

Tire-pressure monitor

VisiTyre from **ETV** is a tire pressure monitoring system that features inductively coupled circuits for the non-contact transmission of power and data across a vehicle's rotating wheel chassis boundary. The system's electromagnetic coupling eliminates the need for wheel module batteries and allows instant monitoring and reporting of each tire's status, including the spare, when the vehicle's ignition is switched on. The heart of the device is an electronic control unit with microcontroller software that is designed to accommodate all emerging and mandatory TPMS requirements of the U.S. Tread Act's FMVSS. The system operates in demanding automotive environments that experience extremes of temperature, vibration, electrostatic discharges, petrochemical liquids, and solid substances within the tire cavity.

Booth 967



Engine data acquisition

ICEview internal-combustion engine data acquisition and analysis system from **OPTIMUM** uses LabVIEW from **National Instruments**. This ensures compatibility with all National Instruments hardware along



with integration with other LabVIEW applications. The PC-based system provides high-speed, crank angle-based sampling for sensors. It provides simple, nonlinear transducer calibration and integrates with the firm's Virtual Engines. Advanced combustion analysis tools include IMEP, knock analysis, flexible digital filters, and identification of insufficient data. Visualization of cycle-to-cycle variability and cylinder-to-cylinder comparison is provided, as well as statistical and cross-correlation analysis.

Booth 2143

Data-acquisition modules

USB-based MICRODAU micro-miniature data-acquisition modules from **Kayser-Threde** enable crash dummies to become "smart." The modules process all of the impact, load, and deflection data from a crash-test event and store it until needed. The modules connect to each of the 20 to 140 (and more) transducer channels in a crash-test dummy. Using USB digital communication to transfer data throughout the dummy eliminates the large number of analog cables that are typically routed throughout the dummy to large analog signal conditioner and data-acquisition boxes outside the dummy. Without the cabling, dummies are easier to position for a test and provide more consistent test results. This is especially true for dummies used in rollover tests, pedestrian tests, and motorcycle tests where having any type of cabling is a problem. Another benefit of using USB in the dummy is the fact that digital signals are less susceptible than analog signals to outside noise and interference, such as the electrostatic discharge that occurs when an airbag is deployed.

Booth 415



Electric drive simulator

Opal-RT demonstrates virtual prototyping of electric motors and power electronics with its RT-LAB Electric Drive Simulator. The simulator bridges gaps in the motor control development process between offline, CAE simulation, and controller testing using a prototype motor. Powered by the company's parallel real-time simulation technologies, field programmable gate array-based I/O, and the Time-Stamping Bridge blockset for Simulink, the system is widely used in control system development and verification for advanced propulsion systems such as hybrid electric vehicles and auxiliary power units.

Booth 2313



Active head restraints

Grammer Automotive's second generation of electronically-activated head restraints reduces the impact of whiplash injury in rear-end collisions by moving the head restraint forward. The anti-whiplash system is completely contained within the head restraint. Unlike the earlier version that is deployed by a gas generator cartridge, the newer model uses an electromagnetic actuator to release pre-stressed springs that simultaneously pivot the headrest while pushing it forward. The headrest houses two coil springs, a plastic headrest housing, an electromagnetically activated plate, and wiring. The two coil springs push the headrest forward after receiving a signal from the vehicle's crash sensor.

Booth 1537



**Come See
What We Have Been Thinking**

Visit The Canadian Pavilion
SAE Booth 915-1323



cars on the brain

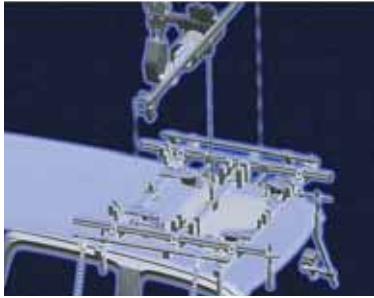
See and experience creative and innovative solutions in design, vehicle safety, research and development and world class expertise in manufacturing and assembly.

Canada

What's New
from the exhibitors

Digital manufacturing

Modern Engineering's Digital Manufacturing Center of Excellence incorporates advanced and innovative manufacturing solutions. The center includes an extensive library of tools and technology



resources geared for product life-cycle management/product data management; computer-aided design, manufacturing, and engineering; simulation; plant material routing and storage; ergonomics; logistics; collaboration; and overall program management. The center can simulate a product design or manufacturing process prior to production launch. Using a variety of automated simulation methods, it can identify system flaws up front and raise awareness on critical planning decisions. Some of the software tools used by the center are: Tecnomatix manufacturing process management tools, DELMIA process planning and simulation tools, and Modern's supply chain network tool.

Booth 1038

Small-component placement

Peeling and placing technology from **AccuPlace** ensures high accuracy and repeatability in placement of adhesive components—even those that are difficult to peel—such as clear material on a clear liner, double-sided adhesive, or small or odd-shaped components. Guides and pinch rollers ensure accurate alignment and consistent tension of the liner in the peeling process. The product range offers both semi automatic and fully automatic systems for adhesive component assembly. The machines can be integrated into existing product lines. The Model 1515 is a solution for placing small adhesive components requiring high accuracy within a small footprint. A linear width of up to 1.5 in (38 mm) and a component length capacity of up to 1.5 in (38 mm) permit an economical solution to many applications. Different configurations and various options allow for the adaptation to specific applications.

Booth 1047

Sensor management ECU

The TTC 200 control unit from **TTTech** is suitable for commercial production that supports both CAN and the TTP (Time-Triggered Protocol). It fulfills all technical requirements for advanced automotive electronics for off-highway vehicles. It can be used as a stand-alone solution or as part of a networked system in safety-critical applications. The system is a programmable electronic control unit for sensor/actuator management.

