Harman Infotainment Strategy

Leverages the Cloud from Entry-Level to Premium; Seeks ADAS, HUD and Clusters Business

There are numerous challenges facing infotainment suppliers. Competition is intense. Entry barriers are low and exit barriers are high. There are far too many suppliers—24 the last time I checked, compared with just three major airbag system suppliers. If that isn’t bad enough, there is additional competition from smartphones, which many drivers believe are adequate for navigation, accessing location-based services, or streaming Internet content.

Investment managers have been asking me about these and many other challenges facing Harman International and its competitors. I recently had the opportunity to present some hard questions to Kele Shen, senior vice president at Harman in charge of global R&D for the infotainment division. Mr. Shen has been with Harman for ten years, having started out in Farmington Hills for six years, followed by two years in China setting up an R&D center there. He has been in his current position for the past two years.

How is Harman holding up against threats from Apple and Google?

According to Mr. Shen, smartphones are a good solution when the car is at a standstill. “But when the car is going 70 mph, it is a completely different environment. At that speed you need different technologies to provide the same intuitive user experience. You need to adapt the system design and the HMI to the car-specific environment. We see the smartphone not as competition but rather as a great addition to infotainment, a value add and a pipe to the cloud.”

Traction Motors—IPM Machines Rule, Despite Scarcity of Dysprosium

Of the three main components of electric and hybrid vehicles—batteries, power electronics and traction motors—traction motors get the least attention. They are not as sexy; they have no semiconductors and no software. Electric motors have been around since the dawn of electrical engineering, so the technology should by now be settled. And yet, there is much here that’s interesting and possibly some money to be made, eventually, given the long-term inevitability of electric-motor-driven powertrains.

General Motors believes the traction motor is so fundamental to the essence of its electric and hybrid vehicles that it not only designs them in house but will manufacture a significant percentage of them itself. “The electric machine gives the vehicle a lot of its character,” said Peter Savagian, GM’s general director of electrification and electric drive systems. “It is also a costly component that needs to be as reliable as it can be. While electric machines have been all around us for many years, they haven’t been applied to automobiles for traction until very recently. There are some specific things in the technology that we wanted to make sure we understood and could drive to make the right kind of machine. We couldn’t gain that level of understanding unless we did it ourselves.” The first motor that GM will manufacture is for the 2014 Chevrolet Spark EV. The GM-designed motor for the Volt is built by Hitachi.

Like most other carmakers, GM’s motor of choice is an interior permanent magnet (IPM) type, because that technology produces a machine that is efficient, affordable, lightweight and compact. The Spark EV’s traction motor measures just 125mm (4.9 inches) long by 213mm (8.4 inches) in diameter.

Laura Marlino is deputy director of the Power Electronics and Electrical Machinery Research Group at the Oak Ridge National Laboratory. “The IPM machine has embedded rare-earth permanent magnets in the rotor, so it produces reluctance as well as magnetic torque. You get a combination of two torque-producing agents. That’s what gives it its power density,” she said.

But the thing that makes IPM motors desirable can be very costly to source: rare-earth magnets, a product that has drawn a lot of media attention recently. “Everything has been driven for the past two years by the commodity prices of neodymium and dysprosium. That still holds a large sway over what is going on with traction motors,” said professor Thomas Jahns, co-director of WEMPEC, the Wisconsin Electric Machines and Power Electronics Consortium, an engineering research group at the University of Wisconsin at Madison supported by more than 80 corporate sponsors.

Other than the magnets, the primary materials that comprise IPM motors—custom-alloyed steel and copper—are pretty easy to source. But the rare-earth materials are a different story altogether. To get that story we went to Steve Constantinides, director of technology for Arnold Magnetics Technologies, who Oak Ridge Laboratory’s Ms. Marlino describes as “the go-to man on all issues with rare-earth magnets.” I asked him if the hybrid and electric-vehicle industry is still having big problems with rare-earth magnets.

