**Intel’s Next-Generation Infotainment System Platform**

Earlier this month at CeBIT 2008 in Hanover, Germany, Intel announced the brand new Intel Centrino Atom platform for mobile Internet devices (MIDs). Designed from the ground up, this platform, which includes a high-performance processor and chip set, consumes just one-tenth the power of a typical laptop platform. MIDs, a product category created by Intel for “highly mobile people who want engaging, rich Internet experiences while on the go,” provide wireless connectivity, Internet access, communications, information access and digital entertainment. That’s exactly what infotainment/telematics systems provide, except that infotainment systems are not portable like MIDs; they are embedded within the vehicle.

Given the similarities between MIDs and infotainment devices, Intel decided more than a year ago to optimize the Centrino Atom platform (previously known as M enamel) for automotive infotainment and telematics applications. Several deals are in the works with European, Japanese and North American tier-one suppliers serving the auto industry. Intel has waned to the point where its share of automotive infotainment/telematics systems is now no larger than one percent. “We really haven’t played in the car very much at this point,” said Ton Steenman, vice president of the digital enterprise group and general manager of the newly formed low power embedded products division of Intel.

**12-Volt Battery R Requirements Approach Tipping Point**

A Role for Advanced Lead-Acid Batteries

General Motors has begun to seriously explore changing the way it specifies SLI (starting, lighting and ignition) batteries. “The usage case is changing,” said Chris Tibiodeau, director of global technology engineering, E/E products, for General Motors. “People aren’t just driving back and forth from point A to point B. Cars have more content and more accessories that people are using even when their cars are parked. When you say you are going to buy back any battery that doesn’t last three years or 100,000 miles, that makes you want to get a handle on the way batteries are used.”

The carmaker has learned much about battery usage from its OnStar remote vehicle diagnostics feature, which collects data from GM vehicles as they are being used in real-world conditions. “You can tell when there has been a large change between the last presented state of charge and the key-on state of charge, and how much energy has been used during the key-off cycle,” noted Shawn Boozer, engineering group manager for electric power systems at GM. “If you look at the time that has elapsed in those sequences, you can tell whether the vehicle was just sitting at the airport for four or five days, or if it was turned off for an hour and a half and you used 15% of state of charge. We are seeing a lot more [battery] cycling from key-off usage in ‘tailgating mode,’ even to the point where people are using the headlights to light outdoor activities.”

GM has several decoupled development projects underway involving a variety of battery technologies: lithium-ion, nickel metal hydride and supercapacitors mixed with lead-acid designs. Within the next year the carmaker expects to pick a “lead horse” for its next set of applications. “I really expect we will start application of new technology in the 2012-2013 time frame, in limited areas, to support hybrid and start-stop applications,” said Mr. Boozer.

**BMW Battery Demands**

BMW has been using advanced lead-acid batteries since 2007 to support vehicles with the micro-hybrid features that BMW calls A uto Start Stop and Brake Energy Regeneration, which are standard on several models. In 2008 the carmaker expects to ship 700,000 BMWs and 130,000 M inis that require A GM (absorbent glass mat) batteries. Eventually A GM batteries will be used exclusively as A uto Start Stop and Brake Energy Regeneration are introduced across BMW’s entire model range, starting in Europe.

A GM batteries, a type of valve-regulated, lead-acid battery in which the electrolyte is absorbed into a fiberglass mat, have been around for years and are widely used in motorcycles and marine applications. Compared with flooded lead-acid batteries typical in automotive applica-
Outsourcing Engineering Will Continue

While the report “Offshoring Automotive Engineering: Globalization and Footprint Strategy in the Motor Vehicle Industry” is a little over a year old, its conclusions are relevant today. According to the report, we should anticipate the trend toward outsourcing engineering to continue, particularly electronics and software engineering. Not only are engineers in India and China paid a fraction of what they are paid in the United States or Western Europe, but electronics and software functions are relatively easy to outsource or offshore, compared with mechanical engineering.

“Software engineers across an ocean can discuss a few lines of code easier than mechanical engineers can discuss how to modify the design of a component,” the report states. And since software and electronics systems tend to follow a more modular product architecture than mechanical systems, such projects are more transportable.

