**IBM Targets Warranty Cost Reduction**

Warranty claims will cost the global automotive industry a staggering amount of money: $30 billion in 2007—about 1% to 3% of a carmaker’s revenues. The percentage can vary depending on who’s making the vehicle and how complex it is. According to Warranty Week newsletter (www.warrantyweek.com), GM alone spent $4,463 million on warranty claims in 2006, or 2.6% of automotive revenue; Ford spent $4,106 million in 2006, 2.9% of its automotive revenue.

Warranty claims tend to be higher for American and European carmakers than they are for Japanese carmakers. And, says IBM, warranty claims tend to be higher for vehicles with high electronics and software content, which means that warranty claims will continue to trend upward as electronics and software content trend upward.

But because electronics and software are two subjects that IBM knows a great deal about, the company is confident it can help carmakers get a grip on warranty expenses. IBM believes carmakers can reduce warranty expenses by 20% to 30% just with solutions aimed at the dealer/service network. The first solution addresses the speed with which major quality problems are first noticed, and the second aims at improvements in the way service problems are diagnosed and fixed by the dealer.

**Quality Insight and Early Warning**

“We propose to analyze warranty claims data, field reports, call center information and chat rooms to find the real technical root causes of quality problems,” said Erich Nickel, director of global automotive market sales and services solutions.

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**Consolidation Coming to Infotainment Industry**

Companies with Strong Brands Will Have an Edge

The absorption of Clarion, Xanavi and HCX Corporation into Hitachi, completed in January 2007, is an example of the sort of consolidation that is in store for makers of audio and navigation equipment for carmakers. There are far too many competitors for a market that may be slowing as the penetration of electronics into vehicles levels to around 15% to 30% of the vehicle’s total cost. The percentage varies depending on the type of vehicle, but most are produced with 20% to 25% of their cost from electronics.

On April 26, 2007, Harman International announced it had entered into an agreement to be acquired by Kohlberg Kravis Roberts & Co. (KKR), GS Capital Partners (GSCP) and others in a deal that put Harman into the hands of private equity. Under the terms of the agreement, which valued the company at about $8 billion, Harman shareholders will be entitled to receive $120 for each share of Harman common stock they own. Prior to the deal, the stock had been trading at around $100 a share, down considerably from its all-time high of $130 per share in the fall of 2004.

The stock price was soaring in 2004 after Harman locked up some significant infotainment (audio integrated with navigation) business with Mercedes, BMW and Audi. Since then, Harman booked additional infotainment deals with PSA and Chrysler. But the market began to question Harman’s ability to move much beyond Europe, beyond its German roots. In 1995 Harman acquired German head-unit maker Becker, the technically savvy organization responsible for much of the company’s success in infotainment.

The biggest part of the cost of infotainment systems comes from the navigation system, which usually requires a large, non-volatile memory, color display and a capable 32-bit microcontroller. But the price of navigation is fast declining in the face of competition from makers of portable devices, which sell for one-third the price of embedded navigation. PNDs are taking a large bite out of the infotainment market. Market estimates from Telematics Research Group, TeleAtlas and Canalsys give PNDs an 85% share of navigation unit sales in Europe and North America in 2008.

Founder and executive chairman Sidney Harman has been off-loading his Harman stock at least since the spring of 2002, when he still held about 8% of the company. Before the April LBO, Dr. Harman owned about 5% of the company. After the buyout, his holdings will be about half that amount.

**Turn to Infotainment, page 2**

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**Infotainment Suppliers**

The convergence of the navigation industry with the mobile audio industry has led to a hypercompetitive market with more suppliers than the industry needs. Here, listed alphabetically, are only the major players:

- Aisin Seiki
- Alpine
- Bose
- Delphi
- Denso
- Fujitsu Ten
- Harman International
- Hitachi (Xanavi, Clarion)
- Kenwood
- Magneti Marelli
- Mitsubishi Electric
- Panasonic
- Pioneer
- Siemens VDO
- Sony
- Visteon

*Turn to IBM, page 8*
Yet Another Infotainment Player

Despite the already overcrowded market, Bose Corporation seems intent on moving beyond its audio roots in speakers and amplifiers into infotainment. In March 2007, at the Geneva Auto Show, Bose debuted its new Bose Media System on the Ferrari 612 Scaglietti. The system combines a 5.1 channel surround sound audio system with FM/AM radio, color display, multi-format disc player, XM satellite radio, navigation system with hard drive and connectivity to Bluetooth, iPod and USB 2.0 portable devices. Typical of Bose, the system features a simple-to-use HMI. This device has two knobs, each with intuitive outer and inner controls. Reach for the far knob and its proximity sensor automatically changes the interface displaying only information that’s relevant to that control.