“Yes,” he said. “When you put a traction drive motor in a vehicle, you want it to have as small a volume and be as light as possible. The strongest magnets we have today, at least at room temperature, are neodymium iron boron magnets; let’s call them neo magnets. Neo magnets are made from neodymium, rare earth iron, boron and possibly a small amount of co-

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Despite smartphones, Harman expects infotainment system penetration will continue to increase for some time. “Smartphone users especially like our TFT color displays and all the features that come with them,” said Mr. Shen.

How might Harman profit as infotainment data and computing moves to the cloud?

The definition of an infotainment system has expanded. It is no longer just a matter of the components in the vehicle—the head unit, display, silver boxes, speakers and other wired electronics. Internet-based content and computing resources are essential for infotainment today. “We now offer end-to-end solutions. It is not just the device [head-unit] end, it is also the cloud,” said Mr. Shen. “When you enlarge the definition of infotainment with cloud services, then the infotainment market grows, and we grow with it.”

What comprises Harman’s cloud services capability?

“The assets are mostly software as well as an understanding of cloud services. We acquired Aha Mobile in 2010. That was the first asset. The second was Interchain Solution, an Indian company we acquired in August 2012,” Mr. Shen said. Based in Bangalore, Interchain provides fleet tracking, connectivity, telematics and Android-based infotainment solutions to OEM customers.

The Aha content aggregation service uses the Harman Cloud Platform to enable Web-based entertainment and information in a radio-like format. By the end of 2013, ten carmakers will have installed Aha in their vehicles. More than 30,000 Aha stations are currently available.

Harman recently introduced another cloud-based service called Harman Insight, which will collect information from vehicles for analysis in the cloud.

Mr. Shen explained: “With this product, carmakers can get valuable insights about how customers are using their vehicles. For example, they can track which specific types of smartphones are getting paired to their vehicles or how often certain features are being used. Carmakers wondering whether to install CD players in future vehicles can get data about CD usage.”

Nearly 100 people at Harman are engaged exclusively in cloud services.

How is Harman responding to the trend at some OEMs, for example, Audi, GM, Ford and Toyota, to bring some infotainment system integration in house?

“With everybody you just mentioned, except for Ford, we are part of their solution. And while average selling prices may be lower when we don’t do the systems integration, our development costs are also lower, so business-wise it is okay for us,” explained Mr. Shen. According to Audi, Harman gets between €150 and €300 for the head unit that is part of Audi’s high-end MIB platform, which was developed in house with Elektrobit.

As infotainment systems have gotten more and more complex, tier-one suppliers have had a tendency to underestimate development costs, negatively affecting margins. What is Harman’s answer to this?

First, Harman has been basing more of its proposals on scalable architectures that minimize the amount of customization required. Its infotainment sales backlog shows bookings that increasingly de-emphasize custom business. Harman’s custom business shows EBIT margins ranging from 6% to 8%, while sales based on scalable platforms anticipate margins between 9% and 11%.

Second, the company continues to reduce its engineering cost by locating engineering in low-cost countries. After disappointing results in its second quarter, Harman announced at the end of January 2013 that it will eliminate 500 jobs in high-cost countries. “Our ability to lower development costs is the reason we have been able to continue to serve the premium segment,” said Mr. Shen.

The penetration of embedded infotainment systems will eventually plateau. Harman has shown an interest in clusters, head-up displays and ADAS (advanced driver assistance systems). What specifically are your aims here?

“We have the ambition to enter the head-up display business, not simply to make another head-up display, but to provide the whole system solution: the head unit, the head-up display, and the instrument cluster. The future of infotainment is not just one display; it is multiple displays. You have to have a platform to support multiple displays so all the information can be shared.”

At the Consumer Electronics Show in January, Harman presented a working head-up display it built with Texas Instruments based on TI’s DLP (Digital Light Processing) projection technology. “We are using DLP technology to increase the image size. Imagine a field of view where you have three or four lanes. If you are doing augmented reality, you want to be able to show an arrow that goes all the way from your lane to the exit,” Mr. Shen explained.

