boostermagazine

MAY 2007

TURBOCHARGERS IN GREAT DEMAND

Delivering on Performance and Fuel Efficiency

Honeywell

boostermagazine

On Track

+ According to J.D. Power, U.S. diesel sales are set to grow by over 200 percent from 2006 to 2016, with light diesel vehicle sales increasing to more than 10 percent of the market by the middle of the next decade. America is about to enter a new diesel era…and OEMs are lining up to make their mark.

+ It's time for gasoline powered passenger cars to play their part in CO_2 reduction. There's a new impetus in the development of technology that will help OEMs to deliver unprecedented fuel efficiency, aided in particular by innovative thinking in turbocharging.

+ Whether at home or overseas, Korean OEMs are making a big impact on the SUV marketplace with fuel efficient turbodiesels that pack performance and practicality.

Diesel heavy-duty pickups are gaining in popularity in the U.S. thanks to their great towing capability. Honeywell's AVNT™ technology is fitted on the Duramax engine that powers the best-selling GMC Sierra and Chevrolet Silverado models.

+ Peugeot and Audi are going head-to-head in the world's most famous endurance race at Le Mans…with Honeywell boosting both race teams. At the same time, Ford and Citroën look set for an epic tussle for the manufacturers and drivers' honors in the 2007 World Rally Championship.

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Listening and Learning

Dear Readers:

The automotive industry has long realized the need to balance fuel efficiency and reduced emissions with the need for vehicle performance. However, recently much of the focus of that equation has shifted specifically to CO_2.

Global warming is a complex issue and industry and governments around the world are seeking possible solutions. And while there's no one answer, it's clear that turbocharging can play a valuable role.

On the diesel front, today's turbodiesels deliver remarkable fuel efficiency and reduce CO_2 emissions by up to 30 percent compared to gasoline engines of equivalent power. The impressive pace of technological innovation is capturing the attention of consumers around the world, most notably those in the U.S. where OEMs and consumers are responding positively to today's clean turbodiesels.

On the gasoline side, turbocharging also proves to be a key technology in combating CO_2 emissions. In view of the low penetration of gasoline boosting—11 percent in Europe and much lower in other regions—continued adoption of turbocharging holds great potential benefits. Honeywell's success in diesel technology has laid the foundations for delivering new generation gasoline boosting systems to our customers on a global scale.

As a supplier, we know technology solutions alone don't make a successful partner. This is why we are deploying what we call the Honeywell Operating System to lift our performance to a new level by redefining all our processes in the context of customer requirements.

As emission standards converge around the world, it seems clear that it is global companies—OEMs and their partners alike—who can most immediately effect change. At Honeywell, we are deploying technology, utilizing our first-class processes and taking advantage of our global footprint to support the most dynamic industry in the world.

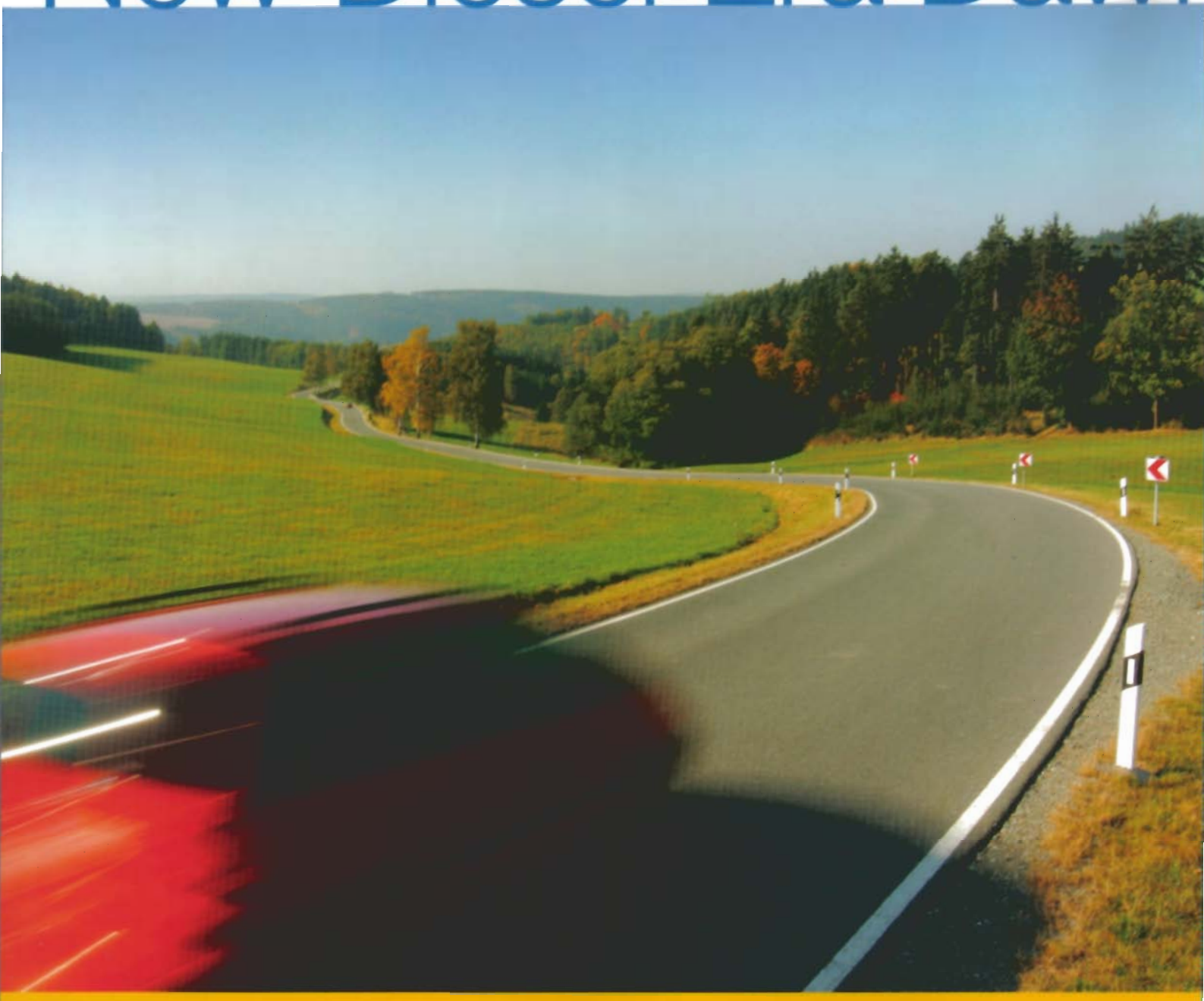
Adriane M. Brown

Adriane Brown
President and CEO
Honeywell Transportation Systems

COVER:
The Mercedes Benz
E320 turbodiesel wit
BLUETEC technolog

+ GLOBAL OEMS VIE FOR POLE POSITION
+ TURBO BOOSTS MARKET GROWTH

New Diesel Era Dawn



Modern diesel engines, aided by advancements in high pressure fuel injection and variable geometry turbochargers, burn, on average, 30 percent less fuel than their gasoline-powered counterparts, with an equivalent reduction in CO_2 emissions.

s In U.S.

