automobile manufacturers are Hella customers, according to Hella. Products include lighting, electronics and electrical equipment as well as complete vehicle front-end modules. A s a whole, the corporation is profitable and continues to see sales increases; automotive sales have been particularly good, with growth in FY 2000/01 over the prior year at 11.9%.

Seventy-three percent of total automotive sales is to OEMs, the rest is to the aftermarket. The Hella Group has 58 manufacturing facilities, production subsidiaries and joint venture companies around the world, with nearly 22,500 employees, about 1,700 of whom are engineers or technicians working in research and development. In addition to Europe, the company is currently investing in Southeast Asia and the United States.

In North America, there are four operating divisions: Hella Lighting Corp., Hella Electronics Corp., plus the aftermarket divisions Hella Inc. and Hella Mex. Hella has had manufacturing sites in Mexico for over 40 years. Hella sold its shares in North American Lighting, a 51-49 joint venture between Koito Manufacturing and Hella, to Koito in October 1998. Hella is now reestablishing itself in the United States at a new lighting plant in York, South Carolina. Still in the startup phase, it will produce forward lighting, such as headlamps and fog lamps; a Mexican facility makes headlamps, rear and other lamps. Auto electronics are produced in Plymouth, Michigan, and Flora, Illinois.

Joe Borruso, president and chief executive officer of Hella North America, told us: “The North American market is very difficult right now, as North America is not driven by short-term results or stock prices. That allows us to invest in the business more, be more aggressive in pricing, and have longer commitments to achieve customer objectives, because we don’t have to worry about quarterly companies are under tremendous pressure to gain market share during this time when automotive sales are good. Carmakers demand cost reductions year in and year out, even as suppliers must invest in engineering to develop new technology. Pressure continues to be intense for suppliers, to say the least.”

Growth Strategies: New Products and ALLiances

OEMs are still looking for substantial price reductions for mature products, in addition to asking suppliers for higher performance characteristics at relatively lower prices. Hella wants to develop more new products with added value and newer technology. That should improve margins. The company views itself as flexible and innovative, spending 8.6% of sales on R&D in FY 2000/01; R&D in automotive lighting was up 5.4% over the prior year; R&D in automotive electronics was up 17.8%, while R&D in vehicle systems was down to zero from the $5.3 million ($5.3 million) in fiscal 1999/2000.

In addition to new products with more value added, the company looks to grow through alliances. Not interested in becoming a mega-supplier, Hella is working hard to remain independent. Mr. Borruso explained: “Our greatest competitive advantage is that we are a private company, not driven by short-term results or stock prices. That allows us to invest in the business more, be more aggressive in pricing, and to have longer commitments to achieve customer objectives, because we don’t have to worry about quarterly
The Company Profile Continued

Hella Automotive OEM Sales (Products and Services) in € Millions ($ Millions)

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<th>FY 1997 to 2001 Annual Growth: 15.6%</th>
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Hella Automotive OEM Sales by Product

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<th>FY 2001 Automotive OEM Sales: €1,860.9 Million ($1,848.2 Million)</th>
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<td>Front-end modules, 12.9% Lighting, 47.3% Auto electronics, 39.8%</td>
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Hella-Behr Front-End Module Sales Update

The 50-50 joint venture Hella-Behr Fahrzeugsysteme GmbH (HBF), set up in 1999, saw the number of front-end module units increase 15% in FY 2001, yielding a 56.7% increase in sales for the vehicle systems business unit. Front-end modules are installation units that consist of lighting, engine cooling, bumper, bumper cover and sometimes the mechanics of the radiator. The annual total capacity of the front-end module facilities is greater than 1,250,000 units.

In addition to manufacturing in Germany, Hella-Behr has manufacturing facilities in countries where labor costs are lower: Puebla, Mexico; Curitiba, Brazil; and Munich, Germany. HBF sales organizations are in Detroit, Michigan, and Barcelona, Spain. HBF is hoping to win orders in the United States and in South Korea. In July 2002, HBF formed a 50-50 joint venture with Samlip Industrial to produce front-end modules in Daegu, South Korea. The venture will have three plants and supply modules to Hyundai and Kia in 2004.

Lighting Products Division

Hella is very aware of how big a role headlamp design can play in the appearance of the vehicle and is promoting innovative front-end module design as an opportunity for carmakers and suppliers to work together to distinguish vehicles.