While some automakers and suppliers expressed concerns about low engineering productivity rates and lack of automotive-specific skills in countries like China, General Motors noted that the shortage of software, electronics and control engineers in the U.S. was part of the reason GM opened a technical center in Bangalore as a “center of excellence for math-based tools and automotive electronics control systems.”

According to The Wall Street Journal, Chrysler will begin expanding its operations at engineering centers in Mexico and China and plans to open others in India and Eastern Europe, having recently cut many engineering positions in the U.S. The WSJ article says that Chrysler CEO Robert Nardelli hopes that offshoring development to China, India and Russia will lead to increased vehicle sales in those markets.◆

<p>| Approximate Fully-Loaded Annual Automotive Engineering Labor Rates by Country/Region for an Automotive Engineer with 5-10 Years of Experience |</p>
<table>
<thead>
<tr>
<th>China</th>
<th>India</th>
<th>Eastern Europe</th>
<th>Mexico</th>
<th>Western Europe</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0-20</td>
<td>$20-40</td>
<td>$40-60</td>
<td>$60-80</td>
<td>$80-100</td>
<td>$100-120</td>
</tr>
</tbody>
</table>

*Total cost of employment of a full-time employee

Intel...

But with the Atom-based infotainment system platform, Intel expects its automotive sales to multiply in three years, to ten- or twenty-times what they are today.

“Wherever there is a color display in the car, there is an opportunity for an Intel architecture platform. This is a very significant opportunity for our company. Analysts are saying that annual global vehicle sales will reach 80 million by 2010, and 50% to 60% of them will have color displays,” said M.r. Steenman. A n open platform, Intel architecture is defined by the Pentium processor family and the Core 2 Duo instruction set used in PCs and laptops today.

Built from Intel’s 45-nanometer processes, the Atom processor chip’s thermal design power (TDP) is in the 0.6- to 2.5-watt range. By comparison, today’s mainstream mobile Core 2 Duo processors have a TDP in the 35-watt range. The new chip’s top speed is 1.8 GHz.

In December 2005 Intel and BMW jointly announced that they would work together to define the next-generation infotainment platform. Three months later Intel announced that it would work with Harman Becker, who would use Intel architecture in next-generation infotainment platforms.

“We have been doing a lot of work with those two companies and a number of other companies I can’t disclose yet,” said M.r. Steenman.

The Intel platform is designed to address three infotainment system requirements: the need to access and process media in the car; the ability to keep pace and adapt to the rapid changes in portable devices; and the ability to tap into capabilities and services available on the Internet.

“A nd those requirements lead directly to an Intel architecture-based platform,” explained M.r. Steenman. “Intel architecture is kind of the default Internet platform nowadays.

“It is a very open platform where you can leverage a large ecosystem of existing services and applications to quickly integrate new features closer to the vehicle’s release date. Today most applications deployed in the car are heavily vertically integrated. Every application for every car needs to be completely written from the bottom up, so there is a lot of duplicate engineering that happens in the industry.”

A nother advantage, according to Intel, is that the Atom platform will also be used in many of the nomadic devices consumers bring into the car. So if the information system has the same architecture, it will be easier for carmakers to integrate those with the vehicle’s user interfaces. AppleInsider.com says A tom will be applied to several new Apple products starting in the second half of 2008.◆

THE HANSEN REPORT
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tions, A G M batteries are lighter and smaller, hold their charge for a longer period of time, handle deeper discharges, and can be cycled three-times more frequently. A G M batteries cost at least 20% more than flooded lead-acid types.

The micro-hybrid features employed by BMW are particularly challenging to the battery. “With conventional vehicles, you charge a battery as soon as you can and charge it until you can’t charge it any more. So the battery spends its entire life at 100% state of charge, which is pretty benign service for a lead-acid battery,” explained Thomas Keim, director of the MIT/Industry Consortium on Advanced Automotive Electrical/Electronic Components and Systems. “In contrast, BMW shuts down the engine at stop lights and schedules charging whenever the fuel consumption impact is small, for example when the vehicle is running down a hill using the engine as a regenerative brake.”

