

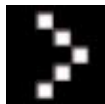
Virtual world

THE VERY LATEST IN DYNAMICS SIMULATION TECHNOLOGIES STOLE THE SHOW AT VEHICLE DYNAMICS EXPO 2009. GRAHAM HEEPS REPORTS FROM STUTTGART



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Dr Andreas Rohde, director, electronic suspension systems segment, Continental



This is an unusual year for automotive exhibitions. September's IAA in Frankfurt, for example, will be without Honda, Nissan, and Mitsubishi, as OEMs and suppliers alike seek to keep costs under control until sales volumes rise again.

With this in mind, the showfloor atmosphere at Vehicle Dynamics Expo 2009 came as no surprise: the event was smaller than in previous years, but as show visitor Koen Reybroeck from Tenneco commented, "The Expo remains a good place to meet people. I'm still here for several days to meet a number of colleagues from all over the world and in future years I'm sure that it will be bigger and better again."

That the show was still attracting the right people was confirmed by exhibitor Dr Andreas Rohde, Continental's director for the electronic suspension systems segment, whose booth had a working model of the Porsche Panamera's air suspension to attract visitor attention. "We're very happy," he reported. "There were fewer contacts

than normal, but the quality of the contacts was very high."

The 2009 Expo was as focused as ever on the latest technologies and tools for ride and handling, steering and braking development. But this year more than ever, it was vehicle dynamics simulation tools that were attracting the attention of visitors to Messe Stuttgart's Hall 3. Most of the industry's leading players were exhibiting this year, and there were plenty of new features and functionalities on show.

Of particular interest was rFactor Pro, a young company that until now has worked exclusively on motorsport simulators and was making its first appearance at an automotive trade show. The product is impressive: video-game quality vehicle and circuit graphics underpinned by professional-quality full-car models (such as Simulink or Dymola) that can be run in real time with a driver-in-the-loop. rFactor Pro is already being used by three Formula 1 teams as their primary simulator for engineering development, setup evaluation and driver training, and

Fast cars catch the eye

Much as show visitors like to be informed about the latest chassis componentry or CAE packages, everybody makes time to check out any interesting cars on display!

This year there were two vehicles that caught the eye. The first was an Audi A4 quattro race car, campaigned in the recent Nürburgring 24-hour race by a team from Aachen's ika/fka, with institute head and former Audi dynamicist Professor Stefan Gies among the driving line-up. The A4 finished a creditable third in class D3T with a best lap of 10 minutes 27.594 seconds. News from ika is that Gies will be leaving academia later this year to take up a senior chassis development position with VW.

Also on display was IFR Automotive's Aspid two-seater. With innovative twin-disc brakes, a lightweight alloy structure claimed to be 10 times stiffer than a conventional spaceframe, and the company's patented, reinforced extruded alloy suspension wishbones, Aspid is a showcase for IFR's state-of-the-art dynamics technologies. A Forum presentation highlighted how Creuat's centrally linked suspension system is also being evaluated for the car, which is set to go into low-volume production.



CLOCKWISE FROM ABOVE: IFR'S FOUNDER, IGNACIO FERNANDEZ RODRIGUEZ; THE ASPID; AACHEN'S A4 QUATTRO 24-HOUR RACE CAR



Company founder and CEO Ignacio Fernandez Rodriguez was also on hand to answer questions from visitors about IFR's growing business as a design and engineering consultancy, with the capability to prototype new technologies or even design a full vehicle for an OEM through to the first physical prototype stage. About 70% of IFR's work is dynamics-related and the firm is now engaged on two major OEM contracts.

it was a Formula 1 car model lapping the track in rFactor Pro's Expo demo – albeit with the bodywork replaced by that of a Lexus IS-F!

There was also plenty of news from the established players in the simulation field. Co-simulation capability with FLUIDON's DSHplus software and Simulink is key to the latest release from Altair, HyperWorks 10.0. The firm promises that more extensive changes are in the pipeline for version 11.0, and a dedicated dynamics software solution is also under development by the company, and could make its debut at Vehicle Dynamics Expo 2010.

Meanwhile, Mechanical Simulation Corp presented CarSim 8, which supports encrypted datasets that enable OEMs to provide suppliers with validated CarSim data in a confidential format. Encrypted data is shown in green on the GUI. The new release also adds FTire to the list of supported tire models. Simulator specialist Simtec works extensively with CarSim, and was sharing a booth with the software company in Stuttgart.