Many configurable I/Os allow for its use with different sensor and actuator types. The unit's robust injection-molded aluminum housing protects against electromagnetic disturbance and mechanical stress. A 40-MHz Motorola MPC555 integrated microprocessor supplies the necessary processing power.

Booth 1316



A Passion

CREATIVITY FOR PEOPLE

for Safety

Integrated Child Booster Seat

In its normal position, the integrated child booster seat serves as a seat for adults. It can adjust to securely hold and protect children from nine months to 12 years of age. Separate five-point safety belts for smaller children and lateral head supports provide outstanding safety.



Active Head Restraint

The active head restraint uses either a pyrotechnic device or a spring mechanism. In the event of a rear collision, it launches the head restraint forward in milliseconds – before the seat occupant's head and body are impacted, arriving in a position to meet the occupant's head and prevent whiplash injury.



Greater protection and comfort for people on the go – that's GRAMMER's commitment. We apply our know-how, experience and personal dedication to develop innovative solutions that make automotive travel safer. And we're setting new standards with the automotive industry while meeting our customers' and consumers' growing needs for safety.

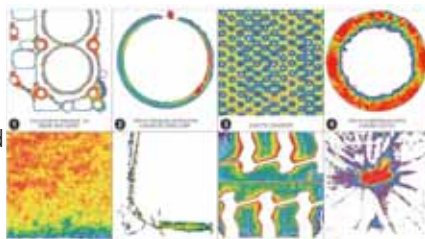


GRAMMER

GRAMMER Industries Inc. · 1550 West Maple Road · 48084 Troy, MI · USA
Phone +1 248 786 0440 · Fax +1 248 786 0444 · www.grammer.com · E-mail: info@grammer.com

Pressure-sensing film

Pressure tactile pressure sensor film from **Sensor Products** is a nondestructive testing tool that quickly and accurately maps and measures pressure distribution and magnitude between contacting surfaces. It assists engineers with R&D, failure analysis, and quality control efforts. Applications include engine gaskets, clamping, catalytic converter canning, brakes/clutches, lamination, door seals, tire-tread footprints, and impact testing. The film comes in seven pressure ranges measuring 2 to 43,200 psi (0.14 to 3000 kg/cm²) and comes in the form of a large, thin, clear Mylar sheet, physically similar to a sheet of paper. When placed between contacting surfaces, the film instantaneously and permanently changes color. This color change directly correlates to the specific amount of pressure applied. Precise pressure magnitude can be determined by comparing color variations to a color-correlation chart. The firm can customize the material for any application by laser cutting it for small or precise areas.



Booth 1715

Movie files

Microsys' PowerPlay 5 option creates AVI (movie files) combining multiple video or sensor windows. The resulting file can contain up to nine windows and be distributed to customers or colleagues, allowing them to view time-synchronized, time-stamped test results using Windows Media Player. Each of the windows may be either a high-speed video or a sensor graph. A banner can be created with selected information, including frame time, number, and rate; AVI creation data; and comments. A logo can be added to the beginning of the AVI file.



Booth 315

Control unit testing

The PCI-Engine from **Applied Dynamics International** is used for design, development, and acceptance testing of an engine control unit (ECU). The boardset can be placed in a standard PC and used to simulate all electrical systems in



a combustion engine. When placed in the firm's rtX PC-based real-time simulator, dynamic models may be used to provide a complete real-time engine simulation. Prototype or production ECUs are connected to the engine board, providing a virtual engine interface for testing the controller. The system supports two controller area network buses with multiple transceiver selection. A dual-access-memory interconnect bus peripheral interface minimizes read-write times for ultra-small-step real-time simulation.

Booth 1600

Leak-testing systems

With **Vacuum Technology's** fully automated test system, automotive torque converters are evaluated for leakage to a high sensitivity level at a production rate of two per minute. Using PC control and custom software, the system automatically loads the parts into the vacuum test chamber from the production-line conveyor, sequences the 10-step test cycle, makes the test validity and pass/fail decisions, and unloads to separate pass or fail conveyors. In this helium mass spectrometer, the torque converters are internally pressurized to 45 psig (310 kPa) with 30% helium in compressed air to meet the leak-test specification for the part of $1 \times 10E-4$ atm-cm³/s of pure helium at atmosphere. The cycle time per part of approximately 30 s includes about 10 s for loading, positioning, and unloading changes. Reliability is high even under critical electromagnetic interference conditions up to 100 V/m.

Booth 1274



High-capacity test chambers

Cincinnati Sub-Zero's line of test chambers has expanded to meet the needs of basic thermal cycling to accelerated stress testing. Two sizes are added with interior workspace of 44 ft³ (1246 L) and 64 ft³ (1812 L). Larger-horsepower compressors are added for customers requiring fast cooling transition rates. Test chambers come in single-stage, -34°C (-29°F); Tundra, -45°C (-49°F); and cascade, -73°C (-99°F) temperature ranges.

