



Record-Breaking Innovation

VW establishes new Guinness World Record for fuel economy

by Mike Traver



John and Helen Taylor completed a 20 day record-breaking journey through the US

The all new 2009 Volkswagen Jetta TDI is attracting a lot of attention these days with its clean-diesel engine. In a recent trip across the 48 contiguous United States, John and Helen Taylor established a new Guinness World Record for lowest fuel consumption by achieving 58.82 miles per gallon in real-world driving. The 2009 Jetta TDI manages this impressive fuel economy while still meeting Tier 2 Bin 5 emissions regulations.

The technology necessary to achieve these goals is an all-star roster of the latest advances in diesel-engine engineering. The fuel-injection system is common rail and employs advanced injectors spraying into an optimized combustion-chamber design. Combustion is managed through cylinder pressure-based control courtesy of the integrated glow-plug pressure sensors. The low-pressure and high-pressure EGR systems are managed through model-based air path con-

trol and the already-low engine-out emissions are then cleaned up by an oxidation catalyst, a lean NO_x trap and a diesel particulate filter in the exhaust system.

The Jetta TDI is well positioned to meet both the existing emissions limits and the future CAFÉ targets recently legislated by the US Congress. Recent strong sales are reinforcing Volkswagen's commitment to offer clean-diesel technology across their range of products to help meet the demands of these two legislated goals. Best of all, future iterations of the powertrain are sure to become better performing, less expensive and cleaner as their advanced technologies mature.

IAV's highly-skilled diesel engineering teams played a strong role in delivering the 2009 Jetta to market, developing both the combustion controller that governs the center of heat release and the model-based low-pressure and high-pressure EGR controller that delivers the proper mixture to the cylinder. For the aftertreatment system, IAV developed the complex state coordinator that oversees more than a dozen different modes for engine operation, and refined the combustion process during the enrichment conditions that regenerate the lean NO_x trap. The smooth interplay of these complex controls systems and the refined vehicle driveability which results owe much to the skills of IAV's calibration teams.

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Editorial

Dear Readers,



In the hope of inciting yet greater competition in curbing environmental concerns such as global climate change, SAE International, in tandem with host company Honda and Tier 1 strategic partner Bosch, have agreed to the theme of "Racing to Green Mobility" for the upcoming 2009 SAE World Congress. To be held from April 20-23, the conference's aim will be to explore topics including hybrid, diesel, gasoline and CNG technologies, as well as their corresponding control systems. Conference chairman Masaaki Koto, president of Honda R&D, puts the theme in plain words, describing the event as "a challenge to the industry and to each of us as individual engineers to act and take responsibility for a goal we all share - ensuring the survival of our planet." IAV's engineers are no exception; in addition to staffing Booth #1354, IAV subsidiary C4D has co-organized an upcoming session in the Executive Business Theater to discuss both new technology innovation and business aspects, such as strategic partnerships and customer value. With sights set on initiatives like those listed above, IAV is sure to play a part in the realization of a greener future for both the automotive industry and society in general. Such efforts, however, are only the beginning.

By investing in strong, mutual partnerships, OEMs and suppliers are indeed better able to optimize performance, while simultaneously furthering new ideas and developments. Collaborations similar to this allow for increased competitiveness, flexibility and refinement of the core competencies of each party involved. Through teamwork, ambition and the drive to succeed, those of us at IAV see great potential for the US automotive industry in the years to come. In fact, the promise of continued innovation has already been realized to some extent; read on about how, with the support of IAV's expert diesel team, VW was able to establish the Guinness World Record for fuel economy in a recent trip across the 48 contiguous United States ...

Utz-Jens Beister
President of IAV Inc.

Going Green in Sunny San Diego

IAV at the 2009 Hybrid Vehicle Technologies Symposium

by Jeremy Goddard

The Pacific gives a great stability to San Diego, for the temperature varies little throughout the 24-hour day, and the highs of summer are not so much above the mid-winter lows. Exhibitors and visitors coming to attend the 2009 Hybrid Symposium held in the city might indeed have expected to find some peace and stability here in these uncertain times ... but it was not to be.

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IAV at the 2009 SAE World Congress

Racing to Green Mobility

by Jeremy Goddard

The IAV Group will have a strong display at the SAE World Congress, to be held at Cobo Hall in Detroit from April 20 - 23. Following the theme of this year's show, Racing to Green Mobility, IAV will focus on displaying some of the many engineering activities the company is engaged in to support the use of alternative fuels and maximize powertrain efficiencies.

Several technical experts will be on hand from IAV in Germany to discuss their work, together with engineers working on these programs in North America. IAV's displays will include a cutaway of GM's FWD variant of the Dual Mode Hybrid transmission, now being offered in the Chevrolet Malibu. IAV has been heavily involved in supporting the Hybrid Development Consortium in Troy, and the

product of that cooperation is now being seen in production vehicles.

