

Edited by Kevin Jost

## Canesta camera adds 3-D sensing

Cameras, radar, lidar, and other sensing technologies are seeing growing use, but they all address only certain limited applications, so volumes for each rise slowly. A small company has developed a single technique that addresses both imaging and distance measuring so it can be used in many different applications, driving volumes upward.

**Canesta**, founded in 1999, is now shipping what it calls electronic-perception technology, aiming at automotive and security markets. Electronic perception augments a conventional CMOS (complementary metal oxide semiconductor) imager with an infrared light source that works much like sonar to add distance measurement to a camera's ability to discern images. Adding distance information to conventional camera images lets software determine what it is seeing.

"We can recognize an object and determine how far away it is," said Jim Spare, Marketing Vice President at Canesta. "That lets us address adaptive cruise control, rear parking assistance, occupant detection, and other applications with a common platform."

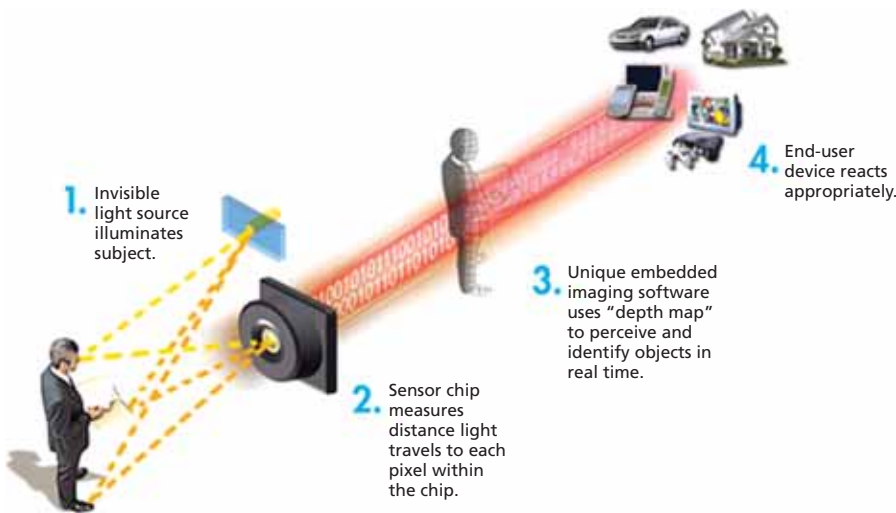
Combining an imaging sensor and IR light source in a module makes it possible to do many tasks with a single module. A module could image white lines for lane-departure warnings while also giving adaptive cruise control distance information.

The same module could be used in the cabin for occupant detection or for blind-spot detection, effectively replacing many different types of sensors now used for various jobs.

"When one technology is used for one application, you can't amortize development across many applications and you don't gain the economies of scale," said Spare. "With our product, prices will decline faster because you can address multiple applications."

Only one other technique, stereo cameras, provides the same benefits, but the second imager and high data-processing requirements make it a more expensive solution, Spare said.

The volume potential for sensors is huge. **Strategy Analytics** lists two imaging technologies among its list of the Hottest Technologies for 2010. Lane departure tops that list, while blind-spot monitoring ranks third. Blind-spot detection should hit four million units by 2012,



Canesta technology bounces light off subjects to see how far away they are.



The Canesta light sensor will compete with many technologies now in use.

the company predicts. Underscoring the fragmentation that Canesta hopes to address, Strategy Analytics predicts that blind-spot detection will be split roughly in half between imaging and radar.

Canesta's technology, which is covered by 15 patents for 3-D image sensing, will also leverage the semiconductor advances that continue to follow Moore's Law. "The design of the sensor is very different from CMOS image sensors, but it's fabricated using exactly the same CMOS processes so we get the same benefits of shrinking geometries," Spare said.