Likewise, signal lighting is having an increasing influence on the vehicle's appearance. New manufacturing technologies and new light sources such as fiber optics and light emitting diodes (LEDs) present opportunities. Hella's combination rear lamp system provides energy savings of up to 86% over conventional lamps. Since fuel costs in Europe are higher than in the U.S., lighting technologies that allow distinctive design while saving energy— including HID (high intensity discharge) lighting— will probably continue

reports at the expense of quality, and we have more control. But, as a private company, our biggest challenge is competing with mega-suppliers.”

Network Value Strategy: Hella’s Alliance Partners

The company refers to its mutually beneficial alliance relationships as Network Value Strategy. Not wanting the debt that buying companies demands, the company believes forming alliances is an important strength, and it will continue to build a network of innovative independent supplier companies with global presence, whose products complement Hella’s.

- Behr mbH (Stuttgart, Germany), the climate-control equipment and radiator specialist, is a partner with Hella in two 50-50 joint ventures. Hella-Behr Fahrzeugsysteme GmbH, established in 1999, develops, manufactures and sells front-end modules.

The second joint venture with Behr, Behr-Hella Thermodistribution GmbH, focuses on electronics activities in the fields of vehicle air conditioning and engine cooling. Hella does the electronics, and Behr does the “wet” components including the condenser. Development and production facilities are in Stuttgart and Lippstadt, Germany.

- Leoni Bordnetz-Systeme GmbH is a wire-harness manufacturer located in Kitzingen, Germany, whose customers include DaimlerChrysler, Volkswagen and Porsche. Hella and Leoni have worked together for several years, and in 2001 they set up the 50-50 joint venture called Intedis (Integrated Electronic Distribution Systems) in Würzburg, Germany. (Hella owns a 17% interest in parent Leoni A G, of Nuremberg, Germany.) Inteding to compete directly with Yazaki, A FL and Delphi, Intedis will develop vehicle electrical and electronics architecture, as well as complete wire-harness systems. Intedis has developed new architecture for a future Mercedes platform in Europe, one of the most advanced electrical and electronic systems as far as multiplexing systems goes, according to the company.

- In September 2001, an alliance with the Japanese automotive lighting supplier Stanley Electric Co., Ltd. (Tokyo, Japan) was set up to optimize automotive lighting technology development and production. The companies will share patents and manufacturing facilities.

- On June 4, 2002, Hella and Taiko Device Techno & Co. Ltd. (Tokyo, Japan) signed an agreement to form a strategic alliance. Taiko Techno has a top share of the Asian automotive market for PCB (printed circuit board) relays, but falls behind in overseas markets; Hella has a top share of plug-in relays in the world market. “A very big change is that before we only had relays that were plug-in types, and now we will have relays soldered right onto the circuit board,” said M. R. Borruso. In the NAFTA region and in Europe, Hella and Taiko will sell Taiko’s automotive PCB relays through their own sales channels. Hella’s most popular relays are its mini plug-in relays, which handle up to 40amps of current and its micro plug-in relay, which handles up to 20amps.

continued on following page
Hella KG Hueck & Co.

Hella Headlamp System Availability in Europe
Twin headlamps, available with combinations of halogen, xenon and/or bi-xenon lighting, are on these vehicles:
- Actros
- Audi A6
- Audi S3
- BMW 5 series
- Honda Accord
- Mercedes E class, CLK and Maybach
- Porsche
- Opel Omega
- Scania
- VW Passat

In the U.S., new business with Chrysler, which has come to Hella by way of Mercedes, involves front and rear lighting, as well as electronics, in the PT Cruiser.

Hella Customers in Europe for Heating and Air-Conditioning Systems
According to the company, it has the largest market share in Europe for heating and air-conditioning systems, including associated sensors and actuators. In addition to suppliers Eberspächer (Stuttgart, Germany) and Webasto (Stockdorf, Germany), Hella customers include:
- Audi
- Skoda
- BMW
- Seat
- DaimlerChrysler
- Volkswagen
- Porsche

Hella actuators, sensors and control units are used in body electronics, powertrain controls, heating controls and lighting. Hella is a European market leader in the automotive industry, with a focus on safety and efficiency.