Sony Selected as Audio Supplier to Ford

One of the things that Harman and Bose have in common is strong brands, which is part of the reason why these companies have been successful. In J.D. Power and Associates’ 2006 Global Automotive Branding Study, Bose is ranked number one, while Harman brands, Harman/Kardon, Infinity, JBL and Mark Levinson are ranked number 8, 10, 11 and 13, respectively.

In that survey, Sony is ranked number two, both in the United States and Europe, just behind Bose. Even more impressive, because it wasn’t limited to only the automotive audio product category, Sony topped the list in the annual Harris Poll of best brands for the seventh consecutive year. In that survey of U.S. adults, respondents were asked which three, of all the brands they knew, they considered to be the best.

“Sony is a very strong, well recognized brand,” noted Jim Buczkowski, Ford’s top electrical engineer. “We decided, given the success we’ve had with Sony in Europe, that we wanted to extend our partnership with Sony to North America.”

“In Europe the take-rate on Sony-branded audio has been 30% to 40%, which is higher than the typical 15% to 20%,” said Don Courvisier, vice president and general manager of personal mobile electronics, which is part of the reason why these companies have been successful.

“The Ford Sync portable connectivity platform is a peripheral that is connected to the audio system. Microsoft is responsible for Sync’s software and produced the reference design. The hardware will be supplied by Continental. ◆

J.D. Power and Associates’ 2006 Automotive Audio Brand Scores

<table>
<thead>
<tr>
<th>Brand</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bose</td>
<td>665</td>
</tr>
<tr>
<td>Sony</td>
<td>636</td>
</tr>
<tr>
<td>Pioneer</td>
<td>571</td>
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<tr>
<td>Panasonic</td>
<td>558</td>
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<td>Kenwood</td>
<td>543</td>
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<tr>
<td>Blaupunkt</td>
<td>539</td>
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<tr>
<td>Alpine</td>
<td>534</td>
</tr>
<tr>
<td>Harman/Kardon</td>
<td>529</td>
</tr>
<tr>
<td>JVC</td>
<td>526</td>
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<tr>
<td>Infinity</td>
<td>523</td>
</tr>
<tr>
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<td>Clarion</td>
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<tr>
<td>Alpine</td>
<td>497</td>
</tr>
<tr>
<td>Delphi</td>
<td>493</td>
</tr>
</tbody>
</table>

Source: J.D. Power and Associates’ 2006 Global Automotive Component Branding Study

THE HANSEN REPORT ON AUTOMOTIVE ELECTRONICS

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**Alpine Electronics**

**FY 2007 Net Sales**: ¥265.1 billion ($2.18 billion)

**Change from FY 2006**: up 4.4%

**FY 2007 Net Income**: ¥5.7 billion ($46.8 million), or 2.2% of sales, compared with net income of ¥6.2 billion ($50.9 million) in FY 2006

**FY 2008 Forecast**: ¥255 billion ($2.1 billion), a decline of 3.8%, with net margin falling slightly to 2% of sales. The company has set a target of ¥300 billion ($2.5 billion) in sales by 2010.

The Audio Products segment accounted for 49% of Alpine's sales; Information and Communications, 51%. In Audio Products, sales were nearly flat, due in part to the industry's movement away from stand-alone audio components toward integrated audio navigation systems, according to the company. Sales in the Information and Communications segment increased 8.7%, driven largely by new products introduced in model year 2007 Japanese vehicles.

Sales to U.S. carmakers declined, and Alpine reported that sales of its Blackbird portable navigation system, introduced to the U.S. market at the start of fiscal 2007, "failed to grow."

**Denso Corp.**

**FY 2007 Consolidated Net Sales**: ¥3,609.7 billion ($29.6 billion)

**Change from FY 2006**: up 4.4%

**FY 2007 Net Sales**: ¥93.3 billion ($766.2 million)

**Change from FY 2006**: up 20.3%

**FY 2007 Operating Loss**: ¥1.2 billion ($9.9 million), the third consecutive year of operating losses for AEC

**FY 2008 Forecast**: ¥100 billion ($821.2 million) in sales, with domestic sales falling 2.2% and overseas sales gaining 10.8%. Operating income is forecast at ¥1.4 billion ($11.5 million).

