traffic technology INTERNATIONAL

FEBRUARY/MARCH 2010

Computer course
Cutting time – not corners – in the traffic simulation/modeling world

Inter-modal guidance
How BMW is developing sustainable solutions to minimize the negative effects of mobility

Just reward
Exploring a world of innovation at Intertraffic Amsterdam 2010

The in crowd

Why crowdsourcing could prove to be transportation's killer 'app' for future product development

Intertraffic Amsterdam Show Issue!

GREG KRUEGER, MICHIGAN DOT • SMART GRIDS • FRED WEGMAN, SWOV • ALPR

move it

Measure it. Manage it. Improve it.

Introducing Pico™

Iteris' Pico Video Detection System can help get you moving.

Pico is a compact video detection solution featuring an integrated camera and processor that delivers the benefit of Iteris' proven Vantage vehicle detection algorithms in a value-conscious package. By helping to imprive traffic flow, Iteris' Pico video detection system keeps you moving

- Affordable, high-quality video detection
- Simple, flexible set up
- Ideal for signal control applications, including Adaptive Control
- Simplicity, ease of use, and reduced life-cycle costs

Innovation for better mobility

ITERIS®

Learn more at:
www.iteris.com

10:39 AM

COVER STORY

50 **ONE IN EVERY CROWD**
PEOPLE POWER IN ITS DEVELOPMENT
The plethora of ways that crowdsourcing, the new procurement and management
strategy, will contribute to creating transport products in the future

COLUMNISTS

FEATURES

IN THIS ISSUE

Somewhere in America...

Good morning.
How was your commute?

Siemens provides total integrated solutions for a quicker and safer commute, everyday

That means less congestion, more commerce and a better quality of life. How? By managing the sources of traffic cooperatively. Siemens **SITRAFFIC® Concert** system connects a city, region or even a state together. Working in unison Concert gives agencies the power to detect incidents faster, respond more efficiently, interface with transit systems and communicate up-to-date travel information, light-rail and bus schedules to the pulic. **Concert** can even help guide you to your parking spot. Connecting life with mobility. For more information on how Siemens solutions can help your city visit **www.itssiemens.com/connectinglife.**

Answers for industry.

SIEMENS
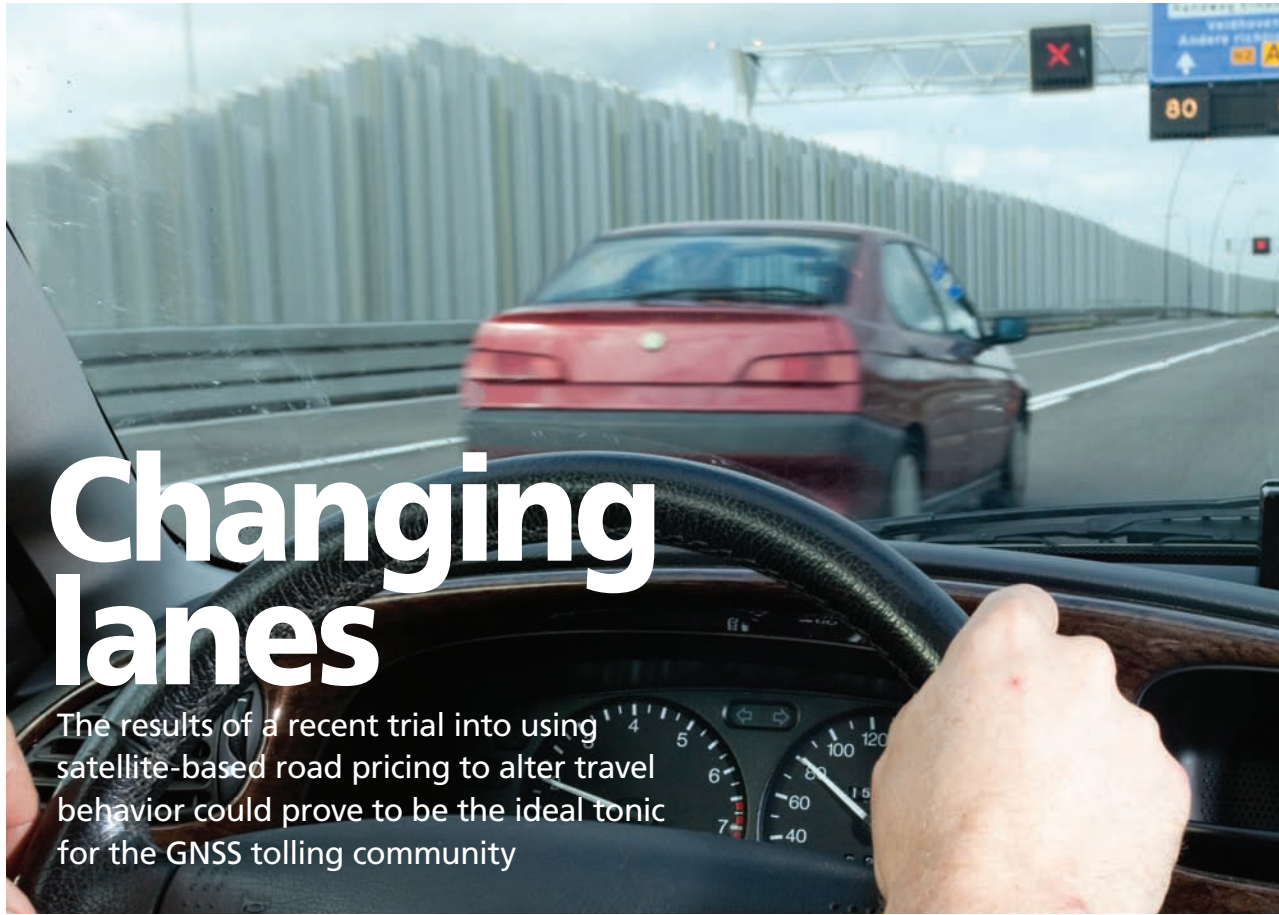
Changing lanes

The results of a recent trial into using satellite-based road pricing to alter travel behavior could prove to be the ideal tonic for the GNSS tolling community

Main: Instant feedback is provided via the OBU, which was essential to changing driver behavior Below: Eric-Mark Huitema is mobility executive with IBM

→ NICK BRADLEY

Eindhoven, Netherlands It's official. Road pricing using GNSS-based in-car technology can alter your travel behavior, leading to a cleaner and more efficient road transport network for all. The findings of a recently published report into a six-month trial, conducted in Eindhoven by IBM and NXP Semiconductors, could potentially have far-reaching effects for national tolling schemes as a whole, particularly when conducted using satellite-based solutions. *Traffic Technology International* spoke with Eric-Mark

Huitema, mobility executive, IBM, about the trial, the IT giant's involvement, the study's key findings, and what might be a tipping point for this type of technology.

As one of the contenders in the race to operate the Anders Betalen voor Mobiliteit (ABvM) Dutch national road pricing scheme, IBM was only too pleased to assist the Ministry of Transport in, first, proving that the technology worked (phase one) – the maps, the GPRS/3G communications with the back-office, etc – and, second, that based on using the

technology, the behavior of the subjects involved was altered. The trial kicked off in mid-2009 with around 50 subjects – mostly employees of IBM, NXP and Philips – each having an OBU with LCD display fitted in their vehicles. The subjects were selected based on their existing driving habits; they had to be commuting to Eindhoven and experience traffic jams on a daily basis. Previous commutes were evaluated to establish a cost for comparison.

As Huitema explains, the results more than exceeded expectations. "The most significant finding was that 70%

Experience counts

Tokyo, Japan Honda has started selling a new automobile driving simulator that includes a number of features to help users better develop their driving skills, including easy-to-understand graphics and descriptions of dangerous situations, as well as advice on how to drive more safely in real life conditions. Extra features include night, fog and highway options as standard, an automatic results display, and a more affordable axis motion base type.

6.4 …billion dollars is the amount paid by Xerox Corporation for Affiliated Computer Services Inc (ACS). ACS will initially be branded 'ACS, A Xerox Company', and will continue to be led by president and CEO, Lynn Blodgett, who has been elected by the Xerox board of directors as an executive vice president of the corporation. ACS operates the PrePass truck verification program and also processes 50% of all toll transactions in the USA, accounting for US$3 billion in revenue a year. It also provides lane integration solutions, such as ORT, and a variety of enforcement systems, such as red light, speed, workzone and school zones.

Total ETC service

Oakwood, Illinois Following PIPS Technology, Diamond Consulting Services and Sirit, Federal Signal has now acquired VESystems – a specialist in back-office and customer management systems and services for the ETC market. "VESystems' expertise and leadership in ETC software and complete system operations is highly respected and already works well alongside the PIPS, Diamond and Sirit technology and service offerings," said William Osborne, Federal Signal's president and CEO.

winner," Huitema continues, "but what it proved was that for a very small gesture, people were really willing to alter their travel behavior. We also saw this in the trials in Stockholm, where we saw a 20% reduction in traffic and an 80% reduction in traffic jams, all for just Euro 2. People there would either work from home for a bit longer, cycle, or take public transport."

Changing driver behavior is really the only option left for a congested, densely populated country such as the Netherlands. "We have around 50 million people in an area the size of Greater London," Huitema adds. "We have no more capacity to build roads, or even toll booths, and our emissions levels need to be reduced in our cities. GPS is the only option. Not only is it perfect for national schemes, it's more flexible in terms of value-added features such as parking, insurance,

The OBU used in the Eindhoven trial, which features an NXP chipset

of the participants really changed their behavior, saving approximately 15-20% based on the costs they were previously spending on their trips," he says. The ability to see how much journey decisions were costing was an important factor. In this trial, the 50 participants were part of a league system, with a 'top ten' – the leader being the person spending the least on their commute, by either using less congested and thus cheaper roads, or simply changing their mode of transport. "We offered a case of champagne or a heart monitor for the

location-based services, etc. This technology is the future."

But with the Dutch government collapsing in February and an election looming for June, could this derail the ABvM scheme? "Nobody can predict the future," Huitema concludes. "But whoever the next government will be, the traffic and the pollution is not going to disappear.

"We have proved a more efficient way to use a scarce resource – i.e. our roads during the peak hours. It helps the flow, it reduces CO_2 and NOx – it's a win-win situation for everyone."

Predicting the effects of weather

Brussels, Belgium With a budget of approximately Euro 2 million (US$2.8 million), the recently announced EU-funded EWENT project is to study the effects of extreme weather on the safety and reliability of traffic systems, as well as estimate the cost effects of weather-related disruptions. Although the main purpose is to support adaptation to climate change, the results will be useful for traffic authorities. Coordinated by Finland's VTT Technical Research Centre, it will identify dangerous extreme weather events and estimate their probability and effects. To be carried out between 2010 and 2012, the cost effects of traffic disruptions, such as costs associated with human casualties, material damages and discontinued supply chains, will be estimated. "This is the first project that intends to estimate their cost effects methodically," said EWENT coordinator Pekka Leviäkangas. The results could be used in creating sizing criteria of infrastructures, pointing out needs for enhanced maintenance capabilities, development of cooperation between authorities and preparedness for exceptional conditions.

FOREWORD

Although stern-faced at the time, my folks now chuckle at a comment inked into my 1987 school report from a certain physics teacher that read: "Nicholas sets low targets… and fails to achieve them." He never liked me anyway – hence referring to me as 'Nicholas' – but more so following an experiment involving rather too much magnesium for his liking.

There is currently intense debate regarding overambitious road safety targets. When I interviewed SWOV's Fred Wegman (*p83*), he voiced opinion about targets set in 2009 to reduce road deaths globally by 50% over the next 10 years, prompting him to write to the European Commission to express his concerns. "I am always much happier when 'ambitious' and 'realistic' are used in the same breath," he told me.

This sentiment was shared in an open letter sent to the EU's newly appointed EC vice president and transport commissioner Sim Kallas in February. Penned by the European Transport Safety Council's (ETSC) executive director, Antonio Avenoso, the letter was backed by 60 signatories, and suggested targets should be "ambitious" yet "achievable". In 2001, the *Transport White Paper* set a 50% reduction in road deaths by 2010 and was implemented with the help of the 3rd Road Safety Action Programme. Despite the fact that the target was not fully achieved, road deaths were still reduced by some 30% – a noteworthy achievement.

The 4th Road Safety Action Programme is expected in the coming months. But the ETSC feels that having adopted a target for the past decade yet failing to have done so for the next, the EU's credibility as a leading light in safety could be diminished. It goes on to propose reducing road deaths by at least 40% between 2010 and 2020, and serious injuries by at least the same.

There is a more worrying aspect to being overambitious in relation to road safety targets. If you fail to meet them, there's a risk that some faceless accountant within EC corridors may decide taxpayers are not getting value for money from the hundreds of millions pumped into much-needed traffic safety research programs, such as euroFOT (*p62*), in doing so, putting future funding into jeopardy.

I am, of course, not recommending my schoolboy tactics, but realistic, ambitious and achievable targets that can be met will surely motivate everyone involved, ensuring that the cash keeps coming – and lives continue to be saved.
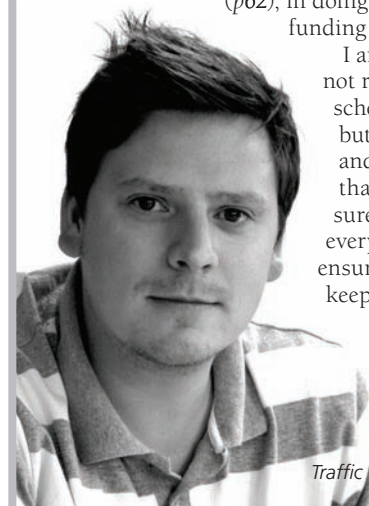
Nick Bradley
Editor
Traffic Technology International

ADRIANWALSH

AN AGE-OLD DEBATE

Shedding some light on the issue of older drivers (and how technology can benefit them), who, argues Adrian Walsh, are not such a danger on the roads as we may believe

by Adrian Walsh, director, RoadSafe, UK

Many of us have a long-held view that the older a driver becomes, the worse he becomes. But a recently published report from The British Institute of Advanced Motorists, based on crash data over 10 years, proves this urban myth to be just that – it shows that drivers over 70 are no more likely to cause crashes than any other driver, and are considerably safer than younger drivers.

Older people rely heavily on their cars, and the ability to drive gives better mobility and access to more activities. The report tells us that men in their 70s make more trips as car drivers than men in their late teens and 20s.[1]

It also shows that 30 years ago, only one in three men and one in 20 women aged over 70 held a driving license; today, three in four men and one in three women are licensed to drive. In the next 20 years, the number of male drivers over 70 will double, and that of female drivers will treble. It illustrates that older drivers are not unsafe; they are safer than most other age groups. This pattern is common across the developed world.

The research shows that 8% of drivers are over 70, yet they are involved in around 4% of injury crashes. In contrast, the 15% of drivers who are in their teens and 20s are involved in 34% of injury crashes.

We know much about the behavior of the young and also know that e-safety systems such as ESC can make significant reductions to their risk. But we know little about the effects of eSafety on older drivers' behavior. We also know from a study from eSafetyAware that although women place safety as their number one priority when buying a car, they know little about these essential life-saving technologies. But we know little about how older drivers rate safety in their purchasing decisions. However, we do know that many manufacturers have carried out large-scale research projects to ensure that their cars are suitable for older drivers and that there is a growing market for this group.

The report shows how age-related decline in mental and physical abilities coupled with age-related frailty can make older drivers more likely to be involved in a crash – and more vulnerable to serious injuries.

Can technology help to make these older drivers even safer? Although not yet 70, I do have a bus-pass and know that such aids as reversing sensors already make my driving easier. I rely on ESC to help when I make an error and I know too how much collision-avoidance systems would help. Having tried blind-spot monitoring, it was great! ■

Adrian Walsh is director of RoadSafe and the Road Safety Theme Champion of gTKP, the global Transport Knowledge Partnership. Log on to www.gtkp.com
[1] *www.iam.org.uk/*

The grey menace?

Huddersfield, UK Road safety charity Brake has called for controls on older drivers following the death of an 18-month-old boy, killed as an 89-year-old driver mounted the pavement when losing control after becoming ill at the wheel.

Current law requires drivers over the age of 70 to renew their license and fill in a self-assessment form declaring they are safe to drive every three years. "Brake believes there should be an annual 'fit-to-drive' health check carried out by a professional," said deputy chief executive, Cathy Keeler. "More frequent checks are needed for older drivers as there are known health risks associated with aging that directly affect driving ability, including loss of eyesight and hearing. Older drivers may also have health conditions or take medication that can impair driving." In addition, Brake has also called for a maximum driving age and regular retests as well as the above measures.

Following in their footsteps…

Gothenburg, Sweden Plans to introduce a road user charge in 2013 similar to the one adopted in Stockholm have been announced following a vote by Gothenburg's city council. The congestion-busting scheme – which will include some 40 toll stations around the city – is aimed at financing infrastructure investments, reducing CO_2 and NOx and cutting traffic in the city center by around 15%. "A decision will be taken by parliament this spring and the plan is for the congestion charge to be introduced in 2013," a statement from the city council read.
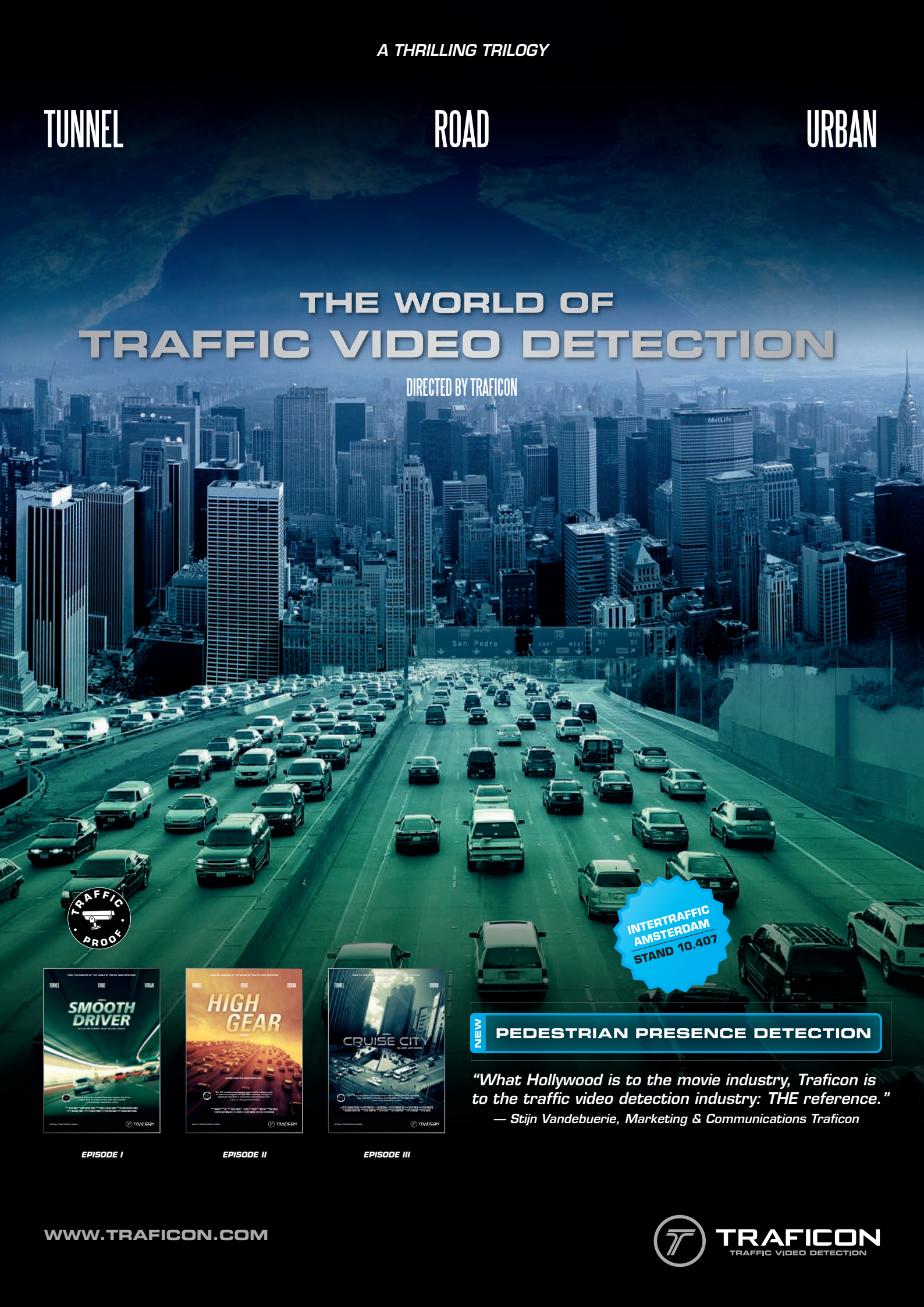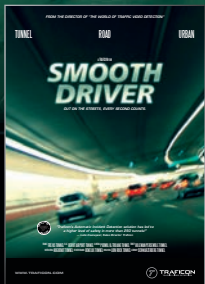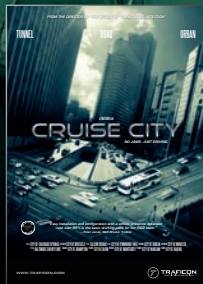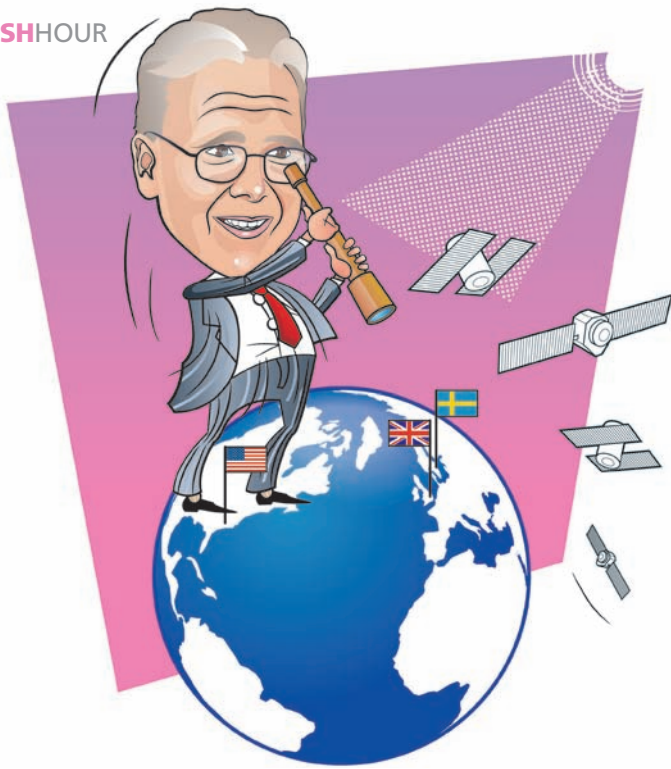
AMERICANS ABROAD

There are lessons that the US can learn from observing how things are done elsewhere when it comes to road pricing; whether America will apply these lessons remains to be seen

by Bern Grush, www.grushhour.com

Late in 2009, experts from the US Department of Transportation, six US state DOTs and a private-sector consultant engaged in a fact-finding mission to unearth what the rest of the world was doing in relation to road pricing. Calling their project 'International Scan: Reducing Congestion and Funding Transportation Using Variable Road Pricing', they visited or examined Germany, London, Singapore, Stockholm, and the recently added Czech Republic.

The group posted a 90-minute webinar, from which I learned that "Singapore estimates that the gas tax would need to be raised by SGD$3.00 to achieve the same traffic reduction results as a SGD$1.00 increase in their electronic road pricing system due to transparency of the charge". This did not surprise me in principle, although it did in scale. Transparency changes things a lot.

There is much that the USA can learn from the European experience in relation to road pricing. For example, we can learn about behavioral effects, expected decrements in bad things and increments in good things, about the quicksand of referenda (although the USA's Johanna Zmud has taught us as much). We can also learn about expense, courage and complexity and perhaps something about attitudes, although that is blunted by our poor comparative record on fuel taxation, so the entitled attitudes of Americans toward paying differently may be harder to crack than it was for the Europeans.

And there is also a lot not to learn. We should not copy any existing system wholesale. I hope no EU jurisdiction does either (although Gothenburg now threatens a carbon copy of Stockholm), as each of the current examples has flaws (the London Congestion Charge), each had specific deployment constraints (the Swedish tax law), specific geographies (the most successful was a peninsular island), specific leaders (Livingston), specific types of government (Singapore) and specific and twisted deployment histories (Czech Republic and Germany).

Technology developed by 2010, nearly a decade after that embedded in the German system, is far more efficient. Had London been able to use what is now available, it would not be using fixed-position cameras. That approach robbed TfL of system flexibility, extensibility and scalability. It is known that Singapore is looking to upgrade (again!) to a newer technology. This is likely not the case in Stockholm, because their tax laws forced the choice of cameras (only their second-best technical option at the time and now their third-best after GNSS and DSRC, respectively). Of course, Germany's system would not be very different from what it is now – except somewhat less expensive – but time usually drives price down. ■

Any comments to bgrush@skymetercorp.com

How to reduce the carbon footprint

London, UK According to DfT figures, 52% of motorists ignore the 70mph speed limit. The Sustainable Development Commission, the UK government's environmental adviser, has called on ministers to install average speed cameras on all motorways to cut carbon emissions, which it believes could achieve a reduction of 1.4 million tonnes of CO_2 a year. Other emissions-busting recommendations include a call for all cars to be fitted with speed limiters, with ministers requested to set a timetable for the introduction of the technology that would make it impossible to break the limit. The Commission also feels ISA should be fitted to all government cars, including the ministerial motor pool, which could save 25 million tonnes of CO_2, as well as improving safety.

An active role in safety

Dearborn, Michigan A consortium of 29 partners has started work on the Accident Avoidance by Active Intervention of Intelligent Vehicles (interactIVe) European research project at the Ford European Research Center in Aachen, Germany. During the planned 42-month duration of interactIVe, the performance of implemented safety systems will be tested through active intervention, including autonomous braking and steering in critical situations, with the aim of avoiding collisions – or at least mitigating the impact severity in accidents.