According to officials at the U.S. Environmental Projection Agency (EPA), America could save up to 1.4 million barrels of oil each day, an amount equivalent to the oil the country currently imports from Saudi Arabia, if one-third of its cars, pickups and SUVs were diesel-powered.

It's a staggering statistic—but the benefits of diesel technology go way beyond simple fuel economy...and that's why the biggest names in automotive manufacturing right around the world are increasingly focusing attention on switching North American car owners onto the benefits of turbodiesel.

According to J.D. Power, U.S. diesel sales are set to grow by over 200 percent from 2006 to 2016. The influential marketing information firm is also predicting that U.S. light diesel vehicles will increase to more than 10 percent of the market by the middle of the next decade from just over 3 percent in 2005.

"We stand on the threshold of a new diesel era in the U.S.," says Alex Ismail, President of Passenger Vehicles at Honeywell Turbo Technologies, "and Honeywell is perfectly placed to help drive clean diesel technologies through both its proven technology portfolio and its global footprint."

The catalyst for diesel adoption in the U.S. is coming from all quarters—from the proposed toughening of the CAFE standards by about 4 percent per year for 2010 model cars and 2012 model trucks, through to growing regulatory pressure on OEMs to cut emissions. Add in the widespread availability of Ultra Low Sulfur Diesel (ULSD) fuel, which is designed to reduce NOx emissions, and it's clear that a new diesel era really is about to dawn in the U.S.

According to the news reports, Mercedes Benz is planning to offer its much touted BLUETEC diesel engine in the M-, R- and GL-class SUVs starting in 2008, closely followed by Audi with a Q7 3.0-liter TDI SUV. Then there's Volkswagen—a longtime proponent of diesel technology—with the Jetta TDI.

The *New York Times* reports that in 2009 Honda will unveil a sedan with a super clean 4-cylinder diesel engine. The automaker is also working on a bigger V6 diesel system for SUVs.

"We stand on the threshold of a new diesel era in the U.S."

DaimlerChrysler, another staunch supporter of clean diesel technology, is reportedly launching a turbodiesel Dodge Ram light duty pick-up for 2010 that will meet emissions standards in all 50 states. Other sources state DaimlerChrysler is also considering selling diesel-powered minivans as early as 2010. In addition, Ford, Toyota, Mitsubishi Motors and Nissan have also recently made claims that they plan to roll out ultra-clean diesel models in the U.S. over the next few years.

Ricardo's Take on U.S. Diesel

The major driver for growing diesel penetration in the U.S., according to Ian J. Penny, Director of Light Duty Diesel Global Product Group at Ricardo, is "performance without compromise"—improved driveability and better fuel economy.

Ricardo sees the market developing rapidly as consumer choices explode over the next 2-4 years. Three very clear segments are emerging that reflect the global and local US market development. Firstly, there is a focus on 4-5 liter V engines for use in large pickups and SUVs—a natural extension of the existing >8500lb GVW diesel segment. Secondly there is a 3 liter 6 cylinder segment emerging for both mainstream and premium brand applications. Finally there is a significant increase in 2 liter 4 cylinder applications often seen in global/European vehicles.

"From this analysis we concluded that diesel would co-exist with advanced gasoline and hybrid powertrains in the U.S. with a natural 10-15 percent penetration," commented Mr. Penny.

Mr. Penny predicts that these applications will see a full range of turbocharger systems from advanced single stage with high and low pressure EGR to complex sequential systems offering power and emissions capability. "In future we will remove the diesel engine from the environmental debate by achieving the emission standards as low as the best gasoline and hybrid powertrains."

+ TURBODIESEL FLEXES ITS MUSCLE
+ VNT™ THIRD GENERATION ENABLES BLUETEC

The Turbodiesel Adva

Today's advanced clean diesel technology offers American consumers a fuel-sipping alternative that does not sacrifice power or performance.

New data from R.L. Polk & company show that annual registration of diesel passenger vehicles in the U.S. has grown 80 percent since 2000, from 301,000 vehicles to nearly *550,000 in 2005*. Thirty one percent of this growth came in the past year alone.

Modern diesels are extremely quiet and feature superior driveability and performance—as the direct comparison with their gasoline counterparts will testify.

ntage

2007 MERCEDES-BENZ E320 BLUETEC SEDAN

	Diesel Model	Gas Model
Powertrain	2987cc DOHC 24-valve V6	3498cc DOHC 24-valve V6
Max. Torque	526Nm @ 1600-2400rpm	350Nm @ 2400 - 5000rpm
Max. Horsepower	208hp @ 3800rpm	268hp @ 6000rpm
Fuel Economy (mpg)		
City	26	19
Highway	37	26
Turbo	GTB2056V VNT™ turbo	N/A

2007 JEEP GRAND CHEROKEE CRD

	Diesel Model	Gas Model
Powertrain	3.0L CRD	4.7L V8
Max. Torque	510Nm @ 1600-2800rpm	305Nm @ 3600rpm
Max. Horsepower	215hp @ 3800rpm	235hp @ 4500rpm
Fuel Economy (mpg)		
City	19	15
Highway	23	20
Turbo	GTA2052V VNT™ turbo	N/A

2007 VOLKSWAGEN TOUAREG V10 TDI

	Diesel Model	Gas Model
Powertrain	5.0L V10	4.2L V8
Max. Torque	750Nm	302Nm
Max. Horsepower	310hp	350hp
Fuel Economy (mpg)		
City	17	14
Highway	22	18
Turbo	GT2056V VNT™ turbo	N/A

The Diesel Play by Honda

As the first major carmaker to introduce a hybrid in the U.S., Honda's decision to burnish its green image by introducing a diesel Civic has been surprising news for many industry watchers.