Harman also wants to provide ADAS solutions. “As an extension of the head unit we would handle system integration including image processing for collision warning, object detection and lane departure warning based on lane detection,” Mr. Shen said.

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The problem with neo magnets is not neodymium. One of the materials we add to neo magnets to get them to perform at elevated temperatures is dysprosium, and dysprosium is truly in short supply.

Hybrid vehicles’ traction motors use an average of about one kilogram of neo magnets. Dysprosium metal accounts for between 8% and 11% of that weight, or 80 to 110 grams of dysprosium per motor. When the price of dysprosium spiked in 2011 to a high of nearly $2,700 per kilogram, the dysprosium needed for a singletraction motor shot up to as much as $297. In January 2013, it was back down to about $600 per kilogram or $66 for the dysprosium needed for a traction motor.

All dysprosium comes from China. According to Mr. Constantinides, the price bubble wasn’t necessarily caused by manipulation by the Chinese government, though it might have been. It started during the rebound from the Great Recession as demand for rare earth magnets, not only from the auto industry but also from wind power and other industries, accelerated in 2010. “Stockpiling and commodities speculation in China and in the West drove the price up quickly, creating a bubble. When the bubble finally burst, China shut down some mines for a period of time in order to stabilize prices. But prices kept dropping because so much supply was built up in the system,” Mr. Constantinides explained.

Even though the price of dysprosium has stabilized, some in the industry, Mr. Constantinides among them, are concerned that the shortage of dysprosium will be ongoing. “There are very few places on earth where dysprosium is concentrated enough to make it commercially viable to mine. Even though the market has corrected, we still don’t have enough dysprosium. That is a problem now, it will be a problem tomorrow, and it will be a problem ten years from now,” he said.

**Alternatives: Motors That Use Less Dysprosium, or None**

Because of their high efficiency and performance characteristics, the automotive industry will continue to rely on rare earth magnet motors. Still, the research community is hard at work looking for ways to either get by with less dysprosium or to improve the performance of non-permanent magnet motors.

“Times could not be better for machine designers,” enthused WEMPEC’s Professor Jahns. “It took quite a long time for a lot of companies to get comfortable with the idea of permanent magnet machines and now all of a sudden, there is a flurry of activity looking at a variety of other types of machines. The dysprosium price bubble was a huge wakeup call, especially for the Japanese, given their historical relationship with China. To a greater or lesser extent, that is happening with all of the world’s manufacturers. They see themselves as vulnerable to forces beyond their control and want to be ready should another sourcing problem occur.”

A number of alternative machines are in the works. In an email, Ms. Marlino wrote: “If we again see a rise in magnet prices, a return to induction motor machines may be on the horizon. Some OEMs are doing research on induction motors to try and achieve higher levels of efficiency. Induction motors with copper rotors are currently being used in Tesla EVs. Toyota announced that they will be using a modified induction motor in the future. While induction motors have lower power densities than permanent magnet machines, their costs are lower. Other alternatives include switched reluctance and synchronous reluctance machines but problems such as acoustic noise, cogging torque, lower power densities and the need for different drive electronics make them less desirable.”

Rather than opting for a non-permanent magnet motor, General Motors’ high-saliency IPM design minimizes the use of rare-earth magnets. “In an interior permanent magnet motor a portion of the torque is generated through magnetic flux linkage. Another portion is created through reluctance. Our motor gets its torque using a larger portion of reluctance—essentially a free kind of torque, which allows us to use fewer magnets,” noted Mr. Savagian. While he wants to further reduce or even eliminate the use of rare-earth magnets in GM’s traction motors, Mr. Savagian does not see their continued use as a “grave concern.”

Another approach to reducing the amount of dysprosium required is to design machines that put less magnetic stress on the magnets, according to Professor Jahns. “Too much stress can move the magnets towards demagnetization. Designers resist stress by making the magnets thicker, but if you could design a machine so the magnets aren’t stressed so heavily, you could get by with magnets that don’t need as much dysprosium,” he said.