The European Commission will cover more than half of the project's overall budget of Euro 30 million (US$42 million). Headed by Ford, BMW, Fiat, Daimler, Volvo and Volkswagen, six suppliers, 14 research institutes and three other stakeholders are involved.

Do the MATH

The benefits all add up: the latest generation of RTMS® from ISS offers the greatest value.

Add more lanes

Only RTMS G4 offers full coverage of 12-lanes with one sensor.

Zero setback

While other systems may need an entire lane-width for setback, RTMS G4 can be installed wherever there's an existing pole - even right next to the curb.

Multiply the savings

RTMS G4 consumes one-third the power compared to other systems. Less power requirement equals a smaller, more economical solar panel and triple the savings.

Subtract field integration

There's no need to carry a box full of connectors and devices into the field. RTMS G4 has the interface/integration devices built-in.

All-in-One

Unlike other systems, RTMS G4 provides one simple unit with all the functions needed for advanced detection. It is simple, easy-to-use and reliable.
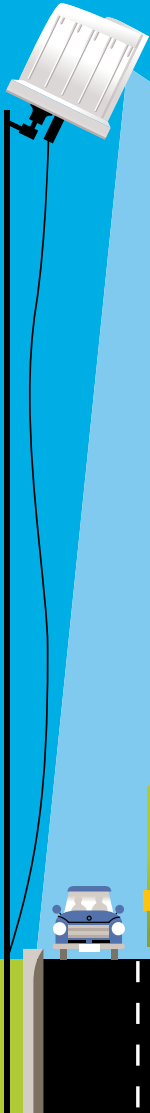
For more information on how RTMS G4 can add value to your operations, e-mail or visit:

info@imagesensingca.com

imagesensing.com

visionary solutions

image sensing systems
i n c o r p o r a t e d

FUJINON
FUJIFILM

Dangers are identified more quickly and reliably with the new Megapixel zoom lens – by day and night.

www.fujinon.de

| Medical | TV | **CCTV** | Machine Vision | Binoculars |

NEW

D32x15.6HR4D
f = 15.6 ~ 500 mm

D32x10HR4D
f = 10 ~ 320 mm

MP MEGA PIXELS

Experience a new Dimension in property surveillance. The Fujinon D32 surveillance lenses make it possible. Now with an even longer focal length of 15.6 to 500 mm: the Fujinon D32x15.6HR4D. With all models you profit from unique Megapixel quality and 32x zoom for extreme distances. Besides, the Fujinon Day+Night Technology makes it unneccessary to refocus when switching between Day and Night mode. Thus you have in view guaranteed everything. **Fujinon. To see more is to know more.**

Collection point

Bicester, UK The new M210 solar-powered logging stud provides count information in a simple, self-contained unit. To collect data from the device, a specially designed radio dongle can be plugged into a USB port to communicate wirelessly up to 10m to the M210. Data can then be collected using a simple download application. The stud's simple construction allows for fast and simple installation. As the device uses a magnetometer to detect vehicles, it is immune from problems associated with damage to loops, including road degradation, utility works, or road repairs. In addition, it is also unobtrusive and less likely to sustain damage from road users, which is common with other types of beside-the-road counter.

Report: Xenon lights better by far

Lippstadt, Germany According to a new study conducted by the ADAC motoring association, drivers who use Xenon headlights drive more safely – by up to 70%. However, despite the known benefits of Xenon, the study recognized that many drivers are still put off by the comparatively expensive Xenon pricetag. That noted, 56% of drivers admitted to not knowing much about the technology, according to Hella lighting expert, Steffen Pietzonka. "About half of all car drivers feel stressed by poor visibility, with serious accidents occurring particularly often in such circumstances," he says. "Indeed, according to the Technical Board report, if all vehicles were equipped with Xenon headlights, the number of serious accidents at night would be reduced by up to 50% and the number of traffic fatalities by at least 18%. By illuminating the road better, Xenon can increase the feeling of safety."

THE BURNING QUESTION

by Professor Eric Sampson
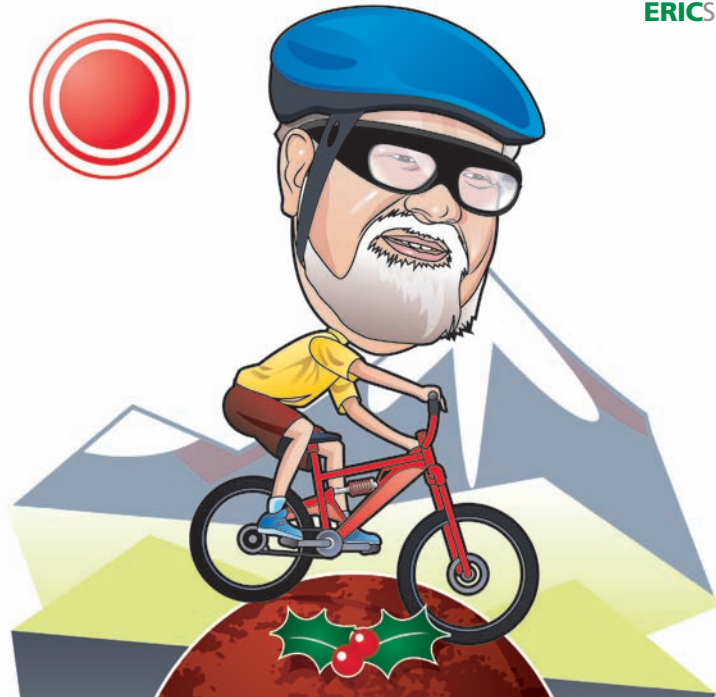
From pudding to pop stars, Sampson's ideas on what we can do to actually tackle harmful emissions (instead of just paying lip service) are far more than just hot air

I was thinking about subjects for this column when the decision was taken for me: I put a piece of Christmas pudding in the microwave intending to have it with my coffee and dialed up three minutes instead of 30 seconds; so it's going to be about carbon reduction [and bicycles].

Just before Christmas I looked into changing my bicycle: it's all-aluminum, still shiny and all the gears work, but it's very Old Technology – meaning no suspension or disc brakes. I was urged by the shop to "buy now to avoid the VAT increase" and nearly fell for this – buying at top seasonal prices to avoid a saving of around a fiver. This got me thinking: it's government policy to encourage sustainable transport, especially cycling because of the health benefits, and to reduce carbon emissions. But we've just had a scrappage scheme, with a large price tag associated, to encourage the purchase of new carbon-emitting cars.

Why can't we do something positive regarding carbon and not only abolish the VAT on bicycles, but have a cycle scrappage scheme with £50 to encourage the trade-in of ancient iron-frame leviathans with three gears in favour of modern, sexy models? And let's appeal to the younger generations by running a national competition for designer cycle helmets coupled with some new thinking about endorsements by current teenage icons so that it becomes uncool *not* to wear a signed Pixie Lott, Duffy or Dizzee Rascal helmet to cycle to school.

I'll answer my own question – tax policy is decided by the Treasury, and Treasury officials and Ministers have all the imagination and marketing skills of a used bus ticket. Couple that with the government's permanent fear of doing anything to disturb the motorist-voter and you have a recipe for stasis. If this were not the situation we would have comprehensive attack on carbon-related emissions involving motorists' wallets. We might have a £200-plus increase in VED to discourage use of larger-engined (or high power/weight) cars, the introduction of simple distance-based road pricing at the worst congestion spots on the strategic road network, and the conversion of the paper VED disc to a microwave tag to enable congestion charging or other pay services and help enforcement of VED payment.

It would not be all 'sticks' – there would be a second phase of Transport Direct called 'Information Direct', whereby in return for installing an in-vehicle box, you would receive personalised journey planning and en route information and guidance covering not just roads, but park-and-ride and public transport. Not perhaps a hugely welcome package, but sooner or later a government will realise that it has to do something about carbon. Let's hope that it's done with some imagination. ■

WHAT'S THE HOT GOSSIP?

Intelligent conversations between cars and infrastructure is a viable future scenario (not just idle chitter chatter) if Misener and his fellow engineers get their way

by Jim Misener, executive director, California PATH, UC Berkeley

Suppose that the traffic signal and your car were able to converse. The traffic signal says: "Hey blue car, I am in a yellow mood. But don't worry, it's temporary! Soon, I'll turn red and stay red for about a minute." And blue car rejoins: "Well, Mr Traffic Signal, can you hold the green on the side road approach just a tad longer so my friend purple bus can safely and efficiently traverse the intersection?"

Is this far-fetched? Not necessarily. In 2008, Audi and the Ingolstadt, Germany road authorities experimented with a corridor where intersections and cars indeed coordinated wirelessly to enact a dynamic green wave. And there is currently a significant four-year effort in and around Frankfurt, where a number of German car-makers and suppliers will have hundreds of cars 'talking' to the roadside.

These conversations aren't all in German, either. (Seriously, we are talking about message payloads of bytes arranged in well-defined data elements that broadcast, among other parameters, the current and expected signal phase.) There are emerging efforts of this ilk in other regions of the world, too. In the USA, the USDOT's recently released ITS Strategic Plan discusses in brief a Vehicle-to-Infrastructure Signal Phase and Timing (SPAT) communications program that would be part of the five-year IntelliDrive R&D effort. Presumably, the SPAT would use the DSRC WAVE short messages (WSM). The emerging message protocol will soon be defined in a published standard, the SAE J2735, based on Media Access Control (MAC) layer protocols and two IEEE sets of standards in progress (IEEE 802.11p and 1609.2-4). Yes, there are a serious number of acronyms in play here. It follows that serious engineers are hard at work. Even silly ones such as myself are hard at work!

The ever-growing momentum is a result of the plethora of potential applications. Consider the possibilities in intersection safety and transit signal priority hinted by the intersections-talking-to-cars conversation vignette. Moreover, consider the possibilities in corridor or regional applications, where information from vehicles can provide corridor- or system-wide feedback to operators on signal timing, allowing for coordinated and adaptive optimization of signal timing. Consider the drivers' perspective: 'eco-driving' enabled by better information about impending signal changes and advice of travel speeds to minimize the number of extra start and stop maneuvers needed while traveling an arterial corridor.

In the end, the Smart Car's cousin, the Smart Intersection, may finally be able to talk, interact, adapt, inform and make you, the driver, a Smart(er) Driver. May the blue car you drive and the purple bus you ride be safe and environmentally friendly, thanks to the loquacious intersection. ■

---

600 …million Taiwanese dollars (US$18.6 million) were saved in energy conservation and carbon emissions reductions in 2009 as a result of ETC on Taiwan's freeways, the National Freeway Bureau has announced. Over 175 million vehicles used the system in 2009, so motorists saved 3.294 million hours, as well as 3.45 million liters of gas. The ETC system reportedly also helped cut 8,525 metric tons in CO_2. Despite this, since the system was introduced four years ago, the ETC usage rate only equates to only 36% of freeway users, as they have to buy OBUs at their own expense, costing something in the region of T$1,199 (US$37). A 20% discount is now being discussed to encourage more take-up.

Pressure point

Sydney, Australia Traffic Tech (Australia) is launching new pedestrian switch pad and iStud vehicle detection systems at Intertraffic Amsterdam 2010. The switch pads are available in a number of configurations and surface finishes, and can detect the direction of travel for various traffic types, including vehicles, bicycles and pedestrians. The new pedestrian switch pads provide non-invasive quick installation and a cost-effective alternative to the installation of IR and video.

The range of iStud detection and warning devices, meanwhile, is new to Traffic Tech. The iStud detectors are in-road magneto-type detectors that offer 11 bin classification and high-accuracy vehicle counts, coupled with long life and durability at around the cost of traditional saw-cut loops.

Smart forward!
We make your traffic flow.
Worldwide.

>>> Kapsch TrafficCom

FROM TODAY TO TOMORROW

One of the biggest challenges of this century will be solving the energy dilemma, and transforming a polluting, congested transportation system into a sustainable and clean network. **Max Glaskin** reports on how smart grids could provide the answer

Main image courtesy of Toyota Motor Company
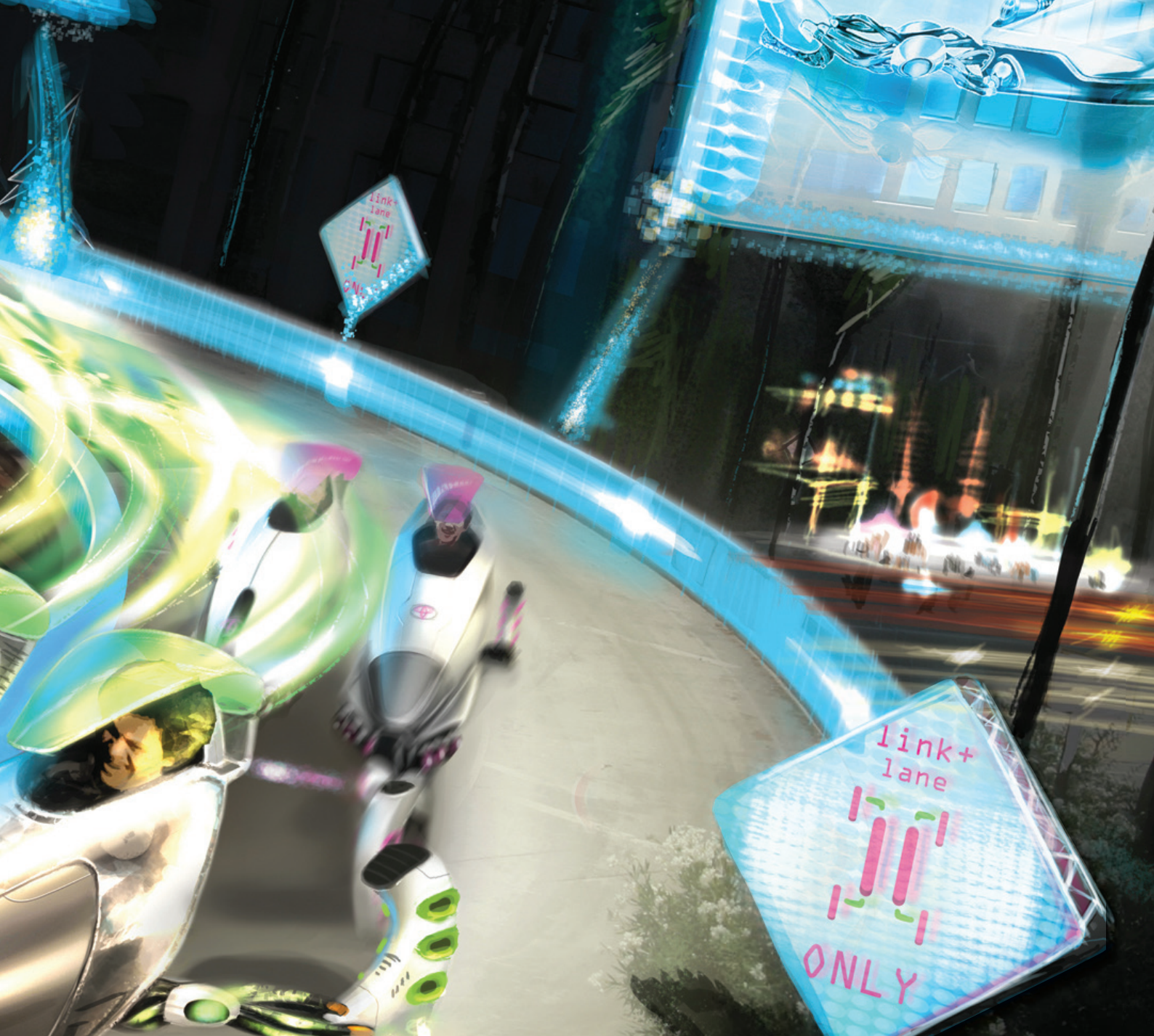
The buzz in the utilities sector is all about 'smart grids' – power distribution networks with built-in intelligence and the ability to regulate the flow of electricity to users. Their appeal is that they could smooth demand and supply, and hence reduce costs and emissions of greenhouse gases.

Electric vehicles (EVs) could be influential in the development of smart grids. It is expected that such vehicles will be charged overnight when there is excess capacity in the power networks. Researchers are also developing vehicle-to-grid (V2G) solutions so plug-in hybrid-electric vehicles (PHEVs) could be used as mini mobile powerstations and even as temporary energy storage units. When electricity demand is high, they could pump it into the grid from their engines or their batteries. For these approaches to work, new infrastructure is required – at

home, in the workplace, streetside, at the mall, and in the parking lot. Plug-in electric vehicles (PEV) and PHEVs will find that it is no longer a case of plug and charge at any time because the flow of electricity to the onboard cells will be managed by the intelligent grid to benefit the wider network.

THE MOVEMENT
But before everyone hurries out to optimize their batteries to withstand the intermittent charging caused by the smart grid, it's worth taking a look at whether smart grids are really on their way. There have been announcements in many countries, some more significant than others. In the USA, for instance, Department of Energy (DOE) Secretary Stephen Chu is awarding US$620 million for 32 regional smart grid demonstration projects. Five projects that involve PHEVs

Signed, sealed, delivered

AutoPort Inc, a vehicle processing and modification facility in New Castle, Delaware, has signed the first license to use V2G technology developed over several years at the University of Delaware (UD). Over the course of the next year, AutoPort plans to retrofit the first 100 V2G cars as a proof-of-concept demonstration of the technology, which was developed by the university's Professor Willett Kempton and research fellow Jasna Tomic.

"AutoPort is excited to be the first company in the world to be licensed to practice this V2G technology," reveals Dick Johnson, the company's director of business development. A minimum of 60 vehicles are needed to produce 1MW of power when the vehicles are plugged into the grid.

The company is currently completing four vehicles for the State of Delaware and

A car is retrofitted with UD's V2G technology

expects to have the first 100 vehicles produced in the next 12 to 18 months, Johnson predicts. Although the first vehicle conversions have been to Toyota Scions, he says that other car models are being considered, and the company is approaching some of its large fleet customers about converting their three-to five-year-old Chevrolet vans.

smart grids. "The smart grid's single biggest potential for delivering carbon savings is in providing cost-effective and increasingly clean energy for PEVs, including PHEVs," according to the DOE stakeholder guide for technology providers.

"The idle production capacity of today's grid – potential that is not now being used – could supply 73% of the energy needs of today's cars, SUVs, pickup trucks, and vans with existing powerplants," says the DOE guide, before producing an interesting environmental equation. "In terms of carbon emissions, the nation's vehicles produce roughly the same carbon emissions as the nation's coal-based powerplants. By moving their emissions from millions of tailpipes to far fewer smokestacks, the smart grid could dramatically reduce the size and complexity of the industry's ongoing 'clean-up detail'. At scale, PHEV deployment will cut greenhouse gas emissions, including CO_2. In the process, it will work toward improving the general health of the USA, as well as lessening our dependence on foreign oil."

These claims about the environmental benefits of linking EVs to a smart grid have been substantiated by research published in January 2010 by the Pacific Northwest National Laboratory (PNNL). It says that a smart grid could decrease annual electric energy use and utility sector carbon emissions by at least 12% by 2030, with the greatest contribution – one quarter of it – coming from the vehicle sector.

The new, intelligent technology will boost the capability of existing power generators to charge more vehicles. According to Rob Pratt, PNNL research scientist, "Smart charging raises the share of electric vehicle miles traveled by 9%, from 64% to 73% of the light duty vehicle fleet. This allows the grid to support 18 million more PHEVs and EVs beyond the 140 million supportable with unmanaged [unsmart] charging."

> **"By moving their emissions from millions of tailpipes to far fewer smokestacks, the smart grid could reduce the size and complexity of the industry's ongoing clean-up detail"**

include AEP Ohio (with DOE support of US$75 million), the Los Angeles Dept of Water & Power (US$60 million), the Texas Center for the Commercialization of Electric Technologies (US$14 million), Pecan Street Project, Texas (US$10 million) and NSTAR Electric & Gas, Massachusetts (US$5 million).

The Australian government announced in May 2009 that it would provide up to AU$100 million for a smart grid, Smart City demonstration project and is currently assessing proposals before announcing which consortium will get the money. It's anticipated that electric vehicle support will be an integral part of the project.

The European Union is at a similar stage. A European technology platform for smart grids was formalized four years ago, but its original strategy overlooked PEVs and PHEVs completely. The first deadline for research proposals is about to pass.

There is, however, already momentum in the Netherlands, where energy provider Enexis is promoting its mobile smart grid project. "We are the inventors of the idea of the mobile smart grid," suggests a bullish Andre Postma, manager of the project for Dutch network operator Enexis. "We have already started a pilot project with EVs where the grid communicates with the car to manage its electricity demand."

The pilot is a proof-of-technology demonstrator and has been running at 's-Hertogenbosch in the south of the

Netherlands. The total electricity demand is monitored so when a car connects, the system checks how much electricity is available at the ring main unit. Based on the computed answer, the car is charged accordingly. It is currently being scaled up to include 10 vehicles and may be extended to 35 soon.

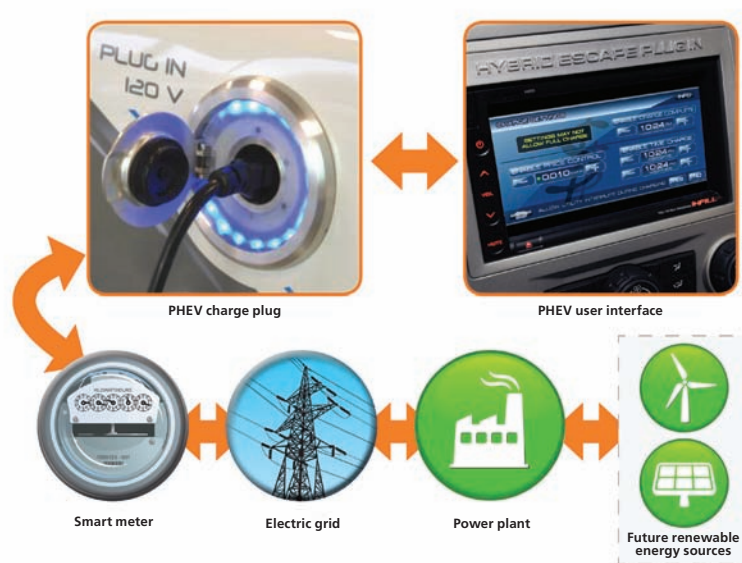In the USA, electrical vehicles of all kinds are being promoted as the 'killer app' for

↑ **Sitraffic Epos is a modular system that can be configured as a sole charging point or as a station with up to 10 satellite connections**

← **The charging stations that EV enthusiasts hope will some day replace gas stations along our highways**

PHEV charge plug

PHEV user interface

Smart meter

Electric grid

Power plant

Future renewable energy sources

It's an aspiration that is already motivating early adopters. Coulomb Technologies, vehicle charging infrastructure provider of Campbell, California, has already twinned with GridPoint, a grid software leader, to unveil a smart charging station. "Coulomb's charging stations are first to market with a smart grid integration that is effortless for drivers and responsive to the needs of the grid," suggests Richard Lowenthal, CEO of Coulomb Technologies. "GridPoint is extending the proven smart charging capabilities of the ChargePoint Network and this integrated solution now provides a single solution to adaptively manage the flow of energy to vehicles and charging stations."

GridPoint has also paired with utility company Baltimore Gas & Electric by launching a multi-year PHEV demonstration using GridPoint's smart charging software. BGE is using five specially converted Toyota Priuses and a Ford Escape, as well as deploying electric vehicle management technology from GridPoint to investigate when and where drivers will charge their vehicles, what effect charging may have on BGE's peak load periods, and how that load can be managed to provide cost-efficient energy to customers. BGE will also evaluate the impact a PHEV fleet has on the company's carbon footprint.

"We recognize that many Maryland consumers are looking forward to buying plug-in vehicles and we want to ensure we're ready to meet their needs for smart charging options," says John J Murach, director of business planning and corporate performance for BGE. Vehicle connectivity modules will be installed in each vehicle to establish two-way communication with the grid and log critical performance data.

PARK AND CHARGE
A key location away from the home for smart charging infrastructure will be the off-street car park. Again, the Netherlands is leading the way here with technology and equipment that will allow drivers to charge their EVs when parked, but without straining the grid.

WPS, the parking systems company based in Eindhoven, has developed hardware and software for smart charging in off-street parking called Park & Recharge. Angelo Peeters, business development manager, explains the project's progress.

"We already had an infrastructure for payment on foot and my original thought was to centralize the intelligence in a control unit with only a charging connection in the bay," he explains. "But with several cars wanting to recharge you need to take care of supply and demand of the power and that means a smart energy meter, with a wireless connection to the control unit."

The standalone WPS Park & Recharge unit has been tested successfully and production units are expected to be available by June. When installed, it is hoped that drivers will eventually be able to book the smart charging bays in advance via the internet and even to specify a time limit or energy limit for their vehicle's charge. "We've talked with municipalities and car park management companies in the Netherlands, the USA, Spain, Portugal, Canada, the UK, and Belgium," Peeters reveals. "There's a great deal of interest."

Siemens Mobility is thinking along similar lines. Its Sitraffic Epos electric charging station is a complete unit with an info-terminal and payment system. It's a modular system that can be configured as a sole charging point or as a station with up to 10 satellite connections. It can be installed anywhere where multiple electric cars need to be charged, such as in public places, where it can be combined with car park ticket machines, or on company property.

The occupancy of a charging station can be wirelessly reported to a back-office system, which continually monitors the use and availability of the charging stations. The integrated user identification is achieved with a contactless card, allowing optimum access control as well as gathering data about actual usage and invoicing.

Smart grids are certainly coming and it is likely their development will be symbiotic with the growth in the market for EVs of all kinds. The faster OEMs and charging infrastructure providers switch on, the swifter that two networks – road and power – will be transformed. ◼

"The faster that OEMs and providers of charging infrastructure switch on, the swifter the two networks – road and power – will be transformed"

Is it as smart as it sounds?