By 2009, Honda plans to sell "clean diesels" that will deliver 30 percent better fuel efficiency than gasoline models. "We're leading the way to cleaner diesel engines," says Honda Chief Executive Takeo Fukui as quoted in *BusinessWeek* magazine last October.

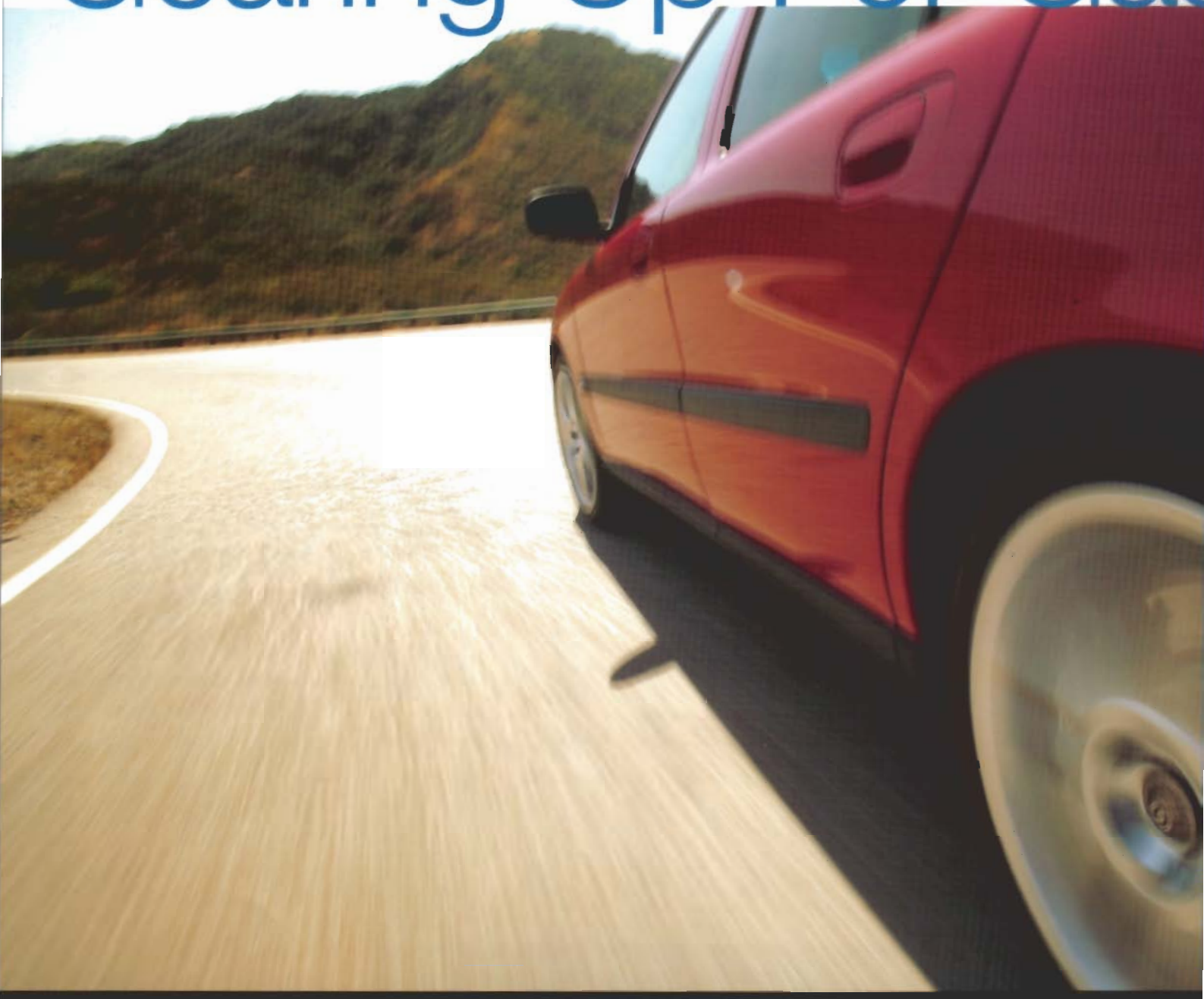
According to the *BusinessWeek* article, Honda's engines will be equipped with a catalytic converter that filters out enough nitrogen oxide (NOx) emissions to meet California's new standards, which are currently the most stringent in the country.

Unlike BLUETEC currently available on Mercedes-Benz models, Honda's diesel engine doesn't require a separate tank of urea. "Instead, its diesel converts some of the NOx into ammonia, then recombines that with what's left of the NOx to make relatively harmless nitrogen," according to *BusinessWeek*.

Honda says that its technology will reduce exhaust emissions to levels comparable to gasoline engines.

+ HONEYWELL TO LAUNCH GASOLINE PROGRAMS AROUND THE WORLD
+ FUEL ECONOMY AND CO_2 REDUCTION DRIVE NEXT GENERATION TECHNOLOGIES

Gearing Up For Gas



In 1962, the Oldsmobile Jetfire Rocket became the world's first turbocharged gasoline passenger car.

It was a landmark moment for Honeywell — and for the automotive industry — and 45 years later turbocharging is acknowledged as a core technology for improving fuel economy and reducing CO_2.

oline

Indeed, Honeywell's gasoline boosting expertise will play a critical role in supporting OEMs as they tackle some of the biggest challenges ever faced by the industry.

Currently, the company is partnering with global automotive manufacturers in numerous key gasoline engine programs, reflecting industry-wide recognition of Honeywell's technology prowess and the company's growing presence in gasoline boosting.

The potential for fuel economy improvement in gasoline is huge. As an example, today only 11percent of the gasoline engines produced in Europe are turbocharged, yet this technology, when combined with direct fuel injection, can provide fuel consumption improvement of 15-20 percent compared to the equivalent naturally-aspirated engines.