Thirteen percent of Omron Corporation's total sales come from the Automotive Electronic Components business segment, whose main products include keyless entry systems, power window switches, automotive relays, laser radar and tire pressure monitors.

Despite production cuts by North American carmakers, major customers for Omron, sales in the region grew 33% and accounted for 41% of AEC sales in FY 2006, compared with 37% of sales the prior year. The company attributes growth in the region to new product launches, including wireless control devices and power window switches.

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**ESC Installation Rates in Europe**

Electronic stability control installation rates for new car registrations January-June 2006, in France, Italy, Germany, Spain and the United Kingdom

<table>
<thead>
<tr>
<th>By car sector</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini</td>
<td>15%</td>
</tr>
<tr>
<td>Small</td>
<td>12%</td>
</tr>
<tr>
<td>Compact</td>
<td>67%</td>
</tr>
<tr>
<td>Medium</td>
<td>90%</td>
</tr>
<tr>
<td>Upper</td>
<td>100%</td>
</tr>
<tr>
<td>Luxury</td>
<td>99%</td>
</tr>
</tbody>
</table>

Source: Bosch

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NXP Semiconductors

Headquarters: Eindhoven, The Netherlands; telephone +31 40 2745678; www.nxp.com
2006 Sales: €4,960 million ($6,646.4 million)
Operating Loss: €640 million ($857.6 million)
R&D: 20%
Employees: 37,620 as of 3/31/07
Sales per Employee: €131,845 ($176,672)
Net Cash Flow from Operations: €760 million ($1,018.4 million)
Working Capital: €765 million ($1,025.1 million) as of 3/31/07
Long-term Debt: €4,397 million ($5,892 million) as of 3/31/07
Shareholder's Equity: €3,403 million ($4,560 million) as of 3/31/07
2006 Automotive Sales: €804 million ($1,077 million)*
Ownership: 80.1% private equity consortium, 19.9% Philips Electronics

Automotive & Identification Business Unit
Headquarters: Hamburg, Germany; telephone +49 040 5613-0
2006 Sales: €872 million ($1,161.5 million)**
2006 R&D: 17.6% of the business unit's sales
Operating Loss: €105 million ($140.7 million)
Products: Application specific semiconductors
Key Applications: Entertainment, networking, access and immobilization, tire-pressure monitoring, ABS sensors
Key Automotive Customers: Bosch, Delphi, Siemens VDO, Sony and Visteon

*The automotive market accounts for €804 million in sales, very roughly, €600 million of which is reported in the Automotive and Identification business segment.
NXP's other business units account for about €200 million worth of power, small-signal discrete and other semiconductors for automotive.

**Roughly €600 million of this comes from the automotive market.

Background
NXP, with headquarters in Eindhoven, The Netherlands, was spun off from Philips Electronics N.V. on September 29, 2006. Philips sold 80.1% interest in its Semiconductors division to a group of private equity investors led by Kohlberg Kravis Roberts & Co. (KKR). A fter three years of losses, the Semiconductors division had returned to profitability in 2004, reporting income from operations of €430 million that year and €307 million in 2005. The deal with KKR gave NXP an enterprise value of €8,275 million, including debt. The private equity consortium paid for its share of NXP largely with funds borrowed in NXP's name. A s of March 31, 2007, NXP had loaded up its balance sheet with €4,397 million worth of long-term debt. A s a result, its new high-interest bond offerings, which it will use to pay off bridge financing, were rated by Standard & Poor's at BB+ and B+ giving them junk (or non-investment grade) status.

The business that became Philips Semiconductor was founded in 1953; it produced its first integrated circuits in 1965. The company's new name, NXP, is derived from "next experience: enabling the next generation of consumer entertainment products."

Targeting A automotive
"Being from Philips we had an incredible amount of audio and video expertise come with us," explained Willem Bulthuis, NXP vice president of automotive sales and marketing. "Five hundred people from research and 25,000 patents came from Philips to NXP. The company now has a total of about 6,700 engineers, and we will be investing about €1 billion in R&D annually." In 2006, NXP invested 20% of sales on R&D.