In order to have room to store the recovered braking energy, the BMW battery must operate at a partial state of charge, and that causes sulfation, a chemical process that quickly ages the battery. Then the stop-start feature, which shuts the engine down when the vehicle is idling, also causes a partial state of charge, because the battery is supplying all the energy required by the vehicle, without the alternator. The BMW intelligent energy management system maintains a state of charge sufficient to ensure enough energy in the battery for engine cranking, plus several weeks at standby when the vehicle is parked. The state of charge is varied according to ambient temperature, because less energy is needed for engine starting in summer than in winter.

Brake energy regeneration and the start-stop feature also lead to many more charge-discharge cycles, which stress the battery further.

Firefly Energy

According to Firefly Energy (Peoria, Illinois), a company that has invented alternative lead-acid battery technology, even A G M batteries will suffer premature aging from operating in a partial state of charge. “[W]hich is why] several leading carmakers from around the world have beaten a path to Peoria to understand what our technology is all about. Either they are experiencing the problem now or their models tell them they are going to experience the problem,” said Mil Ovan, senior vice president and co-founder of Firefly Energy. Firefly’s patented carbon foam-based technology promises to make lead-acid batteries more robust, smaller and lighter.

“In our first version of the technology, all of the negative lead metal plates are replaced with our microcell foam battery plate, which has 2,000 times the surface area of a conventional negative lead metal plate,” pointed out Mr. Ovan. “Instead of plopping the chemistry on top of the lead metal grid, you are washing the chemistry within the pores of this microcell foam. By doing so, the biggest resistor in the battery, the electrolyte itself, is now put into tighter proximity to the chemistry. So your ability to quickly discharge and recharge is much better, and the battery withstands the rigors of sulfation far better, because sulfation happens to the negative plates. You can let this thing sit in a flat state, which you would never do with a conventional lead acid battery. Not only will it recharge, come back to life, it will come back to a full state of health,” said Mr. Ovan. The second version of the technology replaces both the negative and positive plates with microcell foam.

Firefly Energy is currently focused on two major battery development projects, one to improve tank batteries for the U.S. Army, and the other to develop a more robust battery for heavy duty trucks that are subject to anti-idling rules. The first Group 31 truck batteries will be available for testing this month.

A s with most new technology, automotive batteries built from Firefly technology will not be cheap. “W e would be priced at a premium to the A G M batteries out there, but with a different total cost of ownership. Based on the total number of charge cycles per dollar, we are less expensive than A G M,” said Mr. Ovan.

Johnson Controls

Some of the A G M lead-acid batteries used by BMW come from Johnson Controls, the world’s number-one maker of flooded lead-acid SLI batteries. Johnson Controls makes flat-plate AGM, which is what BMW uses, and spiral wound AGM batteries. JCI is also working on formulations of the conventional flooded lead-acid battery to fit the changing usage cases. “Within lead acid there are many things we can do with more robust materials to optimize the design and make it even more effective in applications where the battery is going to see more cycling,” said Bob Gruenstern, director of product engineering for JCI’s battery division.

CEA Surveys Consumers on Automotive Electronics Purchases

Market research by the Consumer Electronics Association shows that automotive OEMs are meeting the market demand for high-end electronics features with factory-installed products. CEA asked consumers who own the products listed below when the product was installed in their vehicle.

<table>
<thead>
<tr>
<th>In-Vehicle Consumer Electronics Purchase/Installation Timing</th>
<th>In Factory</th>
<th>Aftermarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-dash monitor/display</td>
<td>93%</td>
<td>5%</td>
</tr>
<tr>
<td>Car alarm</td>
<td>82%</td>
<td>14%</td>
</tr>
<tr>
<td>In-dash car stereo</td>
<td>81%</td>
<td>14%</td>
</tr>
<tr>
<td>Safety and information services system</td>
<td>80%</td>
<td>8%</td>
</tr>
<tr>
<td>Parking/backup camera or sensor</td>
<td>76%</td>
<td>18%</td>
</tr>
<tr>
<td>CD multi-disc changer</td>
<td>72%</td>
<td>23%</td>
</tr>
<tr>
<td>Premium sound equipment</td>
<td>68%</td>
<td>28%</td>
</tr>
<tr>
<td>Vehicle tracking and location system</td>
<td>67%</td>
<td>27%</td>
</tr>
<tr>
<td>Wired connection to digital music player</td>
<td>56%</td>
<td>42%</td>
</tr>
<tr>
<td>Car video entertainment system</td>
<td>56%</td>
<td>31%</td>
</tr>
<tr>
<td>In-dash navigation system</td>
<td>56%</td>
<td>34%</td>
</tr>
<tr>
<td>Wireless connection to digital music player**</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>Remote vehicle starter</td>
<td>37%</td>
<td>56%</td>
</tr>
<tr>
<td>Gaming system**</td>
<td>29%</td>
<td>47%</td>
</tr>
<tr>
<td>Radar detector**</td>
<td>11%</td>
<td>81%</td>
</tr>
</tbody>
</table>