"As OEMs tackle the major drivers of fuel economy and CO_2 reduction in gasoline powertrains, they increasingly look to proven global technology partners to deliver the right solutions," says Craig Balis, Honeywell's Passenger Vehicle Vice President for Platform Management.

"Honeywell's success in diesel technology has laid the foundations for delivering new generation gasoline boosting systems to our customers on a global scale.

"Our technology is covering the complete range of engine programs – from 3 cylinders to V12"

"Indeed, we are already heavily committed to a rapidly growing number of gasoline engine programs around the world and these projects include some exciting technological advances in the move towards variable geometry turbo solutions. We are not simply trying to configure diesel technology to fit gasoline engines—our focus is on designing turbo systems that acknowledge the specific flow and dynamics of gasoline engines...and that demands a fresh approach."

This development activity also incorporates high performance bearing systems, advanced actuation and sophisticated turbine housing designs, all of which will leverage Honeywell's proven high-temperature expertise as the first company to introduce 1030°C-capable turbochargers.

Says Craig: "This pathway will lead to single turbo solutions that will help set new standards in gasoline engine performance and fuel economy and will be complemented by two-stage options where there is a need for ultimate performance. Today our technology is covering the complete range of engine programs—from 3 cylinders to V12."

The benefits for OEMs and their customers of Honeywell's gasoline boosting technology will be enormous—better vehicle performance and driveability, improved fuel consumption and, critically, lower CO_2. Turbocharging has come a long way since the Oldsmobile first took to the road...but it is probably more relevant to today's automotive industry than at any stage in the past.

Gasoline Boosting at a Glance

Europe's lead in turbodiesel—both in technologies and consumer adoption—has been widely publicized. When it comes to gasoline boosting, however, Europe is also proving to be the undisputed worldwide leader.

In 2006, close to 900,000 gasoline cars produced in Europe were boosted, representing 9 percent of the total gasoline cars rolled off the assembly line. Asia followed closely behind by making about 700,000 boosted gasoline cars, accounting for 4 percent of the total gasoline cars produced.

Americas, a region that holds both tough challenges and great promise ahead, produced only 200,000 boosted gasoline cars, or 1 percent of all gasoline vehicles produced in 2006.

Looking forward, Honeywell sees great promise in gasoline boosting, especially in Europe and Americas. The production of boosted gasoline cars in Europe is expected to increase by more than 200 percent from 2006 to 2010, while that in Americas is likely to increase by 100 percent during the same time period.

Source: Honeywell Turbo Technologies

+ HONEYWELL BOOSTS KOREA SUV GROWTH
+ KOREAN OEMS TARGET OVERSEAS MARKETS

The Perfect Fit

A versatile SUV great for c
driving and weekend trip all

What do the GM Daewoo Winstorm, the Hyundai Tucson, the Kia Sportage and the Ssangyong Actyon share in common? They are all boosted by Honeywell's third generation VNT™ turbochargers... and they are all creating interest among consumers right around the world.

With a booming domestic and export markets for diesel SUVs, Korea carmakers have been leading the way in offering affordable and environmentally friendly models that pack in performance, practicality and driveability.

Honeywell Turbo Technologies has been collaborating closely with Korean OEMs since the company established its operations in Korea in 1989. "We are very proactive in introducing our latest technologies such as VNT™ third generation to our OEM customers," said B.H. Lim, General Manager of Honeywell's turbo business in Korea. "Indeed, by 2008, we expect more than 80 percent of our VNT™ offerings to be third generation."

Hyundai Tucson

Snapshot

The diesel version is equipped with a 2 liter common rail diesel engine based on its Elantra model that produces a decent peak power of 144hp. Impressive torque is available from low end, delivering good driveability. Honeywell first began supplying its VNT™ third generation turbo for the E-4 model at the end of 2005, offering a performance upgrade to the E-3 model equipped with a wastegate turbo.

Latest buzz

Hyundai Tucson finished 2006 as the leading export vehicle from Korea, with 207,727 units sold overseas.

Launch date with Honeywell turbo

December 2005

Engine specifications

Engine layout: 4 in line

Displacement: 1991cm^3

Maximum power: 144hp @ 4000rpm

Maximum torque: 314Nm @ 1800-2500rpm

Diesel direct injection common rail

Turbocharger

Third generation VNT™ turbo

Improved peak power: 24% over the wastegate engine*

Better torque: 20% over wastegate engine*

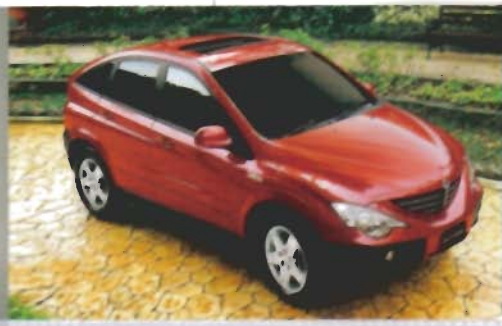
More fuel efficient – 4% better than wastegate engine*

* wastegate engine not equipped with Honeywell turbo

An SUV that packs in performance and affordability

The 1st SUV in Asia to feature VNT™ 3rd generation with REA

A coupe SUV that is city and family friendly



Kia Sportage

Snapshot

The Kia Sportage has become Kia's top seller for a reason: it delivers practicality, performance and dynamism in a real SUV that offers the fun of driving and great value at the same time. Sharing the same engine platform with Hyundai Tucson, Kia Sportage is designed to provide safe and economical highway driving with the ability to handle tough conditions off the beaten track.

Latest buzz

The Kia Sportage has been named as Britain's best value SUV in *Planet 4x4*'s first annual awards in 2006.

Launch date with Honeywell turbo

January 2006

Engine specifications

Engine layout: 4 in line

Displacement: 1991cm^3

Maximum power: 144hp @ 4000rpm

Maximum torque: 314Nm @ 1800-2500rpm

Diesel direct injection common rail

Turbocharger

Third generation VNT™ turbo

Improved peak power: 24% over the wastegate engine*

Better torque: 20% over wastegate engine*

More fuel efficient – 4% better than wastegate engine*

* wastegate engine not equipped with Honeywell turbo

GM Daewoo Winstorm

Snapshot

The Winstorm comes equipped with a 2.0-liter common-rail direct-injection diesel engine, and became the first vehicle in Asia to benefit from Honeywell's third generation VNT™ turbo with Rotary Electronic Actuator. The SUV is built exclusively in South Korea but will go on sale around the world under a plethora of GM badges: Chevrolet, Opel, Vauxhall, Saturn, and of course Daewoo.