As a logical extension of an expertise in gasoline and diesel engines, IAV has for many years been developing gaseous fuel engines to run cleanly on hydrogen, CNG or LPG. In addition to the M271 engine with its CNG system on display, IAV experts will demonstrate the effecti-

ve integration of components and controls into OEM hardware and software.

Clean Diesel is becoming a watchword as renewed focus is given to energy efficiency, and IAV's work in developing exhaust aftertreatment systems not only for heavy-duty truck engines, but also for passenger cars, is now benefiting many OEMs and their customers. Dr. Lutz Kraemer will be on hand to show the latest technology being applied to diesels in order to help meet aggressive CAFÉ targets while satisfying correspondingly stringent emissions targets.

Alongside the technologies on display, IAV experts will present several of the simulation programs in use to model and develop control systems for engines, transmissions and emissions controls, as well as whole vehicle performance. The software package, VeLoDyn, allows development engineers to evaluate, in advance, the comparative performances of several permutations of powertrains under consideration to keep development cost and time to a minimum.

Please stop by to speak with IAV at Booth 1354, and plan to attend the ATX/Consulting4Drive technical sessions nearby.

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Executive Business Theater in Detroit

Professionals coming together

by Paul Moreton and Timm Kellermann

In April, international automotive executives will once again discuss global market trends and challenges at the SAE World Congress 2009. This year's Executive Business Theater sessions will be dedicated to topics which determine success in the global market: customer value, profitability, distribution and service, partner management and organization.

Under the theme Racing to Green Mobility, more than 20 high-level executives representing international automotive manufacturers and suppliers, including GM, Ford, Chrysler, VW, Honda, Yazaki,

Omron and TI-Automotive, will share their thoughts on the following key questions posed throughout five sessions:

- (1) What Lies Over the Horizon? Five Analysts Forecast the Global Economic/Policy Climate that Automotive Executives Need to Know
- (2) How Much Does Going Green Matter in the Most Critical Vehicle Markets
- (3) Selling in a Downturn: How to Optimize Economic Returns in a Fickle Market
- (4) A Production Strategy for the Future: How to Change from Producing Cars to a Flexible Solutions Configuration
- (5) Partnering for Profitability & Growth: Which Partnerships Do You Need to Secure for Tomorrow's Success?

From IAV Group, Utz-Jens Beister, President of IAV Inc. and Harald Gruebel, President & CEO of Consulting4Drive, will participate and present their perception of "green mobility". Guest moderator Larry Fobes, known from the local televi-

sion series "Leaders on Leadership", will provide the right questions and a productive agenda.

The 2009 Executive Business Theater will again be sponsored by Consulting4Drive, a strategy and process consultancy company of IAV GmbH, and the ATX Group (www.atxg.com), one of the world's leading providers of customized telematics services to global automobile manufacturers.

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CONSULTING4DRIVE
powered by IAV Automotive Engineering



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Reaching New Heights

IAV Inc. expands services at new Technical Center North America in Northville

by Paul Moreton



The latest dynamometer technology for future powertrain development

As you may have read in earlier editions of US-automotion, IAV Inc. has built, and now occupies, a completely new Technical Center in Northville, MI. The Technical Center includes four high transient cells: two for testing gasoline and diesel engines, one specified for hybrid drives and a fourth dedicated to heavy-duty engines. The investment in such state-of-the-art test and development capabilities allows IAV Inc. to engage in turnkey development projects across a wide range of powertrains.

This is not the only expansion of IAV's offerings over recent months. Further involvement in consultancy work has led to taking advantage of IAV's deep techni-

cal expertise. For example, a series of safety system reviews have been carried out on motor vehicles prior to production launch to bolster OEM confidence by having an independent organization recheck all the system failure modes for any that might have been overlooked. IAV has also analyzed procedures for a chemical plant controls and instrumentation manufacturer wishing to ensure that their safety systems meet the highest standards of reliability. Applying an automotive industry approach and experience proved to be very effective.

Among IAV programs, there are several strategic consulting opportunities ranging from determining a fuel system design

direction to selecting the optimum engine for a series of cutting edge products. The growth of IAV Inc. and its expanding spread of skills and resources, including valuable support from in-house consulting firm Consulting4Drive (C4D), has made this possible. C4D will also be at the SAE Congress in April at IAV booth #1354, ready to share their breadth and depth of experience in the automotive consulting area.

As IAV Inc. continues to grow, you may hear of IAV getting into some unusual kinds of projects. With the ability to do far more than one may think, speak with IAV the next time you have a complex problem. With plentiful resources, including C4D, to draw upon, IAV will deliver a solution in record time.