“Caution: small sample size. **Aware that radar detectors are not a factory installed option. *CEA observed that all of the ownership data is consumer reported, meaning it may not always match up with real market conditions. Consumer confusion does play a factor sometimes, but we feel it is just as valuable to understand that as it is to understand actual market penetration.”

Corporate Background

The world's fifth-largest automotive supplier was founded in 1871 and launched its first automotive product—pneumatic tires—twenty-one years later. Tires and other rubber-based products remained Continental's primary business until the late 1990s. The Automotive Systems division was formed in 1994 to focus more deeply into the products and technologies of Continental's three automotive divisions: Chassis and Safety, Powertrain, and Interior. Just two years ago Continental took another big step toward solidifying its global standing in automotive electronics with the acquisition of Motorola's automotive business. At the time, Motorola was the leading independent supplier of powertrain electronics in the United States and the world's number-one supplier of telematics hardware, counting OnStar, BMW Assist and LoJack among its customers.

Continental has been an exceptionally profitable company, making EBITA margins of more than 10% for the last three years. Just one year ago Continental acquired Siemens VDO in a deal that was first announced July 25, 2007, and approved by the EU Commission November 29, 2007. Siemens VDO was consolidated on December 1, 2007. *Including 659.3 million euros in Siemens VDO sales. Siemens VDO was consolidated on December 1, 2007. **Company estimate: "... we intend to generate a sales volume that exceeds the 26.4 billion euro calculated pro forma for the whole of 2007 for Continental and Siemens VDO."

This is part one of a two-part profile of Continental AG. In part two we will dive more deeply into the products and technologies of Continental's three automotive divisions: Chassis and Safety, Powertrain, and Interior.

Part One

The Company Profile... Continental AG

Headquarters: Vahrenwalder Strasse 9, 30165 Hanover, Germany; Telephone 49 511 938-01; www.continental-corporation.com

2007 Sales: 16,619.4 million euros
Capital Expenses: 5.4% of sales
R&D: 5.0% of sales
EBIT: 10.1% of sales
ROCE: 7.5% of sales
Working Capital: 1,140.5 million euros at year end 2007
Net Indebtedness: 10,856.4 million euros
Shareholders' Equity: 6,856.1 million euros at year end 2007
Market Capitalization: 9,272.6 million euros as of March 10, 2008
Noncurrent Liabilities: 11,668.3 million euros

2008 Estimated Sales: 26,400 million euros
Employees: 151,654 at year-end 2007; 18,000 are engineers
Sales per Employee: 174,000 euros
Products: Automotive components, modules, systems and tires
2007 Automotive Sales (excluding tires): 7,357.2 million euros

Note: Continental's acquisition of Siemens VDO was first announced July 25, 2007, and approved by the EU Commission November 29, 2007. Siemens VDO sales were first consolidated as of December 1, 2007.

Continental Sales and EBITA Margins

Continental Sales by Division

2007 Total Pro Forma Sales: 26.4 billion euros*

- ContiTech, 11.6%
- Chassis and Safety, 19.9%
- Powertrain, 19.9%
- Interior, 23.9%

*Pro forma, including a full 12 months of Siemens VDO, which Continental acquired in December 2007. Division percentages are based on Continental's and Siemens VDO's sales in 2006.