It's early days for V2G and there is some doubt it will play a significant role for smart grids. Maurice Gunderson, analyst and senior partner in the energy and materials practice of CMEA Capital, San Francisco, for instance, has three good reasons for doubting it will come to fruition.

"First, the battery is the most expensive and life-limited part of the electric car," he says. "Our cars only last for many years because they spend most of their time idle. If we reduce that idle time and use them to store or supply power to the grid, we will quickly use the lifespan of the battery packs.

"Second, the power electronics will be expensive for bidirectional flow, particularly from the battery DC to the mains. The vehicles are already expensive and the cost of the charging electronics for
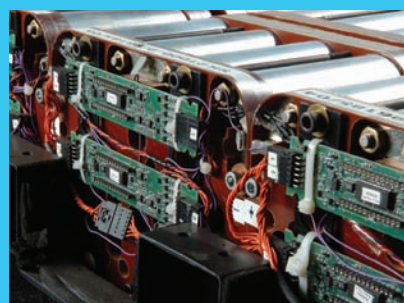
Will smart grids reduce EV battery lifetime?

V2G will be tripled. Third, cars are all about convenience. If we get in and find the car has sold its fuel to the grid, we are considerably reducing the main reason for owning a car."

SEEING IS SURVIVING

Although silent and anonymous, road markings are absolutely vital for road safety. Some of the sector's leading experts tell **Saul Wordsworth** why they're a vital mechanism for achieving a reduction in the number of deaths and serious injuries on the road

Main image courtesy of Ollo

Overhead illumination makes us feel safer; adverse road surface conditions such as potholes and cracks concern us; the inebriation of other drivers terrifies us. Yet nothing is quite so crucial to our safety on the road as those seemingly unremarkable strips of white that most of us take for granted. "These road markings serve as our guides," says George Lee, director of the UK's Road Safety Markings Association (RSMA). "They help lead the way in wet, foggy and night-time conditions. We couldn't do without them." Yet despite their simplicity, their relatively inexpensive application and the reams of data supporting their importance – their ROI can peak at 1,000% – high-quality road markings are all too often overlooked, or the first to suffer during budget cuts. Even when quality markings are applied, they are frequently applied sparingly, or – as we will reveal – not thickly or widely enough.

THE GLASS BEAD

Road markings comprise three essential parts: the 'paint' or binder material; the beads; and the application process itself. According to Warwick Mayall of Potters Europe, "The glass beads provide the retroreflection of the marking, but all three elements must work together in order to achieve a high and lasting performance." Potters Industries is one of the big boys in glass beads, recycling about half a million tonnes of waste glass each year, of which about 70% goes into road marking applications.

These beads are used in two ways, both as premix and drop-on. Typically, a thermoplastic marking will consist of 30-40% premix beads. "The glass is strong relative to the thermoplastic binder," Mayall explains. "Having the right quantity of beads not only gives the required retroreflectivity, but also improves the strength and life of the marking."

Potters has a range of drop-on beads depending on the performance and characteristics required, including beads with high-performance coatings, direct-melt beads for wet-night visibility, and high-refractive-index beads originally deployed in the aviation industry. The retroreflection of a road marking is measured in millicandelas (mcd/lux/m²). "A typical UK application currently calls for only 100mcd, but together with our customers we have developed bead-binder marking systems that can achieve 600mcd," Mayall says. "Recent tests with high-index beads have shown initial results of over 1,500mcd," which

the Potters man suggests is exceptionally bright. Where normal glass has a refractive index of 1.5, high-index beads with refractive beads of 1.9 optimize the retroreflection of the glass.

Mayall points out that it does take time to bring new products to market as the durability of markings needs to be proved, typically over a two-year period. Potters fully supports the current RSMA campaign for the UK to increase the performance requirement to 150mcd, and the width of markings to 150mm.

According to the RSMA's George Lee, thermoplastic markings – which represent around 95% of all of the UK's road markings – are "a reasonably durable product at a competitive price". Other products with higher durability and higher costs are mostly overlooked in the UK. The difficulty is that no matter how high the quality of bead, thermoplastics still have an inferior retroreflectivity in a wet-night scenario: when water sits on top of the marking the beads do not reflect well.

THE NIGHT

The risk of dying in a night-time accident is nearly three times that in the daytime. The driver may be tired, with reduced decision-making abilities, while weather

conditions tend to be poorer. Almost half of all accidents occur during wet nights, despite only one in 10 nights being rainy. Throughout Western Europe, the use of methyl methacrylate (MMA) or 'cold plastic' has been gaining acceptance due to its apparent superior durability and wet-night visibility. Cold plastic markings still contain embedded glass beads but the markings are often structured or three-dimensional, which offers safety advantages because the structuring can dissipate moisture, so enabling the glass beads to reflect light without hindrance. The fact that water runs freely off the marking also reduces the risk of aquaplaning. In addition, the beads within the structuring are not easily destroyed by rolling traffic or the steel edges of snow plows. Highly reflective glass beads on the marking surface provide superior retroreflectivity, which is maintained for many years as the 3D effect of the road marking structure protects the beads from wear. "Here in Switzerland, 80% of highways and over one-third of the 71,000km transportation system employ the use of structured markings for improved delineation and driver guidance," reveals Albrecht Paulos, product manager for Basler Lacke's Road Markings products. "Since January 2009, the Spanish government has required all national routes be installed with high-performance wet-night road-marking products. The technology is also catching on in Germany and other parts of Europe. MMA may be around three times as expensive, but lasts four or five times longer than conventional thermoplastics."

Luna Road lights remove the need for car headlights to reflect on conventional road markers in order to provide night-time visibility

Recent data from a field test organized by DSGS, the German road markings association, proves the endurance capabilities of cold plastics. The Harz area in northern Germany experiences cold winters and much snow. DSGS trialed around 90 materials over three years: on average, 8,000 vehicles passed over the markings every day and each was snow plowed and de-iced with salt hundreds of times a year. The test result showed that most of the cold plastic road markings – including Basler Lacke's own Bascoplast application – reached the minimum affordance of EN 1436, the European standard for road markings. Bascoplast started off with a retroreflectivity of 347mcd in August 2006 and a skid-resistance value on wet surfaces of 59SRT. By August 2009, these figures were 147mcd

and SRT54 respectively, both figures well inside EU performance standards. Almost all of the applied road markings failed under these conditions.

LUNA LANDING
And it's not just white lines that can make a difference to safety, as Richard Sabga director of Sustainable Development with USA-based Luna Road can testify. The company specializes in the design, manufacture and supply of solar-powered illumination technologies and has enjoyed a run of high-profile contracts over the past 12 months. In the Caribbean country of Trinidad, for instance, automotive fatality rates are particularly high. In a country of just 1.2 million people, 200 people die on the roads each year. In fact, one stretch of road in the capital's Port of Spain, at only 2,000ft in length, registers a staggering 60 deaths a year. "This was a killer stretch of road with a very high mortality rate," Sagba says. "We were approached by the director of highways for Port of Spain, who was keen to make the road safer. We installed 200 of our solar-powered units 30ft apart and down three lines of the two-lane stretch." Since the installation of Luna Road's solar studs, deaths on this stretch of highway have fallen from 60 a year to just four – a 90% fall. "And these deaths occurred during the daytime!" Sabga stresses. "The benefit of this technology is that unlike streetlighting – which only provides a localized ambient glow – you can see the layout of the road from a long distance without relying on your headlights, which provides more visual information for the driver."

In terms of product development, in place of its existing polycarbonate covers, Luna Road is working on a brand new self-cleaning, photocatalytic material that will allow ultraviolet penetration, yet will not discolor in the sun after two or three years.

BEAMING WITH DELIGHT
The current manufacturer of the UK's cat's eye glass reflector is Swareflex, a division of Swarovski. Aside from being a leading player in glass reflector technology, Swareflex is

"We are currently working with specialists in the area of optical fittings and are achieving a very high level of brightness at the low angles required for drivers"
Mario Goldbrich, *head of safety, Swareflex, Austria*

Going with the flow

One way for the quality of road markings to be optimized is to apply them in the same direction as the traffic flow, researchers at the North Carolina State University have discovered. This is significant, in part, as around 60% of the USA's roads are marked with paint rather than thermoplastics or other materials. In fact, the research revealed that depending on the direction of travel, the difference in retroreflectivity was equivalent to about a year of wear and tear.

When roadway lines are reapplied, glass beads are scattered onto the paint to make the markings reflective. The researchers found that the beads will bounce and roll because the paint truck is moving. Obviously realizing that most

paint trucks travel in the same direction of traffic, the study was more concerned with the lines dividing opposing lanes of traffic since those tend to be painted simultaneously. That makes them brighter in one direction than the other.

the first company to devise LED products for embedded application in tunnels and – more recently – crossings and roads. "We have hundreds of tunnel applications across Europe, from Portugal and Russia to the UK," reveals Mario Goldbrich, who is head of safety with the company. "Lately we have been moving into applications on zebra crossings. Our product is called LeveLite and each LED module is installed in the road, flush with the surface in front of the zebra crossing. Such areas can be very dangerous for pedestrians. The LEDs are highly visible to drivers and are designed to help reduce the speed of oncoming traffic and increase drivers' willingness to stop."

The power is supplied by connection to a permanent mains supply, to the street lighting, or via solar cells, and the LeveLites shine permanently. With added movement sensors, they can also be made to flash when pedestrians enter the crossing zone – and can be combined with a flashing sign system overhead, also provided by Swareflex, for maximum effect. "LeveLite is a very sturdy product; it can have millions of cars driving over it, as well as snow plows," Goldbrich explains. "The next step for us is to offer the possibility to change the top level without changing any of the electronics, in doing so making the product an even better investment. We are also working with specialists in the area of optical fittings and are achieving a very high level of brightness at the low angles required for drivers."

Other installations of LeveLite include a flush-mounted guidance system in Gieten in the Netherlands, as well as a special installation in front of Hangar Seven (the 'Red Bull Hanger') at Salzberg Airport. "On the road to the hangar, we have installed our LEDs in the company colors of Red Bull," Goldbrich adds. "Many countries illuminate

The sticking point

Chemistry will be key to find new and improved solutions for markings in the future, according to Dr Peter Neugebauer from Evonik Röhm. As a binder, its Degaroute product ensures the fast processability and durability of the cold plastic markings increasingly used by agencies, particularly in high-volume traffic areas – i.e. 80,000 vehicles a day.

Here, markings have to be applied in thicker layers up to 3mm. The embedding and adhesion of the glass beads are essential to maintain the retroreflection. Ideally they should be embedded to a depth of 55-60% of the finished road marking. "This is the right depth to achieve an optimal balance between firm embedding and attainment of the correct optical properties and light reflection," Neugebauer says. Chemical treatment of the glass beads enables added bonding. Silane-treated broadcast beads and premix glass beads show improved adhesion. Evonik also looked into binder modifications and their influence on additional adhesion of the glass beads. "A standard formulation was tested on a turntable and in an on-road test," Neugebauer reveals. "In both tests,

Cold plastics containing Degaroute reactive resin show less abrasion than other markings

a modified binder system was applied in parallel to the standard system, and both the standard system and the modified system (2mm layer) were sprinkled with the same glass bead type." The turntable tests showed that the binder modification can lead to better retroreflectivity, derived from a higher number of residual glass beads in the marking. In fact, after four million wheel passages, around 20% more glass beads remained in the marking compared with the standard formulation.

The same results were not shown by the on-road tests, though, so further tests will, Neugebauer admits, be necessary.

whole streets or highways and this is very expensive. For instance, in Belgium, nearly 100% of highways are lamp-lit yet because of the expense they are shut down at night and only turned on again in the morning. Through using LED markers you can have better safety at much lower installation and maintenance costs. One lightbulb requires up to 1,000W, whereas one of our LED lights consumes just 1W of energy."

THE WAY AHEAD

In the short term, it is likely that financial restrictions will jeopardize the expansion of high-quality road markings across the Western world. In the UK, for example, some authorities have cut maintenance on the edge lines of unlit rural roads as a way of making savings. In the longer term, financial imperatives are more likely to drive a greater reliance on marking solutions. As a mechanism to aid highway authorities in reaching CO_2 targets through the dimming or even removal of streetlighting, they are the perfect solution. "In the future, the evaluation of what you put into the highway in terms of lighting will be constrained," predicts George Lee. "Therefore the need for higher-performance road markings and studs will come to the fore as a cost-effective and carbon-efficient mechanism for underwriting road safety."

There is one more factor that is likely to lead to their growth, with the world about to cross a demographic landmark. In 10 years' time, the global population of over 65s will be greater than the number of children under five – by 2040 there will be over one billion senior citizens in the world. "The eyesight of older drivers obviously deteriorates," Goldrich concludes. "They are less sure and require greater guidance." Simple changes such as widening the line from 4in (100mm) to 6in width (150mm) have shown positive results. How quickly agencies respond to this demographic shift remains to be seen. What we do know is that, when they do, it will be for the best! ■

> ## "The need for higher-performance road markings and studs will come to the fore as a cost-effective and carbon-efficient mechanism for underwriting road safety"

George Lee, *director, Road Safety Markings Association, UK*
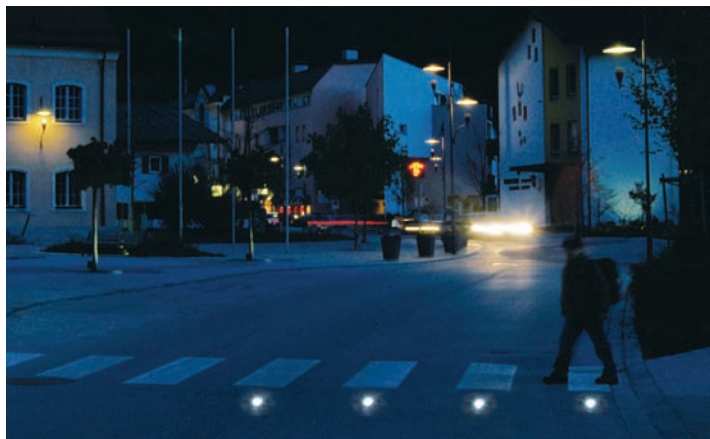
← **LeveLites are designed to reduce the speed of oncoming traffic, yet increase the willingness of drivers to stop**

Exceptional solutions for the roadway industry

Quixote Transportation Technologies has joined Vaisala.
By merging our technologies we can offer smarter, more integrated solutions for RWIS, mobile weather, traffic, ITS, software and services.
Learn more about our solutions at **www.vaisala.com/QTT**
or contact us at: **sales@vaisala.com**

MULTI SKILLED

Despite restricted budgets, it seems that traffic software is still the must-have tool in an engineer's armory. **Nick Bradley** hears how these time- and cost-saving programs are being put to use in the ITS sector

Illustration courtesy of Magictorch

Doing more with less is something that DOT staff have had to adjust to in recent times, leading to many a sleepless night as they decide where and on what to spend their scarce budgets. Under pressure, it's perhaps easy to cut arbitrarily, or maybe hone spending on measures visible to the public gaze.

Suppliers and consultants in the traffic software field are pleased that the axe has rarely fallen on their necks. "The forward-thinking central government departments at least recognize that in this current climate there is perhaps even more of a need for simulation," says the Edinburgh-based Richard Braidwood of Braidwood Associates. "Modeling may be perceived as costly but given the long-term nature of large infrastructure projects it's a small outlay to be 100% sure you're getting the best return on investment," he adds. "The

visionary governments understand this and I think we'll see an increased demand for simulation as a result."

John Albeck, lead traffic engineer with Texas-based Trafficware, agrees. The company develops several software packages for traffic engineers, the most widely used of which are Synchro and TrafficSim. The former is designed to help engineering staff when considering the system-wide impacts created on an individual intersection and the network as a whole. "Signal timing is often overlooked," Albeck believes, "but through signal optimization, traffic engineers can reduce congestion, save time, and make intersections safer."

According to the FHWA, two-thirds of all miles driven annually in the USA are on signalized intersections, 75% of which could be improved simply by adjusting timing plans and better coordinating

signals. "You can have a really big bang for your buck," Albeck insists, with a benefit-to-cost ratio upward of 40:1 and beyond. Using Synchro, analysts can look at the many alternatives quickly and avoid the risk, cost, and disruption associated with field experimentation.

"Other models require a file for every signalized intersection, but with Synchro you can enter data into a single file, and with everything in one file, capacity analytics such as measure of delays, queues, etc, can be performed based on equations. Signals can also be optimized in networks. You're basically looking at minimizing delays and stops and that's what Synchro allows you to do."

Albeck also concurs with Braidwood about the ROI from such software. "Based on an average investment of around US$160,000 over three years, using Synchro plus SimTraffic can pay for itself

How many bulbs does it take to change your mind?

Until Christie's Entero™ LED powered displays, every video wall used lamps. And we do mean used.

For over its life a wall could consume hundreds – an expense that could outstrip the initial cost. And then of course there was the downtime, the consumables, the maintenance charges.

But where conventional lamps might last 10,000 hours, our LED light source lasts 60,000. That's almost seven years running twenty-four hours a day. It could outlive the wall itself.

So, with Christie Entero™ LED powered rear screen displays, when you buy a video wall, you buy a video wall. Not a lifetime's commitment to never-ending expense.

Isn't it time you changed technology – not lamps?

THE ENTERO LED SERIES
REAR PROJECTION MODULES

when it matters.

CHRISTIE®

in an average of 53.8 days, equating to an ROI of 1,628%. Making engineering staff more productive results in direct savings. When developing signal timing plans, they know that Synchro is at worst a very good start. Ultimately, though, they'll rely on gut engineering to implement and fine-tune and adjust timings accordingly."

GLOBAL PRESENCE

If there is such a thing as a stalwart in the software field, few would argue against it being TRI's TRANSYT (Traffic Network Study Tool). First developed around 40 years ago, it is now on its 13th incarnation. Similar to Synchro, it allows users to study and optimize traffic signal timings, but unlike Synchro – which for the moment is right-hand drive only – TRANSYT can be used globally (it's also metric and imperial). "Version 13 has been massive for us," says TRI's Gavin Jackman, head of software, who feels the new GUI deserves special mention. "It's a much more intuitive way of entering data, managing files and visualizing results," he says. "TRANSYT is most commonly used as a network tool, but totally adequate for isolated junctions, too. It's also very good at signalization of roundabouts, which I'm sure the USA will move on to following its roundabout revolution. Most, if not all, consultants in the UK have it or have used it – in fact, very few do not." The software is being used and sold all around the world, from Malta and Korea to Australia and Canada. "We've also established educational programs for it to be taught in Denmark, Iran, Sweden and Poland, to name a few."

THE GREAT ESCAPE

Another software package from the USA is Cube from Citlilabs, Version 5.1 of which was recently launched. Further details are provided by the company's regional director, Keith Hangland. "The important

SimTraffic simulates signalized intersections, unsignalized intersections (including roundabouts) and the interaction that occurs

"The cost of modeling is a small outlay to be sure that you're going to be getting the best return on your investment"

Richard Braidwood, *managing director, Braidwood Associates, Scotland*

thing to understand about Cube is that it's a modeling framework," he says, "so it allows you to plug in lots of different types of models and integrate them. It then provides you with an easy-to-use interface for the planner to create test scenarios."

Cube feeds off – and feeds data back into – a central GIS repository, which Hangland says has really been a central theme to its development. "As a traffic engineer, you can have other people develop the data so you typically have a GIS group that's maintaining the current conditions of the roads in the network. Transport modeling groups tend to be one or two people, while GIS groups will be six to 12 people. Being able to leverage these resources allows the modeler to focus on the model, and not worry about aspects such as the base case network being up to

date, and so on – the types of administrative minutiae that go on in terms of simulation."

Avenue is one of several tools within the Cube software suite, and brings dynamic traffic assignment to the package, allowing for the analysis of a wide range of traffic management and traffic operations improvements, such as vehicle information systems and other ITS technologies. "It's a solution for regional traffic simulation; the big difference is microscopic versus mesoscopic," Hangland explains. "With regional traffic simulation, we don't have the data requirements of a micro model. You can literally develop these models in as little as a few days and for an entire city. The model itself is capacity-restrained, allowing traffic to dynamically react to delays that develop on the network. For instance, if you're checking out at the grocery store and you see a queue building up in one line, you can move to another line. It's doing this on a regional scale, so if you're driving into work and suddenly you see a back-up, you would probably deviate from your original route – and that's what Cube Avenue allows agents and the modeler to do. Some

A model-based approach

Attendees at the TRB Annual Meeting in Washington in January had the opportunity to experience the added value of PTV's model-based approach for enhancing real-time and predictive traffic information. The Karlsruhe, Germany-based company reported its development of a large-scale transportation model for the greater Chicago/Milwaukee area. The PTV TrafficPlatform uses this model, combined with online data, for the calculation of traffic volumes and forecasts. The experience gained from the Validate traffic model implemented in Germany has been key in this instance.

Another novelty is the use of the simulation software VISSIM as traffic management laboratory, which is used to generate traffic data normally provided by

a TMC. As a result of this, it is possible to provide online processes with genuine input data for data completion and forecast, which enables analysis all kinds of traffic scenarios. The results of the procedure are immediately compared with the simulation data calculated in VISSIM.
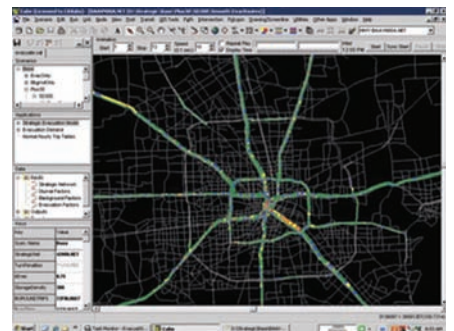
Citilabs evacuation model can be applied to compare the relative system and evacuation corridor performance of alternative policy scenarios

Trafficware's 3D Viewer 7 allows you to create 3D scenes directly from SimTraffic, creating realistic views of traffic environments
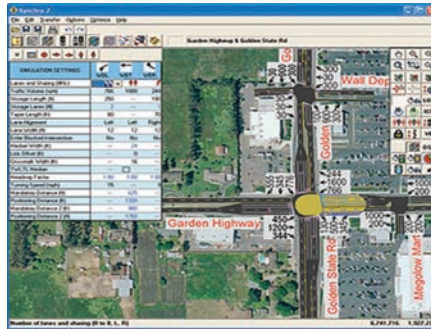
Synchro 7 adds a list of new features such as the ability to visualize full geometric layouts within the software package

models don't have that kind of capability, especially at a regional scale. So, we're looking at every facility, every intersection, every junction across the region, and all the people traveling within it have their assigned destinations that they're trying to reach, either maximizing utility or minimizing the cost of getting to that location. And it's taking place dynamically, so the agents in the model are changing their behavior based on the network conditions."

Avenue was recently utilized by the Houston-Galveston Area Council, the Texas Transportation Institute and Citilabs to develop an evacuation model for the Greater Houston area, in part as a response to the evacuation experience of Hurricane Rita. The focus of the simulation was on queue phenomena, so the algorithm is especially suitable for analysis of evacuation events

such as Rita, in which large portions of the transportation system experienced excessive, near parking-lot, density levels and queues.

"The Houston model was interesting for two reasons," Hangland continues. "Firstly it's an enormous city and secondly it had an actual dynamic network, the reversible HOV lanes." In reality, he adds, there's not really a lot of evacuation planning that looks at an operational level – in fact, to his knowledge, this is one of the first case studies where it's been done on this kind of scale.

The Citilabs man also observes the GIS community looking at models more and more. "We've actually sold software to folk over in Silicon Valley so they can model earthquake scenarios. I guess it's pretty likely that in the next 20 years there's going to be a catastrophic one, so people are starting to seriously consider how long it will take

to get back to an operational level so folk can actually go back to work. It's not just how to react in the immediate aftermath, but also how the whole area functions if, for instance, I-80 (which carries 200,000 vehicles a day) doesn't exist anymore. Our task here as a technology provider is to bring all of the different players to the table and deliver a solution that supports all of them, not just the modeler, not just the GIS person – but also the operations planner."

CALIFORNIA SCHEMING

California is where a great deal of Richard Braidwood's attention has been focused in recent years. Working with Caltrans, for example, he has developed a freeway model of a section of the I-205/580 corridor and also a microsimulation traffic model for I-880. "We've been working on a number of CSMPs (Corridor System Management Plans) for Caltrans, which are being used to assess planned and proposed projects," he reveals. "We're now an established brand; it's five years since we were founded and we're firmly positioned in the USA, as well as in Europe." The company even scooped the British Chamber of Commerce Award for International Business, which Braidwood feels is a "benchmark of excellence".

In his day-to-day work, the Scotsman gets to grips with several of the leading software products, and having also worked for a few of the suppliers in the past he is in a special position to be able to provide an honest assessment of the state of play. "As experienced microsimulation modelers, we appreciate and recognize the need for new functionality in products, particularly as the use of ITS and the need to model it increases on the street, but ultimately there are some enhancements that could be made to existing functionalities. In most of the products, I could suggest something that could model a particular situation better." However, he says that's not necessarily a criticism – more of an acknowledgement that there is always room for improvement.

"The more you give users, the more they want," suggests Dr Alexandre Torday, technical director at Spain's TSS – Transport Simulation Systems. "We see this as a positive. We experienced this three years ago when Aimsun was just a microscopic simulator. We spent a lot of time working with user groups discussing microsimulation, but when we opened the box to macro, meso as well as integration between the three, customers' eyes were opened to a new world of possibilities."

VISUALIZE THIS

According to Brendan Hafferty from Forum8 Europe, the visualization functionality in some packages could be improved, so it's no surprise to hear him suggest his UC-win/Road can fill the void. "You can model any conceiveable scenario you can think of that can happen out on the road, and then you can interact with it," he says.

