

With Germany's 66th biennial IAA commercial vehicle show still going strong in Hanover as we close for press, Brian Tingham offers the first of a two-part review

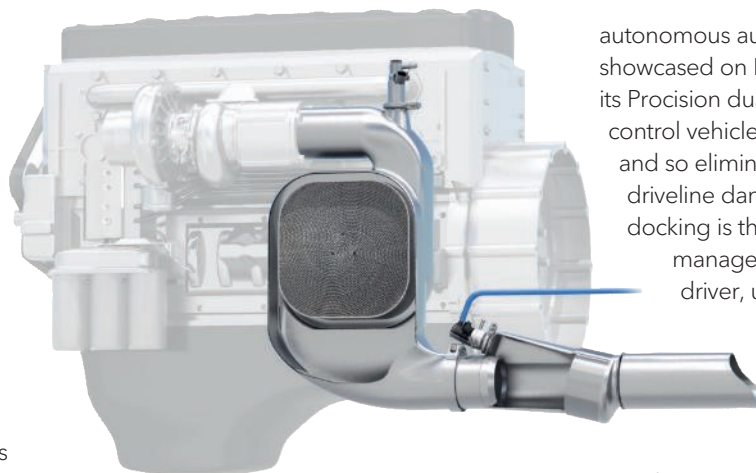
FUTURE TECHNOLOGY NOW



No exhibition on the scale of September's 66th international IAA event, in Hanover, can be covered by a single report. So this first part (the second publishes next month) focuses on new components and systems likely to be behind some of the most significant advances coming.

Starting with tacho specialist Stoneridge, its show-stopper was an Innovation Truck and, in particular, MirrorEye. The latter replaces Class II and IV mirrors with HD digital cameras and interior displays. This is not technology for technology's sake: Stoneridge insists it removes blind spots, keeps drivers' eyes on the road for longer (the angle of the displays is narrower) and improves awareness of dangers around the truck.

Other points to note: no side mirrors mean more streamlined trucks, so better fuel economy; self-cleaning and defrosting functions ensure operation in all weathers; night vision improves manoeuvring in the dark; and image



Continental's latest technology offering: a compact, close-coupled DOC (diesel oxidation catalyst) capable of transforming after-treatment designs

handling software minimises glare. Oh, and its panning set-up allows drivers to follow trailers, merging lanes, etc. Add the firm's TopEye, which replaces Class V and VI mirrors, and you get all-round digital visibility.

Elsewhere, on Eaton's stand, visitors were wowed by the firm's ADAS (advanced driver assistance system): close proximity auto-docking and

autonomous auto-docking. The former - showcased on Eaton's demo truck, with its Precision dual clutch - is designed to control vehicle speed during docking and so eliminate trailer, dock and driveline damage. Autonomous auto-docking is the next level up, allowing managers to take over from the driver, using GPS to auto-park the combination.

Beyond these, Eaton also previewed waste heat recovery prototypes, including its indirect (organic Rankine cycle) system and direct electrical technology. The former uses heat from either the after-treatment pack or the engine to optimise operation of the after-treatment system itself, with Eaton predicting a 5% fuel economy enhancement. Meanwhile, the firm's direct approach uses its EAVS (electrically assisted variable supercharger) to control engine and exhaust gas movements - potentially delivering a 22% improvement in fuel consumption and emissions.

Other noteworthy advances included: Eaton's two-speed transmission for



Electric trucks, platooning technology and ADAS (advanced driver assistance systems): on the road to autonomous vehicles

medium- and heavy-duty electric vehicles, designed to improve speed and torque range, and enable smaller drivetrains; and a range of valvetrain systems, including variable valve lift, cylinder deactivation, hydraulic lash adjusting and a decompression engine brake. The latter enables the valvetrain to switch between driving and engine braking mode, while incorporating VVA (variable valve actuation) approaches, such as Miller or Atkinson.

PLATOONING

Moving on to Continental, IAA visitors were treated to a vast array of technologies designed to enable truck platooning, real-time drivetrain optimisation and more. On platooning – what the company refers to as ‘the electronic tow bar’ – chief executive Dr Elmar Degenhart claimed “up to 15%” better fuel economy for closely following trucks, due mostly to improved aerodynamics. Hence its work on an interoperable internet platform, as well as sensors, swarm connectivity and the

human-machine interface.

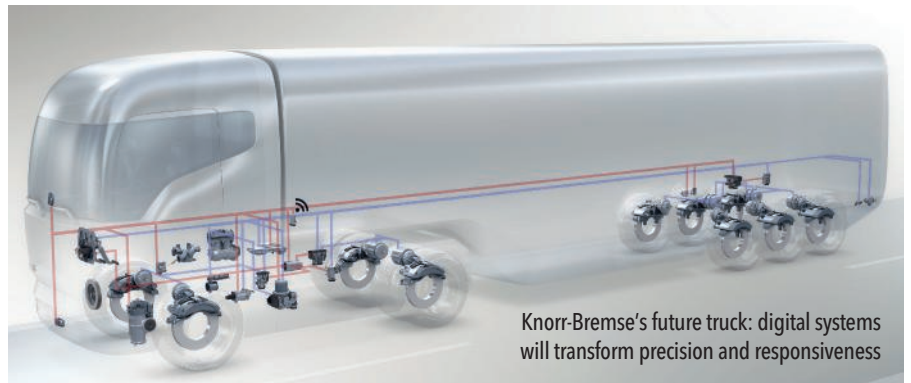
Essentially, braking and sensor data are transmitted wirelessly from the lead truck to the following vehicles, allowing inter-truck gaps to reduce from 50 metres to just 15 at speeds up to 80kph. Developers expect that to reduce further, potentially down to 10 metres. The savings: Dr Michael Ruf, head of Conti’s commercial vehicles and aftermarket business, suggests that, if 50% of a truck’s annual mileage – say 150,000km – was driven in convoy, you’re looking at 4,000 litres less diesel per vehicle.

