



Controlled environment

Electronics continues to play an increasing part in managing vehicle behaviour. Keith Read examines the state of the art for systems entering service as automated braking, steering, suspension and stability assistants

Many driver-assistance systems may masquerade as TLAs (three-letter acronyms), but they're positively making life behind the wheel and on the road safer. That fact has not gone unnoticed by the EU, which, with a mission to halve road fatalities and casualties by 2020, has made some systems – such as ESP (electronic stability program) – mandatory for cars and will soon do the same for commercial vehicles.

Some will come as optional extras and some be mandatory requirements. ESP, for example, becomes part of legislation for vans (N1 up to 3.5-tonnes) from October 2014 and on some N2 (up to 12-tonnes) and N3 (over 12-tonnes) in July 2016. However, many LCV manufacturers have opted to fit ESP long before it is demanded by legislation.

“Over recent years, ESP fitment has increased rapidly and has been further developed to embrace a whole raft of associated active driver-assistance functions,” confirms Martin Flach, Iveco's UK product director.

Bosch has been one of the leaders in development of 'intelligent' ESP and many other systems to make vehicles safer. Dr Bernd Bohr, chairman of the company's automotive division, is on record as saying that future advances in technology will go even beyond simply assisting drivers. Indeed, they will take over the driving. “In coming decades, technological developments will make the vision of accident-free, autonomous driving a reality.”

And his prediction moved a step closer to fact in January when the SARTRE (safe road trains for the

environment) project successfully completed the first test demonstrations of a multiple vehicle platoon. Comprising a lead truck, followed by three cars driven entirely autonomously, the platoon achieved speeds up to 56mph, with no more than 6m between the vehicles.

Carl Johan Almqvist, traffic and product safety director at Volvo Trucks, says the main benefit of road trains such as these is increased safety and efficiency, with additional payback of reduced fuel consumption and better road usage. He says road trains promote safer transport, because the vehicle platoons are led by a professional driver in, for example, a truck, while inter-vehicle reaction response times are much quicker.

Technology gets active

Some technologies employed by the SARTRE project are also used in single-vehicle active driver aids that help to reduce accidents and minimise the severity of collisions when they do happen. LDW (lane-departure warning) and AEB (advanced emergency braking) systems are but two already with us and set to become mandatory.

Knorr-Bremse started developing LDW in the late 1980s, ploughing a huge amount of R&D time and money into the technology. "Since 2000, we've had more than 100,000 systems working on vehicles in service, accumulating millions of miles of

a collision is predicted. If the driver doesn't brake or steer, the system automatically starts to brake the vehicle. If there's still no driver reaction, full emergency braking is activated.

The legislation regarding AEB is not intended to prevent all impacts happening – although it might do so. The goal is to mitigate the impact, with the objective of no collision. "However, if there is an accident, it doesn't mean that the AEB system has failed," explains Brown. "It will have worked and reduced the severity of the impact."

He says the driver is always able to intervene and cancel the system, but he remains passionate about the value of both LDW and AEB. "Drivers can become drowsy or distracted and wander from lane to lane, with the risk of a collision. When you use motorways as often as I do, you can see it happening all the time," he warns. "Motorway driving, in particular, can be monotonous and it takes only seconds for 42 tonnes to be in the back of another vehicle..."

Pressure points

Another driver-assistance system that could amortise its capital cost – and continuously save CV operators money – is TRW's retrofit TPM (tyre pressure monitoring) system. Branded as TRW En Tire Solution, the kit draws on the company's experience supplying OEMs, especially in the US where passenger car TPM systems have been mandatory since 2008. In Europe, any car with new Type Approval from November this year, and any new car sold from November 2014, will require TPM as standard.

"We're not aware of any imminent legislation for TPM on vans and trucks, but we can see it coming," says Helen Sheasby, product manager for TRW's aftermarket electronics. "In the meantime, we're aiming the retrofit kit at fleet operators, specifically those operating rigids." This system is not suitable for artics, she explains, where tractor units are operating with different trailers. However, a dedicated tractor-trailer combination can be equipped.

Sensor units replace the conventional valve dust caps on each tyre, while a display, similar in size to a sat-nav, sits in the cab. The display shows a graphic of the vehicle, with each tyre's condition –



Knorr-Bremse has worked extensively on commercial vehicle brakes and braking systems