"Our task is to bring all the players to the table – not just the modeler, or the GIS person – but also the operations planner"

Keith Hangland, *regional director, Citilabs, USA*

More links for TRANSYT

TRANSYT 13, TRL's offline program for determining and studying optimum fixed-time coordinated traffic signal timings, now has a link to TSS's Aimsun as well as PTV's VISSIM. The addition of the TRANSYT-Aimsun link brings similar benefits to that of the existing VISSIM link, providing an efficient way to optimize the signal settings in an Aimsun area-wide microscopic model using TRANSYT 13. "By automatically communicating the signal settings between the two programs, the new link removes costly data input time and reduces substantially the chances of inputting rogue data," says Gavin Jackman, TRL's head of software. With these links, is TRL therefore bringing yet more functionality to the products of PTV and TSS? "We're aiming to improve the results that

microsimulation will give you," Jackman says. "Most microsimulations are built at the moment for future planning scenarios, and therefore the volumes of traffic are forecasted volumes and approximations, or possibly based on real life. But your model is only as good or accurate as you make it, so you have to do all the calibration, the validation, and everything else. All we're trying to do is ensure models take a step up in the level of accuracy by making sure that you can have the best signal timings ever, relevant to the volume of traffic and amount of congestion you've got in your microsimulation.

"We've got a very strong relationship with PTV and TSS," Jackman concludes. "We actually sell our software around the world, but we also sell through TSS and PTV resellers, so it works nicely."

"It's extremely photorealistic so you get a sense of being there, plus of course it's spatially accurate." Hafferty was recently contacted by Ourtson Traffic Solutions, one of North America's leading roundabout design teams. "They were approached by the Wisconsin Transportation Authority with a view to seeing how roundabouts could be introduced within the state," he details. "Ourston designs roundabouts – they're highway engineers – and they could produce the drawings in AutoCAD format, but what they couldn't do was visualize them."

This was seen as key to allow Wisconsin's citizens to experience roundabouts within a simulated environment. "The average US driver cannot understand them, let alone navigate one," Hafferty says. "UC-win/Road not only provided this virtual reality experience, but also helped Ourston develop a range of training videos to show you how to negotiate them – long before they were even built! You can be standing on the sidewalk looking at it, looking at it from a building, looking at it from an aerial view, and of course in a car driving through it."

"Roundabout design has historically been a highly iterative process," suggests Simon Ayers from Savoy Computing Services, which recently collaborated with TRL Software to develop AutoTrack Junctions. "By linking TRL's ARCADY software with our AutoTrack, we've created a single interactive environment within which all the relevant design parameters are constantly updated, allowing the engineer to see immediately the effects of changes made to the geometry," he says. As a result, the iterative nature of the task has been removed, in doing so reducing the design time, improving efficiency and ultimately reducing cost.

"There's one good thing that's come from funding cutbacks," concludes TSS's Torday. "It's got people to start thinking a bit more intelligently about what they're doing. Instead of launching 20, 30 traffic simulation studies everywhere, they're just doing 10, maybe across a larger area with more consistency and perhaps better oriented to what they really want. This is really fortunate for us because people really start to consider the true potential of the tools. They're not just doing simulation for simulation's sake." ■

⬆ **UC-Win/Road is a tool for project visualization and consensus building for almost any type of road construction project**

READ ALL ABOUT IT...

From tolling and enforcement to journey-time monitoring and crime-fighting, **Louise Smyth** finds out why license plate recognition technology is making headlines in the ITS arena

Illustration courtesy of Tim Ellis

With a wry nod to the fact that no matter how tough times are, innovation in the ALPR sector must not be allowed to flounder, Lawson Noble exclaims: "I wasn't aware that terrorism was suffering a recession!" CitySync's CTO freely admits that 2009 was challenging for the company, getting off to a fairly slow start in particular, although he's pleased to report that the UK ALPR specialist has just ended its financial year with a 35% increase in revenues, with sales coming from all four of its main sectors – ITS, law enforcement, security and parking.

A trend toward more hardware components in CitySync's sales has necessitated expansion, with the recent move to a new headquarters in Welwyn Garden City, Hertfordshire. "It is a 17,000ft² office/warehouse and workshop complex," he reveals. "The space gives us a dedicated partner training area, a large seminar room for product launches and meetings, and an all-weather IR camera test area. There is also a drive-in area for police vehicle fitting and servicing."

It's not only the UK where CitySync is noting the need for expansion. The company recently added a new technician to its US team in Houston, where Noble notes that "sales activity is defying the market conditions", as evidenced by the ever-increasing trend for red-light cameras.

In terms of product news, CitySync has seen huge demand for its Fox-i intelligent ALPR system, a product that incorporates two high-definition cameras, GPS positioning and a 3G modem. "Installations include Heathrow Airport and several police forces," he says. "But we have had one problem – we couldn't make them fast enough! So, we've now increased manufacturing and testing resources to match this demand."

As *Traffic Technology International* goes to press, a prototype for a new addition to the Fox range is being created, the 'Hot-Fox' – a thermodynamically efficient ALPR camera suitable for extreme environments such as those encountered in the Middle East. Technical evolutions are also occurring on the software side, as Noble outlines: "New advanced OCR techniques have been added to better handle the more difficult types of plates from Florida and California. We have also just launched a new color recognition module, which is being used in Italy for a counter-terrorism application. It's also being deployed in the UAE with the new Fox Hybrid camera, which uses both infrared and white light illumination to detect the color of the plate, even during the night."

A SYSTEM TO GRAB YOU

It seems that the UK, the birthplace of license plate recognition, remains a thriving hub of the industry, as demonstrated with news from another key player in the field, NDI Recognition Systems (RS). NDI-RS (whose parent company, the Dacoll Group, is well known in the technology sector) was formed in December 2008 when NDI acquired Appian Technology and its Talon software engine. Quickly becoming a presence in the UK LPR marketplace, the company primarily sells into the law enforcement and police markets, as well as commercial sectors.

In January 2010, NDI-RS launched the V220 – a mobile
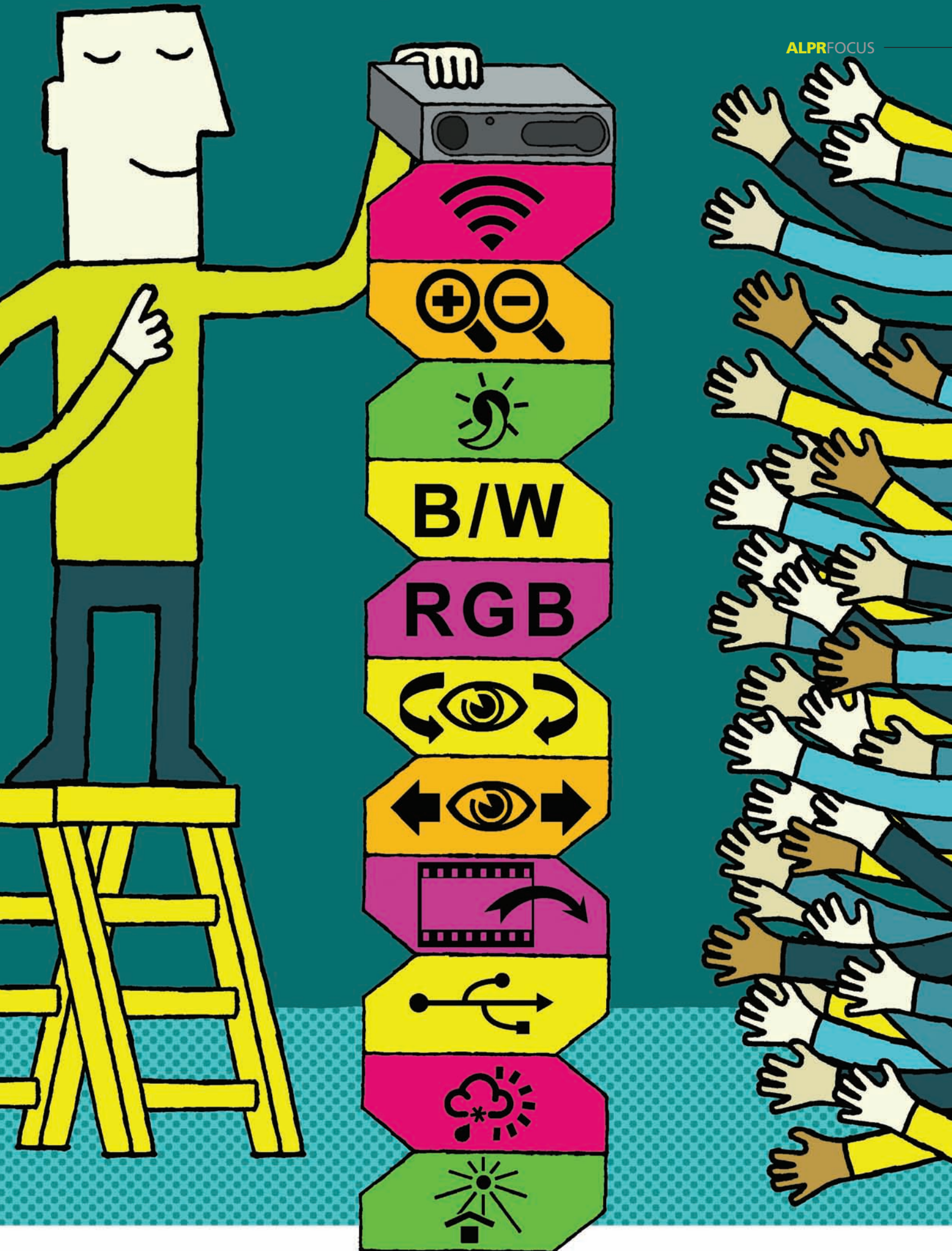
"The downside to color cameras has been that no matter how great they are during the day, as soon as it gets dark, you can't see anything"

ALPR camera used mostly for vehicle-based deployments. Installed on top of a surveillance vehicle, it can also be discreetly mounted within for covert applications. The company's Adrian Cadd is keen to highlight the significance of this launch: "What sets the V220 apart from other offerings is that it uses zoomable lenses. There's always been a belief that vehicle-based ALPR requires fixed focal length lenses, but our zoomable lens allows operators to zoom in and out and set the camera specific to an individual site's requirements. This means that the end-user can now park up and move the camera on a motorized pan-and-tilt unit, whereas before they would have had to move the actual car to the correct angle and capture distance."

Cadd also points out another advance that NDI-RS has incorporated within the V220: "We've added a high-quality day/night camera module to enable optimal sensitivity during all light and weather conditions. The downside to color cameras has always been

that no matter how great they are during the day, you can't see anything at night. So the V220 has been designed to switch to a black and white 'night mode' during periods of low light to maintain its high image quality."

NDI-RS also recently launched a product called Scorpion, a pole-mountable ALPR processor described as a ruggedized PC loaded with LPR software. It takes a camera or video feed from any fixed-site cameras, performs all of the processing at the roadside and then wirelessly sends the data to the enforcement agency's own back-office servers. So what are the advantages of this approach? "Cameras have often been installed on a column with data sent straight back to an office via a fiber transmission. The cost of sending that data was huge – digging up the road, putting fiber in, and so on. Then there was a move to locate ALPR PCs at the roadside, but these frequently got broken into and there were security issues associated with where they were situated.

When mounted onto a pole next to the camera, the unit is out of harm's way. Our systems use 3G (HSDPA), GPRS or Wi-Fi to send data at a fraction of the previous cost. Each of the Scorpion devices can run two dual cameras simultaneously."

Tailoring entire solutions from camera to software engine is what Cadd regards as NDI's unique selling point: "A number of companies in the ALPR sphere are actively marketing solutions, but I'd say up to 80% of these are just resellers – buying in a software engine, adding cost and simply re-badging it. We own all our software products (everything from the OCR engine to a back-office suite), all of the applications that go into a police vehicle, anything that sits by the side of road and all the connectivity. We design and manufacture our own cameras. Then we prove the high standards of our systems by getting accredited by respected industry bodies, including the UK's National Police Improvement Agency."

Talon is based on neural network technology as opposed to OCR (right); the Scorpion processor unit (below); and PIPS' ALPR unit (far right)

This complete systems approach enables NDI-RS to respond to market demands in innovative ways, highlighted perfectly with a new development called the TGX-200. "This is a frame grabber-type device to enable ALPR to be used on laptops more proactively," Cadd reveals. "You would ordinarily get a laptop and use a USB frame grabber, so you'd have a single plug into the laptop and could run one camera in it. We've designed a frame-grabbing device that still uses one USB port, but we can run four separate video feeds into it. So a pair of dual cameras or four separate cameras will run through one USB port, which increases the usability of a laptop. It's a small product for quite a niche market but it'll make a huge difference to those users."

COLOR COORDINATION

It is not only the UK, of course, where technical evolution is occurring. In the USA, a number of vendors are increasing their offerings. The Tennessee-based Perceptics is one example of an organization that's responding to the needs of customers, and the company's Tom Hayes outlines its latest launch: "We've developed an Arabic color version of our license plate reader for use in the Middle East and other foreign markets," he says. "This is not just a color photo – we actually use the color of the license plate as one of the inputs for the OCR.

"This capability initially came about following a customer request, but using color is something we are now looking at offering on a global basis further down the line. Clearly there is more value in using it within international markets rather than the USA. In the Middle East, color is an important part of a plate's identification, which is not the case in the USA."

Perceptics is reading Arabic characters with this new system, using software developed in-house. This is something that many vendors have explored, but failed to attain high enough read rates. The company doesn't make public its claims regarding accuracy on Arabic characters but it does say that the new color system achieves 95% accuracy in plate read as well as state or country of origin identification.

Of course, even 95% leaves room for progress, particularly when it comes to the security-focused applications likely to be deployed in areas such as the Middle East (and indeed at land borders, where Perceptics has many contracts), and Hayes explains that the company dedicates itself to continual improvement: "We don't just sell these systems and run," he asserts. "We work closely with our customers to go through databases of plates that have passed through our LPR points and make sure that any new plates issued by countries are recognized and captured – it's an ongoing process to manage and improve the accuracy."

Unlike many products on the market, Perceptics ALPR systems don't use infrared technology – instead the systems are equipped with stroboscopic illuminators, which Hayes believes is a strong selling point: "We can read both reflective and non-reflective plates, whereas infrared systems struggle to read non-reflective plates. To get the high levels of accuracy required – not only for security applications but for anything in the enforcement field – you need to be able to read all the types of plates that are out on your roads."

Perceptics is hoping to become more involved in new markets, to take some of the experience it has gleaned in borders and security and make the move into areas such as tolling. "We're developing a concept for handheld LPR for law enforcement," he reveals. "We've also just gone through a successful test project using our systems in a gantry-type installation for a toll road. We're entering a couple of new markets in 2010."

Perceptics' LPR system automatically captures, identifies and records the alphanumeric code, state/province of origin, and country of origin

"We work closely with customers to go through databases of plates that have passed through our LPR points and make sure that any new plates issued by countries are recognized and captured"

Small, but perfectly formed

Noting the opportunity for in-vehicle computer expert Microbus to expand its product range and start offering fixed and mobile ALPR cameras, a new division, Microbus AV (Advanced Video) was established. Steve Walker now heads up this division. "Offering the Rapier range of cameras was a natural adjunct to what Microbus was already involved in," he says. The company has today supplied technology into around 90% of the police vehicles using ALPR in the UK.

"One of the founding principles is that we don't sell direct to end customers – we work with OEMs and systems integrators and are completely independent. We don't have, for example, our own LPR software. This allows us to supply our hardware to many different companies and bring the best out of their total solutions. We try to make our cameras as open-interface as possible to allow the software developers to get the best out of them very quickly, and integrate them into other systems."

Microbus has an in-house team that designs and manufactures its cameras, with any additional components (such as camera modules) being bought in. Its most recent product launch is a new addition to the Rapier range of in-car equipment. The Rapier 25 Mono is less than 100mm wide, and houses a remote-controlled 10x optical zoom ALPR camera with integral pulse IR illumination, with a range of up to 25m. The Rapier 25 Dual version, meanwhile, has a secondary 10x optical zoom overview color/black and white camera to provide contextual evidence to the ALPR read.

Walker believes the electronic zoom control is something the industry has been crying out for: "Many people have ALPR systems based on onboard cameras with fixed lenses. We are seeing a big take-up of our cameras from people who think that it's a hassle to have to change the lenses by taking the camera apart. So we build our cameras with zoom capability, which is controllable through a serial port."

MORE FOR LESS

Another Knoxville-based organization becoming more and more involved in tolling is PIPS Technology, whose parent company Federal Signal recently acquired Diamond Consulting Services (DCS) and its Idris vehicle detection and classification software product. The fruits of this acquisition are already emerging, as Brian Shockley from PIPS explains: "We have just announced an integrated product offering for the road user charging market that is truly unique: an Idris-enhanced camera for the ITS market. The Idris software will reside on board the PIPS SpikeHD ALPR camera."

Blending LPR with other tasks is representative of a wider industry trend; the need to diversify applications. "Whether you're talking about business, technology, or life in general, a common theme typically emerges," he says. "How do I do more with less? Marrying the Idris data with ALPR data generates information such as average speed, vehicle length, and class and headway. Combining these two powerful technologies onto the platform of the SpikeHD product represents a huge step in minimizing the hardware, expense, and level of integration typically associated with lane-level vehicle classification and violation enforcement."

OUT FOR THE COUNT

It is not only ALPR suppliers branching out into other sectors. Indeed, there is a growing trend for other service providers to start moving into ALPR. This trend is aptly illustrated by another UK company, CA Traffic – an organization well known in the traffic monitoring field. In 2008, the company announced it was getting into the ALPR market with the launch of the Evo8 camera. "It's been a relatively soft launch because it's a new market area for us, having previously focused on traffic counting and monitoring," explains CA Traffic's Andy

Frechter, recently installed in a business development role. "As well as being in harmony with these areas and the journey-time management that we're involved with, the new system has also opened up a whole new security side. One of the biggest orders we had in 2009 was for the border police of a large European country."

Leeds Council in the UK is another authority investing in CA's Evo8 system for journey-time monitoring, but Frechter stresses how it's a service as much as a product that they are buying: "CA offers a complete solution," he says. "In Leeds, a number of systems are being installed on routes in and out of the city, but we also offer a secure data management system to deliver all of the journey-time information that we are gathering. This means that the

Evo8 provides a completely self-contained ALPR solution with a wide range of onboard communication options

"Marrying the Idris data with ALPR data generates information such as average speed, vehicle length, class and headway"

end customer does not need a back-office or a software department, or anything else for that matter, to realize the benefits of ALPR."

Another recent CA project also illustrates this aspect. The company has just completed a journey-time, origin and destination survey in the UK county of Northamptonshire on behalf of consultancy MGWSP. Evo8 cameras were supplied as well as its Evolution data management system. In all, 43 lanes required coverage and the Evo8 (dual-lane camera) was used to cover both dual-carriageway sites and single carriageways with bidirectional traffic.

The cameras were installed to monitor and gather data on the routes for two 12-hour periods. "All cameras were fitted with GPRS modems, which returned the ALPR data in one-minute blocks to our Evolution server," Frechter explains. "Post-survey, the data was retrieved from and processed offline using an adaptive journey-time measurement system. Three forms of deliverable data were supplied: raw data for ad-hoc analysis (time-stamped ALPR recognition data); individual journey times throughout the day for each route; and average journey times for each route for each 15-minute period."

CA Traffic doesn't have its own ALPR software; an OCR engine from the well-known specialist, Dacolian, is used for the Evo8 system. But then CA is not, traditionally, an ALPR specialist – its experience is in journey-time monitoring. But having the foresight to realize the potential for incorporating ALPR into its existing area of expertise is proving to be a successful business strategy. Moreover, it's also a good illustration of why ALPR itself remains a thriving sector – even during a recession. The technology is continually evolving and equally the applications it can be used for are diversifying. ■

Ideal enforcement back-up

Machine vision and LPR specialist Vitronic says its Poliscan[surveillance] system will soon be put to use by German enforcement officers. "Following a successful test phase of automatic license plate search systems, the German police department in Brandenburg has opted to deploy our technology for use in event-oriented license plate search activities," reveals Vitronic's Lucas Goebel. "Since 2007, our ALPR technology has assisted the police department in apprehending 301 criminals and preventing 31 incidents." The police will be using three mobile and two fixed research systems to further crime-fighting efforts, best demonstrated by a recent case where ALPR helped to apprehend two absconding bank robbers.

In other company news, Goebel says that PoliScan[Incar], Vitronic's latest ALPR

system, is also proving popular with police forces: "It attaches to the windshield or rear window and provides license plate identification in moving traffic. From dense city streets to high-speed freeways, front, rear and even side (parked car) plates can be checked," he says. "After the license plate has been read, it is compared in real-time against a database. If a match is found, an alarm is sounded."

mobitrafic

Driving innovation

2011

The **International Exhibition for Traffic Management and Highways Operation**

5 – 7 April 2011
Lille Grand Palais, Lille, France

MOBITRAFIC is a major new exhibition that provides an international showcase for the technologies, equipment and expertise needed to make highways more efficient. It offers an unequalled marketing opportunity for suppliers in four key sectors:

- **Road traffic management**
- **Safety**
- **Highways operation and maintenance**
- **Parking**

Are you ready to be part of Europe's new highways event?

www.mobitrafic.com

Show partner

i-Trans

Media partner

LesEchos
LE QUOTIDIEN DE L'ÉCONOMIE

MACK BROOKS *france*

Romeland House
Romeland Hill
St Albans AL3 4ET
UK

Tel: +44 (0)1727 814 400
e-mail: mobitrafic@mackbrooks.com

DATA FUSION

Ludovic Broquereau and **Jean-Luc Chazarain** outline how a collaborative effort will deliver a powerful tool designed to optimize road operations, as well as provide a high-quality service to motorists and drivers of heavy trucks

Images courtesy of ASF and Orange Business Services

Businesses and public organizations are constantly evolving to offer ever more effective services suited to the respective needs of their customers and citizens, particularly in this era of instant information and the internet. Real-time traffic information is an effective catalyst to support the challenges that road operators and local authorities face in managing and organizing sustainable mobility and efficient transport systems.

From a motorist's point of view, real-time traffic information generates real benefits, especially when considering increasing road congestion and fuel prices. Personal productivity gains as a result of optimized routes are clearly tangible and easy to monitor through time savings and lower fuel costs. Positive impacts on safety are also directly measurable through adapted behavior such as calmer driving and reduced stress. But that also means that expectations for accurate and efficient real-time traffic information are very high. Motorists need to be able to plan ahead. They need **improved** geographical coverage of traffic information, improved geographical coverage of communication media (delivery of traffic information upstream from decision points along the itinerary), as well as widespread dissemination of journey times or expected delays in the event of a crash.

From a local authority or road operator standpoint, real-time knowledge of events and congestion on a network also guarantees improved effectiveness in road operations. This allows them to contend with the big increase in road traffic, optimize infrastructure usage and travel, and avoid congestion – the cost of which is estimated at 2% of European GDP. Additionally, it allows them to lower the impact of road traffic on the environment, especially given that 25% of CO_2 emissions and 50% of NOx emissions are caused by human activity.

MEETING THE NEEDS
Major technology innovations have recently led to new types of traffic information. The solutions that exist, however, only partially meet needs. Data collection systems, such as loops, sensors, surveys, etc, are costly and complex and offer poor scalability. As a result, the coverage of real-time traffic information is generally restricted to traditionally 'highly equipped' road networks (poor traffic information outside of major roads and motorway networks). From an end-user perspective, RDS-TMC is still the main solution used 'on-trip', and few exist to serve the growing market of devices and media, such as smartphones, connected GPS, the apps market, and so on.

PARTNERSHIP'S AMBITIONS

The ASF (Autoroutes du Sud de la France) and Orange Business Services partnership is intended to supplement and improve the collection of traffic information through new technologies aimed at making road operations more effective and safe. A further goal is to position real-time traffic information in transport as a high value-added service, to allow authorities and operators to better serve citizens.

Transport infrastructure operator ASF was founded in 1957 and currently operates a 2,634km network, with an additional 81km under construction. It connects the Iberian Peninsula with Northern Europe and carries major European business, significant tourism flow, as well as a large amount of regional traffic. ASF is a subsidiary of VINCI, a leading integrated concession-construction group. For a number of years, it has been developing advanced tools and algorithms for traffic management that are a benchmark in the field, as evidenced by the various international awards that have been received (IBTTA, EasyWay European program, etc).
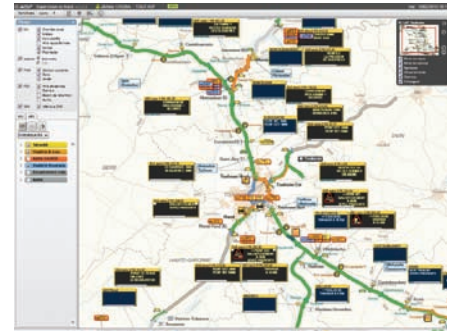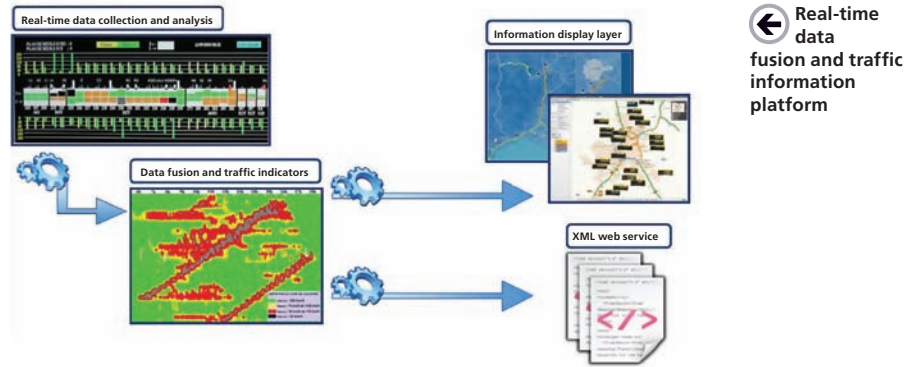
Orange Business Services, meanwhile, is an expert in real-time communication solutions in the transport sector and is the leading mobile services provider in France. With 87% of the population given 3G/3G+ coverage at the end of 2009 and 99.6% 2G coverage, Orange offers the largest – and most extensive – mobile coverage in metropolitan France, passing the threshold of 25 million mobile customers in December 2009. Overall, it has positioned itself as a driving force behind innovation for the transport sector to provide its network with proficiency, integrative strengths and market knowledge to serve the development of real-time information and communication solutions aimed at all transport players.

