

The biennial show that brings together the pan-European commercial vehicle industry – IAA – took place in Hanover, Germany, early last month.

John Challen and Brian Tinham round up key developments



# Vorsprung durch



Iveco's Vision concept, designed for door-to-door deliveries, brings together Iveco's Dual Energy technology with a high-tech frame, body and HMI

Two years ago, Hanover was alive with new Euro 6-engined vehicles – present or promised – and delegates worrying about fuel performance, weight penalties and prices, compared with outgoing Euro 5. But this year saw the German city playing host to a more subdued event, with manufacturers and suppliers keen to focus on their successes with clean commercial vehicles, rather than focusing overly on the next big thing.

One exception was the Iveco Vision concept, designed for door-to-door delivery operations. The environmentally-friendly light commercial vehicle brings together Iveco's Dual Energy technology – unveiled at the 2012 IAA event – with a hi-tech frame, body, interior and HMI (human-machine interface).

Dual Energy enables two types of traction – one electric, the other hybrid (thermoelectric). Together, these can cut carbon emissions by up to 25%, says Iveco. In operation, a transfer unit couples the electric motor with the transmission shafts. The result is a hybrid that is also an adaptive traction system with real-time energy management. Iveco says its vehicle will adapt to the most suitable traction mode: hybrid improves speed and range on intercity routes, while the electric mode gives zero-emission mobility in metropolitan areas.

As for the HMI, you get a tablet computer that communicates with the truck's on-board electronics. But there's more: a fully glazed surface and transparent front pillars, while a panoramic screen on top of the windshield displays the view from the rear camera. Additionally, the truck offers automatic load management, via a series of sensors that identify



# technik

goods and indicate correct positioning in the vehicle. Containment devices can be deployed to prevent larger packages moving around in transit.

Even more impressive and futuristic was Mercedes-Benz, which turned the spotlight on its Future Truck 2025 (*Transport Engineer*, September 2014, page 16), a vehicle designed for driverless operation, which the firm believes will be a reality in Europe within 10 years. Futuristic it is, but the technology is largely current.

The truck uses Mercedes' existing PPC (predictive powertrain control). It also relies on Mercedes' EAM (emergency brake assist) front-mounted radar sensors and has a stereo camera (developed from the lane-assist mono version) to identify lanes, but also pedestrians, other vehicles and objects, road surface condition and traffic information. Then real-time data from side sensors completes the picture for the autonomous controller – and that data can also be shared with other autonomous vehicles.

## Heavy haulage

That said, there was plenty for those interested in heavy haulage, with news of SLT versions of the Actros and Arocs tractor units. The former is now available with a GigaSpace cab and features air suspension, while the latter is steel-sprung and makes do with a choice of BigSpace (also an Actros option) or the narrower Streamspace cab.

Actros SLT is available as a 6x4 or 8x4 and can cope with gross combinations up to 250 tonnes, while the Arocs range features 6x4, 6x6, 8x4, 8x6 and 8x8 versions. Both are available with the firm's TRC (turbo-retarder clutch) for start-off and extreme

retardation, and there is also Mercedes' HAD (hydraulic auxiliary drive) for occasional extra traction on the Arocs.

Meanwhile, fellow German giant MAN unveiled two particularly interesting trucks – a CNG (compressed natural gas) powered TGM for distribution and a parallel hybrid version of the TGX. The TGM is an 18-tonner delivering 280bhp and 1,150Nm torque, harnessing gas engine technology from MAN's bus division, and will be available in 2016. The TGX hybrid is evidently designed for long haul.

Elsewhere, DAF's theme was 'Always the right solution' – with one being its CF Silent – an extra quiet distribution truck boasting noise levels under 72dB(A) in 'Silent' mode. Starting with Paccar's 10.8-litre MX-11 Euro 6 engine, DAF engineers have added a system that, at the touch of a button, changes the engine software to limit torque and engine speed, and to upshift gears at lower engine speeds.

Also on the stand were low-deck versions of the CF and XF – with a fifth wheel height down to 91cm, achieved by using low-profile tyres and fitting air suspension to the front axle. Other highlights included a redesigned roof deflector for the XF, which,

## Engine systems

Mercedes launched its M 936 G natural gas engine for Econic, based on the OM 936 turbodiesel from the new 7.7 l BlueEfficiency Power range. It runs on CNG and develops 301bhp and 1,200Nm torque. That places this single-stage turbo engine on a par with its diesel counterpart, but with massively enhanced green credentials.