Continental Employees by Division

Total as of December 31, 2007: 151,654

- ContiTech, 22,871
- Commercial Vehicle Tires, 8,384
- Passenger and Light Truck Tires, 26,281
- Interior, 33,459
- Other, 242

Continental Sales by Region

2007 Total Sales: 16,619.4 million euros

- Asia, 8%
- NAFTA, 21%
- Europe, 37%
- Rest of Europe, 37%
- Germany, 31%
- Elsewhere, 3%

Continental’s purchase of Temic Telefunken microelectronic GmbH from DaimlerChrysler (60% in 2001 and the remaining 40% in 2002) brought Continental into the automotive electronics market with a broad range of products including powertrain, safety and comfort electronics, and radar ACC technology.

Continental’s acquisition of Siemens VDO for a sales volume that exceeds the 26.4 billion euro calculated pro forma for the whole of 2007 for Continental and Siemens VDO. Continental’s automotive sales increased 32.6% per year. A nd by automotive supplier standards, Continental has been an exceptionally profitable company, making EBITA margins of more than 10% for the last three years.

The next few years will see downward pressure on Continental’s profits as annual sales growth slows. Light vehicle production in Western Europe is expected to be flat and down in the NAFTA region, the principal regions served by Continental’s top customers. Continental will see intense pressure to reduce prices from Chrysler, a major customer now owned by private equity.
The Company Profile Continued

Continental’s Automotive Sales*  

<table>
<thead>
<tr>
<th>CAGR</th>
<th>2003 to 2007: 12.3%</th>
<th>2003 to 2008: 29.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td>In millions of euros</td>
<td>4,625.7</td>
<td>5,007.7</td>
</tr>
</tbody>
</table>

*After the acquisition of Siemens VDO, Continental’s Automotive Systems Division was split into three new divisions: Chassis & Safety, Powertrain and Interior. The figure for 2007 is the combined sales of those three divisions, plus Siemens VDO sales since December 1, 2007.  

**Hansen Report’s rough estimate

Siemens VDO Sales by Fiscal Year*  

<table>
<thead>
<tr>
<th>2003 to 2007 CAGR: 5.4%</th>
</tr>
</thead>
<tbody>
<tr>
<td>in millions of euros</td>
</tr>
<tr>
<td>2003</td>
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<tr>
<td>2004</td>
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<tr>
<td>2005</td>
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<tr>
<td>2006</td>
</tr>
<tr>
<td>2007</td>
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</tbody>
</table>

*Fiscal year ends on September 30.

Continental Shareholders’ Equity by Year End  

<table>
<thead>
<tr>
<th>2002 to 2007 CAGR: 30.6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>in millions of euros</td>
</tr>
<tr>
<td>2002</td>
</tr>
<tr>
<td>2003</td>
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<tr>
<td>2004</td>
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<td>2005</td>
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<tr>
<td>2006</td>
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<td>2007</td>
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</table>

T he New Continental  

Continental’s acquisition strategy culminated in 2007 with the purchase of Siemens VDO, which itself had grown very quickly through acquisitions. But Siemens VDO is by far Continental’s largest and most challenging integration. With 10.3 billion euros in sales for its fiscal year ending September 2007, Siemens VDO was 70% of Continental AG’s pre-acquisition size, and 30% larger than Continental’s Automotive Systems division. Siemens VDO had 50,519 employees compared with approximately 80,000 employees for Continental before the merger.  

Given the erosion of Continental’s stock price since the acquisition, it appears now that the financial markets believe Continental paid too dearly for Siemens VDO, which had an after tax loss of 550 million euros in its 2007 fiscal year.

In July 2007 just before the merger was announced, Continental was trading at over 107 euros per share. After the merger announcement, the stock price declined, recovered for a time, and then declined precipitously—to 55.58 euros by March 19, 2008. Continental paid 11.3 billion euros for Siemens VDO, about 1.1 times Siemens VDO sales. Following the acquisition Continental’s market capitalization was down to 9.273 billion euros (as of March 19, 2008), just 0.35 times pro forma sales of 26.4 billion euros for Continental and Siemens VDO combined.  

To complete the acquisition, Continental borrowed 13.5 billion euros, and on February 26, 2008, Moody’s Investors Service downgraded Continental’s long-term rating to Ba2, “prompted by the sizeable increase in the company’s debt and leverage resulting from the acquisition of Siemens VDO . . . .” Continental plans to issue bonds to repay the loans, but must wait until the credit markets improve.  