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Hybrid systems hold much promise for automakers struggling to meet the challenging mix of low emissions and high fuel economy demanded in the coming years by CARB, the EPA and CAFÉ. The Symposium again brought together analysts, industry executives and government officials to review the expectations being placed on the hybrid contribution, and the possibilities of the latest developments in batteries and controls being able to meet them.

Since last year's symposium, there has been significant progress in the understanding of the marketplace and in technology. Honda's presentation on the development of their new Insight told of remarkable reductions in system mass (-28%) and cost (-40%) and improved performance in comparison with the current Civic Hybrid from which it evolved.

While many of the presentations were deeply technical and offered the results of considerable research and analysis, the background effects of the country's economic distress were felt with the reiteration of concerns about the collapse of the market and the resulting lack of revenue. There were many suppliers eager to sell and relatively few customers seeking to buy. As with the rest of the country, the major manufacturers are waiting to see what happens before they consider writing a check. However, on a more positive note, the Symposium helped forge new relationships, and attendees were given much data to consider as they determine their next moves.

The major conclusion was that, unless fuel prices rise again to drive the car-buying public back into purchasing hybrids (or the efficiencies of clean diesel) and into other alternative fuels, the government must step in with incentives which are powerful enough to affect market forces and encourage the purchases it wishes the people to make. The man in the street will choose with his wallet, and if he is to pay a premium to "do the right thing," he must be able to find the cost benefit.

As conference attendees climbed into cars and aircraft to head home, the Pacific continued to provide its breakers and stabilizing thermal influences, seemingly unaware of the churning turmoil ashore.

Join the debate: What is the Future of Transmission Design?

Competition for the transmission of the future

by Kathleen Rafalko

As the automotive industry searches for creative ways to meet emissions regulations, improve fuel economy and enhance vehicle performance, the transmission engineering community has come together in an effort to provide new solutions. Owing to the many alternative torque-transfer options - DCT, CVT, AMT and planetary, the integration of hybrid systems and the complexity of system controls, IAV has partnered with SAE to provide engineers in the industry the opportunity to take a deeper look into transmission

technologies and to better master future challenges in the automotive sector.

Competition for the Transmission of the Future is the theme for the first annual SAE Transmission Symposium, scheduled for September 8 - 9, 2009. The symposium will be held at the Inn at St. John's in Northville, MI. It will provide attendees with valuable technical presentations from leading experts in the field, along with an opportunity for engaging in open discussions among

peers on the various and sometimes conflicting transmission design approaches. The program will include an informal ride and drive event, key note speakers and panel discussions.

Don't miss this most relevant and affordable technical event held in the Detroit Metro area. Additional event details are available at www.sae.org.

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Working for IAV - A Cultural Experience

One engineer tells his story

by Jim Ireton

In February of 2007, I joined IAV after 14 years of powertrain development at two of the Big Three. My first assignment was to move my family to Berlin and integrate myself into an international diesel engine development team. The goals were to build strong relationships with my new counterparts in Germany, understand the European diesel engine market, gain experience with the dynamometers and emission analyzers in Berlin and familiarize myself with the IAV GmbH engine development process. It was exactly the type of challenge for which I had been looking.

Sending engineers to Germany for extended training is IAV's concept to ensure a strong partnership with its parent company. My assignment was originally envisioned to last for 6 months but, due to the initial success, would eventually expand into a 15-month experience. Some of the transitional processes were still being understood, but everyone in Human Resources and the Management teams both in Germany and the U.S. made every effort to ensure a smooth transition. The importance of this exchange program was evidenced by their patience, caring and concern.

On my first day in the Berlin office, I was introduced to the team. I was a bit uncertain of how I would be received as an outsider from another culture who didn't speak their language, but they were more open and welcoming than any team with which I have ever worked. We hit it off instantly. They seemed almost as eager to learn about the Detroit auto industry as I was to learn about the European market. Also, their tradition of eating lunch as a team meant that I was quickly absorbed into the group.

Covering New Ground

The language barrier was not an issue at work. When I would enter a meeting, the conversation would switch from German to English and then switch back again when I left. Due to the international nature of their projects, English fluency is an important skill and many of the engineers were happy to have the chance for some casual practice.

I noticed that engineers of my same age typically had five years less working experience. I am told that engineers in Germany typically stay in school four to five years longer than their counterparts in the U.S. and spend nine months in military or social service between high school and college. I was quite impressed with all of the engineers on the team. Given the varied nature of the projects they work on, each engineer is very broadly trained. Even though they each have their area of expertise, many are well experi-

enced in all aspects of diesel engine and aftertreatment control & simulation, hardware design, dynamometer control, vehicle development and various commercial engine control software packages. They work in much smaller project teams than is typical at the U.S. OEMs and therefore have much greater range of responsibility.