And there were further novelties at dSPACE, where the focus was on enhancements to the ModelDesk front end for real-time models built



in Simulink. For dSPACE's release 6.4, which arrives in July, the ability to conduct vehicle dynamics simulations on an articulated truck and trailer has been added, with the ability to quickly switch between axle configurations via ModelDesk.

Back in the real world, the Expo was also the platform for some interesting new technologies from chassis component suppliers.



ABOVE LEFT: EBM-PAPST ELECTRIC MOTORS FEATURE ON THE ZF VECTOR-DRIVE REAR AXLE UNIT. LEFT: CHRIS HOYLE, RFACTOR PRO'S TECHNICAL DIRECTOR, IN FRONT OF HIS COMPANY'S SOFTWARE DEMO



JOACHIM AHLE OF AHLE SPRINGS (ABOVE) TOGETHER WITH HIS COMPANY'S LATEST SIDE-LOAD COMPENSATION DESIGN (RIGHT)



Having made headlines in the past with Synaptic Damping Control (now in production on the Lancia Delta, and coming soon on the MiTo), and the U-link rear axle (see *VDI*, May 2008, page 36), Magneti Marelli was once more in the limelight at Vehicle Dynamics Expo 2009.

The subject of the firm's presentation to the Open Technology Forum on Day 1 was personal dynamic tuning (PDT), the exact specification of which is being evaluated for a possible, limited launch into the automotive aftermarket before the end of 2009, with the potential for OE-fit in the future.



AWD-FRIENDLY TWIST-BEAM REAR AXLE WITH ARCHED TUBE ON THE MAGNETI MARELLI BOOTH

EX-SAAB LEGEND ROLAND CHAIRS FORUM

On Day 1, attendees at the ever-popular Open Technology Forum were treated to a presentation by former Saab chassis guru Magnus Roland, who also chaired the session.

The free-thinking Roland's current company, www.s2ab.se, which has an ongoing chassis project with Benteler, believes that with low-cost entrants to the automotive market competing on price, the mature industry is being "forced into a paradigm shift for future sustainability". That not only means a change in the way in which future technologies are integrated, but "quantum leaps" in technology, such as pneumatic hybridization rather than the added cost and weight of the present plug-in and hybrid vehicles. Roland said, "The hydroformed body structures will most probably be integrated into a network forming the tank for pressurized air."

This theme of original thinking was reflected in the sessions chaired by Roland in the Forum, where Fiat, Getrag, and Dufournier were among the companies presenting. "I hope the sessions gave the listeners something to think about," he says. "There were many examples of how much could be done by an in-depth understanding of the inner art of physics."

Roland's own presentation to the Forum detailed a suspension concept based on the principles of topological geometrodynamics. The full version including videos can be downloaded from http://www.s2ab.se/s2ab/home_files/expo.zip. Other 2009 Forum presentations will be available soon to download in pdf format from www.vehicledynamics-expo.com/downloads.



Under the PDT system, the driver can choose from a range of customization to the car's adaptive dampers that goes far beyond the two- or three-stage switches typically found in vehicles that feature electronic damping. A personal information device is used to control attributes such as understeer/oversteer and dive/squat. There's even the possibility that the system could be linked to the satnav, in order to calculate recommended settings for the route to be driven.

Also on Marelli's stand was a twist-beam rear axle with an arched tube, suitable for accommodating a differential in AWD versions of B- or C-segment cars that also come with twist-beam rear ends in FWD form. The firm revealed that it has a production contract for the item, although the unnamed vehicle is still several years from market launch, and added that tightly packaged alternative fuel vehicles, such as

those with an underfloor gas tank, would also be suited to the arched-tube hardware.

Elsewhere, Ahle Springs had two innovations on display. The German company believes that the new small sizes for its 'super-progressive' springs will mean that the technology has applications beyond vehicle suspension, for example as a pedal-feel simulator in electric braking systems, as a step-free replacement to the spring packages currently employed.

On a larger scale was Ahle's latest side-load compensation suspension spring. This provides a shorter, more assembly-friendly solution to the conventional 'banana' spring by the use of thicker spring wire on one vertical side than the other. Managing director Joachim Ahle told *VDI* that the design has been patented and the manufacturing process fine-tuned. The concept is being presented to OEMs.