**Hybrid EV Market Underwhelms**

A big cloud hanging over the market for traction motors, especially for non-Japanese suppliers, is the lack of strong demand for electric and hybrid vehicles, other than those made by Toyota. In the U.S. alone, Toyota sold 314,477 hybrids and 12,942 PHEVs in 2012, compared with 160,251 hybrids, PHEVs and EVs sold in the U.S. by all other carmakers combined, according to hybridcars.com. Even by 2020, hybrids are expected to account for just 2.1% of the global vehicle market, and plug-in vehicles 1.8% according to Pike Research. If the current tendency for carmakers to keep traction motor design and production in house persists, the prospects for many suppliers selling traction motors at high volume are pretty grim.

**Remy International**, the U.S. motor maker spun off from GM, was producing traction motors for GM’s hybrid Tahoe but that business went away. Remy’s IPM motors and alternators feature the company’s proprietary high voltage hairpin design that gives it features not available to other motor makers. And while it has won some commercial launches, including a traction motor for an Alison Transmission parallel hybrid system, the prospects look much better for its smaller motors.

“A few years ago we were getting a lot of interest from hybrid vehicle developers in 30- or 40-kilowatt applications,” said Steve Stover, director of sales and business development for hybrids at Remy. “But now OEMs and tier ones are asking for smaller motors, anywhere from 3 to 10 or 15 kilowatts. We are now being asked to quote a lot of belt starter-alternator motor applications, where the motors are being used not necessarily for traction but to provide some power to the drivetrain.”
The Company Profile... Continental Automotive Group

**Background**

Continental, founded in 1871, was primarily a supplier of tires to the automotive industry until the late 1990s. An automotive systems division was created in 1994 to focus on electronics for braking systems, chassis controls, tire pressure monitoring and air suspension systems. A series of acquisitions between 1998 and 2007 including ITT’s brake and chassis division, Temic Telefunken Microelectronics, Motorola’s automotive electronics business and Siemens VDO broadly expanded Continental’s product portfolio, global footprint and customer base. Today, Continental employs approximately 170,000 in 46 countries. Seventy percent of sales are for original equipment, 28% are non-OE. The long-term goal is to raise the non-OE percentage to 40% of total sales. Continental’s tire business accounts for 29% of annual sales.

To finance its acquisition strategy, especially the €10.3 billion purchase of Siemens VDO in 2007, Continental had to borrow billions of euros. Continental reported its net debt at the end of 2008 at €10,483.5 million. Late in 2008, in the midst of the Great Recession, Schaeffler KG purchased 90.2% (49.9% voting rights) of Continental’s stock for €12.7 billion, approximately €75 per share. By late March 2009, the stock was trading at just over €12 per share. At that time, the combined total of Schaeffler’s borrowing and Continental’s debt from the Siemens VDO acquisition was estimated to be roughly €22 billion. In January 2009, Standard & Poor’s downgraded Continental’s credit rating to BB (below investment grade), outlook negative; the rating was further downgraded to B in May 2010.

Through restructuring, five bonds and generating free cash flow, Continental has reduced its net indebtedness to €5.3 billion by year-end 2012. Its share price had risen to €92.17 in early March 2013. Standard & Poor’s still rates the company below investment grade, BB-, but now with outlook positive.

**Interior Division**

◆ New Infotainment Strategy

Infotainment systems have for years been facing increasing price pressures from personal navigation devices and...
more recently smartphones, brought into the vehicle. EBIT margins for Continental’s Interior business unit were below the Continental Group average. And within Interior, the Infotainment and Connectivity business unit has not been as profitable as its three other units (Instrumentation and Driver HMI, Body and Security, and Commercial Vehicles and Aftermarket). One of the difficulties has come from the high end of the market. Complexity and software content in high end infotainment has mushroomed to the point where it is difficult to accurately estimate the amount of R&D required and therefore difficult to quote a project appropriately.