Latest buzz

GM Daewoo Auto & Technology Co. said its auto sales in January surged 33 percent compared to last January as a result of robust sales of its new models Tosca and Winstorm.

Launch date with Honeywell turbo

June 2006

Engine specifications

Engine layout: 4 in line

Displacement: 1991cm^3

Maximum power: 148hp @ 4000rpm

Maximum torque: 321Nm@ 2000rpm

Diesel direct injection common rail

Turbocharger

GT15 VNT™ third generation

Controlled by Rotary Electronic Actuation (REA)

Improvement in peak power

Better torque and quick response

Ssangyong Actyon

Snapshot

Actyon, striving to be the leader in domest entry level SUV vehicles, comes with a unique style, and the highest performance compared with other vehicles in the same class. Targeted at younger drivers who enjoy uniqueness and originality, the car features a design that is a combination of SUV and coupe

Latest buzz

The company signaled that it would be focusing on the European market, where it expects to sell more than 70,000 vehicles a year.

Launch date with Honeywell turbo

October 2005

Engine specifications

Engine layout: 4 in line

Displacement: 1999cm^3

Maximum power: 143hp @ 4000rpm

Maximum torque: 310Nm @ 1800-2750rp

Diesel direct injection common rail

Turbocharger

Honeywell D20 DT VNT™ third generation

Improvement in peak power

Better torque and quick response

- NEW HONEYWELL WAY OF WORKING DRIVES UP QUALITY
- HONEYWELL OPERATING SYSTEM SWITCHES MINDSET TO CUSTOMER SERVICE

Redefining Custom

Atessa Takes The Lead

The Atessa turbo plant in Italy was among the first manufacturing centers to pilot the new Honeywell Operating System...and it has not only resulted in dramatic productivity improvements, but also led to a change in mindset among the people who work there.

What HOS has delivered is a major shift in culture, in how people throughout the plant embrace the concept of continuous improvement.

"So far, 50 percent of the plant is running HOS," says Pietro Sterpone, who is the leader of the program in Atessa. "Our experience is that the more we run HOS, the more people come on board and change the way they approach their job."

The statistical improvements tell only part of the story—but they are very impressive. In 2006, overall customer quality improved by more than 60 percent; Safety now stands at zero incidents; Customer delivery improved by seven percent.

"For Atessa, HOS meant reviewing plant layout, introducing one-piece-flow, ensuring that coaching was widely available to our

er Support

Honeywell is driving a completely new approach to quality and customer satisfaction through manufacturing excellence—and it's a system that's generating remarkable results.

The Honeywell Operating System (HOS), modeled on world-class operating systems such as those at Toyota, Nissan and Alcoa, is literally transforming the way that the company is organizing its manufacturing plants and processes around the world.

At the heart of HOS is an ethos that redefines the purpose of management in the context of enabling the shop floor to meet the requirements of customers. It's an approach that is rewriting the industry norm—and it's resulting in 25 percent quality improvements in a single year...and 50 percent over two years.

"Continuous improvement programs such as Six Sigma deliver incremental gains, but the aim of HOS is to transform manufacturing by gluing together operating processes and lean tools and techniques through 'wall to wall' implementation," says Adriano Palma, who is leading the HOS program at Honeywell Transportation Systems.

"HOS is founded on process standardization, so that every operator in every Honeywell turbo plant around the world can conform to common practices and share an identical way of working. But more than this, the new system redefines the relationship between management and the shop floor by focusing all activities on the needs of customers.

The result is a new approach to manufacturing that is changing the mindset of our people by giving them greater confidence in their working practices, encouraging creative problem solving and providing a better understanding of how they as individuals contribute to the success of the company. In short, HOS empowers people for the benefit of customers.

Honeywell's manufacturing centers in Atessa (Italy), Mexicali (Mexico) and Pune (India) were among the first to implement HOS—and the results have been stunning. Bucharest (Romania), Shanghai (China) and Thaon-Les-Vosges (France) are embarking on the journey, with full HOS implementation expected by 2009.

"Since the launch of HOS in 2006, there have been major improvements in quality, delivery, safety and inventory.....and our customers tell us that they like what they see," says Adriano. "It's a system that promises not just the incremental gains conventionally driven by a culture of continuous improvement—what we are talking about here is a true transformation in performance and customer satisfaction...and we've got the results to prove it."