Real-time data fusion and traffic information platform

of Orange via its Orange Labs to produce so-called floating mobile data. Orange Labs has leveraged its experience in network planning and traffic management on wireless networks to investigate this expanding domain and to unveil a new concept. Orange Labs has been developing a new platform embedding complex algorithms able to process signaling data stemming from communications in vehicles on the move, and to combine them with network simulations to determine, in real-time, an accurate value-added traffic information – traffic speed data. Processed data is anonymized to fulfill privacy policy.

or directly integrated into a road operations and traffic management software streamlined for local authorities and road operators.

By combining their know-how and aggregating their respective content, ASF and Orange Business Services will offer extremely reliable traffic information, updated every six minutes. This includes spot speeds at a given point on the road network, traffic conditions, journey time, jams, and more effective tailback detection and clearance time indications.

This new solution has the advantage – through adaptation on Orange France's mobile network – of being more simply and rapidly implemented, on a large-scale basis, across the entire French road network, including roads not previously covered. This clears the way to major benefits for local authorities or road operators regarding their projects for road traffic information with limited operating and maintenance costs, and no additional investment in dedicated data collection infrastructure.

"Its scalability allows the targeting of large monitored spots at a reasonable cost, because no dedicated hardware infrastructure is required"

UNPRECEDENTED INFORMATION

The solution is based on a new source of innovative, rich and effective traffic information that combines data from the mobile network with traditional road sensors. ASF collects traffic data provided by numerous sources (sensors, traffic counters, cameras, patrols, etc). Expertise and know-how has been acquired by the operator to extract from these sources advanced real-time information and indicators, enabling effective operations of a road or motorway network, as well as enabling the easy understanding of events by motorists.

Orange Business Services draws primarily on the network of Orange mobile base stations throughout France, as well as on the innovation and engineering expertise

The solution is a breakthrough as it doesn't require any calibration process, any onfield measurements, and keeps up-to-date following network evolutions. Its scalability allows the targeting of large monitored spots at a reasonable cost, because no dedicated hardware infrastructure is required, apart from that in mobile networks.

The platform developed by ASF collects and analyzes data gathered in real-time using traditional systems and then aggregates and merges it with floating mobile data produced by Orange. The real-time aggregated data flow feeds ASF's road traffic software platform to calculate value-added traffic indicators (saturation level, journey time, etc). The output is available as an XML web service

INITIAL PILOT DEPLOYMENT

A first operational pilot is currently deployed with an objective of delivering real-time traffic information on nearly 1,200km of road network from Toulouse to Montauban, Auch, Albi, Castelnaudary, Pamiers and Saint-Gaudens, including motorways, national and departmental highways, and peri-urban expressways, stretching 600km in both directions. The perimeter covers the different types of traffic (urban, peri-urban and long-distance) active in this region. ■

Ludovic Broquereau is director innovation and European programmes at ASF, while Jean-Luc Chazarain is business partnership development executive, Orange Business Services. For further information, please email ludovic.broquereau@asf.fr

CREATING TRUST ON ROADS

MESTA 1200   MESTA 1000

MESTA 2000   MESTA 2200

MESTA 3000

Sagem Sécurité
SAFRAN Group

Road fatalities are on the rise in many countries across the globe. Sagem Sécurité has addressed this problem by developing a wide array of modular solutions for its clients, ranging from automated speed measurement and red light running solutions to automated number plate recognition.   **www.sagem-securite.com**

Congestion Free Hessen
2015

HESSEN

Strategies in Motion

22. April 2010 in Frankfurt am Main

Invitation:
International forum
on intelligent
mobility technologies

Apply now:
www.staufreieshessen2015.de

Hessian State Office for
Road And Traffic Affairs

Our Expertise
Your Mobility

The International Benefit Evaluation and Cost Working Group, or IBEC, is a group of ITS professionals with a common interest in promoting excellence in the evaluation of ITS programs and projects through international cooperation. IBEC convened its first event as a half-day workshop at the 6th World Congress on ITS in Toronto in 1999. It has remained active ever since, culminating recently with a one-day seminar on road pricing preceding the 16th World Congress on ITS in Stockholm in 2009.

This 2009 workshop was designed to address a number of specific topics, some of which followed themes from previous World Congress special sessions in which IBEC was involved. What, for instance, are the economic benefits of road pricing and how can they be measured? Can it provide large-scale and long-term economic stimulus for a 21st century economy? How should we inform and consult with stakeholders? What about social equity: do we understand the social distribution of costs and benefits? How should we manage politics and public expectations? Are HOT lanes a step in the right direction or a dangerous distraction? What have we learned from current efforts of implementation? Where have real benefits been delivered, and what have we learned from the failures?

The benefits of road pricing include not only the immediate traffic impacts but also the economic and social benefits that effective pricing can generate. Of course these benefits vary widely depending on the type and scale of pricing. Systems that provide a 'guaranteed' level of service such as those that involve some form of variable pricing should help business and individual travelers to solve a key transportation problem of the 21st century – i.e. reliability. There are also environmental concerns, such as the extent to which road pricing can reduce or smooth traffic flow to provide a useful contribution to greenhouse gas reduction. First, though, it has to be implemented – and road pricing has a public image problem to address.

THE SWEDISH EXPERIENCE
At the seminar, Sweco's Jonas Sundberg provided a stimulating keynote presentation on a retrospective view of the general concept for road pricing in 1994 versus the rule of thumb today in Sweden. Stockholm congestion charging took a decade to move from initial considerations to deployment after a referendum that authorized a six-month trial. The very visible and positive impact of the trial was why people voted to continue congestion charging.

The value of evaluation results from the Stockholm trial contributed much to the recent decision to move forward with urban road pricing in Gothenberg. In summary, access to high-quality factual information does speed implementation and this means that information on evaluation results
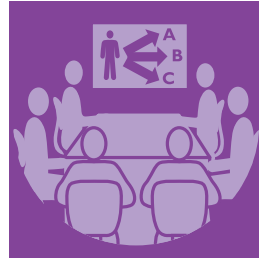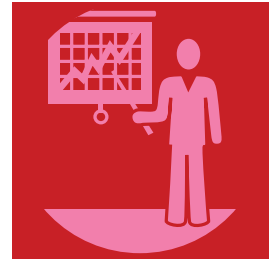
A MEETING OF MINDS

Steve Morello and **William Johnson** report on the successful IBEC-organized Road Pricing Seminar – the ideal opportunity for participants to learn from each other the trends in demand management from around the world

Illustration courtesy of Kathy Konkle

relevant to the decision context is key to success. However, evaluation results are often difficult to find – a void that IBEC may be able to fill with its role in sharing evaluation information.

AMERICAN DREAM?
The subject of national road pricing in the USA was highlighted by some thought-provoking ideas from Jack Opiola (D'Artagnan Consulting). These focused on a potential move toward road pricing based on VMT (Vehicles Miles Traveled) and HOV-to-HOT lane conversions as a transition strategy to introduce a payment mechanism leading to VMT and areawide/regionwide pricing strategies. A key consideration is the

possible move from the current fuel excise tax to a VMT tax. The main rationale for this move emanates from gas taxes being viable with vehicles getting on average 8-12mpg, but not in the future when the average will attain 45mpg. This move is further supported by the new Administration's energy, environment and climate change policy objectives to reduce congestion and emissions in the USA.

Opiola further asserted that the likely road pricing technology choice will not rely only on a satellite-based system. Rather, given the technology support provided by the US government, a move to use the 5.9GHz (802.11p) communications protocol with its associated potentially enormous

road safety-related benefits is very likely. Given revenue generated and demand management impacts from electronic toll collection (ETC), a main point raised was that ETC is the most effective and enabling market segment within the ITS value chain.

In addition to the national VMT pricing in the USA, Ben Perez from Parsons Brinkerhoff provided some lessons learned about the strategies to implement congestion pricing schemes in New York City and Los Angeles County. At this time, New York City is considered the most important US road pricing example – even though it was not ultimately adopted. New York City went through a political process where the focus of the plan evolved from quality of life enhancements to arguments over potentially enormous federal subsidies – all this in a politically charged arena. In contrast to New York City, Los Angeles County has focused on an incremental process to introduce congestion pricing by starting with Los Angeles Express Toll Lanes coupled with extensive outreach (public relations and communication) activities in order to inform key stakeholders and the general public. Some key lessons were espoused, including the need to focus on the social good in messages, not changing objectives mid-stream, avoiding discussion of revenues (as it politicizes the discussion), and using extensive goal-driven outreach.

DUTCH COURAGE
The national road pricing scheme in the Netherlands, ABvM (for Anders Betalen voor Mobiliteit or Pay Differently for Mobility), was presented by Jan-Willem Tierolf (Rijkswaterstaat). The Netherlands is currently in the midst of procuring the largest TDP (time, distance, place) system in the world to implement road pricing for all vehicles on all roads. A key government strategy to garner stakeholders' support has been the government-initiated 'platform for stakeholders', which led to the option of TDP pricing in lieu of other taxes that, on average, must be revenue-neutral for passenger cars driven approximately 15,000km per year. TDP revenue must be earmarked for transport improvements, and operational costs must be less than 5% of total revenue. Timescales will comprise progressive deployment beginning with trucks in 2010 or 2011 and culminating with all vehicles equipped by 2014.

Anticipated benefits to society include 13% improvement in road safety and 15% reduction in car usage with concomitant impacts on CO_2 emissions.

A unique approach to the national road pricing initiative by the Netherlands Government is the setting up of 'main' and 'guarantee' tracks. The main track will comprise an open market for authorized service providers and is being developed with industry players alongside the TDP consultation and engagement with key stakeholders and the general public. The guarantee track refers to the tender of a dedicated back-office with certified vehicle equipment that, depending on the development of the market, can be upscaled and downscaled covering five related fields – OBU, collection, enforcement, trusted element, and verification and validation. The Guarantee track concerns an active measure to ensure that the establishment of the KMP system is not fully dependent on the timely creation of a market of private service providers.

CAPITAL GAINS
The first major metropolitan area in Europe to introduce cordon-based congestion charging was London. Transport for London's Jeremy Evans noted that Greater London represents 40% of England's congestion, with average speed being no more that 9mph (15km/h), despite the fact that 85% of all journeys in the city are via public transport, cycling or walking. Among the benefits and lessons learned from London was the requirement for strong political commitment prior to deployment and even afterwards. A need for effective research and clear policy objectives was also deemed necessary, as well as extensive consultation and engagement with key

New York congestion pricing was proposed for vehicles traveling into or within the Manhattan central business district

"The benefits of road pricing include not only the immediate traffic impacts but the economic and social benefits effective pricing can generate"

stakeholders and the general public. In-depth evaluation and monitoring activities are ongoing and will be crucial during and after full-scale deployment.

Transport for London has carried out detailed benefit-cost analyses that show an overall ratio for London Congestion Charging of 1.7:1, providing sound evidence in support of implementing such a road pricing scheme in a heavily congested urban area.

EASTERN PROMISE
A presentation on ERP (Electronic Road Pricing) in Singapore outlined current issues. Kian Keong Chin (Land Transport Authority) noted that ERP – which started in 1975 as a paper-based system – migrated in 1985 to using color-coded OBUs to identify vehicle class. The next stage of OBU enhancement will move from a cordon-based scheme to a congestion charge rate for each journey within the specified area.

The main lessons learned from this scheme included the need to correlate congestion charging within the nexus of broad policies to complement investment in other transport modes, notably public transport. Cordon boundary charging conditions are critical yet sensitive and must be relatively simple and easy to grasp by the general public. Based on the experience in Singapore, a high level of public relations and communication is needed during the initial teething period until people learn and understand the system. The main consideration to move beyond ERP in the city center comprises a plan to introduce an ERP-based parking system as well as linking the OBU to other value-added services.

CONCLUSIONS
Whether road pricing initiatives have failed to move forward, have been deployed, are currently under deployment, or still in the planning stages, there are several key success factors or lessons learned that were highlighted at the IBEC's 'Road Pricing Beyond the Technology' seminar. Political commitment in terms of local, regional or national 'champions' is a must, while public debate must be based on facts obtained through a comprehensive and agreed evaluation program. Urban congestion charging schemes must also

be wrapped within a broader program of improvements in the public transport network. For road pricing schemes, outreach (i.e. public relations and communication) with stakeholders and the general public must be adequately planned for, funded and implemented before, during and after deployment, even though it will almost never be sufficient. Road pricing takes time to implement. Stakeholders and decision makers do not embrace it instantly. Once addressed, though, road pricing strategies continue to re-emerge as a viable option and gain greater constituents over time. London and Stockholm are but two examples that took a decade or more to emerge.

This positive outcome to the seminar reflects well the IBEC focus on promoting evaluation (cost-benefit analyses, before and after studies, etc) as well as communicating with stakeholders, constituents and road users. The major theme to go 'beyond the technology' was the right way to go… ∎

Steve Morello is business development manager with Egis Projects, France, while William Johnson is from Transport Research, Education & Development Services, Canada. IBEC would like to recognize the support from volunteers involved in organizing this event, with special mention to seminar chairman Alan Stevens (TRL), Amy Polk (Citizant, Inc), Jane Lappin (Volpe), Dick Mudge (Delcan) and, in particular, Odile Pignier (Harmonised Events) for logistics and onsite support. For further information about IBEC, please log on to www.ibec-its.org

Connecting Communities through Smart Transportation Solutions

ITS AMERICA'S 20th ANNUAL MEETING & EXPOSITION
May 3-5, 2010 ■ Houston, Texas

Stay on top of issues impacting your business and your community.

ITS America's 20th Annual Meeting & Exposition will provide transportation leaders with effective tools and strategies to create smart cities and communities that are safer, cleaner, more livable and less congested.

As national, state and local leaders are working to find innovative solutions to our nation's transportation challenges in a fiscally constrained environment, this is your opportunity to learn more about smart technologies and cost-effective solutions for reducing traffic congestion, greenhouse gas emissions, and traffic accidents, financing infrastructure projects, collecting performance measurement data, and improving system management.

DON'T MISS THESE OPPORTUNITIES!

■ **Make business connections** with a diverse community of transportation, technology, and other government professionals dedicated connecting communities through smart transportation solutions.

■ **Experience the most comprehensive exhibition** of smart technologies, services, and solutions from more than 100 competitive service providers and public agencies.

■ **Gain new knowledge and earn valuable Professional Development Hours** by attending a variety of technical and scientific sessions on topics such as local ITS deployments, congestion management, and business development.

■ **Hear innovative solutions and take home best practices** from leading ITS professionals in Texas and from around the nation that can be put to work in your community.

REGISTER ONLINE AT
WWW.ITSA.ORG/ANNUALMEETING.HTML.

ITS ✦ AMERICA

MAGNETIC PULL

Dr Christoph Roth outlines the attractions of a new wireless magnetic sensor-based vehicle detection technology that is similar in accuracy to inductive loops yet also has the long lifetime of any aboveground solution

Illustration courtesy of Caner Tan Bideci

Vehicle detection today is still predominantly achieved with inductive loop detectors. But due to certain deficiencies – reduced lifetime, for instance – there has been a noticeable (albeit rather slow) trend toward aboveground methods. Inductive loops are nevertheless still deployed in more than 50% of new installations as many road authorities deem them superior in terms of detection ability. (Detection rates close to 100% are common in all environmental conditions and they rarely fail during installation or set up.)

But aboveground technologies, such as video and radar, have proved their worth for vehicle detection in many applications. The main advantage of these variants compared to inductive loops is long lifetime. As they are mounted onto a pole or a gantry, they are unaffected by the wear of the road surface so do not need to be replaced when a new layer of asphalt is laid. But such aboveground technologies have not superseded loops in all applications, due mainly to their mounting position. From a pole or gantry, the occlusion of vehicles on adjacent lanes can often not be excluded, while an approach detection of 20-60m from the stop bar is difficult to attain as the gaps between vehicles driving at close distance are not 'seen' by the detectors.

A NEW BREED?

A different form of technology might be able to fill the gap between the high detection rate of inductive loops and the long lifetime of aboveground detectors. Wireless magnetic detectors are in-ground detectors able to detect vehicles under all ambient conditions. With their small size and the absence of communications or power cables, the lifetime is far longer than it is for, say, loops.

Shaped like small cubes with dimensions around $7.5 \times 7.5 \times 5cm^3$, wireless magnetic detectors are installed into the road surface. A small hole, roughly 10cm in diameter, is drilled in the asphalt and the detector is placed in the hole and subsequently filled with epoxy until the detector is completely covered. With wireless data communication and internal battery power, there is no need for any cables to connect the detector to roadside equipment. As a result, it can be installed with minimal damage to the road surface and in most cases is placed in the middle of the lane – a location of low wear between the lane grooves. Even if the road surface is stressed and starts to corrugate, the sensor will stay in place and continue to operate with full functionality. Moreover, during the winter months, there is no risk of damage from snow plows as the detectors are completely below the road surface.

These newly introduced alternatives to loops and aboveground sensors detect vehicles in road traffic by observing changes in the natural static magnetic field of the Earth, which is changed in direction and strength by any metallic or

magnetic object. In this scenario, the metal objects are the vehicles traveling over the top, which are detected immediately. The detectors are usually equipped with several magnetoresistive, Hall or flux sensors that measure the magnetic field strength in two or three axes. A signal processor analyzes the raw signals of the magnetic sensors and can distinguish between changes caused by vehicles and disturbances from other sources. Signals from vehicles on adjacent lanes or temperature drifts of the sensors are suppressed in the signal analysis.

The detection data is communicated wirelessly to an access point mounted on a pole at the roadside. A low-power radio communication is used to ensure a long battery life, even on roads with high traffic volumes. In a typical configuration at an intersection, one access point located on a signal mast or pole collects the data of all detectors in each of the approaches. The data is processed in the access point and sent in real-time to the signal controller.

The advantage of magnetic detection is that it is a pure passive technology, able to detect changes in the ambient field. Detectors such as loops or radar, by comparison, need to generate an electromagnetic field which requires certain minimum input power.

Communication is based on the low-power ZigBee (IEEE 802.15.4) standard and is modified for traffic detection. A special protocol reduces the number of transmissions to a minimum without introducing delays in communication. Each detection event is reported immediately. Without traffic, the detector is almost completely idle apart from a sign of life once every minute. The battery power supply combined with the wireless communication means installation costs are very low.

FIT FOR PURPOSE
Wireless magnetic detectors can be used for many applications in road traffic, ranging from presence detection at intersections to traffic data acquisition with vehicle classification. Similar to inductive loops, a double-sensor configuration with two

Wimag detectors

Sitraffic Wimag is the Siemens brand for the company's wireless magnetic detectors, which covers the complete range of sensors, including access point, repeaters, etc. For intersection control, Sitraffic Wimag offers a high level of system integration, which reduces the installation cost to a minimum. Many Siemens signal controllers provide a direct link to the Wimag access point, which eliminates the need for interface cards and reduces the risk of failures in the system. The user interface allows a fast assignment of the detectors to the controller inputs and the correct performance can be controlled easily. With Power over Ethernet, a single cable between access point and controller is sufficient for data and electrical power. Besides the products, Siemens offers the complete service package including installation, set-up and maintenance. Wimag is an easy-to-integrate component of the Sitraffic family of systems from Siemens Mobility and can be expanded step by step to create a comprehensive traffic management system. The Wimag traffic data is available on all levels from the signal controller to the central office of the road network operator.

"Wireless magnetic detectors can be used for many applications in road traffic, ranging from presence detection at intersections to traffic data acquisition with vehicle classification"

sensors located at a distance of about 3-4m in the direction of traffic flow can be used to measure vehicle speed, length and to classify the vehicles in two classes. The raw signals of the two sensors are processed in the corresponding access point in order to calculate speed, length and vehicle type.
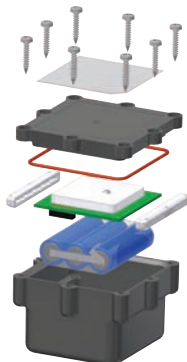
One of the main advantages of wireless magnetic detectors is the flexibility in choosing the detector locations. With conventional technologies, there are many restrictions relating to the position of the detector. Loops, for example, often cannot be placed too far from the stop bar as the installation cost for the feeder cables would be prohibitively high. Boundary conditions also apply to aboveground detectors, which are often placed near signal heads as access

to poles for public street lighting or similar is often not possible. For wireless magnetic detectors, however, installation cost remains low, regardless of where they are installed; wireless data transmission means no increase in cost for large distances from the intersection. And by using repeaters, it is possible to place the detectors up to 500m away from the access point.

For approach detection, wireless magnetic detectors also have a considerable cost advantage over loop detectors as there is no need for the costly installation of feeder cables. Systems based on aboveground detectors will be similar in cost to wireless magnetic detectors although there is extreme disparity in terms of the detection rate. For approach detection, video or radar detectors need to detect the vehicles at a distance of 20-60m whereas wireless magnetic detectors are located exactly at the point of detection so can detect vehicles with a high precision.

After many successful installations for vehicle detection, these detectors are now advancing toward other applications, such as travel-time measurement on arterial roads. By comparing the magnetic signatures at several locations in the network, vehicles can be re-identified and their travel times determined. Indeed, a matching rate of around 50% – which is sufficient for many traffic management systems – has been achieved in the first pilot installations. Therefore, wireless magnetic detectors present themselves to be a cost-effective alternative to systems that do not require matching rates of close to 100%. ■

➔ **Wireless magnetic detectors are especially useful at traffic signals**

A BETTER STATE

Louise Smyth learns that despite increasing traffic volumes – and the fact that there are limits to how far its existing infrastructure can be developed – the German state of Hessen is still managing to reduce congestion, leading to a safer and cleaner network for all

Images courtesy of Hessen Road and Traffic Authority

The German state of Hessen is famed for its excellent transportation infrastructure, which is borne in part out of necessity. The state is a huge transportation hub and must cope with a network demand that is completely disproportionate to its circa six million inhabitants. The road network, including the trans-European and German motorways that cut through the state, are just a few pieces of the overall jigsaw. Flughafen Frankfurt am Main, Frankfurt's busy international airport, is in Hessen. There are high-speed rail lines, Germany's busiest railway station, and trans-European waterways as well. As the most important transit state in Germany – with higher traffic density on its motorways than anywhere else in the country – there is additionally a massive amount of multimodal traffic that needs to run smoothly all year round.

In 2003, recognizing that demand for capacity was not going to drop any time soon, the state of Hessen started work on an ambitious project that it codenamed 'Staufreies Hessen 2015', or 'Congestion Free Hessen 2015' – an innovative scheme involving multiple strategies and solutions to keep traffic moving. Within the scheme, there was a strong emphasis on making the most of what Hessen already has to offer, using the available infrastructure in the most efficient way, rather than attempting to build more capacity. The aim of being 'congestion-free' is an ideal; the reality is simply to focus on continual improvement.

And continual improvement has certainly been achieved over the past seven years. The state now claims that the duration of traffic jams has decreased by more than 70% since 2004 – an impressive statistic that is the result of a number of different solutions all working toward the same aim.

INTELLIGENT THINKING

To understand how this has been achieved, head of the Hessen Traffic Centre, Gerd Riegelhuth, believes it is helpful to explain what the situation was like before the scheme started: "Our background is very much rooted in traffic management and transport telematics activities," he says. "Congestion has long been a problem here, particularly in the Rhine-Main area. There are a lot of motorways, many of which have average traffic levels of more than 130,000 vehicles a day. These traffic volumes combined with our long-held belief in the value of intelligent traffic management is why we started the initiative."

Riegelhuth himself began working with the Hessen Road and Traffic Authority (RTA) in the early 1990s, so has observed great changes on Hessen's roads since. His initial field of expertise was traffic control and management, but as time and technology progressed, he became more involved in telematics. The German now manages Hessen RTA's involvement in a number of European research projects and is keen

Learn from example

Among an abundance of technology-oriented projects being deployed as part of the Congestion Free Hessen 2015 initiative, several future-focused elements stand out as examples that other authorities could potentially learn from.

DIAMANT, Dynamic Information and Applications for assured Mobility with Adaptive Networks and Telematics infrastructure: As a partner in the DIAMANT technology joint venture, the RTA is testing the potential of adaptive networks for traffic management. To do this, cars communicate via spatial network connections that are built up among each other – similar to a WLAN connection. Information about workzones, or temporary use of hard shoulders, flows to the Hessen Traffic Centre via a stationary traffic management infrastructure. DIAMANT supports telematics applications for increasing traffic safety and improving traffic flow on the motorways.

AKTIV, Adaptive and cooperative technologies for intelligent traffic: In the AKTIV research project (running from September 2006 to December 2010), a consortium of 28 partners is developing a series of applications, including an innovative assistance system to support the driver in situations where an accident could occur, and intelligent traffic management systems to network road users. Another application is mobile communications technologies for C2X communication. The project is supported by the Federal Ministry of Economics and Technology. In the Hessen test field, applications for traffic modeling incorporating individual vehicle data for cooperative strategy management are being tested.

SIM-TD, Safe Intelligent Mobility – Test Field Germany: As a European traffic hub with big traffic generators such as Frankfurt Airport, Frankfurt long-distance railway station and the central railway station, if a traffic-busting strategy works well in Hessen, it is safe to say it will work well in other regions. As part of the SIM-TD project, vehicle-to-vehicle and vehicle-to-infrastructure communication technology is being tested in a four-year trial running until June 2010.

dWiSta, Dynamic variable message signs with integrated traffic reports: dWISTA VMS are used to control traffic on motorways; if an incident occurs, traffic can be diverted along alternative routes. Such an approach can prevent tailbacks and enable better utilization of the network. Hessen currently operates 14 dWISTA signs.

The Hessen Traffic Centre is among the most advanced in Europe

"Other federal states are keen to find out more about the initiative as a whole, but especially the results we've achieved through the temporary use of the hard shoulder"

Gerd Riegelhuth, *head of the Hessen Traffic Centre, Germany*

to point out that today's successes are not only in regional traffic management but also in inter-regional traffic management throughout key European corridors. "Starting with these activities at a European level, over time we have developed our own systems tailored to Hessen's needs," he explains. "The success of our initiative has been down to two key elements: on one hand, it has been about developing advanced technologies, while on the other it's been about introducing smarter management strategies."