Booth 723



Visit us & **RT-LAB** TestDrive™

Complete systems on demo stations in our booth for you to discover

Attend one of our in-booth presentations and get one 64MB USB memory stick

Presentation Schedule:
daily at
10:30 am,
1:30 pm
and 3:30 pm

At the SAE World Congress in the Cobo Hall Booth #2313



Contact and register with **Opal-RT Technologies Inc.**

Toll Free: 1-877-935-2323 (North America only)
Phone: 1-514-935-2323 (Outside North America)
info@opal-rt.com

www.opal-rt.com

RT-LAB TestDrive▶

- ◆ Fully programmable, cost-effective replacement for static simulators
- ◆ Powertrain and vehicle simulation for ECU-in-the-loop
 - ◆ Scalable solution for open and closed loop testing



NOW AVAILABLE Reconfigurable FPGA for distributed I/O and signal conditioning

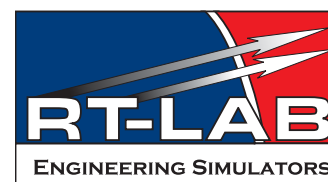


▲ RT-LAB Hilbox

- ◆ For Hardware-in-the-Loop applications such as ECU development and testing
 - ◆ Compact, rugged chassis designed, fully enclosed signal conditioning modules for rapid deployment and replacement
 - ◆ Single-target system or grouped as a multiple-target distributed computation system

◀ RT-LAB Electric Drive Simulator

- ◆ Detailed hard-real-time simulation of power electronic converters and drives
- ◆ Test your electrical drive controller with close-to-reality simulation
- ◆ Reduce prototyping time and costs



What's New
from the exhibitors

Meeting EU4 and LEV II Emissions

FEV Motorentechnik worked with Mercedes-Benz AMG to ensure that the SLK 55 AMG met new EU4 and LEV II exhaust emissions requirements. Testing was conducted using the customer's FEV



Combustion Analysis System, which provides integrated stationary and dynamic knock analysis, with real-time functionality. Calibration development of the vehicle's diagnostic package was performed, with emphasis placed on rate-based-monitor compliance. Monitoring the continuous readings from the vehicle's electronic control unit and drive recorder produced data such as adoption values, fault events, and other engine parameters. Vehicle test drives then calibrated and validated the parameters of the engine-management system under various operating conditions. This collaboration resulted in a V8 engine capable of producing 355 hp (265 kW) and 376 lb-ft (510 N-m), propelling the roadster from 0 to 60 mph (0 to 100 km/h) in 4.9 s and performing well below the EU4 and LEV II emission levels.

Booth 1815

Electromechanical assembly press

An electro-mechanical assembly press (EMAP) from Promess allows the end user to operate multiple stations with one PC. The system features an intelligent black box that improves and speeds communication among the assembly system's programmable logic controller, EMAP, and machine controls and sensors. An enhanced software package is faster and easier to learn than the previous version. The assembly press encompasses 16 sizes ranging from 225 to 75,000 lb (1 to 334 kN). Built-in, onboard force and distance sensors allow CNC (programming) to a set force and set position (both with limits).



Booth 820

Diesel filter balances

The SE2-F microbalance from Sartorius contains a draft shield that is ergonomic for both left- and right-handed users. It meets high standards of cleanability (thanks to stainless steel components that can be removed easily), which is essential when working with nanoparticles. The unit is suited for weighing the 47-mm (1.85-in) filters



specified in EPA regulations and can also be used with optional weighing pans for 75- or 90-mm (2.95- or 3.5-in) filters. In addition to shielding samples from drafts, it provides protection from electrostatic charges. System resolution is 0.1 to 2.1 µg (0.003 to 0.067 µoz). Booth 2242

Invest in Bavaria





www.invest-in-bavaria.com

Pole Position for Invest Automotive Suppliers in Bavaria

- Automotive engineering center and component suppliers' park High Franconia
- Close to all German automobile manufacturers
- Excellent infrastructure
- More than 800 supplier companies
- World leaders in R&D
- Highly skilled and experienced workers
- Tradition in manufacturing automobiles
- Top productivity



State of Bavaria

Contact	United States Office for Economic Development	Bavarian Ministry of Economic Affairs, Infrastructure, Transport and Technology
	Ms. Dagmar A. Cassan, MBA Executive Managing Director	Dr. Markus Wittmann
Address	560 Lexington Avenue, 17th Floor New York, NY 10022	Prinzregentenstrasse 28 80538 Munich, Germany
Phone	212-317-0588 or 800-595-2990	(+49 89) 21 62-26 42
Fax	212-317-0590	(+49 89) 21 62-28 03
E-Mail	info@bavaria.org	info@invest-in-bavaria.de
Internet	www.bavaria.org	www.invest-in-bavaria.com

Invest in Bavaria – a joint project between the Bavarian Ministry of Economic Affairs, Infrastructure, Transport and Technology and Bayern International

Automotive Suppliers

Fluid-elastic and CFD

LINFLOW from **ANKER-ZEMER Engineering** is used to study fluid flow, aeroelasticity, acoustics, fluid-structure interaction, and aeroelastic stability. It is suited for the study of propellers, fans, vibration in ducts and pipes due to internal fluid flow, lift and drag of airfoils and spoilers, acoustics, and general fluid structure interaction. It helps engineers perform simulations without having to generate large, complicated models of the fluid domain. The software is based on the boundary element method (BEM), which simplifies modeling compared to software based on finite volumes or finite elements. It runs as a stand-alone package or as a module within **ANSYS**. When used in the ANSYS environment, pre-processing, solution, and post-processing can all be done in ANSYS. The software includes a full set of macros and other software needed for full and tight integration with ANSYS. Special commands for ANSYS are created with menu entries. These commands are used to set up input, run LINFLOW, and perform post-processing. The package can also run with other software through its FEMAP interface or its general interface program and graphical user interface.