In October 2007, to help fund the acquisition, Continental sold 14.65 million new shares to institutional investors at 101 euros per share, which generated nearly 1.48 billion euros in proceeds. A key to the upcoming annual shareholders’ meeting, Continental’s executive board will suggest paying a two-euro dividend for 2007, the same as it paid the prior year.

The Challenge: Integrate Siemens VDO  

Much now depends on how quickly Continental can integrate Siemens VDO into its business and make it profitable. Continental’s 2007 EBIT margin would have been 11.5% were it not for Siemens VDO.  

Those betting on Continental’s ability to meet its current challenge successfully would cite Continental’s strengths. For example, like Siemens VDO, Continental maintains strong relationships with the German carmakers who pioneer many of the new technologies that eventually find

continued on following page
Continental AG

Distinctions Claimed by Continental
World's fifth-largest automotive supplier
Europe's second-largest automotive supplier
Chassis & Safety
World's number-one supplier of foundation brakes
World's number-one supplier of airbag control units and sensors
World's number-two supplier of electronic brake systems and brake boosters
Powertrain
World's number-one supplier of fuel supply systems
World's number-one supplier of piezo common rail injection systems
World's number-two supplier of gasoline systems
Interior
World's number-one supplier of instrument clusters
World's number-one supplier of telematics hardware
World's number-one supplier of comfort and body electronics

Continental's executive board, chief technology officer and, since December 2007, board member responsible for the Chassis & Safety and Powertrain divisions.

Continental expects to complete the Siemens VDO integration by the end of 2008. The merger will lead to synergies, which will mean job cuts at some locations. In Germany alone, Continental expects to be able to cut 2,000 jobs: 500 right away, plus 1,500 more over the next two years. Job cuts will come in other regions as well. “We are not through,” said Dr. Neumann. “We are currently analyzing North America, and we will see what needs to be done there. If businesses there aren’t returning a profit, we will have to look at our manufacturing footprint and general administrative costs.”

Continental will look for opportunities where it can stop redundant development activities, but these actions won’t necessarily reduce employment. For example, both Continental and Siemens VDO have telematics developments underway and, according to Dr. Neumann, “along with the Wedge Brake, Siemens VDO developed a complete electronic stability control algorithm. Continental is the market leader in ESC, so we don’t need someone to reinvent it. And both companies have worked on camera-based, next generation vehicle safety systems. So as quickly as we can, we will migrate this into one technology and one platform and then we won’t need so many engineers on that one thing. There are many places where you find that you can save engineering resources but we need them desperately elsewhere.”

Continental had 18,000 engineers after the merger with Siemens VDO and hopes to keep them all, though some will be re-assigned or relocated to places of greater need. With the integration of Siemens VDO, Continental's R & D investments will rise to 6% of sales in 2008, but the company will try to reduce that percentage beginning in 2009.

While the company won’t completely rule out making a small acquisition if the right opportunity comes along, buying another large automotive company is highly unlikely anytime soon. It will take at least until the end of 2010 for Continental to pay down enough debt to bring its debt-to-equity ratio within its targeted range of 80% to 100%. Continental’s debt to equity ratio stands at 159%.

A nd further, the company has a stated objective not to let its automotive systems businesses exceed 60% of total sales. Continental’s three automotive divisions currently account for 64% of sales. Continental believes its product portfolio is complete. “I don’t see at this moment any strategic gaps we desperately need to close,” declared Dr. Neumann.

Product Strategy

While Continental’s electrical and electronics product line is very broad, it does not intend to cover all possible products—for example, the company does not make headlights. And in December 2007, Continental sold to Brose the electric motor drive business acquired from Siemens VDO and its own cooling-fan business, two businesses with about 740 million euros in combined sales and 4,200 employees. Continental will likely divest other businesses that don’t fit its strategy, but none as big as the motor business.

In deciding which businesses to keep and in which technologies to invest, Continental is most likely to support projects and product lines that mesh with what it sees as the four biggest trends driving the auto industry.

◆ Consumers and regulators are demanding more safety systems, both active and passive. For example, the European Commission has set a goal of reducing the number of people killed in car accidents in Europe from around 40,000 per year to 20,000 by 2010.