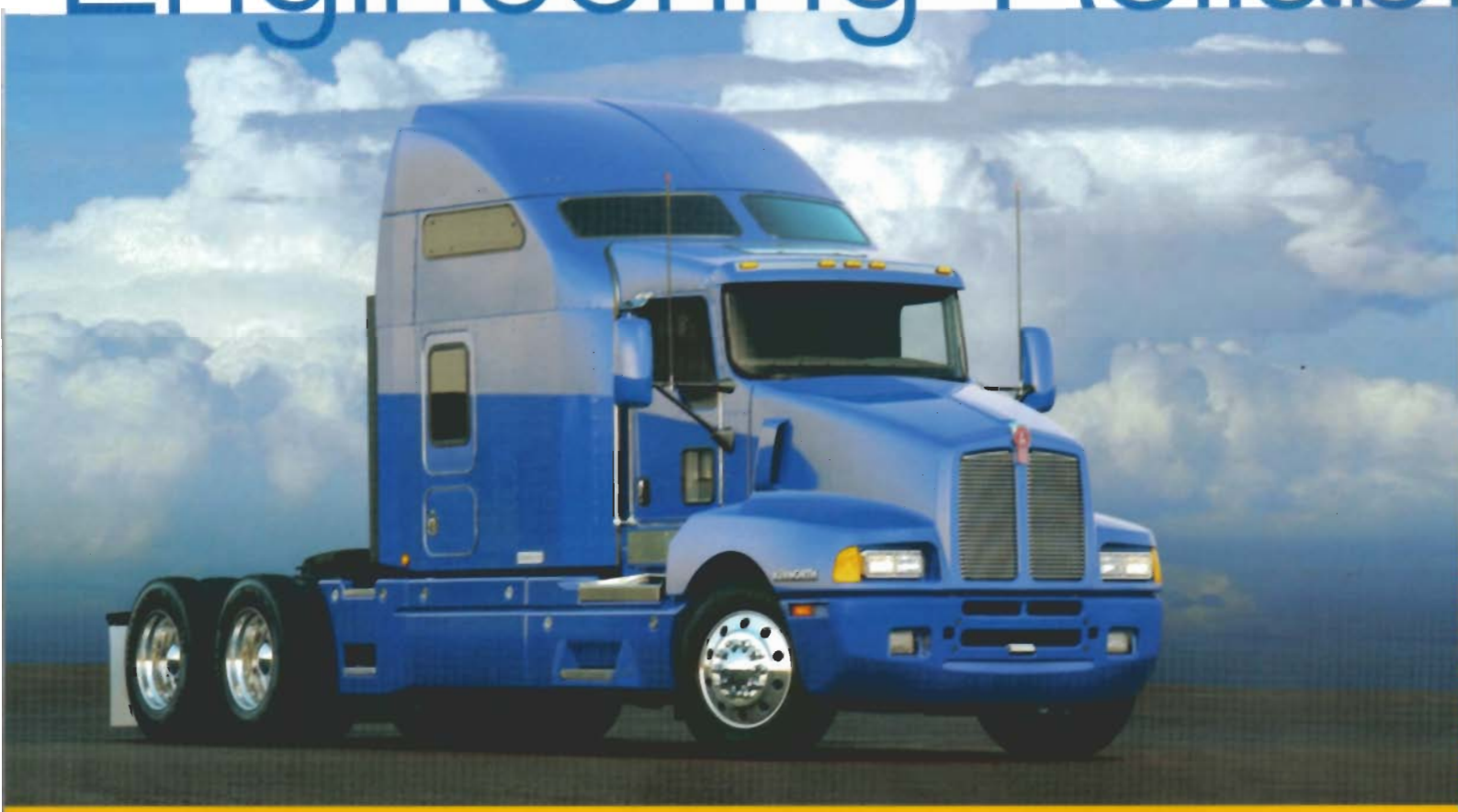
"HOS is founded on process standardization"

people and that everyone bought in to the new standardization of processes. Today, all employees feel that they have a stake in HOS, that they have the full support of managers in making improvements and that they are genuinely contributing to a completely new way of working for our industry."

Such has been the success of Atessa's HOS initiative that the plant is sharing its experience of implementing the program with other Honeywell manufacturing sites.

+ COMMERCIAL VEHICLES BUILD POWERBASE IN EUROPE
+ RELIABILITY AND DURABILITY DRIVE FUTURE TECHNOLOGY

Engineering Reliabi



As commercial vehicle OEMs plan for the "one million mile" diesel engine era, Kevin Slupski, Head of Global Commercial Vehicle (CV) Engineering for Honeywell, believes that more than ever in the future it will be quality, reliability and durability that will leverage commercial success. Here Kevin outlines what is driving Honeywell's service for CV customers.

What are the key trends in CV globally?

We are seeing a seismic shift underway in the commercial vehicle sector, with over 60 percent of engines being defined in Europe, even for the U.S. market. Vertical integration has been the norm in Europe and it is expected to be more common in the North American market in the future, where DaimlerChrysler and Volvo are already well established.

What is the impact of this structural shift on technology?

Global companies increasingly want global solutions when it comes to technology. Emission standards around the world are becoming ever more stringent and are converging to a point where by 2011, developed regions such as Europe, the U.S and Japan will share similar standards. This convergence will enable commercial vehicle OEMs to deliver common engine solutions around the globe. That said, meeting the emissions standards will require significant investment in combustion and air handling, including advanced turbocharging such as variable geometry turbocharging, and in exhaust gas recirculation, in valves, particulate traps...and more, which will add cost to engine development.

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How will OEMs seek to gain competitive advantage if emissions obligations are likely to drive up cost?

OEMs are already focusing on the "one million mile" engine. The economics of the future dictate that the major issues impacting on competitiveness will not only be enabling technologies such as turbocharging and exhaust gas cooling, but will also revolve much more around reliability and durability. Whole life cost will become even more of a critical issue for OEMs and their customers. So we see a future characterized by increasing system complexity, but with evermore reliance placed upon quality and reliability as more technology content is added to the system.

How is Honeywell preparing to meet these challenges?

Firstly by strengthening our global footprint and augmenting our worldwide customer support structure. One example of this is our investment in a new engineering hub in Brno, Czech Republic, where we are building a major presence to support our CV operations. Secondly by focusing on reliability and durability, which are key priorities both for our customers and for Honeywell as engine systems become more complex. So we've created a dedicated Product Assurance team to ensure that reliability is built into new product development and rolled out through application engineering. All this is in line with our determination to lead the way in systems reliability and performance.

What are the key developments in terms of CV technologies?

Commercial Vehicle business is driven by emission standards, but also by value to the end customer which includes fuel economy and performance. Where Honeywell wins for its customers is through innovation and the breadth of its product portfolio. We have a track record of turning innovative thinking into products, as with the AVNT™. Currently, our engineers are combining two compressors on a single shaft, whether in series (primarily for heavy duty and off-highway applications) or in parallel (primarily for light trucks). Ball bearing technology also sees wider adoption, providing lower frictional losses which are particularly impactful for series turbo systems which are gaining favor at many OEMs. The ball bearings are also proving to have excellent durability in lab and field testing.

There are also exciting developments underway in electronic actuation to ensure optimum turbocharger performance, while our speed sensors enable engine makers to increase power density by reducing the margins on turbocharger speed limits. We are also developing new exhaust gas coolers that deliver improved performance and value.

What about China?

As a company, we are very strong in the Americas and building in Europe, but it's clear that China will be a major growth area in the future. Honeywell has been in China for many years and is ideally placed to support OEMs as they introduce bigger and bigger trucks in a country that now reportedly boasts the world's second largest network of roads capable of carrying heavy duty trucks. They are also becoming increasingly concerned about emissions, which means that turbocharging will become an increasingly important enabling technology for the 21st century.

Kevin Slupski

As Director of Commercial Vehicle Engineering & Product Assurance, Kevin Slupski oversees platform engineering, application engineering as well as product assurance for Honeywell Turbo's global Commercial Vehicle business.