Booth 1641



Emblem technology

Marking Specialists Group's Durographic style provides the greatest depth of 3-D image and fine definitions achievable in the production of molded, fully pigmented, multi-colored, or clear



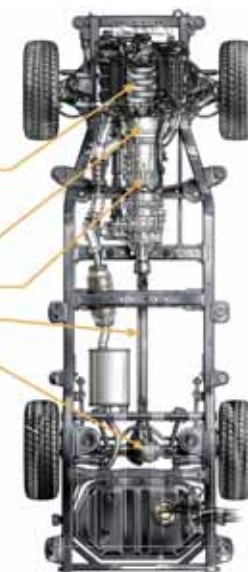
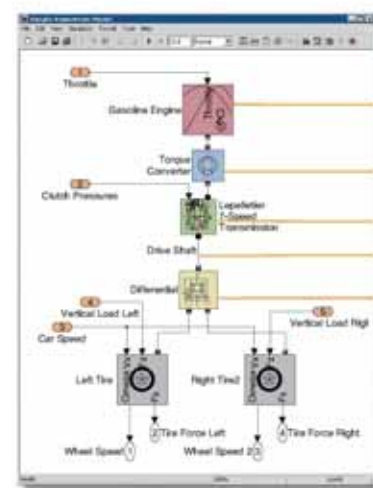
emblems and graphics. Various textures and finishes are available including mirror chrome to exacting automotive standards. The durability, performance, and sharp appearance of this versatile product provide the designer with a medium that has not been available until now.

Booth 964

Drivetrain simulation

SimDriveline from **The Math-Works** allows users to model and simulate the mechanics of driveline and drivetrain systems efficiently—saving time and reducing reliance

users can explore more-extensive design options and attain higher quality and faster time-to-market. Tools are included for modeling transmissions, gears, clutches,



on costly prototypes. It extends the power of Simulink software for multidomain simulation and model-based design of dynamic systems, to provide engineers with a modeling environment that assists in controller development for transmissions and other powertrain components, such as all-wheel-drive center differentials and hybrid electric vehicles. The package then allows for the testing of these components in real time. Thus,

and rotating shafts. The software provides libraries of components for driveline systems, standard transmission templates, and simple engine and tire models. Models for most driveline configurations can be built using the Library of Common Gear Configurations and the Library of Dynamic Elements, which provides interfaces for modeling clutches, flexible shafts, and torque converters.

Booth 2323

SAE International

Members

people of uncommon commitment

Your membership in SAE International is your entrée to industry's great engineering alliance, to a world of colleagues, and a world of advanced technology.

www.sae.org/membership

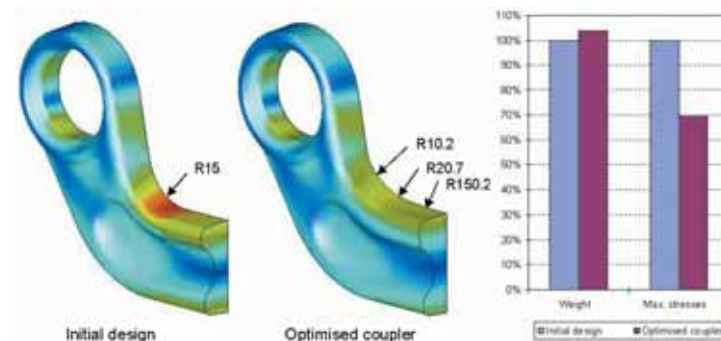
Share. Serve. Advance.

Join SAE International!

automotive • aerospace • commercial vehicle

Topology/shape optimization

OptiStruct and TOSCA from **FE Design** are used as software tools for topology optimization. Both offer the possibility of determining the direction of deformation, which is crucial when optimizing castings and forgings. In addition, the optimized structure can be smoothed



and transferred in STL or IGES format in a CAD system. While topology optimization is important at the start of product development to achieve a global design, shape optimization is used to determine the object's final design. Shape optimization involves the displacement of surface nodes in the design area of the FE model with the aim of reducing stress peaks in areas of high stress gradient—this method results in an even stress distribution in the critical areas of the component. TOSCA can use both NASTRAN and ABAQUS solvers, which allows consideration of nonlinear components.

Booth 1641



Marking Specialists Group a leader in the product identification industry with 30 years experience as a manufacturer of high-quality, high-end emblems and nameplates used in the automotive, appliance and consumer goods marketplace has just introduced Durographic® a revolutionary, patented emblem technology. Durographic® provides the greatest depth of three dimensional image and fine definitions achievable in the production of molded, fully pigmented, multi colorized or clear emblems and graphics. Various textures and finishes are available including mirror chrome to exacting automotive standards.

Visit us at SAE booth # 964.

marking  specialists group

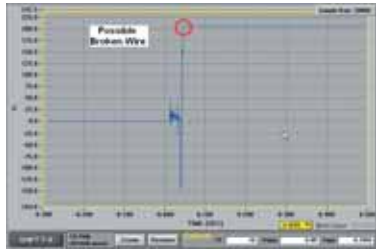
3726 N. Ventura Drive • Arlington Heights, IL 60004 • 800-678-8073 fax 847-797-9301
www.marking-specialists.com

ISO:9001:2000 • Proud Sponsor of SAE 2005 World Congress

What's New
from the exhibitors

Crash data validation

TDAS Data Validation Engine (DaVE) from **DTS** automatically validates crash-test data. The software identifies common data quality issues caused by sensor or wiring problems, setup mistakes, or other anomalies and generates a comprehensive report. The analysis is



reliable and promises to eliminate the need for a skilled data analyst to perform basic data validation. Some of the tests include signal saturation; inverted signal; broken sensor wire; sensor separated from body; identify shifts in zero level; data character pre-, during, and post-impact; energy in frequency ranges above interest; redundant channel verification; and consistency of integrated speeds.
Booth 434