◆ Consumers and regulators are demanding vehicles that are more energy
efficient and produce fewer harmful emissions. The European Commission's goal is to reduce CO₂ emissions to 120 g/km by 2012 and further to 95 g/km by 2020. Today's ratio is much higher at 163 g/km. The United States recently passed legislation requiring an increase in corporate average fuel economy (CAFE) to 35 mpg by 2020, which corresponds to a CO₂ reduction from 219 g/km to 156 g/km.

- Demand is growing for infotainment and telematics systems that connect the vehicle and its passengers to the world outside.
- Growth in demand for more affordable cars is reaching double digits, especially in China and India, but also in Brazil and Russia. “By 2016 we are expecting Asia to annually produce 15 million to 16 million more cars per year than they produce today,” said Dr. N. eumann. “Many of these will be low cost cars, so we are preparing ourselves to understand the requirements and to have products that can go into these markets.”

Promising Pre-Development Projects
We asked Dr. N. eumann to list some of the most promising pre-development projects underway at Continental in terms of expected sales.
- Continental is developing a turbocharger, from scratch, which will be ready for production in two years. “We think the future of powertrain is direct injection and downsizing, and that means turbocharging,” he said.
- Continental’s lithium-ion batteries will be used on the new Mercedes-Benz S400 BlueHybrid, the world’s first volume production car to use lithium-ion batteries. Production of the battery systems will begin at the end of 2008; the vehicle launch is scheduled for calendar 2009. Continental will also supply the power inverter and DC/DC converter.
- Continental is one of two lithium-ion battery partners with GM for the Volt plug-in hybrid vehicle. Continental will provide the battery pack and electronic controls for lithium-ion cells developed by A 123 Systems. The other team developing batteries for the Volt is LG Chem and its subsidiary Compact Power Inc.
- Continental already builds the portable device connectivity hardware platform for the Ford Sync, and it is developing technology that will let smartphone-based navigation systems play on the vehicle’s human machine interfaces.

Looking East
While Continental can technically count every major carmaker in the world as a customer, its top eight customers and 89% of sales come from carmakers based in Europe and the United States. Home to some of the world’s fastest-growing economies and 40% of the world’s light vehicle production, Asia accounted for just 8% of Continental’s sales in 2007. But Continental aims to change that imbalance by sharply focusing resources on carmakers producing vehicles in the region, especially those in China, but also in Japan, Korea and India. The company’s goal is to have Asia account for 20% to 25% of sales by 2015—a very aggressive target.

The company is establishing its Asia automotive division headquarters at a new development center in Shanghai, China. By May 2009 the center will employ 900 people.

Continental is a major supplier to Honda or Toyota, the world’s two most demanding carmakers. Strengthened by their experience in supplying high quality, high value parts, Honda’s and Toyota’s major suppliers are far more likely to win new business at Western carmakers than Western suppliers are to win at Toyota or Honda. As a result, in some of its product lines Continental will be hard pressed to maintain its share of business with customers who are open to using Honda’s and Toyota’s suppliers. For example, Continental’s infotainment business with German carmakers will see plenty of competition from Alpine, Denso, Aisin Seiki and several other strong Japanese suppliers.
2007 Supplier Roundup: Delphi, TRW Automotive, Visteon

Delphi Corp.
2007 Sales: $22,283 million
Change from 2006: down 2.0%
2007 Net Loss: $3.1 billion; net loss in 2006 was $5.5 billion.
Net Sales by Segment
Electronics and Safety: $5,035 million, with $63 million in operating income
Change from 2006: down 1.1%, although sales to GM rose slightly
Powertrain Systems: $5,663 million; operating loss of $276 million
Change from 2006: up 1.8%, due mostly to favorable exchange rates
Electrical/Electronic Architecture: $5,968 million; operating loss was $36 million
Change from 2006: up 11.2% due primarily to increased volume outside North America
Thermal Systems: $2,412 million; operating loss was $29 million
Change from 2006: down 7.5% due to decreased volume and price cuts
Automotive Holdings Group: $2,946 million, with operating loss of $393 million
Change from 2006: down 19.0% due to lower volumes and price reductions

Sales to General Motors accounted for $8.3 billion, or 37%, of Delphi's sales in 2007. Delphi predicts sales to non-GM customers will grow by more than 9% per year from 2008 through 2011 but non-GM sales have increased by just 4% annually since 2005. Delphi's 10-K notes that sales to GM have been declining mainly because of GM's North American production cutbacks, price reductions and Delphi's exit from unprofitable businesses.