Hella's AFS (Adaptive Front-lighting System), which comprehends road corners and bends the light in that direction, will see production in 2003 in the new Audi A 8. Hella and Audi have developed the world's first headlamp with cornering light as a standard feature. Using a free-form reflector and halogen bulb, the light system is swiveled about the vertical axis depending on the radius of the corner being driven. To measure the corner, a control module evaluates the vehicle's speed, steering angle and whether the turn signal is in the on position.

Hella's aftermarket light cornering product called DynaView is packaged as an individual headlamp, either right or left, that consists of two headlamps in a high-tech housing with dual reflectors. The double headlamp allows a strong, straight high beam and an auxiliary cornering light to illuminate the sides of the road when the control unit senses the vehicle cornering around bends. Using asymmetrical free-form technology in the reflector chamber, DynaView uses a yaw-rate sensor to determine when cornering is taking place in order to switch on the correct lamp.

High Intensity Discharge Lighting
A nother product area that the company promotes with safety in mind is HID lighting, which is brighter, consumes less power and has a longer life than conventional light sources. In the United States, NTHSA studies are inconclusive as to whether HID lights present a hazard to oncoming drivers. Some believe that HID lights can distract oncoming drivers by their intense brightness. On the other hand, according to Hella literature, older drivers really need more light to drive safely. For example, the impression of brightness from an object made on the eye of a 55-year-old person is only about 50% of that made on the eye of a 30-year-old.

While today halogen lighting is more widespread in the automobile industry than xenon, the company can deliver headlamps that use both light sources. Hella uses each technology nearly equally; in FY 2001, xenon lamps accounted for roughly 45% of unit sales of headlamps. According to Hella, the HID (xenon) penetration rate in Europe runs about 40%.

Xenon produces a brilliant white light when it is excited electrically and is widely used in strobe lights; the arc from the xenon replaces the filament in the bulb. Hella claims a market share worldwide of over 60% in xenon headlamps and the associated electronic circuitry.

The company promotes xenon as a superior light source over halogen for these reasons:
- Almost 3 times the amount of light
- High light output, or more technically efficient
- 1.35 watts, much lower electrical consumption
- Lower thermal strain on the system
- The light color is almost the same as daylight so drivers tire more slowly and are safer and more relaxed.

The high light output of xenon has caused the ECE (European Commission) to approve it only if it has automatic or dynamic headlamp leveling devices and a lens cleaning system. Hella has developed and supplied lens cleaning systems since 1972. Hella's bi-xenon headlamps use the light from a single xenon bulb to produce low and high-beam light from a single xenon lamp.

Daytime Running Lights
The Institute for Road Safety Research did a study, requested by the European Commission, and found that if all motor vehicles drove with lights on during the day:
- The number of European accident fatalities would be reduced by 24.6%, which corresponds to 5,500 lives saved.
- There would be 20% fewer injuries, equal to 155,000 people.
- 740,000 fewer reported accidents
- 12.4% less economic damage

Hella points out that daytime running lights switch on automatically when the engine is started, an advantage over using low-beam headlights in the daytime.

Auto Electronics Products
Hella actuators, sensors and control units are used in body electronics, powertrain controls, heating controls and lighting. Hella is a European market leader in this area.
leader in powertrain controls including E-Gas systems (electronically controlled acceleration), turbocharger control units, air-intake control valves, speed regulators and in completely integrated accelerator-pedal modules for drive-by-wire systems, according to the company. The company cites the following promising product areas.

**Smart Parts:** Smart junction boxes will increasingly replace electromechanical devices and lead to cost savings of 5% to 20%, according to Hella literature. In Europe, Hella uses CAN-bus interfaces in its electronics systems for control of diverse functions such as central locking, remote control and interior lighting. Hella first developed its smart junction box for the Mercedes 1999 C class. The company now produces 750,000 units annually in Germany. Production of smart junction boxes will also be done in Plymouth, Michigan.

**CAN Control Units and Power Management:** CAN bus-compatible electronics, like SA M's (signal recording and triggering modules), are now in Mercedes C class vehicles. A Hella power management module is part of each new BMW 7 series: its software controls the power supply from the battery and alternator to about 70 different control units involved in comfort and safety functions. Generally, Hella will concentrate on body electronics, while the Hella Leoni JV, called Intedis, focuses on the vehicle E/E architecture.