Catalytic substrate defect detection

The CATPRO 4000D from **Image Labs** is a catalytic substrate plug-detection system with advanced reporting capabilities. The system features a 14.5 x 14.5 in (368 x 368 mm) inspection system that provides automatic substrate sensing as the material is manually placed on the platform. An illuminated vertical inspection of ceramic or steel catalytic substrates and diesel particulate filters can be obtained in less than 1 s, decreasing manual part handling and viewer error at key inspection points along the production line or in the laboratory. The optics and illumination are optimized to determine relative measurements, plugged cells, perpendicularity, and cell density during the extrusion and monolith coating processes. Pro-CS Software V 4.0 provides centralized data collection for defect detection and measurement for nonconformance to specification. Data can be generated and reported after extrusion and before/after firing to detect catalytic substrate defects.
Booth 2246



Environmental-condition simulation

The SolarClimatic Series test units from **KHS Technical Lighting** simulate indoor and outdoor conditions. Parameters such as global irradiation, temperature, and humidity are easily programmed. Spacious test chambers allow for testing according to the standards for components with large surface areas such as airbag units; or in the case of the 3400-L (120-ft³) unit, the testing of complete, large components such as instrument panels. The test chambers are economical alternatives to lengthy traditional outdoor component testing.
Booth 612



Automatic extensometer

The SIE-560/560S Automatic Extensometer from **Shimadzu** handles all measurements—from elastic modulus to elongation at break point. Automated functions include return to the gauge-mark position, extensometer mounting and dismounting, and detection of the gauge-mark position. A digital strain processing engine uses a high-speed central processing unit to measure the sensor outputs at high resolution and to rapidly process large volumes of data. The unit also employs real-time digital calibration to achieve precise repeatable data output. Combined with accurate magnetic-induction linear sensors and strain-gauge sensors, the system provides accurate measurement as well as conformance and compatibility with applicable standards and regulations. It is operated with Windows-based TRAPEZIUM2 software. An automatic toolbar enables one-touch operation, while gauge-length settings can be set automatically for the extensometer.
Booth 623



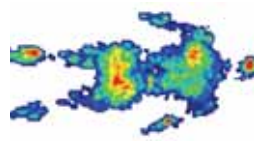
Hot bonder

The HB-1 Hot Bonder from **WichiTech Industries** provides heat to cure composite materials during repair operations. The handheld unit features high performance in a 3.5-lb (1.6-kg) unit, and performs well from the workbench to the tightest spots. Digital programming makes the system simple to enter and read. It features four active thermocouple inputs, an audible alarm, and safety devices. Set to go with its own standard vacuum line and heating blanket, all it needs is a vacuum source or shop air with venturi to do the biggest or smallest jobs quickly and efficiently.
Booth 2243



Tactile pressure measurement

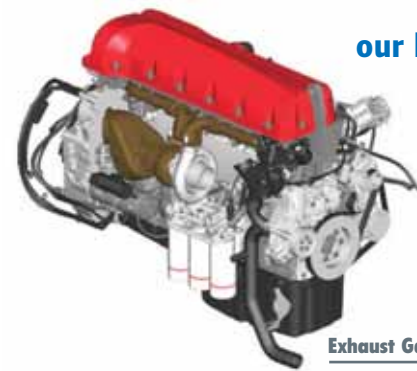
BPMS from **Tekscan** measures the pressure distribution of the human body on support surfaces such as seats, mattresses, cushions, and backrests. The system includes hardware, software, and thin-film pressure sensors. As many as 2016 individual sensing elements are combined in each sensor. The sensor's thinness enables the user to incorporate it into the application without altering support surface characteristics. The combination of these factors enables precise measurement of the location and magnitude of peak pressures and overall pressure distribution patterns.
Booth 1333



IFP Services
in Powertrain Engineering

2 days 2 chances

to visit us at
our booth #2427



- Charging
- Direct Injection
- Combustion
- Cooling
- Fuel & Lubricants
- Exhaust Gas & After-Treatment
- Engine Management



IFP POWERTRAIN ENGINEERING
92852 Rueil-Malmaison Cedex - France
Tel.: +33 1 47 52 59 18 - Fax: +33 1 47 52 53 04
<http://engines-fuels.ifp.fr>

bull's-eye.

When it comes to the auto industry, the Roanoke Valley of Virginia hits the spot. Prime real-estate. Low costs. Strong labor pool. Central location. And easy access. Ready to make that move?

Ready. Aim. IGNITION!

The Roanoke Valley Economic Development Partnership.
Visit www.roanoke.org or call 1-800-Locate2 today.

Tactile pressure measurement

The I-Scan system for door seals from **Tekscan** can be used as a feedback tool in vehicle assembly plants during the mounting and assembly of a door to the vehicle frame. A real-time contact pressure display provides direct feedback to the assembly technician as adjustments are made to the door latches and hinges. The I-Scan System also can be used in fuel-cell applications to ensure uniform contact pressure in the battery stacks. Lastly, the firm's Wiper System measures wiper blade to windshield interface force profiles under various testing conditions.



Booth 1333

Total exhaust system

Cardington Yutaka Technologies' total exhaust system includes an exhaust manifold that is made from heat resistant metals and provides good flow to support the demands of high-performance engines. The exhaust chamber features high heat resistance and superior sound suppression. Thin-wall catalysts provide improved emissions purification in the catalytic converter. The muffler's simple internal structure has enhanced sound-dampening properties and superior endurance at high temperatures. The exhaust tip is designed with advanced stamping and curling processes.



Booth 2236

T.E.S.T. Group

Technology
Enhanced Safety
Testing



Ideas count as much as money

The best price gets noticed, but supplier executives know that cost alone is not a sure way to get an automaker's business. There needs to be something extra.