“We were providing very aggressive quotes that often underestimated R&D, and that was giving us comparatively lower margins than our other products,” said Helmut Matschi, member of the Executive Board for Interior. “We had as many as 400 people working on a single project at a cost of around €40 million to €50 million annually.”

Mr. Matschi has been making some changes. For now at least, Continental isn’t pursuing the high end of the market. Instead, it is focused on the mid-range infotainment market characterized by connected head units with color displays, systems that cost between €100 and €350 depending on whether features such as navigation are included. “This is the sweet spot we are locked on right now,” said Mr. Matschi. For each infotainment project it takes on, Continental will limit the size of its R&D staff to between 50 and 100 engineers.

Rather than developing each new infotainment system from the ground up, as often happens at the upper end of the market, Continental has come to the conclusion that the standardization around Genivi does make sense. “Rather than designing every element of an infotainment system from scratch, we can instead focus on enhancing its functionality or creating a driver interface that minimizes distraction,” pointed out Mr. Matschi.

Continental engineers are presently working on one of the world’s first production orders for an infotainment system based on Genivi, which will start shipping in 2014. Genivi is the alliance of carmakers and suppliers led by BMW that is creating a standard open-source infotainment platform. The Genivi platform consists of Linux-based core services, middleware and open application layer interfaces.

Continental says it is agnostic when it comes to the infotainment system operating system and is quite willing to develop systems based on Windows Embedded Automotive, Linux and Genivi. Continental has thus far supplied 22 million telematics boxes, for OnStar and others, which now run on Linux. OnStar’s used to run on a QNX operating system.

Continental had been pushing its own AutoLinq concept (head unit, software and HMI), based on Google’s Android operating system. While Continental is currently shipping AutoLinq to a Chinese customer, its activities based on Android are on a smaller scale.

◆ New Interiors Products

Continental’s innovation programs provide a framework for product development that includes customer input at an early stage. Every new project, including those listed below, requires the participation of at least one lead customer before product development work begins. In exchange for participating in development, lead customers get exclusive rights to manufacturing output for a period of time.

3D Cluster

Continental is working with a lead customer to develop a glasses-free, 3D instrument cluster for a 2016 or 2017 vehicle launch. “Not only does the 3D cluster make the car’s interior more attractive, but it provides measureable safety benefits,” said Ralf Lenninger, head of system development, innovation and strategy for the Interior division. “For example, with adaptive cruise control activated, 3D can graphically convey the distance to the car in front of you much better than 2D can.”
Mercedes installed a 3D cluster in its F125! (125th year anniversary) concept vehicle shown at the 2011 Frankfurt Auto Show. That technology came from SeeFront Gmbh based in Hamburg, Germany, which offers its autostereoscopic 3D technology for license. With this technology, the 3D effect is only visible when the driver's head is in a certain position. A variation of the technology, autostereoscopic with head tracking by a camera, will adapt the 3D effect according to the driver's head position.

Augmented Reality HUD
Continental is working to develop an augmented reality head up display (HUD) solution using two separate HUD units. The first HUD presents a standard sized 5 x 1 degree (202mm x 40nn) image on the windshield that appears virtually 2.5 meters beyond the vehicle’s windshield. The second HUD, used for example to paint virtual navigation arrows on the road ahead, presents a 10 x 4 degree (1,320mm x 538mm) image that appears 7.5 meters beyond the front of the vehicle. The augmented reality HUD could be ready for mass production in 2016.

HUDs promote safety because they keep drivers' eyes on the road where they belong. But they are costly and take up a lot of room in the instrument panel. Each one is at least half the size of a shoebox. Continental expects HUD installation rates in Europe and North America to pick up rapidly in the next five years, reaching more than one million units annually by 2017.