An example that illustrates both of these facets well – and something that Riegelhuth is very proud of – is the Hessen Traffic Centre itself. The state describes the facility as one of the most modern traffic centers in Europe, with traffic managed around the clock with the help of a dynamic telematics system. Thousands of sensors, both loops and radar, detect current traffic conditions and allow operators to respond to them, including taking decisions to deploy dynamic rerouting. Hessen already has some communication between vehicles and

infrastructure via wireless comms systems (all data is fed back to the center) and the aim is to expand such systems in the future. This is a good real-world case study of vehicles being used as probes, and Hessen works with a number of automotive OEMs on this part of the scheme.

INFRASTRUCTURE TO CAR
The center also communicates with drivers in a variety of ways (via VMS, for instance) to manage flow and encourage drivers to make the best choices. Data is also collected and analyzed in the center, with the aim being to respond in advance to forecasted future increases in traffic on the network.

Better management of current traffic levels has been achieved in part through allowing temporary driving on the hard shoulder. Today, 65km of hard shoulder can be used at certain times, but the RTA's master plan envisages 350km eventually being used. This has been successful in increasing capacity of the affected sections of the network by 25% and has made a huge contribution to the reduction in traffic jams

on Hessian motorways. Such a low-cost, common-sense strategy appeals to other authorities and Riegelhuth says there has been a great deal of interest in how Hessen is benefiting from driving on the hard shoulder: "Other federal states in Germany are keen to find out more about the content of the Congestion Free Hessen project as a whole, but especially the results being achieved through the temporary use of the hard shoulder, and how we at the Traffic Centre manage this element. Of course we are also keen to share our experiences with other authorities."

As well as fewer traffic jams as a result of the Congestion Free Hessen project, safety has also improved, with Reigelhuth claiming a 30% reduction in serious accidents. Again, this is a benefit that other authorities are particularly interested in.

With regard to the financing of such an ambitious and long-term scheme, this is not about private industry or spending big bucks. Motorway projects in Hessen are financed by Germany's federal government, while projects on other roads (and Hessen's involvement in European research projects) are financed by the state of Hessen. Every cent must be spent wisely and accounted for. Riegelhuth and his team are understandably proud of what's been achieved with what they feel are limited resources. "We did not have vast amounts of money, yet we've shown it's possible to have success on a large scale with reducing congestion, improving safety and guaranteeing mobility." ■

ONE IN EVERY CROWD

From the generation of real-time traffic data to the reporting of road maintenance issues, crowdsourcing in ITS is on the rise. **Jonathan Sorensen** investigates how people power will help develop transportation's killer 'apps' in the future

Illustration courtesy of Magictorch

The processes and methodologies used in the development of transportation solutions has traditionally adhered to a static, formalized structure, supported by defined resources operating within a rigid, procedural and formulaic framework. A task is traditionally specified and assigned to a defined workforce for resolution within a predetermined timeframe and budget. Recently, though, a new solutions model has emerged within the transportation industry, establishing an alternative approach for developing and procuring transportation solutions. This new solutions model – based on a philosophy of 'openness' and supported by the emergence of new web-based communal tools and technologies – is setting the stage for the implementation of 'crowdsourcing' projects within the transportation industry.

DEFINITION
In layman's terms, crowdsourcing is a new procurement and project management strategy that enables the realization of values associated with an 'open call' to an unlimited pool of resources, typically through web-based technologies.

A crowdsourcing project is typically initiated with the definition of a problem statement, or identification of a specific need or needs, followed by a formal 'open call' to the masses (the crowd), requesting participation in the solution or development of resolution to the overall project or task. A transportation crowdsourcing project is often supported by the availability of 'open data' or the release of datasets or data catalogs to the crowd. In some forms of crowdsourcing, the crowd's specific task is to generate or 'source' the desired data. Generally speaking, a crowdsourcing project

is invoked to generate data, aggregate and/or fuse data, to process data or information, or more directly to develop transportation applications or planning and design of transportation solutions.

Wikipedia is probably the earliest and best known example of a crowdsourced project and a great illustration of what can be achieved with a crowd-based solutions model. Linux – which is an 'open source' application (and should not be confused with crowdsourcing) – was developed and is maintained through crowdsourcing methodologies. To be clear, crowdsourcing is *not* the same as outsourcing. Outsourcing utilizes traditional staffing or sourcing methodologies, typically within a rigid, contractual framework with a defined resource pool, whereas crowdsourcing utilizes the benefits of 'openness' to attain the overarching goal.

➔ **Waze is a social mobile application providing free turn-by-turn navigation based on the live conditions of the road**

ENABLING FACTORS

To help enable this form of problem-solving within the transportation community is the Open Government Initiative and Open Data initiative, established and deployed under the Obama Administration in 2009. These new initiatives are based on a philosophy of transparency, which has enabled the availability of vast amounts of data and information previously unavailable to the transportation community.

The initiatives are now being implemented by many federal, state and local agencies throughout the USA, further enhancing the foundation for the use of certain crowdsourcing solutions models. The individual federal, state and local initiatives have also facilitated the publication of vast datasets and data catalogs – once strictly confined to internal use – but now available to the transportation community. The recent deployment of Data.gov and Apps.gov by the federal government has illustrated the value of open access, as well as providing a roadmap for those state and local agencies looking to make data and information accessible to the general public. Another key enabling factor for the emergence of crowdsourcing strategies within transportation is the recent mainstreaming of communal communications platforms, most notably Web 2.0 technologies, which have provided a platform and intelligence engine for engaging the 'crowd' and enabling active participation and multi-path communications between the masses and transportation agencies. Finally, and possibly most notably, the recent market saturation of key mobile technologies such as GPS-enabled smartphones and other mobile devices have provided additional key components in establishing a fertile, functional framework for crowdsourcing in the transportation community.

EXAMPLES

Crowdsourcing strategies can be employed during most phases of the transportation solutions model, including data sourcing or data generation, data aggregation and data processing, system planning and design, development of transportation software applications, as well as the operations and maintenance of transportation systems. The following provides several examples of recent crowdsourcing projects implemented within the transportation industry.

Data Sourcing: Just recently, crowdsourcing principles have been used for attaining traffic and congestion data. Several different models have been deployed to source and aggregate data from mobile field devices, most notably GPS-enabled smartphones.

Several private traffic data and traveler information vendors, including INRIX and Traffic.com, have developed smartphone

CHALLENGES AND BENEFITS

One of the primary advantages of crowdsourcing is the ability to reach and engage a broader intelligence pool. The realization of attaining this greater resource pool increases the potential for identifying new, unforeseen solutions. This is particularly attractive to smaller outfits that typically rely on much smaller, internal staffing to generate solutions, and allows these small entities to compete with larger entities with greater staffing and intelligence resources.

An added incentive is the greatly reduced costs associated with a project or task of this nature. The ability to establish a desired fee (or prize money) up front sets a firm cost for executing the project, and will often require less funding than standard procurement methodologies, as startups and small businesses are often limited in the size of projects that are suitable in relation to the staffing and company structure.

Crowdsourcing almost evens the playing field by widening the resource pool for smaller organizations. It also allows all sizes of organizations to pool much larger resources for great ideas, at a predefined and often greatly reduced cost.

The ability to aggregate a useful dataset provided by the crowd is also useful. By using Web 2.0 technologies, all discussions, ideas, contacts, issues and other project-related information can be captured by the application and used for review and data mining purposes. Data collected during a crowdsourcing project is often valuable for other projects or task work, and can offer great value in providing insight into participant perspective.

As with the implementation of most new policies, procedures or technologies, the ability to innovate and implement is highly dependent on identifying and overcoming existing methods and procedures, and surpassing certain challenges indigenous to the existing landscape.

The ability to change or embrace and implement new technologies almost always requires addressing the 'comfy couch' syndrome, or the mainstream philosophies and concerns with changing from the status quo. This often requires modification to existing guidelines and procedures that may be deeply ingrained in an agency's culture. Crowdsourcing

applications that generate location and traffic information through GPS-enabled smartphones. The end-user initiates the collaborative relationship by downloading the vendor's application to their smartphone. The application provides the end-user with traffic information related to their location and in turn the vendor's application uploads the end-user's location and traffic data (anonymized) to the vendor's central software application. Google and Bing both offer traffic information based on similar crowdsourcing data collection models.

Another variation of this form of crowdsourced traffic data has been implemented in a peer-to-peer architecture. Waze is a free peer-to-peer traffic application that collects travel-time and traffic information from each of its users (via smartphone GPS). The point data and user reports are uploaded to a central application, as well as exchanged to other local users in a peer-to-peer network. The application allows users to report accidents, speed traps, and other traffic-related issues in their local area. The ultimate success of this type of peer-to-peer crowdsourced application will be highly dependent on achieving a critical mass of users in major metropolitan areas, and attaining a market penetration sufficient to generate relatively accurate traffic information. This is in contrast to applications from vendors such as INRIX, which uses crowdsourced data to supplement other data collected and processed to support its primary algorithms.

Mashup Sourcing: Crowdsourcing is also being used to generate informational mashups for a wide variety of transportation-related products. The crowd typically provides data and/or information through an existing central resource, such as a mapping tool or central software application. The value in this form of crowdsourcing is also attained when a critical mass of participants is realized, providing hyperlocal data to form a big-picture product.

Trapster, a crowdsourced application that aggregates user-identified speed traps, was one of the first crowdsourced transportation mashup applications to reach the market. Trapster also provides a smartphone application, used by end-users to provide data from the field to a central application. Trapster's success is closely tied to the mass of participants providing input to the application. The National Traffic Management Center inventory is another example of an open, crowdsourced mashup that uses crowdsourced intelligence to generate a national inventory of traffic management centers (TMCs) throughout the USA. The inventory is built by TMC practitioners around the world and participants and members of various dedicated transportation groups, including the Traffic Management Center's LinkedIn group.

Application Sourcing: The crowdsourcing model has also provided a valuable tool for the development of transportation software applications, most notably mobile or smartphone 'apps'. Using data catalogs made public by transportation agencies, developers have created a wide range of useful transportation applications. The value of utilizing a crowdsourced model for application development can be best illustrated by two recent projects – 'Apps for Democracy' and the 'MassDOT Applications Developers Conference'. In 2008, Washington DC's Office of the Chief Technology Officer initiated the 'Apps for Democracy' contest, which advertised an 'open' call to all software developers to create applications based on the city's recently publicized data catalog. The data catalog contains a vast array of public data, including real-time and aggregated datasets collected by the city.

The city posted US$50,000 in prize money and received a total of 47 iPhone, Facebook and web applications – an estimated US$2.6 million in value to the city – all in a 30-day timeframe. Entries included several transportation-based applications, as well as pedestrian and parking applications. Other cities, such as New York's NYC Big Apps, are also showing success in developing applications based on newly publicized datasets and an open call to the developer community.
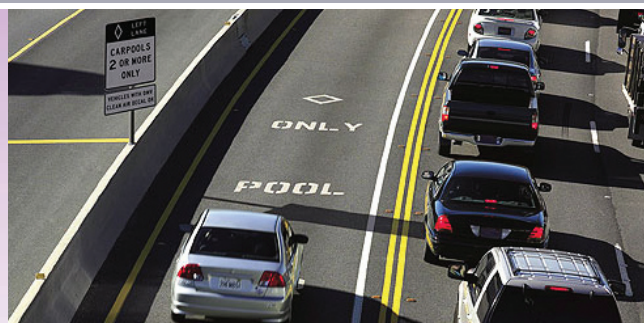

As laser radar detectors draw your attention too late to photo enforcement systems, iSpeedCam has been designed as the driver's ultimate companion to avoid speeding tickets

can pose a disruption to normal day-to-day procurement methodologies, and can even disengage internal staff. The disruption – justified or not – can initiate a level of concern or fear regarding future frameworks.

Successful crowdsourcing projects will rely on the ability to implement the strategies, tools and policies that enable the project to function within an agency's existing framework. Agencies and those looking to implement crowdsourcing methodologies must consider existing internal policies and regulations that may preclude their implementation. Typical projects often require the implementation of a new 'openness' initiative, whether it be data or other internal processes or information that are presently precluded from being made public as a result of existing internal policies. Policy changes may be required to enable the engagement of staffing resources without a formal contract. Risk management may also be concerned with several aspects.

A key value to crowdsourcing is tapping previously unreachable resources. If a crowd cannot be motivated to take part, the chances of successfully managing and executing a project are greatly diminished. Often, prize money or other rewards are established and advertised to generate interest. But there is no guarantee that a suitable and capable crowd will be assembled or will participate. This risk must be weighed when determining the feasibility of deploying a crowdsourcing project.

Crowdsourcing has the theoretical potential of greatly impacting traditional business models, and in some eyes could pose a disruptive effect on future contracting and procurement processes. The perception of this worst-case scenario could lead many to discount its values.
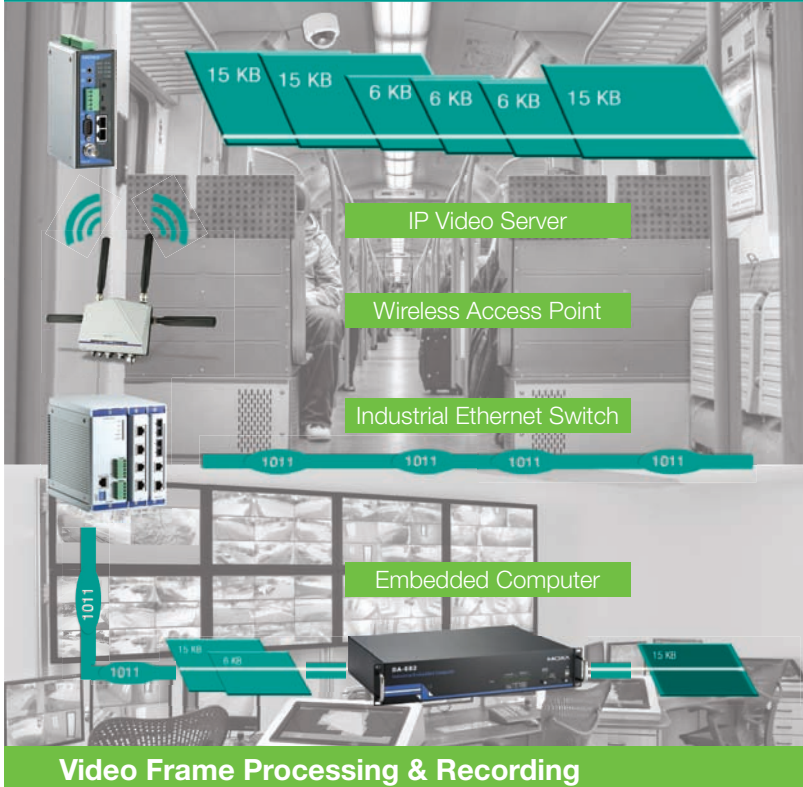

ITS America's Congestion Challenge was won by iCarPool, which gives you best ride matches with high precision trip matching

Unexpected results are both a goal and a disadvantage. Final results may require extra internal resources to steer a project or to bring the crowdsourced results to acceptable completion. By its nature, crowdsourcing typically involves no written contracts, including non-disclosure agreements or agreements related to IP. Another potential vulnerability is that results may be impacted by outside sources. A crowd may be unintentionally slanted or imbalanced with respect to general project-related philosophies, so offering a disproportionate perspective and results. Crowdsourcing may also be vulnerable to intentionally misguided or malicious results or impacts from outside competitors.

On November 14, 2009, the MassDOT/ Executive Office of Transportation announced the '2009 MassDOT Developers Challenge', which called on application developers (@MassDOTdev) to create new transit-based applications that could be released for public use. These were based on real-time and static transportation data made available by the Executive Office of Transportation and its family of agencies. The data catalog was made public as part of the Massachusetts Open Data Initiative. The conference included presentations, workshops and the chance for developers and transportation staff to meet and discuss MassDOT data and transportation applications, which were judged on the quality of design, usability and convenience. A 'Visualization Challenge' was also included, calling on developers to use data released through the MassDOT Developers site to show 'A day in the life of the MBTA'. The data released included all 'CharlieCard' 'taps' on average weekdays in the summer and fall. The developer's conference was a resounding success, with a total of eight applications and nine visualizations developed during the one-day event. The group continues to meet and discuss uses and develop applications based on the 'open data' provided by MassDOT.

Planning and Design Sourcing: Crowdsourcing has also significant potential for the support of transportation planning and design activities. Agencies have started reaching out to the public or targeted crowds, predominantly through Web 2.0 platforms, for input on the planning and design of transportation projects. The following presents several examples to illustrate the general capabilities and potential of crowdsourcing for these types of transportation activities.

Planning Model: Federal, state and local public agencies have engaged crowdsourcing to implement tools and services that facilitate active civic engagement in the transportation planning processes. Two recent projects illustrate the values of crowdsourcing for planning initiatives.

The Federal Transit Administration recently provided a grant to Salt Lake City, Utah to initiate a demonstration project that utilizes crowdsourcing principles. The demonstration project will develop a public participation model for the facilitation of public involvement and elicitation and aggregation of public comments related to the transit planning process. The City of San Jose, California, meanwhile, recently launched its first crowdsourcing project to facilitate public involvement in the development of the City's Master Plan. The City used Web 2.0 technologies to reach out to citizens, encourage them to participate and provide management capabilities for

Based on crowdsourced data, Trapster helps lead-footed drivers avoid known and newly discovered speed traps

"If a crowd cannot be motivated to take part, the chances of successfully managing and executing a project are greatly diminished"

the public involvement and civic engagement process. The city's Wikiplanning site included a 19-question survey, as well as functional capabilities to accept user input including photos and other documentation for identifying issues within the city, or for citizens to illustrate elements from other cities deemed valuable to the city's new plan. The public could also access presentations, videos and mapping related to the Master Plan Project, all via the Web 2.0 platform. The 'crowd' was notified and assembled through advertising, which included the offering of prizes provided by the cultural and arts community in San Jose. The prizes also provided an opportunity to promote the local arts and cultural community – a win-win-win for the city, its residents, as well as the arts and cultural community.

Design model: The crowdsourcing model is also being utilized by transportation

organizations to support or manage transportation design tasks. Simple yet illustrative examples of this process can be found in recent crowdsourcing projects in New York City and Chicago.

In 2009, Fixcity.org launched a project to crowdsource the placement of bike racks in New York City. Run by the Open Planning Project, the scheme reached out to the cycling community, soliciting their needs for the identification of individual rack locations. A cyclist visited Fixcity.org, accessed a map and placed markers for locations where bike rack locations would be ideal for that individual user. The site accepted images and a preliminary design of proposed locations by each of the users. The site also provided location guidelines, sizing and space requirement templates, and even a video to aid users in their placement and preliminary design of the bike rack locations. FixCity reviewed all submittals, identified key locations important to multiple users and the city as a whole, ultimately providing a final design review of each of the new bike rack locations.

Another successful crowdsourcing implementation was recently initiated by the Chicagoland Chamber of Commerce as part of its InnovateNow campaign. During preparation for its 2009 Innovation Summit, the Chamber was approached by Innocentive – a company that provides crowdsourcing solutions and maintains an extensive resource pool (crowd) for clients seeking innovative solutions. The Chamber decided on implementing a challenge that would pose to the crowd questions related to increasing transit ridership, and a US$5,000 prize was posted for the Transit Challenge-winning solution. The challenge
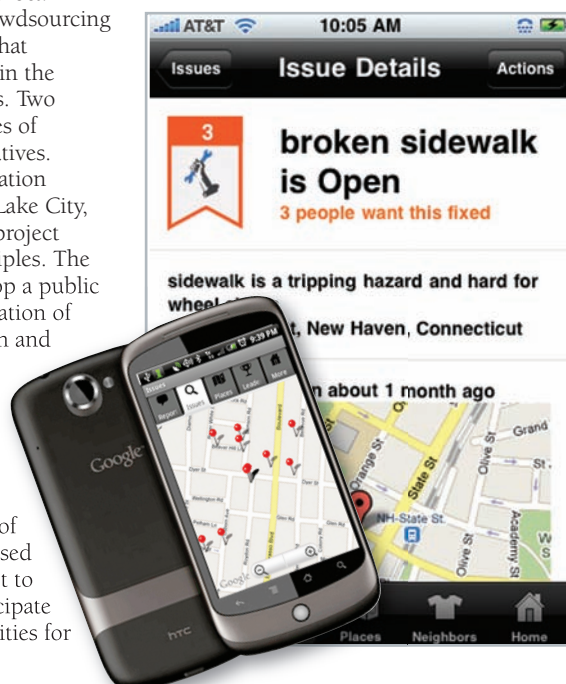
SeeClickFix allows people to report and track non-emergency issues, which empowers citizens, community groups, media organizations and governments to take care of and improve their neighborhoods

received 125 official submittals with submissions from all contents. The winning entry was used as a key component of the campaign to increase transit ridership.

Crowdcasting
Crowdcasting is a variation of the traditional crowdsourcing model that has also shown promise for the transportation community. It is a mix of aggregation and dissemination (or push and pull) strategies utilized to assemble an 'appropriate crowd', and to manage the crowd to attain new ideas or insights. Crowdcasting primarily focuses on problem-solving and acts as an agent for the facilitation of generating new ideas through crowd-based brainstorming, or 'crowd-storming'. Typically a problem statement is disseminated to a focused or select 'target group' (crowd), often in the form of a contest. The target group is usually comprised of industry experts or practitioners with more than general knowledge of the problem statement and the issue(s) related to it. Similar to crowdsourcing, crowdcasting projects are typically coordinated and managed through the use of a dedicated social network and/or other Web 2.0 technologies.

In June 2009, ITS America in partnership with IBM and Spencer Trask Collaborative Innovations, launched the 'ITS Congestion Challenge' – a global crowdcasting challenge for the development of the best congestion mitigation solutions, with the winner receiving US$50,000. The project included the deployment of a social network and collaborative commune for ITS practitioners and any other interested parties to discuss, communicate, submit entries and ultimately score each of the submitted candidate projects. The challenge engaged more than 5,000 experts worldwide, with the focus being to propose and assess possible new solutions for congestion mitigation.

Crowdtracking
Crowdtracking is yet another genre of crowdsourcing in which the crowd is engaged to provide a tracking or monitoring role for a specified task or project. Generally speaking, the crowd is informed of the tracking or monitoring tasks required by the managing agency. The crowd provides the tracking or monitoring service, and ultimately provides a reporting function

based on results of the tracking task. Crowdtracking methodologies are being used to engage the traveling public and local citizens for a variety of transportation-related tasks.

One model uses citizens to provide monitoring and reporting for the identification of transportation maintenance needs, or identification of other issues related to transportation. Citizens (the crowd) notify an agency (typically via a public Web 2.0 interface) of any transportation infrastructure maintenance issues, such as signal outages, signal timing problems, system operations issues or roadway maintenance issues such as debris in the roadway, all while conducting their normal daily routines. New smartphone applications, such as SeeClickFix, are facilitating this type of crowdtracking service. The application provides a mobile tool for identification, documentation and

> "The ability for agencies to reach a broader intelligence pool has shown significant value in creating new transportation tools and solutions"

submission of maintenance issues. The application includes functionality to submit photos, location (coordinates) and written notifications. The application automatically determines the appropriate maintaining authority (via GPS coordinates), and forwards the request to the appropriate maintenance staff, typically via email or text messaging. These applications also provide the end-user with issue-tracking functionality, which allows the reporting agent to track the status of the issue and progress of any necessary repairs. This type of application is also proving to be a very valuable community relations tool by

FixCity:Bike Racks is a social mapping 'app' designed to crowdsource community and government collaboration in the gathering, planning and implementing of new bike racks

providing citizens a sense of ownership and a feeling of involvement in managing and maintaining their own community.

CONCLUSION
The potential for successful execution of crowdsourcing strategies by the transportation community is extensive. The ability to reach a broader intelligence pool has shown significant value in creating new transportation tools and solutions. The recent trends of 'open government' and 'open data', coupled with the emergence of Web 2.0 technologies, has established a fertile foundation for the implementation of new crowdsourcing deployments. The potential for cost-savings associated with crowdsourcing also provides an attractive procurement alternative to agencies bound by tight budgets, particularly during economic downturns.

However, challenges lay ahead that will no doubt decide the ultimate fate of the crowdsourcing model and its depth of use within the transportation community. Fears associated with the perceived dissolution of traditional transportation solutions models and barriers associated with the common 'comfy couch syndrome' will no doubt kill some potential crowdsourcing opportunities from the start. Those transportation organizations looking to take on the challenges associated with crowdsourcing will need to navigate issues related to existing internal policies and regulations, including those policies and regulations associated with the ability to make internal data public, and those associated with funding projects with no contracts or non-disclosure agreements in place.

In the big picture sense, one could worry about total disruption of traditional contracting and consulting business models. John Perry Barlow once envisioned a world of free agents ruling the workforce. But this level of integration of crowdsourcing principles would require surviving significant battles, and would represent total dissolution and disruption of our current business models. Somewhere in between lies a land that will maximize the benefits attainable through crowdsourcing and generate some impressive transportation solutions. There's one in every crowd. ∎

In Chicago, a US$5,000 prize was posted for the Transit Challenge-winning solution to increase ridership in the city

LATEST TRAFFIC NEWS:
ESCAPED CAT MALCOLM FORCES MR BROWN TO SLAM ON HIS BRAKES

Take the drama out of life

Wouldn't life be great if news like this made the headlines? No traffic jams to report. No wrong-way drivers to warn of. No tunnel closures to deal with. If you'd like your world to contain a little less drama, talk to Siqura. We have a proven track record in high tech surveillance solutions for highways. Combining reliable surveillance technology and expert assistance, Siqura provides everything you need to stop traffic situations escalating. Siqura, for sure.