Meanwhile, MAN used IAA to launch its D38 six-cylinder engine for the flagship TGX truck. This is a 15.2-litre unit delivering 520, 560 and 640bhp – which is gutsy, but not compared to Scania's big beasts. "The objective wasn't to have too much power, because while that is good for brand image, operators don't need it," commented Bernd Maierhofer, R&D director. He also advised operators to be aware of "discussions in Brussels around further NOx reduction". There is no timescale yet for Euro 6 'B' and 'C', but Maierhofer expects further engine alterations.

Then Cummins unveiled its latest G Series heavy-duty ISG12 in-line six-cylinder engine, along with a lighter weight Holset HE300VG VGT (variable geometry turbo) and its first Holset M<sup>2</sup> two-stage system with rotary turbine control (RTC), developed with Nissan for its Titan pickups.

The new engine – available with 11- and 12-litre displacements and already in the new Foton Daimler Auman GTL truck – is aimed at trucks, buses, coaches and specialist vehicles. The Euro 6 version is due out shortly. Interesting features include its compactness and lighter weight, with Cummins director Brett Merritt explaining that these result from a sculpted block (which retains rigidity while reducing mass), as well as composite materials for the oil pan and valve cover. The result: weight is 860kg and it delivers more than 500bhp and 2,300Nm torque.

As for the Holset HE300VG, Cummins claims a 12% efficiency improvement, as well as a 10% weight reduction. It also says that integration with engine systems has been eased, thanks to a new actuator. Durability and performance are also better, due to a patented moving-shroud VG mechanism.

combined with a Super Space Cab, improves aerodynamics, saving a claimed 1.5% on fuel.

Then on the Volvo stand, technology advances included the firm's I-Shift dual clutch transmission on its flagship FH. Offering zero loss of power or torque during gear changes, the new gearbox is an option on FHs powered by the 13-litre Euro 6 engine. Volvo also claims more comfortable driving as well as improved engine braking.

For PSV (public service vehicle) operators, Volvo launched a plug-in hybrid-electric bus, the 7900 articulated PHEV. The Swedes state that fuel economy is sub 1l/100km – that from a vehicle powered by a 5-litre diesel engine and an electric motor delivering 1,152Nm of torque via a 600V, 19kWh Li-ion battery pack. They also say the pack can be charged in six minutes via a roof-mounted pantograph, enabling electric-only mode to run for 70% of vehicle operating time.

#### Fuel economy

Away from the vehicle OEMs, Allison Transmission displayed its largest ever range of gearboxes, designed for vehicles from LCVs to off-highway applications. One of its innovations was FuelSense, an efficiency package said to improve fuel economy by up to 20%. The new technology incorporates Allison's latest generation electronics, which automatically optimise shift schedules and torques to the duty cycle.

Moving on, Bosch focused not on fuel systems but connectivity, with director Wolf-Henning Scheider

explaining: "We expect that, by 2016, every new commercial vehicle in Europe and the US will be web-enabled." One development is Eco.Logic Motion – a system that uses a navigation system-based electronic horizon to optimise driving strategy. Scheider said that Bosch systems connect the powertrain with the navigation system. This results in average fuel savings claimed at 5% – with some early users reporting 9%. Next, Bosch will connect the engine and transmission management systems with web-based data, adding not only topography data, but also speed limits and roadworks information.

Meanwhile, Delphi launched a range of common



## Wheels and rubber

Continental revealed plans for the industrialisation of dandelion rubber in tyre production. First tyres built using Taraxagum are winter products, and the firm says its goal is improving sustainability. Research continues with the Fraunhofer Institute, although there are question marks over market demand and space for growing the dandelions.

Bridgestone majored on improvements to its Total Tyre Care programme with the addition of three options: Advanced Tyre Monitoring; Premium Tyre Maintenance; and Elite Tyre Management. They provide operators with "effective solutions to manage tyre-related costs, maximise value, and reduce total cost of ownership," said the firm.