As for Conti’s after-treatment

developments, which some see as game-changing, Dr Markus Distelhoff, head of fuel and exhaust management, explained that its approach allows the DOC (diesel oxidation catalytic converter) to be sited much nearer to the engine – in turn enabling a 30% reduction in equipment size and (adding the recently released Crossversal efficient catalyst) a weight saving of 20%.

Key benefits: the new DOC’s higher working temperature means urea injection can begin earlier – also eliminating performance problems associated with, for example, stop-start urban duty cycles, caused by low downstream exhaust gas temperatures. Indeed, Distelhoff reckons reduced heat losses and high conversion efficiency will help meet future NOx emission limits such as CARB 2023 (California Air Resources Board) in the US.

Impressive, yes, but so was Conti’s connectivity portfolio. This is not just about the established ContiPressureCheck TPMS (tyre pressure monitoring system). Most interesting was its Dynamic eHorizon, which builds on the 2012 iteration, estimated to have saved 300 million litres of diesel on trucks fitted with the device. The new system still delivers topographical and GPS data to engine management systems – so controlling gear ratios and speed. However, it also takes in real-time information such as weather, incidents



Knorr-Bremse’s future truck: digital systems will transform precision and responsiveness



MirrorEye replaces conventional Class II and IV mirrors with HD digital cameras and interior displays

and traffic congestion. If it's the latter, the system prompts connected vehicles to coast or shift down. As well as saving fuel, that could prevent further incidents by warning drivers of dangers ahead.

Elsewhere, Wabco's stand was another bristling with technology - from braking to ADAS, as well as fleet management software and aerodynamics kit. Top of the list was its Evasive Manoeuvre Assist, jointly developed with ZF (*Transport Engineer*, August 2016, page 8), which combines the former's ESC (electronic stability control) and vehicle dynamics controls with ZF's active steering. The result: a system that automatically steers around obstacles if it sees that driver-initiated or autonomous braking alone cannot avoid a collision.

In a similar vein, Knorr-Bremse also majored on ADAS and autonomous driving technologies. Its intelligent electro-hydraulic steering assist, for example (initially launched following the tedrive acquisition), is again designed to steer trucks around hazards. Meanwhile, its autonomous yard manoeuvring system is similar in concept to Eaton's. This combines camera and radar sensors with brake, drive and steering controls to automatically drive combinations

to and from selected loading bays. A smartphone app tells the driver when to return to the cab.

Then, beyond blind spot assistance (again using camera and radar sensors), Knorr-Bremse's most interesting launch was its modular GSBC (global scalable brake control) system.

BRAKING REVOLUTION

What's different? This is about artificial intelligence and application-specific parameters on the software side, plus integrated acceleration and yaw sensors, together cutting OEMs' design and installation costs. It's also about saving space and weight by eliminating pipes, brackets and pneumatic adapters. Knorr-Bremse says it can handle everything from simple ABS to sophisticated EBS.

Incidentally, the firm also launched its Synact high-performance disc system, claiming 11% more torque than the existing SN7, as well as a 10% weight reduction. Key features include an improved brake calliper and backing plate, plus new internals and materials. There's also a new adjustment mechanism claimed to maintain tighter

clearance throughout the brake's lifetime, so reducing pad wear and residual braking torque - all with a nod to future automation.

And there was more.

The firm also showcased: its smart pneumatics; AMT (automated manual transmission) components designed for dual-clutch systems; a new long-life clutch servo for manual gearbox automation (aimed at emerging markets); and trailer braking and diagnostic systems. The latter included its TEBS G2.2 electronic trailer braking system, with intelligent levelling control, and the iTAP (intelligent trailer access point) user interface, which delivers tyre temperature and pressure data, as well as odometer, braking performance, error messages and video to drivers' smartphones.

Finally, though, given the topicality of heavier full-electric and hybrid trucks and the debate over range extenders versus advanced battery technology, Akasol's world premiere of its AKASystem OEM attracted attention. This compact, modular lithium-ion battery system is claimed to integrate standard PHEV (plug-in hybrid electric vehicle) modules from major battery manufacturers such that they meet the demands of heavy commercial vehicle drives.

"[This] provides the ideal basis for reliable and economical operation of hybrid and fully electric drive systems," said Akasol CEO Sven Schulz. The standard version offers a 24.4kWh capacity and delivers peak output of 150kW at 661V (nominal). The claim: an unlimited number of the new solution's battery boxes can theoretically be connected in parallel or series, so enabling energy storage and output for virtually any vehicle and range. [IE](#)