Find out how we can help you take the drama out of life. Visit: www.siqura.com/for-sure-13

INDIVIDUAL MOBILITY

New transport concepts and intelligent traffic management, BMW's **Dr Markus Mailer** suggests, ensure the most efficient and environmentally compatible use of the existing road network, in doing so minimizing the negative side effects of mobility, such as traffic congestion, crashes and burdens on the environment

Images courtesy of BMW Group

Taking its social responsibilities very seriously, BMW likes to think it goes beyond the usual realms of other car manufacturers by demonstrating strong commitment to numerous projects for solving transport problems and, accordingly, reducing the level of CO_2. On this very subject, its engineers have calculated that an 'optimized green wave' or dynamic traffic control could reduce CO_2 from passenger cars in Germany alone by approximately 8% – equal to 7.4 million tonnes of CO_2.

At the same time, the Bavarian car-maker is looking at developing sustainable solutions to help minimize the negative effects of individual transport – not only quickly, but also on a long-term basis – without depriving the individual of their personal mobility. Ultimately, BMW feels the automobile is part of a complex network of different modes of transport, each of which should offer its particular strengths and qualities. Innovative mobility, telematics and navigation solutions should help to improve efficiency in road traffic.

GREATER EFFICIENCY

BMW's EfficientDynamics technologies serve to enhance the environmental standard of its cars. The Auto Start Stop function, for example, is now an indispensable feature of BMW and MINI models, making every stop at the traffic lights an opportunity to save fuel simply by the driver releasing the clutch to switch off the engine. Whenever the engine remains switched off for more than four seconds, the car is able to save energy, in doing so reducing both fuel consumption and emissions.

But how can the driver know how long he will be stopped at the lights? These and other questions are studied by the BMW Group's traffic researchers, who also consider what information from the transport infrastructure might be of interest to the driver and vehicle, and how this information should be transferred into the car.

One possible solution is Car2X communication by WLAN. Another possibility would be to go through traffic control centers gaining, comparing, evaluating and passing on information for greater efficiency. BMW's engineers have been working for a number of years on the exchange of information between vehicles, as well as the exchange of information with traffic infrastructure such as traffic lights. Technology of this kind can help to not only avoid accidents but also to improve the benefits of EfficientDynamics. Using the Auto Start Stop function as an example, once the car receives additional information from the traffic lights specifying how long

the lights will remain on red, it would be able to deactivate the Auto Start Stop function for a very short stop of less than four seconds, while activating Auto Start Stop for a longer stop.

BMW engineers would like to verify these ideas by establishing a test scenario for trying out this principle in practice and gaining further important information. In particular, the optimization of traffic management through traffic lights operating appropriately is believed to offer great potential for saving fuel and time as opposed to driving up to traffic lights and crossing road junctions in a simple non-optimized process. The introduction of 'intelligent' green waves and the efficient use of stopping times when the lights are on red, therefore, offer much potential for greater economy.

Engineers at BMW are also looking to make motoring outside of town more efficient through the provision of traffic data. A good example in this regard is the presentation of speed limits on overhead

> ## "Optimized green wave or dynamic traffic control would reduce CO_2 emissions from passenger cars in Germany alone by 8%"

gantries determined by the traffic control center, which causes the driver to follow the instructions received. Should the driver be traveling on the autobahn at a speed of, for instance, 120km/h (75mph) – but knows that in a few hundred meters the speed limit will be 80km/h (50mph) – he can take his foot off the accelerator and capitalize on the momentum of the car, not providing gas and applying the brakes where unnecessary and therefore slowing down 'gently' to the speed allowed.

Camera systems used for the detection of traffic signs in the BMW 7 Series are already able to retrieve such information today, but only from up close. The idea of traffic management experts is to transmit such information straight to the car by direct connection to the traffic control center. Such speed limit information has indeed already been used successfully in a research project, and now the next step is to compile and integrate the data required.

Another example is road construction work or other traffic obstacles such as

detours, closed roads, and congestion. Again, such information may be provided in good time through central interfaces as traffic data, in doing so ensuring greater efficiency as well as extra safety and in many cases helpful savings of time.

INTER-MODAL ROUTE GUIDANCE

The term 'Inter-Modal Route Guidance' means nothing more than promoting individual mobility by using existing traffic systems networked with one another. This is precisely why BMW seeks to integrate various means of transport and use them in a synergetic process. To ensure that BMW and MINI drivers reach their destinations as quickly as possible, in style, and feeling

directly by car, when parking space at your destination is not sufficient, or if parking would be far more expensive than taking the underground. This enables customers to save time and money, no longer having to look for parking space in town and avoiding any extra and superfluous fuel consumption. This may potentially benefit not only commuters, but also tourists or employees who do not drive into town regularly.

The opposite case is also conceivable. Should a commuter who uses Park & Ride every day hear in good time that short-haul passenger transport is currently unavailable, or is severely delayed, he may change his plans and drive to work by car for a change. To make alternatives to the individual's

Important criteria for or against the combined use of various means of transport – such as the presumable travel time, time saved, cost benefits, the last opportunity to get back to the parking lot, as well as possible delays in the traveler's journey – must be made available to the customer at all times. A further point is that the proposed Park & Ride parking lot must be readily available and easy to find, with the option to conveniently change to another means of transport.

Inter-modal route guidance will first be tested in Munich. As a provider of mobility services, BMW cooperates closely through the BMW Parkinfo Service with the Munich Transport Authority (MVV). After having successfully passed the first test, inter-modal route guidance may then be tested in other densely populated centers the world over.

The technical features for successful implementation of this ambitious project are already in place today. The challenge in the future will be to intelligently network and use the data compiled on traffic conditions and integrate such data into the car.

"The challenge in the future will be to intelligently network and use the data compiled on traffic conditions and integrate it into the car"

relaxed, use of the automobile is connected intelligently to the various providers of public passenger short-haul transport, even taking parking conditions and the availability of parking space into account.

The Park & Ride concept offers a perfect starting point for establishing appropriate traffic networks. Particularly in densely populated areas, it may be more meaningful for the individual to park his car outside of town when driving to the inner city – especially if the underground, bus or light rail will take him to his destination faster and more conveniently. This is the case above all when roads are congested, when it is not possible to reach your destination

car really attractive, a high-performance mobility service must reliably provide the driver with information also outside of his car. The key to the combined use of traffic systems therefore lies, first, in the provision of the latest information on public transport, as well as parking conditions and, second, in the availability and use of mobile terminals. This means that the driver is able to check his best travel itinerary both before setting out and while traveling. Networked with the car's onboard computer and, accordingly, with the navigation system, the driver's terminal will then be able to present the route desired both within the car and outside of the vehicle.

A DATA REVOLUTION?

For a number of years, navigation systems have been able to not only show the way to the driver's destination but also respond to unforeseen events, such as congestion, and suggest alternative routes. This is made possible by providing traffic data via radio on the Traffic Message Channel (TMC).

Large-scale communication of traffic congestion by TMC still works relatively well today, but has now reached the limits to its practical implementation. Having to cater for upcoming traffic information-based travel services, such as inter-modal route guidance offered by BMW, TMC no longer meets these new requirements as the new functions available in the car require not only straightforward traffic data but also a lot more information with relatively large data volume. And as TMC can be received only on FM radio with its limited bandwidth, it is impossible to receive large amounts of data efficiently and quickly.

MORE POWER, MORE FUNCTIONS

The solution to this problem is TPEG (Transportation Protocol Expert Group) – four letters that describe a new international standard for transmitting multimodal traffic and travel information no longer requiring voice communication. The TPEG Automotive Profile (TAP) has been developed as part of the Mobile Info Project for transferring such information to the car. In this project involving various car-makers and providers of traffic services seeking to make full use of traffic information, BMW was the leader, particularly developing this extension of TPEG.

TAP offers much greater bandwidth and is used more efficiently than with other transmission protocols in the past. The special feature of this new transmission mode is that the information transmitted

Practical, clear, up to date

The following example shows how inter-modal travel assistance might help the driver in the future. Leaving from the town of Landshut about 110km north-east of Munich, the driver proceeds to Munich to visit BMW Welt. In the late afternoon he has another meeting right in the middle of the city. But due to a major event downtown, Munich is closed to all private traffic while roadworks on the main road leading into town cause severe traffic congestion with vehicles hardly making any progress and consuming a lot of fuel in stop-and-go traffic.

After the driver has entered the various stopovers on his trip, inter-modal travel assistance presents the route to the first destination and advises the driver to use public transport on his ongoing journey. Once the driver has confirmed this proposal, the navigation system calculates the complete route together with the subway connections required, as well as the remaining distance he still has to cover on foot. It also automatically checks the

occupancy of parking lots in the area and looks for optimum connections with public short-haul transport. The user also receives all relevant information such as the cost of transport, departure times, stations for changing trains, and the last available train back to his car. And as the mobility service constantly receives the latest traffic data, the Travel Assistant also considers possible interferences in a dynamic route planning process and suggests alternatives where required.

In the future, BMW sat-navs will help drivers change to public transport or use Park & Ride whenever the inner city is overcrowded, closed to car traffic, or when there is traffic congestion on the route planned

can be processed better and more efficiently by machines and prepared quickly and easily for use by human beings. Specifically, this means that location references, updates and news management are now becoming much better, faster and – most importantly – more reliable.

Interacting with the development of broadband transmission channels such as Mobile Radio, DAB (Digital Audio Broadcasting) or HD Radio in the USA, TPEG allows the customer to access a very large range of information with utmost convenience from almost everywhere.

MORE DATA, MORE OPTIONS
The TPEG Automotive Profile (TAP) provides the framework for numerous applications and functions. Although TMC used to cover only individual traffic events such as traffic congestion, traffic jams, accidents, closed roads – and was limited in all cases to the motorway or autobahn alone – TAP offers traffic information on federal highways and in the inner city. And because both the location of the vehicle as well as the presentation of a specific place or location have been further optimized, the navigation function has also improved.

TAP also offers useful information such as traffic flow and speed, weather, parking options and the occupancy of parking lots, connections to other means of transport, as well as gas stations and fuel prices. The two characteristic applications, Traffic Event Compact (TEC) and Traffic Flow and Prediction (TFP), already offer a short outlook at what the TPEG Protocol might be able to offer in future.

WHAT'S COMING YOUR WAY?
Traffic Event Compact (TEC) follows the original TMC function and specifies traffic conditions. Similar to TMC, TEC informs the driver of traffic congestion, roadworks and obstructions, but now covers not only the autobahn but also federal highways and the inner city. A further point is that TEC markedly speeds up the transmission of traffic data through TAP and makes the flow of information more reliable.

Theoretically, TEC is also able to transmit traffic flow information, which is important as it shows where traffic is flowing and where it isn't. But as the transmission of such information through TEC requires a lot of bandwidth, implementation of this concept depends on the available infrastructure. In Asia, for instance, sufficient bandwidth is available through DAB, while in Europe the infrastructure for transmitting data has not yet made sufficient progress. This is why the presentation of traffic flow information has been further enhanced in the context of the Traffic Flow and Prediction (TFP) Project.

TRAFFIC FLOW AND PREDICTION
Contrary to TEC, Traffic Flow and Prediction (TFP) allows very efficient encoding and transmission of traffic flow information. The main advantage of this

"Information simply showing where traffic is congested or where parking lots are available and how full they are is good but not sufficient"

information is that road congestion reports as such do not indicate whether traffic has come to a complete halt or whether it is still flowing slowly. Traffic Flow and Prediction, on the other hand, shows that, for instance, traffic is still moving at a speed of, say, 30km/h at a certain point along the route. This indicates the time lost in a traffic jam as opposed to taking an alternative route, as well as which of the two options is best in terms of time and efficiency.

TFP not only collects current traffic flow information but also historical data able to provide good forecasts for the volume of traffic at a certain time and at a certain place. As a result, TFP allows intelligent route planning tailored to the time of day and actual traffic conditions. Clearly, when the driver sets out, what is currently happening at a place he will only reach in one hour is not really relevant. It is far more important to know what conditions will be

like there in one hour in order to plan the best route accordingly.

The first field test with the new TAP transmission protocol and the TFP application was successfully concluded in the USA in November 2008, and showed some positive results. In cooperation with ClearChannel – a provider of traffic information – traffic data was broadcast on HD Radio, the counterpart to the future European DAB format, with the tests proving that the TPEG Automotive Profile and TFP are ready for series development and market introduction. Further test series are currently being conducted in Munich.

CHALLENGES IN REGULAR USE
The technical infrastructure for using the TPEG standard is already in place. What is still missing is the broad foundation of traffic data making all the information required available – simply because the more data that is available, the easier it is to forecast traffic events and conditions.

The process of compiling such data is still in its early phase. Although it is already possible today to measure the flow of traffic and its speed at neuralgic points by means of GPS tracking and autonomous radar detectors running on solar cells, only broadscale or even nationwide surveys will allow valid predictions. With more and more data survey mechanisms being implemented, however, it is fair to assume that the amount of information available will increase greatly in the years to come.

FUTURE SCENARIOS
A point still to be clarified is how the enormous flood of data can be properly handled in future. Information simply showing where traffic is congested or where parking lots are available and how full they are is good but not sufficient. Instead, such information must be efficiently compiled in future, prepared intelligently for further use, and then made available according to specific requirements.

BMW's Inter-Modal Route Guidance Project takes the first step in this direction. TPEG provides the basis for feeding information on traffic congestion, the availability of parking lots, connections to public short-haul transport and other important information into the car, thus giving the driver his optimum route through one single entry. As TPEG allows several transmission routes and modes, a further advantage is that the information required may be provided either by mobile messaging going to the driver's mobile phone or by DAB going to the navigation system. ■
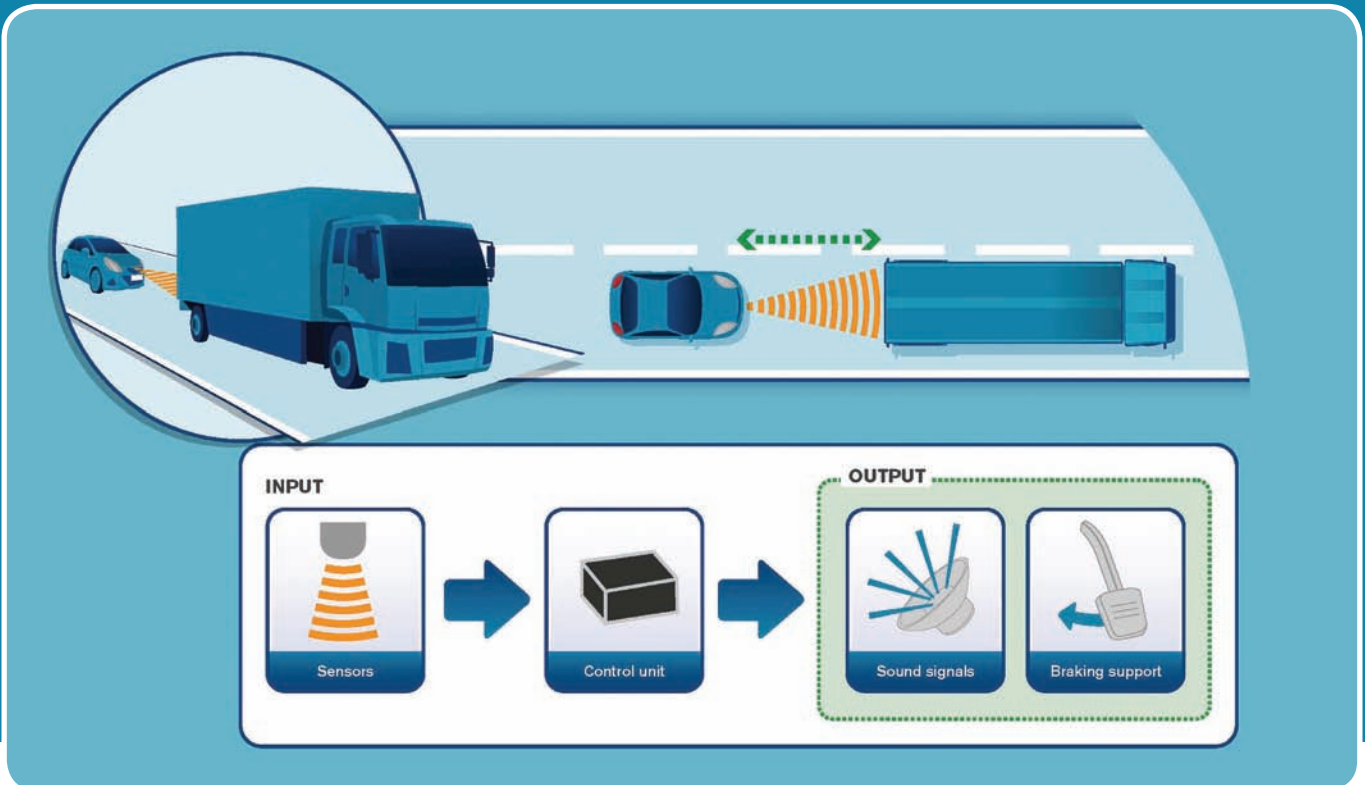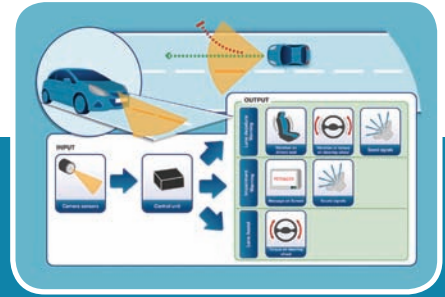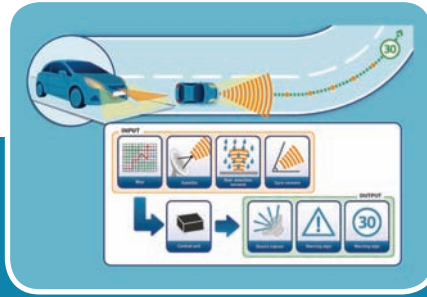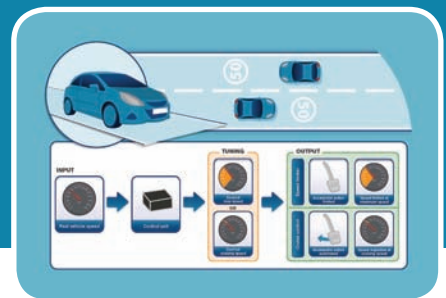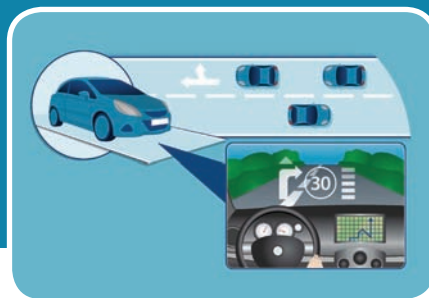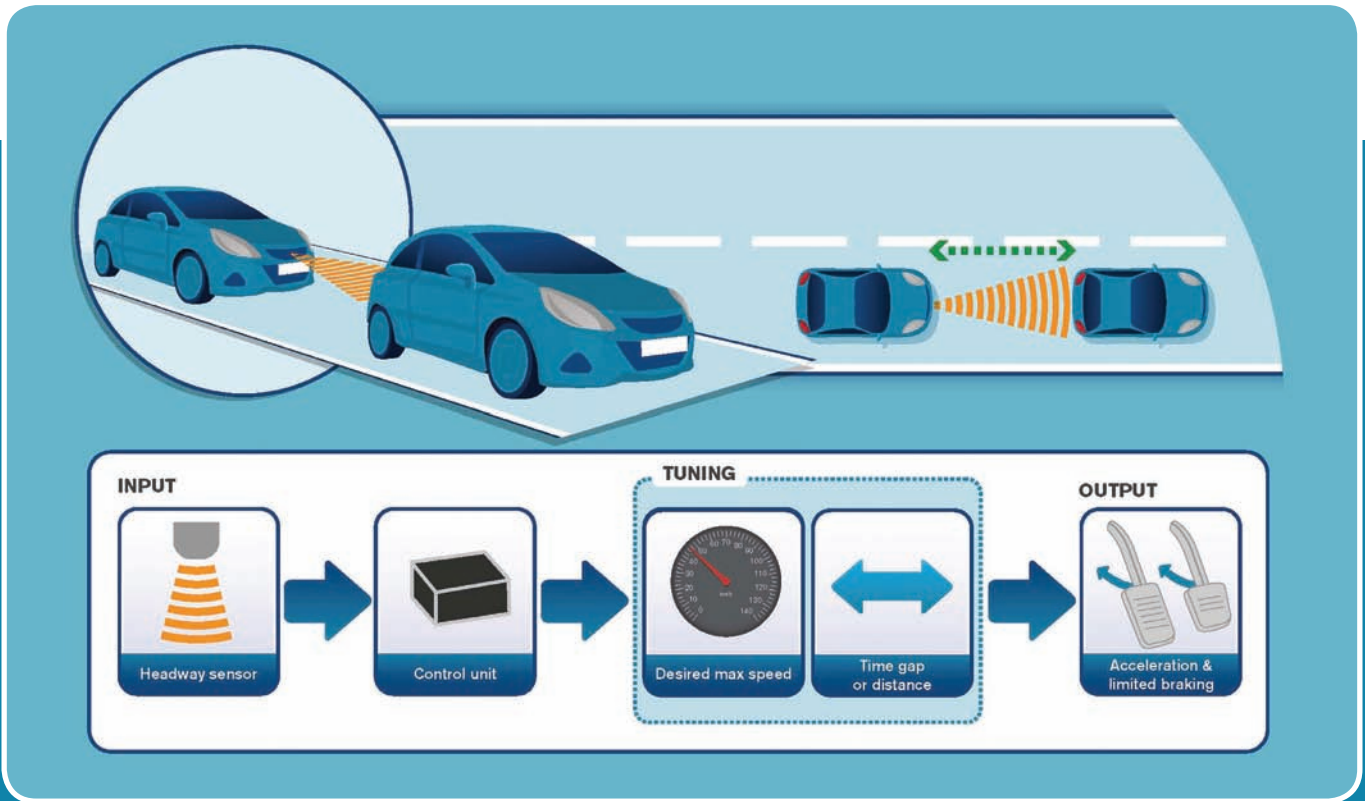
FIELD MARSHALLS

Tested with real drivers on real roads, eight intelligent vehicle systems will be the focus of intense scrutiny, assessed in terms of their impact on safety, efficiency and driver comfort. ERTICO's **Maxime Flament** and Ford's **Aria Etemad** explain the significance of the euroFOT project

All images courtesy of euroFOT

Car and truck fleets are currently getting ready for the first pan-European field operational tests (FOTs) of active in-vehicle safety systems. The euroFOT large-scale project – part of the EC program on Information and Communication Technologies (ICT) for mobility, aimed at improving traffic safety and efficiency – will see over 1,000 equipped vehicles on the roads of Europe in 2010 for a total of 18 million kilometers.

Car manufacturers including Ford, Mercedes-Benz, BMW, Renault, Volvo, Volkswagen, Audi and Fiat/Lancia, as well as truck manufacturers MAN and Volvo, have joined forces with automotive suppliers, universities and research institutes to test near-market advanced driver assistance systems in real traffic conditions.

The test vehicles are equipped with data acquisition systems (DAS), varying from simple CANbus readers to complex video recording units, monitoring drivers' behavior and their short- and long-term

adaptation to the tested technologies. In addition, vehicle and traffic dynamics are analyzed under all traffic conditions with the aim of contributing to future product development. Driver questionnaires and interviews will also feed the study with subjective information to obtain more personal feedback on the systems tested.

In addition to comprehensive technical assessments of active system performance and capability, the trial results will also provide a better understanding of how European drivers handle and interact with their vehicles. Moroever, it will also offer an important opportunity to raise consumer awareness for available safety technologies and their impact on our daily lives.

The eight systems tested include both longitudinal control functions, such as forward collision warning (FCW), adaptive cruise control (ACC) and speed regulation system (SRS), and lateral variants such as blind-spot monitoring (BLIS), lane departure warning (LDW) and impairment warning

(IW). euroFOT will also test more advanced applications, such as Head-up Display (HUD) interactions (safeHMI), fuel efficiency advice (FEA) and new-generation curve speed warning (CSW).

The project was officially launched in May 2008. Since then, preparatory steps have been undertaken, such as setting up data acquisition systems (DAS) and data management centers, specifying further the research questions and their hypotheses for each of the functions, and dealing with the acquisition of the drivers and the vehicles.

EXPERIMENTAL PROCEDURES

As set out in the FOT handbook proposed by FESTA (Field opErational teSt supporT Action), the development of a common methodology is key to the success of euroFOT and is a crucial step for any such test. The first major FOT methodology challenge was the identification, selection and specification of performance indicators describing driving behavior, driver workload
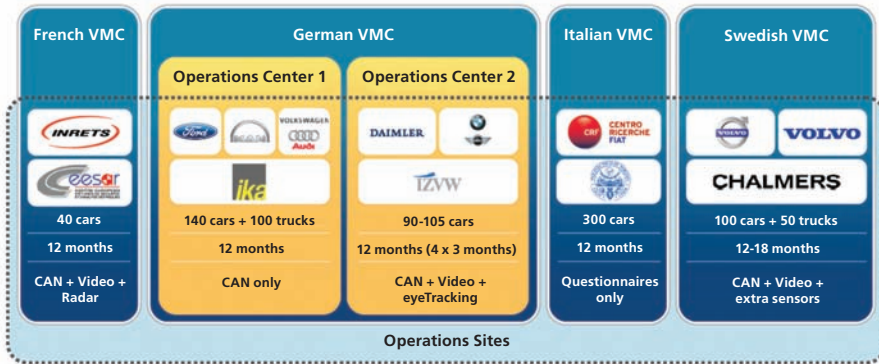
French VMC	German VMC		Italian VMC	Swedish VMC
	Operations Center 1	**Operations Center 2**		
INRETS / eesar	Ford / Audi / ika	DAIMLER / BMW / TZVW	CRF CENTRO RICERCHE FIAT	Volvo / VOLVO / CHALMERS
40 cars	140 cars + 100 trucks	90-105 cars	300 cars	100 cars + 50 trucks
12 months	12 months	12 months (4 x 3 months)	12 months	12-18 months
CAN + Video + Radar	CAN only	CAN + Video + eyeTracking	Questionnaires only	CAN + Video + extra sensors
		Operations Sites		

and acceptability, traffic safety, traffic efficiency, and impact on the environment.