Canesta uses a fabless semiconductor model, manufacturing parts at fabs in Israel and Taiwan. Spare predicted that the technology could show up on model-year 2009 luxury vehicles, migrating to lower-priced vehicles as prices fall and awareness grows.

*Terry Costlow*

## Denso shrinks lighting ECU

An electronic control unit (ECU) for adaptive front lighting systems (AFS) developed by **Denso Corp.** is about 70% smaller in volume than its predecessor. The reduction comes as observers predict a quick takeoff for moveable front lighting.

Denso developed its first AFS ECU in conjunction with **Toyota**, gaining it market volume and usage knowledge. Its new controller arrives as the lighting technology is hitting a sharp surge in deployment.

"There were around 10 vehicles with AFS in the U.S. in 2005," said Jeff Erion, a spokesman for the **Motor Vehicle Lighting Council**. "We expect that to triple this year." He noted that AFS is typically used with high-intensity-discharge lighting generally found on high-end vehicles. AFS is seeing more rapid acceptance than the adoption of

HID, which was the last lighting trend, Erion added.

Denso feels the small form factor will help this growth. "The number of ECUs in a vehicle is increasing due to the development of various information, safety, and driving-support systems, and as a result the demand for smaller ECUs is growing," said Mitsuhiro Masegi, Managing Officer of Denso's Driving Assist & Safety Product Division.

Denso reduced the size of the ECU by moving the motor drive circuits that control headlamp direction out to the motors instead of housing them on the controller. The board also holds both controller area network (CAN) and local interconnect network (LIN) chips, reducing the size of input and output connectors on the ECU. The latter move also reduced the size of wire harnesses, simplifying installation.

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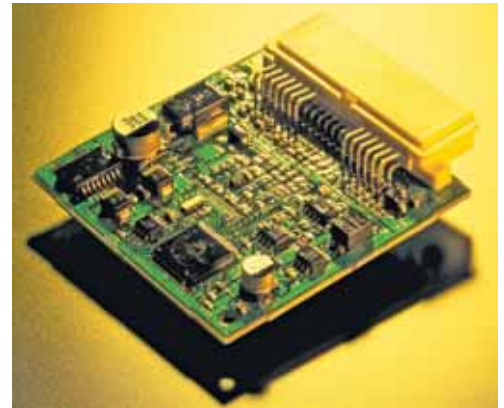
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Component manufacturers note that these controllers need multiple network communications because of the different speed requirements of lighting.

"Engineers use LIN for controlling the ballasts and as a diagnostic bus," said Johann Stelzer, European Marketing

Manager for **Microchip's** Automotive Products Group. "Things like leveling need faster buses, so communications for this use CAN."

Denso's board incorporates this auto leveling function, which controls the headlamps in a perpendicular direction



Denso's AFS controller is 70% smaller than its predecessor.



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as vehicle weight, speed, and other parameters alter light output. Denso noted that OEMs typically use auto leveling ECUs on models that do not have AFS. Incorporating this function makes it possible to eliminate the stand-alone ECU.

The compact ECU also provides more detailed light distribution control. At speeds of 30 km/h (19 mph) or more, the ECU can simultaneously redirect both the left and right headlamps. At speeds below 30 km/h (19 mph), headlamp motion is controlled in relation to steering-wheel movement, improving visibility at intersections and sharp curves.

Though AFS is just beginning to see acceptance, the means to achieve the same function is expected to see significant change over the next few years. That is because declining costs for white LEDs (light-emitting diodes) means that forward lighting will probably see the kind of transition that is occurring in rear lights.

"Going forward, we'll see more LEDs," Stelzer said. "A lot of LED systems were demonstrated last year, so they're definitely coming."

This change will have a significant impact on AFS, with observers noting that it will make lighting movement much simpler since banks of LEDs can be turned on and off as necessary to light different areas.

"When you move headlamps, you create a lot of packaging headaches," Erion said. "With LEDs, those pretty much go away." However, he doesn't believe that LEDs will make much impact for five to ten years.

Terry Costlow