"Without innovation in product, process, or service, you are only offering price," said Jacqui Dedo, President of The **Timken** Company. "In this global economy, there will always be someone, somewhere, able to beat (price). But they are less likely to duplicate innovation."

Dedo and four other supplier executives (Michael Brosseau, Vice President of Sales for **Brose** North America; George Dettloff, President of **SKF's** auto division in North America; Don Manvel, Chairman and CEO of **AVL** North America; and Dave Westgate, President and CEO of **Jason, Inc.**) are slated to offer their opinions during a discussion on "Lessons Learned in Working with the OEM." The panel, moderated by David Cole, Chairman of the **Center for Automotive Research (CAR)**, takes the AVL Technology Theater stage today from 3:30 to 5 p.m.

A supplier should strive to demonstrate value by developing new or improved technologies. "It is vital to success," said Dedo, adding, "Timken has always operated under this belief. Innovation has been a part of our 105-year heritage from the beginning. It's why we have research facilities in France, India, Romania, and the United States and annually invest nearly \$77.5 million in research development efforts."

For those companies putting an emphasis on internal R&D work, the resulting technological advancements can equate to a competitive edge. "The supplier who can open up the door for an automaker (with) new methodology or technology will get ahead in the game," said AVL's Manvel.

Technical innovation also can



"Staying focused on core capabilities helps make you the expert in your field," said Jacqui Dedo, President of The Timken Company.



"I think it's OK to 'toot your own horn' in order to demonstrate that you have world-class capabilities and can be a valuable member of a customer's team," said George Dettloff, President of SKF's automotive division in North America.

play a prime role in developing stronger supplier-automaker relationships. "I think there are great opportunities ahead for continued product innovation that can help the OEMs work to reduce costs and improve performance, safety, and fuel efficiency. We don't see them all as mutually exclusive," said Dettloff, who added that by getting involved early in the design process and applying disciplined methodologies like Six Sigma, a design team can "often come up with some 'out of the box' ideas that hit the key criteria."

Dettloff further stresses that an open and trusting relationship with an automaker's buying and engineering departments can be a crucial collaboration component because "the customer is more willing to share past problems with field reliability or manufacturing assembly issues. I think it's important to clearly establish your credibility and expertise with the OEM's full team. Don't assume that everyone knows about your past involvement with the customer, or your relevant experience with other customers in other markets."

Learning what works and does not work in business is just as valuable as keeping a permanent record of best engineering practices. "The

most obvious lesson learned is, in order to provide the automaker—or any customer—the best product, you must stay true to your company's core capabilities. You can't be everything to everyone," said Dedo, adding, "a hard-to-accept lesson is to recognize and walk away from deals that are not a win-win situation for both parties involved. If you don't, you only have yourself to hold accountable."

Another hard-to-take lesson involves the financial side of doing business. "The biggest challenge is making sure that you get paid for your expertise," said Dettloff. Even if a supplier has worked to establish credibility, gotten involved early in the design concept and made an engineering investment to propose an optimum, cost-effective solution, "the customer can take your solution, send it out for bids, and someone could potentially come in and offer to produce it at a lower price," noted Dettloff, adding, "There still needs to be some compensation or slight piece premium to reward and encourage the true innovators."

Kami Buchholz

P-80[®] RUBBER LUBRICANTS

Improve Automotive Assembly Operations with P-80 Temporary Rubber Lubricants



P-80 provides lubrication during part assembly, then dries allowing the natural tight fit of rubber to return.

Try a FREE SAMPLE of P-80 to see how it can help you increase output rates, reduce rejects, achieve closer fits, improve product performance, and avoid injuries.

P-80 is widely used in hundreds of assembly tasks involving natural and synthetic rubber.

- ✓ A-Frame Bushings
- ✓ Electrical Grommets
- ✓ Body Molding Seals
- ✓ Boots
- ✓ Diaphragms
- ✓ O-Rings
- ✓ Mounts
- ✓ Windshield Seals
- ✓ Windshield-Washer Hoses
- ✓ Motor Insulators
- ✓ Bumpers
- ✓ Washers
- ✓ Sleeves
- ✓ Fuel-Line Hoses
- ✓ Plugs
- ✓ Exhaust Hangers
- ✓ Belts
- ✓ Tires

Three P-80[®] Products available: P-80[®] Emulsion • P-80[®] THIX and introducing NEW P-80[®] Grip-It

INTERNATIONAL PRODUCTS CORPORATION
(An ISO-Certified Company)