**Oil-Quality Sensors:** In development is a new sensor that will determine if the quality of the motor oil has deteriorated to the point where an oil change is needed; it is based on the oil-level sensor that Hella supplies to a number of European automobile manufacturers. The oil quality sensor employs a combination of electronic sensors, which measure oil parameters such as temperature, viscosity and dielectric constants, from which oil quality is inferred.

**Optical sensors,** which may be used as pre-crash sensors, are also promising. Hella's optical sensors are already in production in rain/light sensor systems that automatically switch on the wipers and lights as needed.

**The company also started producing a new contactless accelerator pedal-position and angle sensor** that uses alternating current principles and is based on inductive use as an ETC (electronic throttle control) pedal sensor, it may also be used for axle sensing and steering speed sensing (steer-by-wire).

**ETC:** The company is the first manufacturer to develop completely integrated accelerator pedal modules for ACC and traction control, as well as drive-by-wire systems. Hella's accelerator pedal module combines accelerator pedal, pedal force production (return force and hysteresis) and sensors. Hella's electronically controlled acceleration (E-Gas) can support ACC (adaptive cruise control) and traction-control systems. Hella's experience with pneumatic cruise control devices goes back to 1976; 12 European OEMs have used Hella's system in ACC. In North America, the company has one production order—from Nissan—but other ETC systems will go into production soon. Hella reports that about 70% of European vehicles are equipped with ETC compared with only 10% in the United States.
Michigan, Visteon and AssitW are Technology (Wexford, Pennsylvania) for the video imaging and object recognition technology. After 2004, assuming that NHTSA finds that lane-departure warning systems would significantly save lives, it will still take years before NHTSA could propose rulemaking and the U.S. government mandate their use.

Vision System Technology

While charged coupled device (CCD) cameras have been widely used in low-cost, limited-space applications like the Japanese applications described on page 2, all the developers we spoke with are working with CMOS cameras because of their wider dynamic light range compared with CCDs. CMOS cameras are less susceptible to blooming (overexposure) when there is too much light. “When working with low-dynamic range cameras, you could try to take several pictures with different f-stops (aperture settings) to get enough data out of the scene,” noted Delphi’s Bill Bauson. “With a wider dynamic range camera you need only one shot.”

With CMOS you can put both the camera and the CMOS processing on the same chip, reducing space and cost. “With CMOS, since it is the same manufacturing process, you can allocate one part of the chip for the image sensor and the other part of the chip for the microprocessor, A/D and D/A converters and communications,” explained Mr. Bauson. Instead of a microprocessor, some developers are using digital signal processors.

Cost is the number-one obstacle to vision systems. The cost of computing and memory has declined but the cost of proper CMOS cameras is still high, as is the cost of qualifying new video-system components for automotive applications. Mr. Bauson told us that he needs to find CMOS cameras that can reliably operate over the temperature range from -40 to +85 degrees C.

The Japanese Electronics Industry Association involved with solder is researching lead-free alloys. “Everybody is getting antsy about it, but nobody has driven a stake in products. “Everybody is getting antsy about it, but nobody has driven a stake in products. "Everybody is getting antsy about it, but nobody has driven a stake in products.

Auto Electronics Leaders to Meet in Stuttgart

Leaders from the German automotive electronics industry will gather in Stuttgart on November 26th and 27th for the annual Progress and Future of Automotive Electronics conference, sponsored by Verlag Moderne Industrie AG & Co. KG, a trade magazine publisher.

The roster of thirty speakers includes decision makers from BMW, DaimlerChrysler and Volkswagen/Audi as well as top engineers and managers from the German auto electronics suppliers. A mong the scheduled presenters and their topics are Dr. Horst Brinkmeyer, director of central systems, passenger car development, DaimlerChrysler, on “Changes in Vehicle Electrical System Architectures—Requirements and Solution Concepts;” Dr. Peter Gieselhart, director of telematics Europe, Motorola GmbH, “Telematics—Bridging the Gap Between Consumer Expectations and Automotive Industry Capabilities;” and Gunther Reichart, manager E/E strategy, BMW, “Hardware and Software Strategy—the OEM Share.”

Papers and technical sessions will be in both English and German. For more information or to register, call 49 8191 125-218, email: k.brandstaetter@m-i-c.de, or visit www.m-i-c.de.

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