Customers from around the Globe

I also realized that IAV is perceived much differently in Germany than in the U.S. IAV is a new brand in Detroit - only eight years old at the time and lesser known than its competitors in the US. In Europe, IAV is a very well established company with an excellent reputation. IAV is one of the largest automotive engineering service providers worldwide. Business was plentiful and I was impressed that their customer base was not as concentrated on German or European OEMs as I had imagined. Customers from around the globe sought out IAV's services. The project teams at IAV worked hard to satisfy as many customers as possible, but some projects could not be pursued because resources were often fully utilized.

IAV Inc. was in the process of building a multi-million dollar test facility in Northville, Michigan, with the intent to be nearly identical to the facilities in Germany. The similarity of test facilities and processes would make it easier to exchange engineers between organizations when necessary. One of my primary tasks while in Berlin was to study the operation and control of the dynamometers and emission test equipment to prepare for our facility start-up in Michigan when I returned.

IAV GmbH had many state-of-the-art test cells. The dynamometer labs were like none other I had worked with at the OEMs. The system would synchronize data from multiple measurement sources while running the engine through programs of transient test cycles. We frequently programmed it to run a series of tests overnight or the entire weekend and then simply shut off the lights and let it work unattended. The detailed safety systems would ensure that the engine or equipment was not damaged. It was even possible to send text messages to my cell phone if a problem occurred or the test was completed successfully. Essentially, the dyno continued to work while I was at the local biergarten.

I was very lucky to join a project team that was assigned to develop a NOx aftertreatment and engine control system for a European diesel vehicle with



Jim Ireton and his wife Marie visiting "Zugspitze" - Germany's highest mountain

a goal of entering the U.S. vehicle market. I gained valuable experience with SCR system design and control, but was also able to contribute my experience with diesel engine control and the nuances of the U.S. emission and diagnostics regulations. The differences between the U.S. and European approaches to emissions regulation goes beyond the cycles and thresholds.

The experience was a tremendous growth opportunity for my family and for me. My children completed the 2nd and 4th grades while in Germany. Berlin is a great city with a lot of potential that is just beginning to be realized. We miss it and all of our good friends every day.

New Friends and New Experiences

Now that I'm back in the U.S., I still feel that I'm part of the team back in Berlin. When I need advice, I simply pick up the phone and call my old friends. I can take advantage of the difference in time zones and receive solutions to problems overnight. Recently, I invited one of my best friends in Berlin to come to a meeting with a new customer on short notice. His expertise in Diesel Aftertreatment Simulation and Control proved to be very valuable. He didn't hesitate for a second. As an added benefit, we watched the Superbowl together at my house, which

was only fair since I had watched it at his apartment in Berlin last year.

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<p>April 20 - 28, 2009 Auto Shanghai 2009 Shanghai, China</p> <p>April 20 - 23, 2009 SAE World Congress (booth 1354) Detroit, USA</p>	<p>June 16 - 19, 2009 Testing Expo 2009 Stuttgart, Germany</p> <p>June 18 - 19, 2009 7th Symposium "Powertrain Control Systems for Motor Vehicles" Berlin, Germany</p> <p>June 29 - 30, 2009 5th IAV-Conference "Design of Experiments (DoE) in Engine Development" Berlin, Germany</p> <p>June 30 - July 01, 2009 VDI-Congress "Vehicle Transmission" Friedrichshafen, Germany</p>	<p>July 26 - 30, 2009 28th International Conference on Thermoelectrics Freiburg, Germany</p>	October
May		September	<p>October 06 - 08, 2009 Commercial Vehicle Engineering Congress & Exhibition Rosemont, IL</p>
<p>May 07 - 08, 2009 30th International Vienna Engine Symposium Vienna, Austria</p> <p>May 12 - 13, 2009 3rd IAV-Conference "Oil Circulation in Combustion Engines" Zwickau, Germany</p> <p>May 12 - 14, 2009 3rd CTI Symposium + Exhibition Detroit, MI</p> <p>ATZ 05/2009</p> <p>"Hybrid Powertrain Simulation" <i>thiess-magnus.wolter@iav.de, dr.burghard.voss@iav.de</i></p> <p>ATZ/MTZ Engineering Partners 05/2009</p> <p>"Test-Engineering for Engine Controllers - IAV as Test Facility for OEMs" <i>andreas.greff@iav.de, dr.heiko.hepp@iav.de, thorsten.roehrs@iav.de, carsten.kulkwitz@iav.de</i></p> <p>Automobile Construction 2/2009 "Rapid Calibration of DPF- Regeneration" <i>benjamin.felchner@iav.de, juergen.rohr@iav.de, michael.frambourg@iav.de</i></p>		<p>September 08 - 09, 2009 Competition for the Transmission of the Future Northville, MI</p> <p>September 23 - 24, 2009 Dynamique du Véhicule Lyon, France</p>	
			