GT Radial launched 11 new tyres. Highlights were the GSW226 – its first winter steer axle tyre – and the GTL long distance trailer tyre. GSW226 has a wide shoulder groove and uses a new compound said to improve mileage. Meanwhile, the extra-wide seven-rib GTL925 has a low-profile casing, claimed to promote a regular wear pattern, with low rolling resistance and noise.

Elsewhere, Maxion Wheels showcased its lightweight truck wheels, Gen35. Each is 6% lighter than its equivalent predecessor, and a claimed 3.5% lighter than the lightest from its competitors. Weight has been cut by using a re-optimised profile, with a goal of helping operators to improve payload, better fuel economy and emissions.

rail systems for medium-duty trucks, as well as a high-pressure direct injection (HPDI) natural gas injector. Managing director Steve Gregory said the new common rail system – due out in 2016 – delivers improved fuel control, with pressures up to 2,400 bar to maximise the burn and reduce emissions. It's also modular to allow for scalability and integration with existing engines. As for the new HPDI gas injector (also due in 2016), this is a second generation device co-developed with Westport Innovations and aimed at heavy-duty applications.

Incidentally, Delphi also revealed its next-generation heavy-duty fuelling technologies, building on its three new F2 diesel injection systems. "Our F2 systems are already working at up to 2,700 bar and are designed for operation at up to 3,000 bar," said David Draper, Delphi director of engineering. "Our next systems will deliver improved hydraulic efficiency, enhanced robustness to fuel contamination, as well as smaller, lighter valves that enable even faster opening and closing."

Looking at other technologies, on Continental's stand there was more talk of automated truck driving technology but also dandelion rubber for tyres. Continental says it is working on the next generation

of driver assistance systems for commercial vehicles, using automation to improve safety and efficiency. According to Dr Michael Ruf, head of commercial vehicles and aftermarket, Continental wants “to make partially automated driving a reality as early as the current decade”.

By 2025, Ruf expects fully automated driving on certain routes. Key to that will be what Continental calls a networked electronic horizon – using data from a navigation device, as well as sensor data from other road users, to define optimal truck routes.

Finally, big news in Hanover concerned the merger of ZF and TRW – bringing together driveline, chassis,



**Delphi launched a range of common rail systems for medium-duty trucks at IAA**

power steering (HPS) for CVs and electrically powered steering (EPS) for cars, with a goal of improving control and stability. The second was the ActivMode hydraulic power steering pump, claimed to cut energy consumption by 50%, as a result of dual-mode flow logic, which matches steering demand at engine idle but also cruising speed.

What about the new radius rod? Dr Cengiz Erdogan, head of engineering for CV linkage and suspension, said it is 30% lighter than traditional units. “The key ... was the functional integration of cardanic elements from the rubber bushing into the connecting elements between the two housings,” he explained. “We redesigned the tube component, which now uses two inverted C-shaped pieces of metal,” he said, adding that the new torsion rod is interchangeable with existing designs. **TE**



**DAF's new CF Silent uses Paccar's 10.8-litre MX-11 engine, but with new engine software that limits torque and engine speed**

safety technologies and electronics systems expertise. ZF also announced that it is withdrawing from its joint venture with Bosch – ZF Lenksysteme – because, as ZF chief executive Dr Stefan Sommer put it: “The megatrend of automated driving has more potential for the future.” Whether Sommer is right will become clearer when the show returns in the autumn of 2016.

**Innovative engineering**

ZF showed its 25m long (with trailer and semi-trailer) Innovation Truck – capable of being manoeuvred remotely using a tablet computer in charge of the hybrid driveline, chassis and steering systems. It uses ZF's intelligent TraXon (dual clutch and hybrid) automatic transmission combined with Servotwin steering and Openmatics Telematics, and operates using the truck's electric motor for emission-free operation. ZF reckons there will be a shortage of drivers in the future – meaning that loading and unloading needs to be separated from driving.

Then TRW Automotive launched two new steering technologies and a lightweight radius rod for trucks. On the steering side, the first offering, dubbed ReAX, merges two of TRW's existing systems – hydraulic



**Cummins' new G Series is available with 11- and 12-litre displacements and is already used on the new Foton Daimler Auman GTL truck**