In his current position, he also interacts closely with Commercial Vehicle Platform Management on product strategy and with Customer Management on optimizing value delivery to customers.

Having been with Honeywell for eleven years, Kevin joined the company following six years of work at Cummins Engine Company, where he was a senior design engineer. He holds a BS in Mechanical Engineering from the Georgia Institute of Technology

+ HONEYWELL AVNT™ SETS THE STANDARD FOR DIESEL TRUCKS
+ OEMS OPT FOR RELIABILITY AND QUALITY

A Quick Rise to Top

The redesigned 2007 Chevrolet Silverado and GMC Sierra heavy-duty pickups began shipping to dealers in the U.S. in February this year. Honeywell's AVNT™ GT37 is the turbo of choice for the Duramax engines that power the best-selling trucks' diesel models.

Seller

Heavy-duty pickups are gaining in popularity, especially in Texas and California, where people have horse, boat and RV trailers to tow. These drivers tend to prefer the diesel-engine option in heavy-duty trucks, which gives them more towing capability thanks to a higher torque output of the diesels.

Honeywell's AVNT™ technology made its debut in 2002 on Ford F250 and F350 powered by International's Power Stroke engines, and since 2003 has been fitted on the powerful and reliable Duramax engines, which are equipped on Chevrolet Silverado, GMC Sierra as well as GMC Topkick 4500 to 6500 series.

GM surged past Ford and Dodge in diesel heavy-duty sales in 2005 when it introduced a new Duramax diesel engine, made by a joint venture between GM and Isuzu. According to Gary White, Vice President of GM North America and vehicle line executive for full-size trucks, about 66 percent of all heavy-duty trucks in the U.S. are sold with diesels, and GM's share during 2006 was 35 percent of that market, making Honeywell's AVNT™ the undisputed turbo top seller for heavy-duty diesel pickups.

"We continue to innovate to make the technology a true industry standard."

"It has been a great learning experience for us working directly with a world-class truck manufacturer like GM," said Tony Schultz, Vice President of Customer Management for Commercial Vehicles at Honeywell Turbo Technologies. "But we rose to the challenge, and we are happy to have contributed to the phenomenal success of GM's diesel trucks."

The new 2007 heavy-duty models of the two GM trucks feature an updated 6.6-liter Duramax diesel V8 engine, which leads in both horsepower and torque measured against its rivals. The engine is rated at 365 horsepower and 660 foot-pounds (895Nm) of torque compared with 353 horsepower and 373 foot-pounds (506Nm) of torque for the standard 6.0-liter V8 gasoline engine.

The new trucks can tow conventional trailers weighing up to 13,000 pounds, and fifth-wheel or gooseneck trailers of up to 16,700 pounds, according to GM's Gary White.

"What OEMs really like about AVNT™ is its relative simplicity, its inherent reliability and durability, and its over-riding quality," said Tony Schultz of Honeywell. "But we continue to innovate to meet these changing requirements—new vane shapes, improved materials, better actuation—to make the technology a true industry standard."

Duramax Diesel 6.6L V8 Turbo Engine

- Class-leading diesel horsepower and overall torque
  > 360 horsepower @ 3200 rpm
  > 650 lb.-ft. (881 Nm) of torque @ 1600 rpm
- Low operational noise level
- B20 biodiesel compatibility
- Common rail fuel injection that utilizes advanced electronics and pilot injection
- A variable-geometry "smart" turbocharger, located in the valley between the cylinder heads for a compact design, that features computer-controlled turbine vanes and an air-to-air intercooler
- A new Diesel Particulate Filter (DPF) that helps meet new diesel emissions standards

Source: GM/Isuzu

- NEW UPGRADE KITS BOOST TOWING PERFORMANCE
- DISTRIBUTOR NETWORK IN FIVE-FOLD INCREASE

New Kits For Ultima

It's a technology that's out in front…but at the same time making a big impact on what's happening behind diesel pickups.

Honeywell has unveiled two upgrade kits that are transforming performance for trucks that function as tow vehicles or operate in hilly terrain, with new packages that deliver up to 550 horsepower and 1200 lb./ft. of torque (1627Nm).

These numbers represent the high end of the increased engine performance truck owners can experience—with performance chip and intake—if they install the new Garrett® PowerMax™ turbocharger upgrade kit for Cummins-equipped Dodge Ram pickup trucks. Honeywell is also introducing a Garrett® PowerMax™ turbo kit compatible with GM Duramax diesel engines.

These two additions to the Garrett® PowerMax™ lineup, when added to Honeywell's existing turbo upgrade for Ford's Power Stroke diesel, make the Garrett® turbo upgrade kits the most complete lineup for light duty diesel pickups.

The new turbo kits feature improved aerodynamics on both the turbine and compressor stages, increasing the air flow range to allow increased horsepower and torque, proprietary dual ball bearing technology for faster response time and better durability, and increased turbo efficiency leading to lower exhaust temperatures and improved reliability

"The kits are ideally suited for truck drivers who do a lot of towing or hauling, or drive in hilly conditions," said Mary Crivello, Director of the North America Independent Aftermarket at Honeywell Turbo Technologies. "In addition, the kits will enable performance-minded truck owners to obtain significant increases in horsepower and torque without compromising reliability."

The Cummins package comes in three performance levels. The first is a drop-in kit for towing; the second, compared to the first level, offers a larger compressor housing for improved performance. The stage three kit includes an even bigger compressor and turbine for hardcore truck enthusiasts as well as adding water cooling for the turbocharger bearings, a feature not available from the factory. The Cummins kits are for Dodge Ram diesel pickups produced in 1998 and later.

The Duramax kits are compatible with 2001-2004 Chevy Silverado, GMC Sierra and LB7 Duramax diesel trucks.

Each kit includes all necessary accessories and connections as well as illustrated instructions.

The announcement also marks the rapid expansion of the Garrett® PowerMax™ distribution network, which last year expanded from 30 distributors to 150.

New Turbo Kit For Chevrolet Cobalt

Honeywell has launched a new Garrett® kit for Chevy Cobalt owners looking to build what may be the ultimate late-model sleeper.

Built around the famous Garrett® "Disco Potato" GT2860RS turbocharger, the latest offering is a complete performance kit for owners of 2005 model year and later Cobalts with the 2.2L Ecotec engine.