P.O. Box 70, Burlington, NJ 08016-0070 USA

Tel: 609-386-8770 • Fax: 609-386-8438
www.ipcol.com • SAE@ipcol.com

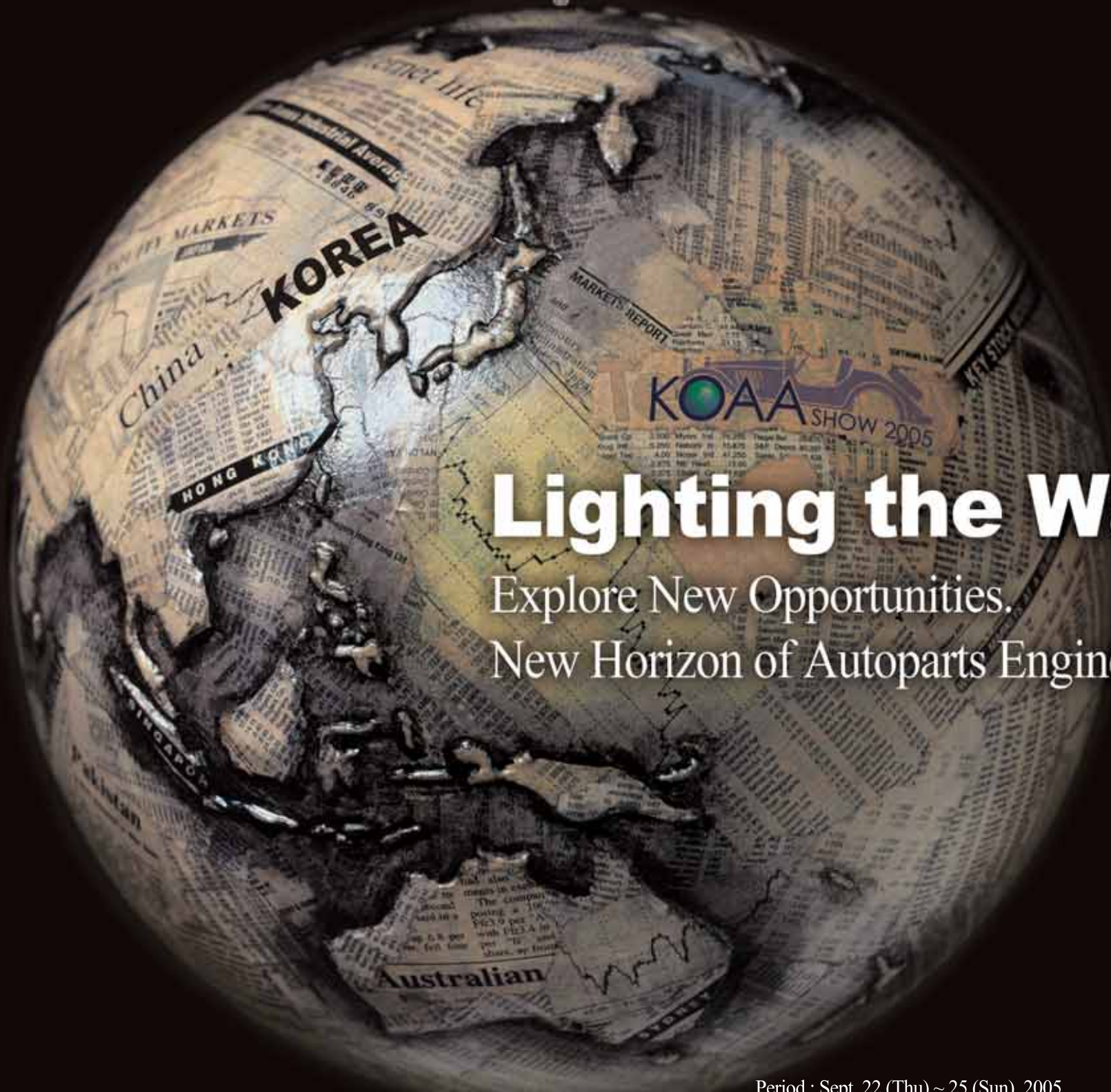
Visit us at SAE World Congress 2005: Booth 1044 050222



KOAAshow 2005!

Korea Autoparts & Accessories Show 2005

Millions of New Technologies
Unlimited Potentials at the KOAAshow 2005



Lighting the Way!

Explore New Opportunities.
New Horizon of Autoparts Engineering.

Period : Sept. 22 (Thu) ~ 25 (Sun), 2005
Venue : KINTEX (Korea International Exhibition Center)
Organized by S.TRADE in cooperation with SAE International
Sponsored by Ministry of Commerce, Industry and Energy
Gyeonggi Provincial Government

Automotive Engineering Seminar, which key engineers of Korean automobile manufacturers and major parts suppliers participates in, will be co-organized by SAE International & S.TRADE.

Web-site : <http://www.koaashow.com>
E-mail : koaashow@koaashow.com
Telephone : +82-31-433-0023
Facsimile : +82-31-433-0302



Millions of New Technologies
Unlimited Potentials at the KOAAshow 2005

Please visit us at SAE Show Booth# 226

**Focus
on people**



At Tuesday's World Congress event, Arkansas Governor Mike Huckabee speaks about the benefits that his state can offer to businesses that locate there.



Hau Thai-Tang (left), Director of Advanced Product Creation and SVT for Ford, and Dan Knott, Director of DaimlerChrysler's SRT group, chat prior to their participation in Tuesday's "Exciting the Weekend Warriors Means Profits for OEMs and Suppliers" panel discussion. They agreed that it is important to establish credibility among grassroots racers and other performance enthusiasts if OEMs hope to capitalize on those products in the marketplace.

"What is good for the internal-combustion engine will benefit hybrids," said John Moulton, President, Powertrain Division, Robert Bosch, at Tuesday's panel session "Hybrids vs. Diesel vs. Modified Gasoline, the Near Term—Is It Time for a Reality Check?" He concluded that diesel and gasoline engines will share the market and be dominant for the next 20 years.