Car Access via NFC Smartphones
Another development project is building secure vehicle access systems based on near field communications (NFC) from authorized smartphones. NFC technology lets smartphones and other enabled devices communicate over short distances (no greater than four centimeters) with other devices containing an NFC tag. NFC tags could be installed in the doors to gain access to the vehicle or on the dashboard to start the vehicle.

“We are developing trusted back-end services with a high level of security in order that the access code sent to the smartphone is not accessible to a hacker,” said Dr. Lenninger. Continental expects to receive a production order for such a system in 2013.

More Tire-Pressure Sensor Functions
Soon, tires from Continental will be available with a pressure sensor fitted directly underneath the tread. The sensor will accurately detect the size of the tire’s contact area, calculate the vehicle load and let the driver know when the vehicle’s payload has been exceeded. Tire load detection will form the basis for further improvements as chassis control functions make use of information about the vehicle's actual weight.

Using conventional tire-pressure sensors, Continental has developed tire-filling assistance systems that inform you when the required tire pressure has been reached. Already in production with an Asian carmaker, the system generates a short acoustic signal during filling once the correct tire pressure has been reached. Continental can also provide tire-filling assistance by means of an app that displays the exact tire pressure on the user's smartphone.

Chassis and Safety Division
◆ ESC
While the bulk of sales made by the Chassis and Safety division come from brake systems, most of the growth in division sales has come from electronic stability control systems, which Continental says are second only to seatbelts in their ability to save lives.

Demand for ESC systems has not yet peaked as governments around the globe increasingly require their adoption. Already required on all vehicles in the U.S., ESC must be installed on new models in Europe since 2011, and on all new vehicles beginning in 2014. In Russia, all new models must be equipped with ESC beginning in 2014, and all new light vehicles in 2016. In Japan, all new models require ESC as of October 2012; the mandate extends to all new passenger cars in 2014. As of 2012, all new vehicles in South Korea must have ESC.

Continental’s second generation ESC system, called ESP II, added steering intervention to the brake and engine intervention accomplished by generation-one stability control. ESP II comes into play in nonhomogeneous friction situations (for example where one side of the road is icy and the other side offers grip) that limit the vehicle’s ability to remain stable by braking alone.

In order to implement steering actuation, a vehicle must have electric power steering. According to Strategy Analytics, EPS was applied to 59% of vehicles in 2012, and will grow to 73% by 2017.

◆ Emergency Braking and Steering
As its ESC business matures, Continental expects three advanced driver assistance products to pick up steam over the coming years: advanced emergency braking systems, followed by advanced emergency braking and steering systems, and lane departure warning.

Continental provides advanced emergency braking systems not only for high-end vehicles but also for entry-level vehicles. At the low end, Continental is already in production with an emergency braking system based on a Lidar infrared sensor that detects obstacles in the range of 10 to 15 meters. Given the sensor's short range, the system is capable of providing full-authority emergency braking only at speeds up to 30 kph. Remarkably inexpensive, the system is available on the Skoda Citigo, for example, for just 150 euros. The Continental emergency
The Company Profile Continued

Distinctions Claimed by Continental

◆ Europe’s second largest auto parts maker
◆ World’s third largest automotive supplier
◆ 20 million instrument clusters produced per year (roughly $1.8 billion worth)
◆ More than 22 million remote car keys sold in 2011

braking system is also available on the Volkswagen Up and Ford Focus. It is standard on some Volvos. Beginning in 2014, Euro NCAP will include emergency braking in its safety assessments. Continental offers both the sensor alone and the complete braking system.

Continental will soon start shipping a stereo camera sensor to Mercedes for its new S class. The Mercedes system accurately senses position and direction of moving pedestrians and will trigger emergency braking to avoid hitting them.

Still in development, Continental is working on an emergency steering system that will automatically change ESC algorithms when an obstacle in front of the vehicle is detected. “Since we know the distance to the obstacle we must detour around, we can support the driver in his steering action toward the optimum path, so it is smooth enough to maintain the grip of the tires,” said Peter Rieth, senior vice president, systems and technology. “We won’t completely overrule the driver’s steering input, rather we will give a steering recommendation. If the driver oversteers or is too hectic, we damp him a little bit. When he is too slow, we nudge the wheel toward the optimum path.”