The turbocharged engine delivers 198 horsepower at 5000 rpm and 219 lb.-ft (297 Nm) of torque at 4000 rpm, an increase of 46 percent and 58 percent respectively over the stock engine.

The Garrett® Chevy Cobalt Kit is available in

te Towing

four different trim levels. The Alpha Kit includes everything a Cobalt owner needs for installation; the GT Tuner Kit provides a complete kit but allows fuel management and boosting monitoring customization; the Essentials Plus Kit provides even more owner control by making the charge air cooler, plumbing and brackets an optional purchase; and the Essentials Kit includes a bare bone system incorporating the GT2860RS turbocharger, exhaust manifold and exhaust pipe adapter. Another notable feature of the kit is that the downpipe maintains the stock exhaust location for any aftermarket exhaust upgrade and a Ni-resist exhaust manifold with the T25 turbo flange.

The kits are available through Honeywell Garrett® performance distributors as well as online at www.TurboByGarrett.com.

+ AUDI AND PEUGEOT BATTLE FOR DIESEL SUPREMACY
+ CITROËN AND FORD REIGNITE RIVALRY AT WORLD RALLY

Fast Forward Into A

It's that time of year when all the winter planning finally makes it to the racetrack and the serious business of crossing the winning line begins. Whether it's the 24 Hours of Le Mans, the World Rally Championship or the Champ Car World Series, the pre-race preparations are just as important as real-time maneuvering on the race course in determining who will be collecting the silverware in a few months time.

New Season

Le Mans — Diesel Duo Go Head to Head

It's shaping up to be one of the biggest duels on the racetrack of the year, with two automotive giants going head-to-head with turbodiesel technology at the world's most famous endurance sportscar event.

This year Peugeot will be lining up alongside the all-conquering Audi R10 TDI at the 24 Hours of Le Mans...challenging last year's champion with its own diesel design, turbocharged (like the Audi) by Honeywell.

The Team Peugeot Total Peugeot 908 Hdi-FAP diesel coupe set the fastest time in its first outing at pre-season trials at the Paul Ricard circuit. Sebastian Bourdais, the US Champ Car World Series Champion, set the fastest time overall at 1m 43.705s, sharing the Peugeot 908 Hdi-FAP diesel coupe with Pedro Lamy. The team also includes the considerable talent of Jacques Villeneuve, one of the three drivers who have won Formula 1, CART and Indianapolis 500.

Audi, meanwhile, is continuing where it left off last year, winning the American Le Mans (ALMS) season-opener at Sebring and the street race in St. Petersburg despite facing more challenges due to rule changes.

But it is the 24 Hours of Le Mans that is the big prize and it promises to be a real clash of the titans.

"It's definitely one of the big moments in the motorsports calendar"

"It's definitely one of the big moments in the motorsports calendar and it's great to think that the eyes of the race world will be focused on diesel technology turbocharged by Honeywell," Says Doug Milliken, Honeywell's Motorsports Manager.

World Rally Championship — The Stage is Set

Ford has launched a spirited defense of its manufacturers' title in the World Rally Championship against a Citroën factory team which aims to wrestle the crown back through the sparkling talent of Sébastian Loeb.

After the Portugal rally, the BP-Ford boosted by Honeywell led with an eight-point lead in the manufacturers' standings for its Ford Focus RS World Rally Car. Marcus Grönholm is currently second in the drivers' championship, just one point from the leader Sébastian Loeb.

"I want to get back in front of Loeb in the championship," said Marcus Grönholm. "I had a good test in Sardinia and hopefully we have found a few small things which will increase performance in Argentina." Indeed Marcus Grönholm needs to maximize his potential on the next three gravel events, as the second half of the season will feature four asphalt rallies that favor Sébastian Loeb.

Champ Car World Series — New Power, New Horizons

In North America, there are new cars and new racetracks to excite Champ Car World Series fans in 2007, with the added spectacle of even more power-to-pass.

Honeywell turbochargers are once again specified for the series, though this year the boost-on-demand available to drivers has been increased from 50hp to 75hp to provide even more power at critical moments for overtaking maneuvers or defensive driving.

In addition to North American racetracks, Champ Cars will this year be crossing continents to race in Europe (Holland and Belgium), China and Australia. Look out once more for a strong showing from Sebastien Bourdais in the Newman/Haas/Lanigan car, as he focuses on a record fourth consecutive Champ Car World Series title, starting with the series opener in Las Vegas.

Media Talk

When Honda, a pioneer of hybrids, announced its intent to offer turbodiesels, industry observers knew that the era of game-change would arrive soon. While Europeans get all the cool diesels, drivers in the U.S. will soon be able to pick from a number of turbodiesel choices from Audi, BMW, Ford, DaimlerChrysler, Honda, GM and VW.

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"J.D. Power estimates diesel's share of India's passenger vehicle market will grow to 35 percent by 2010 from 30 percent now as new models and advanced technology attract the young and better-off to join the cost-conscious."

"Maruti launch may speed India's switch to diesel"

The Economic Times, January 25, 2007

"Honda, known as one of the world's premier engine makers and a pioneer of hybrids, is getting more interested in diesel. If Honda delivers what it promised last September, its diesel technology could be a game-changer. The company says it will be affordable and will meet all new emissions rules."

"Honda's diesel-powered dreams"

Business Week, January 10, 2007

"The power characteristics make Mercedes diesels, diesels in general, good for hauling lots of people and cargo, and handling hills easily; once underway, the Mercedes CDIs will literally shove you back in your seat with a prod of the throttle pedal."

"Mercedes diesels are alluring for power and mileage but have some quirks"

USA Today, January 26, 2007

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"Europeans get all the cool diesels…Audi, BMW, Ford, DaimlerChrysler, Honda, General Motors and VW are among the companies working on 50-state diesels for introduction in 2008 and 2009, so the '06 Touareg diesel can be thought of as a preview of good things to come."

"A Diesel Sold Everywhere"

New York Times, December 17, 2006

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"The real-world experience is clear: Diesel wins convincingly both on and off the track."

"Diesel already wins the race as energy alternative; Future is now for Audi's R10 at Detroit Auto Show"

The Detroit News, January 18, 2007

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