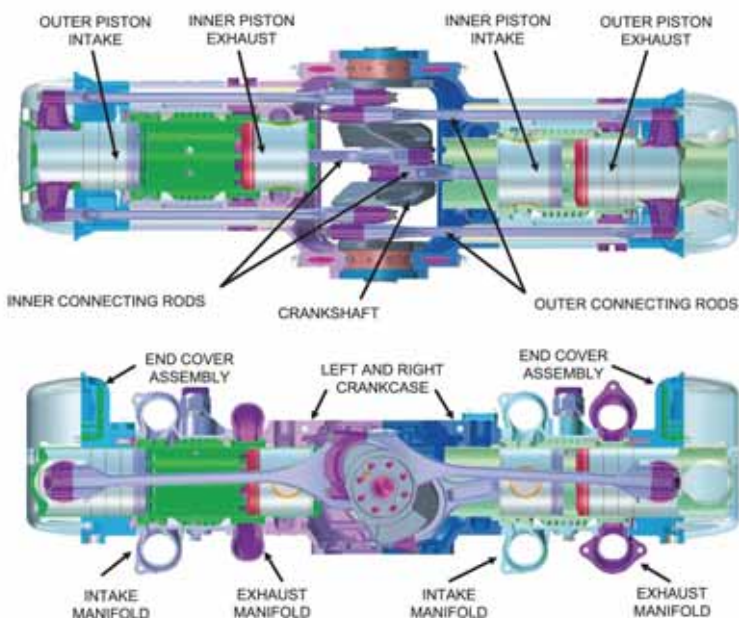
Alba Colon, NASCAR Program Manager, GM Racing, launched her automotive career by making contacts at Formula SAE. She was a founding member of the FSAE student chapter at the University of Puerto Rico.



Opposing view from FEV

A new lightweight engine that achieves high power density and operates on diesel or JP8 fuel is being shown at FEV's booth, 1815. Developed by FEV under a **DARPA** sponsorship, it uses a two-stroke, opposed-piston, opposed-cylinder (OPOC) configuration, boosted by an electrically assisted turbocharger from **Advanced Propulsion Technologies**. The engine delivers 325 hp (242 kW) and has a mass of only 275 lb (125 kg).

The concept engine is a combination of two designs originally produced before World War II: an opposed-piston two-crankshaft diesel engine developed by Hugo **Junkers**, and the opposed-cylinder boxer engine developed by Ferdinand **Porsche**. Production costs for the engine are expected to be significantly lower than conventional engines because it has about 25% fewer components, eliminating cylinder heads and the valvetrain. Fewer parts also mean greater simplicity and less friction.



The opposed-piston, opposed-cylinder engine configuration being developed for military ground vehicles by FEV has all the forces acting on the crankshaft and not on the main bearings or the crankcase.

See **OPPOSING VIEW**, Page 17

Next-generation turbochargers

During the "Military Vehicle Advanced Propulsion System Technology" technical session today at 1:30 p.m. in Room D3-24/25, researchers from **Honeywell Turbo Technologies** will discuss the development of a single-shaft, low-speed turbocharger (LST) that they say is capable of pressure ratios in excess of 5:1.

As power density has increased and the use of high-pressure EGR (exhaust gas recirculation) for on-highway engines has become more prevalent, engine applications have exceeded the capability of engineers to develop a single compressor/turbine turbocharger that could meet the pressure ratios, flow ranges, and efficiency levels required for today's vehicles. Two-stage turbochargers have thus become widespread, and while admired for their performance, they

present several disadvantages in terms of cost, complexity, thermal inertia, and packaging limitations.

Honeywell engineers chose a single-shaft configuration that uses back-to-back wheels in a two-stage compressor arrangement. Although the intuitive perception that requires series compressors to run at a common speed would reduce the map width of the overall compressor stage, the engineers claim the exact opposite happened.

Initially, the LST was targeted toward off-highway engines, which typically use free-floating or wastegated turbine housings. For on-highway engines, a variable geometry turbine would be required.

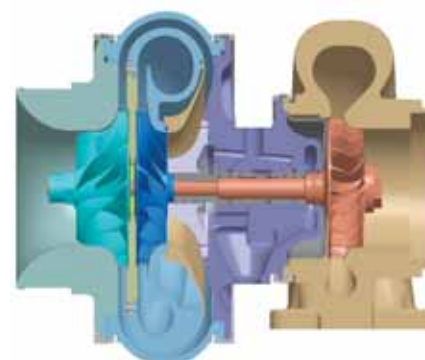
The researchers will discuss the fundamental design concept of the LST as well as the compressor design, analysis methodology, and performance results; turbine design

challenges and resulting tested performance; and rotordynamics analysis and bearing system design.
Jean L. Broge

Editorial staff

AEI editorial staff for the Show Daily can be reached during show hours at Booth 2069.

- Kevin Jost
Editorial Director
- Jean L. Broge
Associate Editor
- David Alexander
Associate Editor
- Patrick Ponticel
Assistant Editor
- Ryan Gehm
Assistant Editor
- Matthew Monaghan
Assistant Editor
- Matthew Newton
Editorial Assistant
- Kami Buchholz
Detroit Editor
- Contributing Editors
Terry Costlow
Jenny Hessler
Linda Trego
- Wayne Silvonc
Production Manager
- Contributing Artists
William L. Schall Jr.
Christian Bonicky



Honeywell engineers have developed a single-shaft turbocharger with a back-to-back series compressor that allows the rotor length and overhung mass to be reduced. They claim the design allows the rotordynamics to meet standard turbocharger criteria while using conventional turbocharger design and manufacturing processes.

Can't stop thinking about vehicle improvements? We're on your wavelength, with high-performance materials and technologies for powertrain, safety, thermal management, fuel, electrical/electronic and interior/exterior vehicle systems. And that's only the beginning. 1-800-533-1313 or automotive.dupont.com.

Congratulations on 100 years of leading our world in motion.



fuel for dreaming ▶

See us at Booth 1959

 **The miracles of science™**

The DuPont Oval Logo, DuPont,™ and The miracles of science™ are trademarks or registered trademarks of E.I. du Pont de Nemours and Company. © 2005 E.I. du Pont de Nemours and Company. All rights reserved.