Compared with three years ago, NXP has doubled its annual investment in automotive R&D, much of it focused on zero-defect quality initiatives. Before the spin-off, automotive received less than the average the company spent on semiconductor R&D in other segments; after the spin-off, automotive projects receive a greater share than average. Less cyclical than other semiconductor markets, NXP has long-term interests in furthering its automotive business.

Since the spin-off from Philips, NXP is faster on its feet, according to Mr. Bulthuis. In March 2007, NXP acquired the cellular communications business of Austin, Texas-based Silicon Laboratories Inc., and it is more open to making acquisitions. "While it was not in the automotive space, the acquisition of Silicon Labs happened quickly. We are actively looking at acquisitions of companies in the automotive space, smaller companies with an..."
Bulthuis continued: “We offer a complete applications goes well beyond radios. Mr. is embodied in software algorithms that buildings.” Much of NXP’s capability here RF signals bounce back and forth between fast the car is moving or how much the video excellent reception regardless of how possible by such things as our phase diver- noted Mr. Bulthuis. “And that is made

NXP Is First in Car Radio

NXP says it is the world’s top supplier of both car radio DSPs (digital signal processors) and car radio tuners. Indeed, NXP’s Tuner + CarDSP system is designed into radios produced by 15 of the top 18 radio suppliers in the world.

How was that level of adoption achieved? “Our claim to fame over the years has been quality radio reception,” noted M r. Bulthuis. “A nd that is made possible by such things as our phase diversity and multi-tuner solutions, which provide excellent reception regardless of how fast the car is moving or how much the RF signals bounce back and forth between buildings.” Much of NXP’s capability here is embodied in software algorithms that are embedded in the chips its sells.

NXP’s experience in entertainment applications goes well beyond radios. M r. Bulthuis continued: “We offer a complete portfolio of IC products for multimedia, from the antenna to the speaker system, the whole solution. The radio is the heart of the infotainment system in the car—everyone wants a radio. So we build a lot of functionality around the radio, including connectivity [to portable devices], audio amplifiers, power supply, and now video processing, an application that is rapidly expanding.”

Last month NXP announced that Sirius Satellite Radio selected NXP’s N experia PN X 9520 media processor as the key component used to decode Sirius video broadcasts. Sirius Backseat TV will be launched later this year in select 2008 Chrysler, Jeep and Dodge vehicles. The PN X 9520 has been designed into a Sirius system from Delphi. “The main reason the PN X 9520 was selected is the quality of the codecs,” noted Leland Key, senior director of automotive sales and marketing for the Americas. “By that, I mean the way the processor robustly handles errors in the data it receives, especially when the vehicle is moving.” The processor delivers high-quality video through a combination of highly efficient video decoding, advanced video post-processing and graphics acceleration features.

‘This multimedia device is one of our core products. It combines audio, video and connectivity all in one flexible platform,’ added M r. Bulthuis.

continued on following page
The N expieria PN X9520 media processor can support a great deal of functionality including:
- DVD and CD playback
- DVD ROM playback
- HDD video and audio playback
- Multi-speed CD ripping
- Dual video decoding
- JPEG photo browsing
- TV source decoding (DV B-T, ISDB-T, 1-Seg)
- USB stick audio/video streaming
- Audio streaming to headphones via Bluetooth
- Wi-Fi audio/video streaming (DLNA compliant)

NXP is the world's number-two supplier of audio amplifiers for automotive applications. “We accomplished that by knowing how to deal with digital audio and also how to fine-tune amplifier technology,” pointed out M r. Bulthuis. “One of the things we are focusing on right now is Class D amplifiers, which are very powerful, generating up to 130 watts per channel with limited heat. That is especially important because it allows you to integrate the amplifier into the radio—you don’t have to have a separate module stuck under the seat or in the trunk.”

NXP counts among its customers some of the biggest names in car entertainment, including Sony, Panasonic, Alpine and Clarion, companies that normally are more inclined toward buying semiconductor from Japanese suppliers. And one of N XP’s fastest growing customers is Harman/Becker, whose brands include Harman/Kardon and Mark Levinson.

NXP is working on a DSP radio platform that can be customized for different markets and different features entirely through software—so-called software-defined radio. “You can adapt the radio to all kinds of different formats, which are emerging very quickly all over the world,” said Mr. Bulthuis. “Broadcasting standards vary from region to region, and that makes it difficult for the car industry, which must maintain inventories of a lot of different modules.” NXP’s Multi-Standard Audio Receiver will perform according to what NXP software it is running.