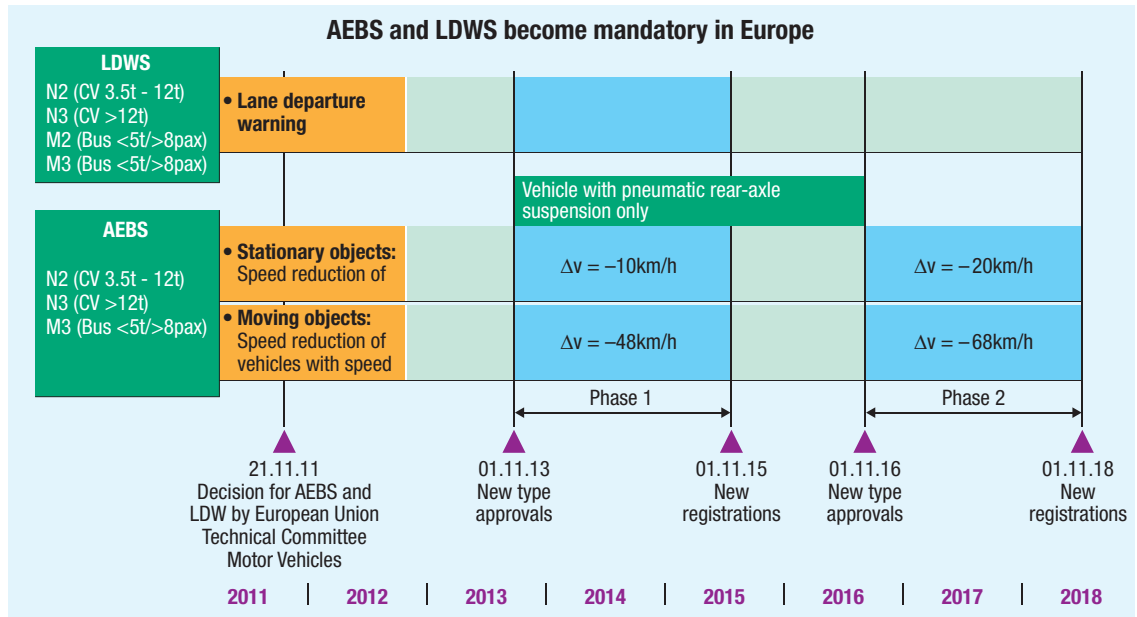
experience. LDW warns inattentive drivers when they wander over lane markings on the road," says Gary Brown, account manager at the global company's UK base in Bristol.

"With the EU targeting a 50% reduction in the number of accidents, it has embraced LDW, although the introduction of legislation is somewhat complex," he continues. "Key dates range between the beginning of 2014 and the beginning of November 2015. What dictates the exact date of introduction is when the customer has a new Type Approval. So, if there is a new vehicle Type Approval after 1 November 2013, then it must have LDW – unless it is an exempt vehicle."

If the LDW system fails to alert the driver, and his vehicle is heading towards a collision, or there is an object in the lane ahead, Knorr-Bremse's AEB system comes into play. It constantly monitors the traffic ahead and starts its warning sequence when



Countdown to the enforcement of AEB and LDW systems for CVs



pressure and temperature – displayed sequentially. As well as alarms for a rapid deflation, the system will also show when a tyre’s pressure falls below specification. Initially, it warns at 15% below, with a further warning when pressure drops below 20%.

“If tyres are maintained at the correct pressure, operators will save at least 3% on fuel consumption,” continues Sheasby. “Correct pressures also prevent wall-degradation, thereby ensuring carcasses retain their retread value. The system also saves time on routine tyre checking, since maintenance people can sit in the cab and confirm each tyre is correctly inflated, without having to physically check with a gauge.”

Sheasby maintains that an investment in TRW kit is roughly the same as the price of one new tyre, making it very cost effective. “If the system prevents an accident, or a tyre being scrapped, the kit has more than paid for itself,” she comments.

Moving on, among the systems already in widespread use for many years are cruise control and its more recent development, ACC (adaptive cruise control). With Iveco’s presence in the van and truck sectors, Flach is well versed with ACC, which, he says, is particularly valuable on HGVs. “It not only maintains the desired speed, but also ‘looks’ at the vehicle in front and automatically maintains a safe separation distance. It’s really popular at the heavy end of the market.

“I wouldn’t put sat-nav in the category of active driver aids, although some systems are quite useful,” continues the Iveco man. “I’d much rather include the ‘drowsy driver’ systems. There are two ways of operating these. One, which is quite expensive, is to have a camera watching the eyes: when it detects drowsiness, it sounds an alarm. Other systems look at the driver’s actions – such as

a sudden movement of the steering wheel, brakes or clutch – by using sensors that are already on the vehicle. They can interpret sudden movements as the driver becoming drowsy. This system is not as 100% [effective] as the camera system, but it does offer ways of detecting that something’s wrong and sounding an alarm.”

That said, not everyone would include axle weight monitors as a driver aid, but Flach does. “If you’re overloaded and need to brake, but, because of the overloading the retardation is lower, then I believe axle weight monitors can be considered as driver assistance aids,” he explains.

On the horizon are a number of additional and very useful driver aids. Poor visibility systems that use radar and cameras to help drivers when it is foggy, or in falling snow, are at an advanced stage of development. Meanwhile, forward-facing cameras are already in use, helping innocent drivers defend themselves following accidents or alleged traffic offence violations. Video footage from the cameras can now be submitted in evidence. There is also the potential to negotiate reduced insurance premiums for vehicles so equipped.

But Flach says that a concern many transport managers have over the increasing number of certain driver aids is that they are just that – aids. “They can’t overcome the laws of physics or mitigate the laws of stupidity,” he points out.

“While systems such as ESP can prevent a roll-over or skid, if the vehicle is driven stupidly the chances of an accident remain high... As one highly experienced truck operator put it: ‘If these systems are used as driver assistance, then they are very beneficial. If they’re used to see how far beyond the boundaries you can push the vehicle, the laws of physics still apply’.” ^{TE}