◆ Automated Driving

By 2016 Continental says it will have a system ready for the highway that is capable of supporting partially automatic driving in traffic jams on the highway. There will be no need to manually control the brakes or the accelerator, no hands on the wheel, but the driver will need to monitor the system and be able to take over the driving task at any moment. The system will have enhanced sensors, possibly including four 25 GHz mid-range radar sensors at the vehicle's four corners, and a forward-looking camera to keep track of lane markings and the vehicle ahead. But the driver still must be in control of the vehicle at all times. “It will provide relief from manual loads but not relief from the driver’s responsibility to monitor the traffic,” cautioned Dr. Rieth. Fully autonomous driving won’t happen before 2025, according to Dr. Reith.

◆ Sign Fusion

Later this year Continental will begin volume production of a camera-based sign-reading system that can process images from multiple signs. “Our cameras already detect traffic signs and speed limits,” said Dr. Rieth, “but now we can integrate images from more than one sign. For example, now we can help avoid those terrible accidents when people enter the highway going the wrong direction. We can now detect those two round red signs with the horizontal bar to the left and right of the road. In addition, we can detect the round blue sign with the white arrow indicating which side of the road you must enter.”

Powertrain Division

The bulk of sales in the Powertrain division comes from gasoline and diesel injection systems, transmission control units, sensors and actuators, and fuel supply units. The division also produces hybrid and electric vehicle systems and components including power electronics, motors and batteries. While Powertrain sales have registered healthy growth in the last three years, profits have not been healthy. EBIT margin in 2010 was 4.2%, and just 0.5% in both 2011 and 2012.

Continental views vehicle electrification, along with exhaust aftertreatment, (especially controllers and sensors), as key product areas for future growth. In electrification, the company is focused mainly on entry level hybrids and plug-in hybrids as well as 48-volt systems. Continental formed a joint venture in 2012 with SK Innovation, of Seoul, South Korea, to develop and manufacture lithium-ion batteries. The new venture, SK Continental E-motion, began operations in January 2013, working initially on development programs in the 48-volt mild hybrid segment and for commercial vehicle applications. Continental owns 49% of the joint venture.

The company also sees opportunity for expanding sales in the BRICs markets and North America. Last year, 52% of Powertrain sales were in Europe, 24% in the NAFTA countries and 23% in Asia.

◆ New Scalable Turbocharger

Working with Ford, Continental developed a new, low-inertia turbocharger for Ford’s one-liter, three-cylinder EcoBoost (Fox) engine for the Ford Focus in Europe, launched in 2012. According to Continental roughly 25% of Focus buyers were opting for the EcoBoost version. The turbocharger was designed for fully automatic assembly, which keeps production costs low and quality levels consistent. The same design can be applied in larger-sized, higher output engines.

According to Continental, the global turbocharger market is about 20 million units; 5 million of them are gasoline engine applications. In 2016, the company sees the market growing to 35 million units, including 15 million for gasoline.

◆ Traction Motors

Continental offers an externally excited synchronous motor, which uses no expensive rare earth metals. Because the field can be weakened or excited on demand, the excitation currents can be tailored for more precise control of the motor. According to Continental, the technology provides “a better overall level of efficiency across the driving cycle for an electric vehicle’s operating range,” compared with internal permanent magnet traction motors. Continental’s is the first externally excited synchronous motor to be used in series production, by Renault.
Roundup 2013: TRW and Magneti Marelli

TRW Automotive

2012 Sales: $16,444 million
Change from 2011: up slightly, by 1.2%
2012 Operating Margin: 6.6%
Outlook for 2013: Little to no overall sales growth is expected in 2013. Revenue in the range of $16.4 billion to $16.7 billion is forecast, based on assumptions that vehicle production will increase by 3% in North America, decrease by 4% in Europe, and expand in China and the rest of the world.