The platform will address a range of features and functions: analog and digital radio, a variety of compressed audio and connectivity formats and audio enhancements.

NXP developed a lot of connectivity expertise in its consumer electronics and portable device businesses and believes that USB-based products will continue to move quickly from those markets into automotive applications. “NXP is already selling a lot of USB chips, and we are leveraging that experience with connectivity into the auto industry, where we already have a couple of USB applications,” said M r. Bulthuis. He believes the penetration of USB connectivity will grow from around 10% of new vehicles in 2006 to 50% by 2012.

M r. Bulthuis favors the USB connector over the proprietary iPod connector because the industry must make cars that last for ten years, and USB offers flexible functionality. “Carmakers want a universal connector that is not specific to one brand of portable device.”

Wireless USB could be the next step in connectivity, and it could begin to penetrate automotive applications in 2012. But, because with wireless connectivity you can’t maintain a physical connection to the portable device to keep its battery charged, NXP is investigating wireless charging. It is M r. Bulthuis’ view that wireless USB will co-exist with Bluetooth, which today provides wireless connectivity between portable phones and the vehicle.

W LNA

NXP is hopeful that its association with the DLNA (Digital Living Network Alliance) will lead to further standardization of the way automobiles can safely support the use of portable devices in the vehicle. Mr. Bulthuis explained: “While putting a USB chip into each radio is quite easy to do, the challenge is how to interface on a functional level with all the different portable devices, which is why we joined with Microsoft as one of the founding members of the DLNA. We have formed and are chairing a dedicated automotive working group within the DLNA to discuss with carmakers and Tier Ones the standardization activity taking place in the consumer electronics industry and how we can leverage that in the automotive space.”
In-Vehicle Networking

A demand toward NXP suppliers worldwide shipped a total of 600 million CAN, LIN and FlexRay nodes in 2006. Most of those were high-speed CAN nodes. NXP expects the global market will reach 1 billion nodes in 2010, and by then FlexRay nodes will start to represent a significant portion of the market.

In-vehicle network ICs comprise NXP’s second-largest of five product segments; entertainment is the largest segment. “We have one of the broadest portfolios of networking products in the industry,” declared Mr. Bulthuis. NXP says it’s the world’s top-selling manufacturer of in-vehicle networking ICs—LIN and CAN transceivers, mostly—with more than 50% share of the market. By the end of 2006, NXP shipped a total of 1.5 billion network transceivers. Every major carmaker uses NXP transceivers, says the company. Other networking ICs include a CAN/LIN system basis chip, which is an integrated circuit that integrates several functions that are usually part of an electronic control unit, such as transceiver, voltage regulator, reset circuit and a watchdog circuit.

FlexRay

A founding member of the FlexRay Consortium—together with Freescale, DaimlerChrysler and BMW—NXP was in a good position to win BMW’s first-ever order for FlexRay transceivers and system basis chips. The chips are used in the 2007 BMW X5’s Adaptive Drive system, which combines active roll stabilization with electronic damping control.

In 2000, when the FlexRay partnership was first announced to the world, the intention was to use the network in brake- and steer-by-wire systems, given its time-triggered, deterministic characteristics. But in the initial applications, FlexRay was chosen because of its speed—it is 20 times faster than CAN and may well become a high-speed alternative to CAN. FlexRay offers less complexity when multiple CAN buses are required. BMW has said it plans to deploy FlexRay in all five vehicle domains: infotainment, body, powertrain, airbag and chassis.

Thus far, no other carmaker has gone on record saying exactly when and in which vehicles it intends to put FlexRay into production. However, Nissan, GM, DaimlerChrysler, Honda and Hyundai have all indicated that they would use FlexRay in high volume by 2013 at the very latest.

NXP expects that once the market for FlexRay chips takes off, demand for FlexRay components will begin to outpace demand for CAN components—but that won’t happen for at least ten years. FlexRay will initially be aimed at chassis control and safety applications and at hybrid powertrain applications.

Despite the higher cost of each FlexRay node compared with each CAN node, “ultimately the total cost of systems will be lower with FlexRay than with CAN,” said Mr. Bulthuis. “With FlexRay you can simplify the network topology and reduce the number of nodes.”

Access and Immobilization

Access and immobilization is NXP’s third-largest automotive product group; 50% of all new cars use NXP immobilization technology. The company has shipped more than 100 million RF transponders used in remote keyless entry systems and passive keyless entry systems.