In 2007 Delphi sold its North American braking business to TRW; the interiors business was sold to Inteva, a unit of the privately held Renco Group. Sale of the global steering business to Platinum Equity was approved by the bankruptcy court in February 2008. Wheel bearings operations will be sold to Michigan-based Kyklos Inc. Delphi's battery business went to Johnson Controls in 2005.

Delphi is looking to raise $6.1 billion to exit bankruptcy by the end of March 2008, but facing today's tight credit market, the company recently requested a two-month extension. If the $6.1 billion exit financing is not secured by April 5, 2008, a separate financing commitment from private equity investors in the amount of $2.55 billion could be withdrawn. GM agreed to take on more than $2 billion in loans to Delphi.

TRW Automotive
2007 Sales: $14,702 million
Change from 2006: up 11.9%. Excluding the benefit of foreign currency exchange rates, sales increased 5.3%.
2007 Net Profit: $90 million, or 0.6% of sales, compared with $176 million in earnings in 2006

Outlook for 2008: TRW expects sales in the range of $15.6 billion to $16 billion, with significant growth coming from module business as a result of the acquisition of some Delphi braking operations. Growth in Europe and Asia will be offset by lower production volumes at the Detroit carmakers, especially in the first half of 2008.

Standard & Poor's Credit Rating: BB+/Stable, S&P's highest junk bond rating

Broken down by segment, Chassis Systems accounted for 54.4% of total sales; Occupant Safety Systems accounted for 32.1%; and the Automotive Components segment (engine valves, body controls, engineered fasteners and components) contributed 13.5%. Eighty-six percent of sales were to major OEM customers. TRW's largest OEM customer is Volkswagen Group, followed by Ford (14.5%) and General Motors (10.1%). European customers accounted for 57% of sales in 2007. Eight percent of sales are to the aftermarket.

A s a result of a secondary stock offering on May 29, 2007, the Blackstone Group reduced its ownership of TRW Automotive shares from 56% to approximately 46%.

Visteon
2007 Net Sales: $11,266 million
Change from 2006: Flat
2007 Net Loss: $372 million, more than double the net loss in 2006 of $163 million

Outlook for 2008: Visteon expects product sales of approximately $9.7 billion, compared with $10.7 billion in product sales in 2007.

Standard & Poor's Credit Rating: B/Negative/B-3

Visteon's three major product groups, Climate, Electronics and Interiors, accounted for 89% of total sales in 2007. Electronics accounted for 31% of sales, Climate for 30%; and Interiors for 28% of total sales.

Visteon's former parent company, Ford, remains its largest customer, accounting for 39% of sales (not including sales to Mazda) compared with 45% of total sales in 2006. Hyundai/Kia is Visteon's second largest customer, accounting for 15% of sales, followed by Renault, with 11% of total sales.

In dollars, sales to Ford were down 15% in 2007 largely due to Ford's 6% lower production volume in North America. By 2010, Visteon says, sales to Ford globally will account for 24% of total sales, with just 6% of total sales going to Ford North America.

Geographically, sales in North America and Europe are about the same, 37% and 36% respectively. Asia accounts for 27%, mostly Korea.

During the past year, Visteon secured approximately $1 billion in new business wins—25% in Asia and the remainder split equally between North America and Europe. The Climate product group will have 40% of the new business wins; Interiors, 38%; and 22% is attributable to the Electronics product group. According to a Visteon presentation to automotive analysts in January 2008, re-sourcing by Ford will far offset new electronics business, resulting in a $370 million net loss of business for the Electronics group over the next three years.

Sales for the Electronics group rose 4% over the prior year, to $3.5 billion, due to increased Ford production volume in Europe. Price reductions to Ford were offset by favorable currency rates. Gross margin for Electronics was 7.2%.

A s a part of Visteon's ongoing restructuring, three facilities were closed and four were sold in 2007. The company continues to move both manufacturing and engineering to low labor cost countries. The percentage of engineers employed in high labor cost countries decreased by 16%.