In 2012, 42.5% of TRW sales were in Europe. The company plans to continue restructuring efforts begun in 2012, given the continuing weakness in the European auto industry. TRW is focusing investments in China to support expected growth in that region.

Volkswagen Group was TRW’s largest OEM customer in 2012, accounting for 23.5% of sales. Ford accounted for 17.6% of sales, followed by Chrysler and GM at approximately 10% each.

Chassis Systems remains TRW’s largest product segment, contributing 63% of total sales. Chassis Systems sales were up 3.6%. Occupant Safety products accounted for 20% of sales; Electronics, 6.2%; and Automotive Components, 11% of total sales. Electronics products include passive safety and chassis electronics, RF products, powertrain electronics and active safety systems including ACC and lane-keeping assistance.

Sales in the Electronics segment grew 16.5%, driven in part by increased demand for active safety products. Among new products under development is a pedestrian detection system. Pedestrian protection systems will factor into the new Euro NCAP safety ratings.

In July 2012, TRW’s German subsidiary pleaded guilty to occupant safety product price fixing charges brought by the U.S. Department of Justice and agreed to pay a $5.1 million penalty.

Magneti Marelli

2012 Sales: €5,828 million
Change from 2011: down by 0.5%
2012 EBIT Margin: 2.2%, compared with 0.2% in 2011 (which resulted from some unusual charges).

Magneti Marelli’s Lighting division sales increased 13%; Electronics Systems sales grew a healthy 21%, and Aftermarket sales showed 2% growth. All the other business lines, Engine Controls, Suspension Systems, Shock Absorbers, Exhaust Systems and Plastic Components and Modules, saw sales decline, especially in Europe and Brazil.

Growth in Electronics was driven by strong sales of telematics and body electronics products and increased business with Chrysler, PSA and Daimler.

Harman...

Harman has already booked a contract to develop a rear-facing parking-assist system. The company is doing the image processing and object detection algorithms. “If there is anything behind you that we think you are going to hit, we warn you,” Mr. Shen said. “The idea at the low end is to leverage the smartphone. Besides traditional AM/FM radio and maybe a CD mechanism, this platform provides navigation and online streaming, but presents the information safely in a more convenient and comfortable way. For example, the music is streamed through the speakers using our audio algorithms to make it sound better. You don’t have to touch the smartphone; you use the buttons on the radio. Voice announcements for navigation come over the speakers; turn-by-turn icons appear on the head unit. In most cases you don’t even have to look at the smartphone.”

Light Vehicle Sales in 2012 and 2013

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Source: LMC Automotive

Without strong sales in Germany, North America and China, conditions in the European market would have brought sales down even further, according to Fiat Group’s annual report. (Magneti Marelli is one of three subsidiaries that comprise Fiat’s Components and Production Systems.)

Magneti Marelli’s Lighting division sales increased 13%; Electronics Systems sales grew a healthy 21%, and Aftermarket sales showed 2% growth. All the other business lines, Engine Controls, Suspension Systems, Shock Absorbers, Exhaust Systems and Plastic Components and Modules, saw sales decline, especially in Europe and Brazil.

Growth in Electronics was driven by strong sales of telematics and body electronics products and increased business with Chrysler, PSA and Daimler.

Harman has already booked a contract to develop a rear-facing parking-assist system. The company is doing the image processing and object detection algorithms. “If there is anything behind you that we think you are going to hit, we warn you,” Mr. Shen said. “The idea at the low end is to leverage the smartphone. Besides traditional AM/FM radio and maybe a CD mechanism, this platform provides navigation and online streaming, but presents the information safely in a more convenient and comfortable way. For example, the music is streamed through the speakers using our audio algorithms to make it sound better. You don’t have to touch the smartphone; you use the buttons on the radio. Voice announcements for navigation come over the speakers; turn-by-turn icons appear on the head unit. In most cases you don’t even have to look at the smartphone.”


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