Most cars today come with keys that remotely unlock the vehicle from a few meters away, using one-way communications, but NXP is developing ICs that support two-way car keys where the car can transmit information back to a display on the key fob. “That could tell you, ‘yes, you locked the car,’ or ‘the engine was able to remotely start,’ or ‘yes, there is enough fuel,’ or ‘it is safe to enter your car’,” explained Mr. Bulthuis. Thus far one European top-tier supplier has selected NXP for this application, and together they are pursuing business with carmakers.
for IBM. He observed, "Carmakers have terabytes of warranty claims data just sitting in these data warehouses, and the question is how to analyze such a mountain of data." IBM’s approach to the problem is a two-step process. Step one is integrating all those sources of unstructured textual data, and step two is analyzing the data with so-called text analytics, which is software that extracts concepts, facts, and relationships from text.

"Essentially we take raw data and develop meaningful business information," said Mr. Nickel. "This is the strength of IBM, dealing with mass data, having high-performing systems, not just in hardware, but our intelligent algorithms as well. We have very strong support from IBM Research at the Watson Research Center in Hawthorne, New York."

Analysis of service and maintenance records provides early warning insight into product defects and service issues before they become widespread, thus enabling quicker resolution and lower recall costs.

Mr. Nickel elaborated: "Often the dealer’s service technician simply replaces parts—sometimes two or three—until the problem goes away, and after testing the returned parts you learn that with many of them, there was 'no defect found.' But these parts that were not defective become part of the dealer’s warranty claim."

This is especially problematic when dealing with distributed functions. “For example, in the MOST bus you have a head unit, a navigation system, telephone, radio, DVD player and other parts, all connected to the bus. Then it is very difficult to find the root cause of the problem. In cases such as this, 60% to 70% of the replaced parts might be determined to have 'no defect found,'” he said.

The investment necessary to get up and running with IBM’s quality insight and early warning system depends on how well integrated are the carmaker’s sources of raw data. “We have done pilot projects for the automotive industry that have taken three to four months for a subset of data. But at some companies where the computer systems are not well integrated, where they are not homogeneous from region to region, it could take up to two years and several million dollars of integration work before you begin to get the full results,” cautioned Mr. Nickel.

To make systems integration less costly, IBM suggests using UIMA (Unstructured Information Management Architecture), which is a common standard interface that lets text analytics components from multiple vendors work together. A UIMA software developer’s kit is available from IBM to the general public without charge.

### Parametric Analysis

IBM also wants to help carmakers and commercial fleet operators set up computer systems to analyze parametric data from the vehicle’s sensors while the vehicle is operating on the road. “For example, we might want to analyze a car that malfunctions, not in the shop, but only after it’s been running on the road for a while, a situation that happens quite often, increasingly so in cars with high electronics content,” said Mr. Nickel.

IBM has developed a remote diagnostics system for the U.S. Army to keep track of combat vehicles. So far, that system involves a test fleet of fewer than 100 vehicles. And IBM is working with DaimlerChrysler on a system to monitor a validation fleet of 50 fuel-cell vehicles operating in California, Germany, Japan and elsewhere. That fleet is permanently monitored by means of black box data recorders that can wirelessly transmit data as needed. IBM believes that near- or real-time parametric analysis of malfunctions can lead to faster corrective action and a 5% to 10% reduction in warranty costs.

### Service Bay Diagnostics and Information System

PSA is tackling the “no defect found” problem by means of a service bay diagnostics system, co-developed with IBM, which controls the way service technicians do their job. PSA only allows warranty cost reimbursement to dealers who use the guided-diagnostics system.

Guided by the fault code, the system has the technician start with the lowest-cost potential solution—for instance, a loose electrical connection—not by replacing an expensive part that might have failed. A nother way the system saves money is by focusing on the source of the customer’s complaint, directing the technician right to the malfunctioning area, without taking him through a long, drawn-out diagnostics tree.

The diagnostics system, which PSA began installing at its dealers in 2004 after two years in research, is now in operation at all Peugeot dealers worldwide and is implemented as each new vehicle model is brought to market. With the new system, 90% of vehicle failures get diagnosed in the first-path analysis, which takes less than 15 minutes to complete.

For more information, please contact Erich Nickel at hhnickel@de.ibm.com.