The specification of experimental procedures to be applied represented the second challenge for the methodology. Experts have developed a set of detailed procedures explaining in detail how to investigate the different systems tested. These include a list of measurements, performance indicators, events, and situational variables. All these procedures should help researchers of euroFOT to find comparable answers to the hypotheses that were defined at the inception of the project – the 'research questions'.

THE NEXT STEPS

The first test vehicles – able to collect field test data and to perform the pilot tests – have now been prepared following a similar method across vehicle brands. This is to ensure comparable data collection. Spread out in at least 11 operation sites around Europe, these test vehicles are currently hitting the roads in small fleets. Researchers have conducted a four-month pilot experiment and the 'real' euroFOT data collection began in January 2010. The pilot tests will ensure that data acquisition systems are properly installed, and that

the logged data and management centers run smoothly and gather the essential data needed to answer the research questions. During these pilot tests, euroFOT researchers will also test early data mining techniques, to guarantee the identification of relevant safety incidents among the hundreds of thousands of kilometers driven.

To ensure a proper data analysis for euroFOT, robust and flexible data management solutions are needed. For such a wide scale of field operational tests, the whole chain of data management needs to be established, from data collection and storage to analysis tools. Experts from the consortium carefully defined and developed the best-suited data acquisition

systems (DAS) and data storage solutions for euroFOT. Along with these data management solutions, they also ensure that common analysis tools are used and that the quality of this data is assured.

To provide the right solutions and to determine DAS components, data management partners looked at performance indicators as well as technical and practical constraints due to the differences between all the vehicles to be tested. Indeed, the availability of measurements as well as their accuracy and frequency can vary greatly between car manufacturers.

All of these specifications, procedures, hardware and software implementation were delivered in a common approach. However, each vehicle center tests a different set of safety functions and hypotheses, so there is also a need for different data management solutions. As a whole, data management partners of the project provide a common core, as well as specific solutions for each Vehicle Management Centre (VMC).

All data acquisition systems in euroFOT are connected to the in-vehicle CANbus, providing extensive information about vehicle state. Also, several vehicle centers are using video cameras and extra sensors such as radars, microphones, and others to enable better data mining and analysis.

All the DAS are connected wirelessly using GPRS and UMTS to transmit status reports and CANbus data. On the other hand, full video data will be stored on hard drives and picked up manually by the vehicle center's crews whenever necessary.

In all, the size of the data storage planned will approach 140TB, which will require rigorous data mining and analysis tools using state-of-the-art database engines. In addition to the collected data, an enrichment

FOTs: a common approach

In order to ensure a common approach and comparable results, the euroFOT project is following a common methodology promoted by the European Commission and by numerous European stakeholders – the FESTA methodology. The European network of field operational tests called FOT-Net is making sure this methodology is applied and gathers further recommendations to improve it.

The best way to learn about the FESTA methodology is to read its FOT handbook containing guidelines on how to conduct a field operational test. This handbook was intended to guide the work of field operational test organizers on a general level; each FOT would need to

adapt to its special needs. The handbook walks the reader through the whole process of planning, preparing, executing, analyzing and reporting a field operational test, giving information about aspects that are especially relevant for a study of this magnitude (administrative, logistics, etc).

The FOT-Net project gathers European and international stakeholders in a strategic networking platform to present results of FOTs, identify and discuss common working items and promote a common approach for FOTs. The FOT networking platform aims not only to spread this methodology, but also to further explore the FESTA recommendations, and debate about issues that will need further attention.

tool will add specific environmental and road feature information such as traffic density information, roadworks, legal speed limits and other ADAS horizon features from digital maps (next intersection, road curvature, slope, etc).

At the moment, the use of hardware and software components is limited to the euroFOT partners. However, the knowledge built in this project (the specifications and procedures of the requirements) will be shared with the whole FOT community.

A COMPLEX STRUCTURE
Ensuring that around 1,000 vehicles hit the European roads across 10 vehicle brands grouped in four vehicle management centers, five operation centers, and at least 11 operation sites, is a real challenge. The euroFOT operations are organized in four vehicle management centers in Germany, Sweden, France and Italy. The VMCs play a key role in collecting the data from the vehicles. They provide an operational platform for the entire project where practical details are treated in line with the methodological recommendations

LDW & IW
MAN
Volvo Trucks
Volvo Cars
VW
Fiat
Audi

SCS
CEESAR

BLIS
Volvo Cars

ACC
Ford
MAN
Volvo Trucks
Volvo Cars
VW
Audi

SafeHMI
BMW
Mercedes

CSW
Ford

Around 1,000 vehicles

35	CAN + Video + extra sensors
150	CAN + Video
275	CAN only
460	Data loggers in total

FCW
Ford
MAN
Volvo Trucks
Volvo Cars

FEA
Volvo Trucks

1,500 questionnaires to 300 vehicles with LDW

50+ FEA trucks auto-logging

⬆ **Showing the functions under test within the euroFOT study, ultimately evaluating the overall effectiveness and feasibility of intelligent vehicle systems**

"Ensuring that around 1,000 vehicles hit European roads across 10 vehicle brands grouped in four vehicle management centers, five operation centers, and at least 11 operation sites, is a real challenge"

during FOT preparation and piloting. These VMCs are divided into five operation centers and a series of operation sites. The operations centers are responsible for the acquisition of the vehicles, the purchase and installation of the data acquisition systems, the relations with the drivers and the data quality monitoring. The operation sites address the practical details such as vehicle handling, installation of the DAS, driver interaction, and pick-up of the data. In total, there will be 11 operation sites across Europe.

⬆ **About 100 Volvo V70 and XC70 cars, equipped with cameras and computers, will be involved in the field test in Sweden**

⬅ **The driver's behavior will be monitored in order to gain more knowledge about how we react as human beings in complex traffic situations**

EVALUATION AND ASSESSMENT
The positive effects of ADAS have been shown in various paper studies. The task here is to confirm this with hard facts. Three main results are expected for the data analysis. First, the defined hypotheses will be verified on the effects of the functions. Then the global impacts on safety, traffic efficiency and environment will be analyzed. Finally, the socio-economic costs and benefits of the functions will be compared.
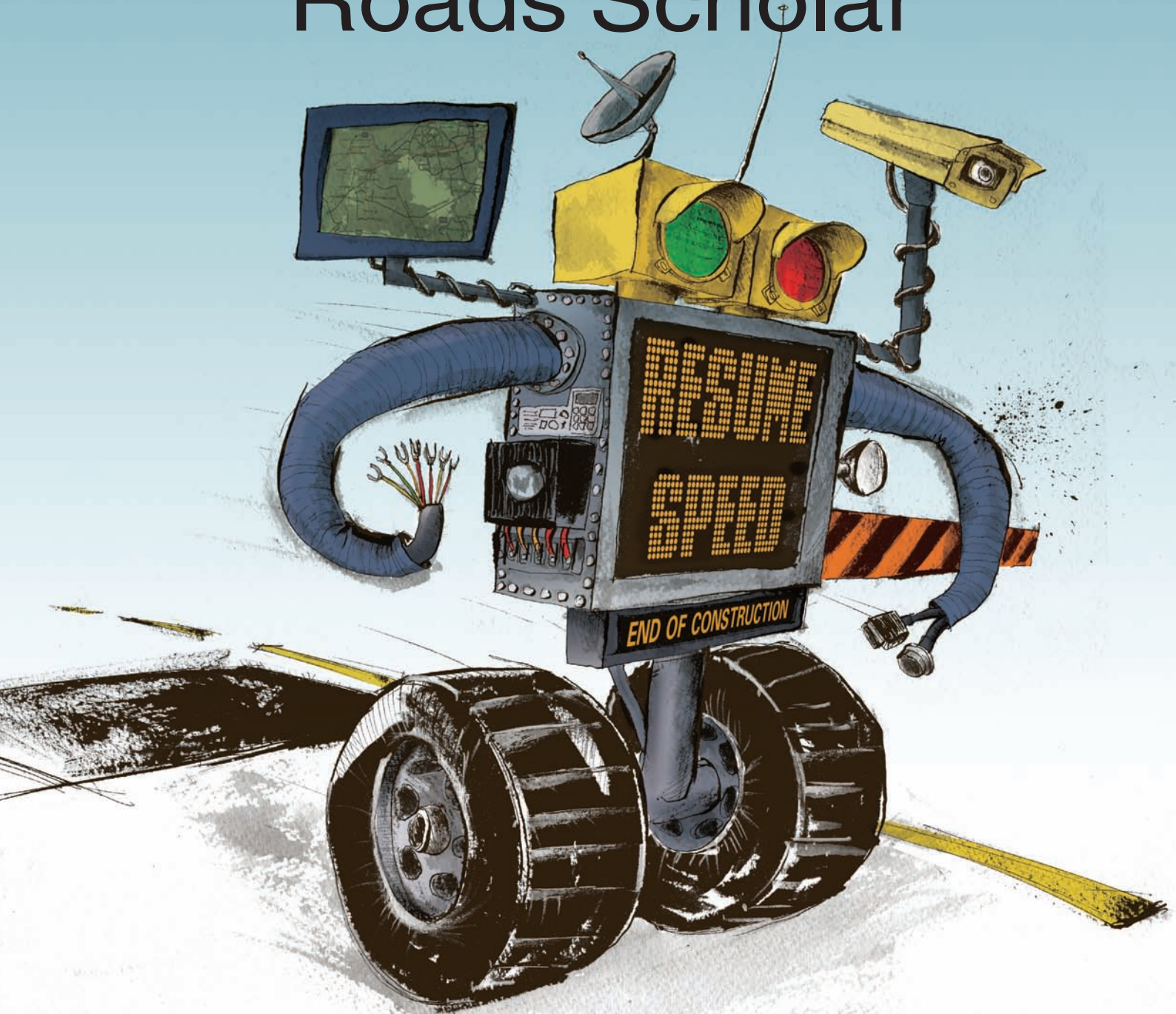
This means that the collected data needs to be carefully analyzed and studied to evaluate the real impact of the functions under test. During the test itself, the incoming data quality will be monitored to provide early warnings if it seems erroneous. As a result of this quality check, researchers will be able to judge if field intervention is needed by the operation site crews.

All user-related aspects concerning driver behavior and performance will be studied such as workload and user acceptance and how these behaviors develop through the tests. The impacts of the selected functions on traffic and driving safety, traffic efficiency and environment will also be identified.

The final results of this field test are expected for 2011. With so many countries, functions, brands and interests combined into this unique project, this is quite possibly one of the most challenging European-wide field operational tests that has been conducted for some time. ◼

[1] For more information about the FESTA and FOT-Net project, log on to www.fot-net.eu. Alternatively, you can contribute to the FOT Wiki: http://wiki.fot-net.eu

pple's Steve Jobs once stated that innovation distinguishes between leaders and followers. That's as true in the field of ITS as it is in IT. For obvious reasons, the traffic sector cannot accept second-best – there's too much at stake. Fortunately for the agencies and authorities involved, second-best is seldom an option; quite the opposite, in fact. This sector is awash with intelligent solutions to transform the mobility experience: smart concepts to smooth the journey from A to B, designed to get you to your destination as safely and efficiently as possible, these days created with the environment very much in mind.

A WINNING MENTALITY
It is these very products that are acknowledged in the Intertraffic Innovation Awards – the winners of which will be announced at the 20th edition of the

Intertraffic Amsterdam show in the Netherlands, taking place at the Amsterdam RAI, March 23-26, 2010. Over 80 products were put forward in 2010, the majority of which had certain qualities that perhaps warranted further mention. However, an international panel of jurors had the unenviable task of whittling down the list to just 17 nominees in six separate categories – Environment, Cooperative Systems, ITS/Traffic Management, Parking, Safety and Infrastructure.

What better way to highlight the smartest ideas the ITS sector has to offer than to showcase the companies handpicked by the Intertraffic judges. Over the following pages, you'll discover that *Traffic Technology International* has caught up with each potential award-winner individually to assess their chances of claiming one of the coveted prizes. And whoever wins, be sure to read it first on www.traffictechnologytoday.com! ∎

A WORLD OF INNOVATION

From parking and PAYD to ATMS and ACC, Intertraffic Amsterdam 2010 boasts the whole ITS industry under one roof. **Louise Smyth** speaks with the cream of the crop – those companies shortlisted for a prestigious Intertraffic Innovation Award

Illustration courtesy of Anna Davie

The runners and riders...

Safe upon reflection

⚠ C-Me-2 is a regular bicycle, the metallic frame of which has been coated with a white paint embedded with highly reflective glass beads. This makes it highly visible at night when lit up by a car's headlamps, particularly in conditions such as rain or fog. In turn, this affords car drivers more time to react and avoid collisions, as well as offering cyclists enhanced safety while pedaling in the traffic. "We were contacted by a young Dutch designer, Afke Huitema, who as a frequent bicycle rider wanted to improve the visibility of bikes at night, by painting the whole metallic frame with reflective particles," explains Pascal Hivert from **Potters**

Europe – the road markings company behind the innovative coating. "Interested by this goal, we supplied high-performance glass beads and supported the project from a technical standpoint.

"Our hopes are firstly to demonstrate the efficiency of our glass beads as retroreflective materials, and secondly that this new tool will improve visibility and safety, and will create a new business opportunity for us."

The painted bicycle will be on show at Intertraffic Amsterdam 2010 and Potters hopes it will give its regular customers an unusual way of seeing how well glass beads can perform. "We have a history of innovation in the glass beads and road safety equipment industry, but this is a new step for us."

www.pottersgroup.com

Fluid idea for speed bumps

⚠ A personal motivation was in part responsible for this innovation, as its creator José Antonio Aguilera from the Spanish company **Badennova** explains further: "I have always hated conventional speed bumps," he says. "They were installed in my road recently and I found myself totally frustrated at having to travel over them several times a day – they're so rigid and unforgiving, even when you are driving below the speed limit. As a result of another invention of mine, my company had already been experimenting with non-Newtonian fluids. That is how I had the idea to develop a speed bump that, due to the properties of non-Newtonian fluids, would harden according to the vehicle's speed."

The result is the Intelligent Speed Bump, a clever product with a simple premise. If you are not speeding you won't be affected by it. Only drivers going too fast for the conditions will feel the jarring impact as they hit the bump. The fluid can also be manufactured to cater for differing speed limits.

"Ever since we presented the prototype at the Trafic Fair in Madrid in October 2009, we have been receiving a lot of positive feedback. To be honest, I was overwhelmed by the response. It motivated me and my team to keep researching and to perfect our product, so much so we are shortly going to be able to launch the Intelligent Speed Bump."

Not bad for a company founded less than a year ago!

www.badennova.com

Enforcing Amsterdam's clean air initiative

♻ Environmental zones to ensure the most polluting vehicles are kept out of urban and city areas are gaining acceptance in the Netherlands, with potential schemes regularly investigated. The environmental zone in Amsterdam is, however, the first such project in which **Gatsometer** has had an involvement.

The zone went live in October 2008 and was initially enforced by a team of wardens. Since September 2009, though, Gatso has been responsible for a fully automated system.

In Amsterdam, goods vehicles with Euro 0 or Euro 1 diesel engines are not permitted to enter the zone, while vehicles with Euro 2 or Euro 3 engines are only allowed in if they have a soot filter. For a system such as this to be successful, drivers and fleet managers of polluting vehicles must understand that if they enter the zone, they will be caught and penalized. As such, the need for highly effective enforcement was paramount.

When Amsterdam City Council put out the tender for the contract, one of the requirements was that the system must record at least 80% of passing vehicles. In response, Gatso devised an ALPR-based system that is not only the first of it kind in the Netherlands, but which surpassed the council's requirements. "Of all vehicles that pass through the zone, 95% of the plates are read by our system," confirms Gatso's project manager, Rob Berkhout. Also impressive is the system's very low error rate. "Out of those 95%, we have a maximum error rate of 0.02%," he adds.

The license plate recognition cameras utilize an innovative loopless trigger radar that projects a virtual loop onto the road. The camera is activated when a vehicle passes over a set position in the 'loop' – designed to be the optimal position from a photographic point of view. "We worked with a partner to develop some sophisticated LPR software," he says. "Once a plate is recognized, the back-office identifies whether or not it is a violating vehicle by searching for it in a database containing all Dutch plates. In case of an offence the image is sent wirelessly to the back office for processing.

"We have had a lot of interest from other authorities also hoping to reap the benefits of such an effective approach toward enforcement and a cleaner environment."

www.gatsometer.com

Magic box of many tricks

Canadian organization **Skymeter** has been nominated for its V5.7 'smart road-use meter' – designed, the company states, to "simultaneously address all forms of automotive mobility-related payments, such as parking, insurance, and tolling in every conceivable scheme".

The GNSS system provides a range of value-added services, such as addressing courier congestion, journey management, carbon metering, and reward schemes to encourage driving at different times, carpooling, or even the use of other modalities, like teleworking.

The in-car component features an internal antenna and battery, all housed in aesthetically designed packaging for mounting on the dash or windshield. Skymeter's Gateway (proxy) that moves pricing information in and out of the vehicle incorporates solutions that reduce costs and provide for privacy, while increasing system flexibility and utility.

Skymeter's newly released V5.7 is already being put to use, as JD Hassan, vice president, Business Development, explains: "We are part of the ARENA EETS-compatible RUC systems trials," he confirms. "We've teamed with NXP to integrate our GNSS-based Time, Distance and Place billing data applications and services with NXP's Automotive Telematics On-board unit Platform (ATOP) chipset. We are also part of the EC-GNSSmeter consortium to integrate GPS/EGNOS/Galileo and EDAS positioning technology. We have even started our first commercial deployment, with the Winnipeg Parking Authority, who are allowing us to manage their parking payments. In fact, they are helping us with detailed parking maps and great deployment ideas. We're managing a growing group of vehicles whose drivers park frequently and happen to get a higher-than-average number of tickets for expired meters. Our system provides a graduated parking scheme so such ticketing is not needed. As soon as this reaches a critical mass, we'll add PAYD insurance and we hope to start a 'green rewards program', such as parking discounts for avoiding peak times and areas. When a government that has permitted GNSS-based parking management is ready for road charging, the system will already be in place!"

www.skymetercorp.com

A finger on the pulse

The Israel-headquartered biometric parking solutions provider **Lidror** has been nominated for its Biopark solution, which is being officially launched at Intertraffic Amsterdam 2010.

Biopark is a portable digital parking permit, equipped with an electronic identification system designed to prevent the abuse/forgery of disabled permits for vehicles. The man behind the idea, Ofer Lidror, explains why the world has been crying out for such a product: "Initially I thought this trend of forging disabled permits was a problem we only had in Israel, but I soon realized it was a global phenomenon. I watched a TV program on the subject in which it was claimed that, technically, nothing could be done to prevent such forgery. However, it was very clear to me that something *should* be done and that the solution had to be electronic, as digital products can't be tampered with easily.

"As we began our research, we also quickly realized how this crime is having a severe impact from an economic standpoint. Cities around the world are losing millions in parking revenues."

With Biopark, each digital permit is coded for its individual user. This authorized person simply carries the small device with them to any vehicle they want to drive and it's activated via fingerprint identification. In parking mode, it features colored LEDs that blink (green for successful operation) yet stop flashing when the car is in motion. Parking attendants use these LEDs to confirm legitimate use; after all, it only operates if authorized users have activated it.

Lidror says the reaction to numerous tests in Tel Aviv has been encouraging: "In terms of operation in live, in-car situations, it's going very smoothly; it's a stable product that's achieving great results."

And what does being nominated for the Innovation Award before the product has even officially launched mean to him? "It shows other people recognize the issue and the need for action," he concludes. "To win would be great, but it's more important to get the message out there and gain a higher profile for our solution to what is a deep-rooted global problem."
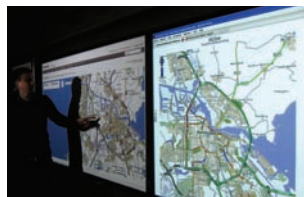
www.lidror.com

Maximizing coverage through wider penetration

After introducing its High Definition Traffic (HDT) product for consumers in 2007, with the launch of HD Flow, **TomTom** is setting its sights on the B2B and B2G markets. The company claims the product consists of "Europe's best available traffic information with the highest available coverage and accuracy in travel time". The traffic feed allows governments and private traffic management companies to better and more efficiently steer traffic across their networks, covering highways and secondary roads. The traffic feed uses the same technology deployed in TomTom's HDT consumer product. Millions of cell phones and GPS devices contribute to the information. Next to TomTom's own sourcing, available sensor data is fused with TomTom fusion logic. The feed is delivered via a standard XML traffic feed in the international Datex II format.

George de Boer explains why TomTom is now targeting the business sector: "We always intended to do it, but until now we were busy rolling out HDT," he says. "Governments are used to traditional roadside infrastructure, which they have been relying on for decades, but then this new approach and terminology, 'cellular floating data', came along. Getting them to see that the tools we can offer for travel times and traffic information are superior to – and more cost-efficient than – deploying roadside systems has required a shift in thinking. "Customers have now bought the product in terms of a license, and it will soon go into production before going live," deBoer says. "Other customers are on the verge of signing agreements to use the data, and their feedback is that HD Flow is indeed a truly great alternative to get traffic information in large areas for a lower price."

www.tomtom.com

STAND 04.410

Beware, intruder about

Those employees conducting maintenance work on highways are inherently vulnerable road users. In the USA alone, up to 1,000 people a year die in workzone accidents, the result primarily of vehicles veering off the highway and driving through the plastic cones. However, a number are caused by maintenance vehicles themselves – at a busy, noisy road workzone, it's hard to hear when a truck is backing up.

To help prevent these scenarios from proving fatal, **Transpo Industries** created the Sonoblaster – an intrusion alarm that is mounted onto workzone barricades or cones to simultaneously warn drivers about their errant vehicles and maintenance crews of the potential danger.

Arthur Dinitz, chairman and CEO of Transpo Industries, describes the phenomenal reaction to the Sonoblaster: "There is definitely a need for such a product and the USDOT's Federal Highway Administration (FHWA) was aware of this," he suggests. "When we announced the development of this simple, economical mechanical device, they were very excited."

The technology behind Sonoblaster is quite simple. When tilted or impacted, an internal weight releases a spring and subsequently a pin into a CO_2 tube, which provides the air to blow the horn. "The FHWA immediately purchased 2,500 units to distribute at no cost to the states – 50 to each state," Dinitz reveals. Distribution of these units is almost complete and Dinitz is already hearing some pleasing reports: "As well as maintenance crews giving feedback on how the Sonoblaster is avoiding nuisance impacts, we've had one documented 'save', which, based on the value the FHWA places on safety products, has paid for every dollar spent on the units and more."

Transpo Industries is receiving interest in this product from a number of other sectors as well as road safety, including oil companies, which have indicated to Dinitz that he would be surprised at how many oil tanks supplying gasoline to gas stations get backed into. "We've also had a large tire manufacturer purchase around 50 units," Dinitz adds. "They have these huge stacks of tires and if a forklift driver is a little careless and hits one of these stacks, you end up with thousands of tires bouncing around the warehouse! I have heard about some very interesting – and comical – applications of the Sonoblaster, but by far the most important thing is that the FHWA feels that it could save hundreds of lives every year."

www.transpo.com

STAND 11.717

The green wave ahead

"Travolution is a joint project involving **Gevas Software**, Audi, the Technische Universität München and the city of Ingolstadt," explains Florian Weichenmeier, head of traffic research and development at Gevas. "The idea was to show how state-of-the-art signal control and car-to-infrastructure communication could improve urban traffic – and in one of the fastest-growing German cities."

The central tenet of the project is the need for sustainable transportation. It takes a realistic approach in acknowledging that there will always be high levels of traffic in urban areas, and focuses on making the most of existing infrastructure and addressing the need for cities to reduce the harmful emissions caused by traffic.

So what role has Gevas played in this project that has led to it being shortlisted for an award? "We developed genetic algorithms, which were used in traffic-adaptive network control for the first time in Germany," Weichenmeier says. "These create the best possible green waves for the entire main road network. Our remit was the implementation of the genetic algorithms and the installation and calibration of the adaptive network control."

Network control via genetic algorithms went live in July 2008, and there is currently an extension to the project underway in Ingolstadt. The scheme goes beyond just optimizing traffic signals; the car-to-infrastructure focus is on something called 'the informed driver system'. An in-vehicle display shows the driver the green wave ahead of him. The aim is to encourage an anticipatory, safe and economical way of driving. These two elements together have enabled Travolution to reduce waiting times at red lights by 21%.

Now that the solution has been proved in the real world, Weichenmeier has high hopes: "The technology could be applied in any other city at any time."

www.gevas.eu

Awards categories

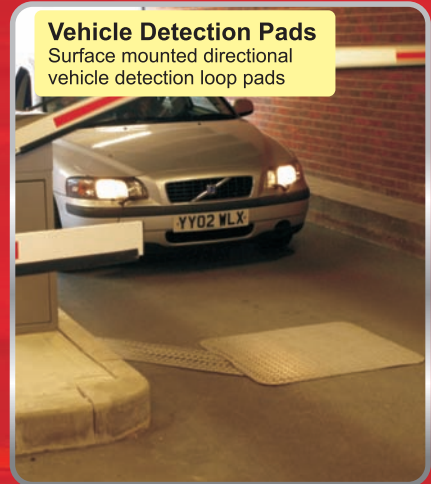|			
!	Safety		ITS/Traffic Management
	Cooperative systems		Environment
P	Parking	A	Infrastructure

Better market penetration

A new approach to generating travel information is being offered by **Trinité Automatisering**, as CEO Frank Ottenhof explains: "BlueTracking uses the Bluetooth signals from in-car devices to provide information about what's happening on the roads.

"We started off with RFID-based technology but not enough cars have this so we researched using Bluetooth as an alternative," he says. "We found out that in the Netherlands, 25% of the cars use Bluetooth car kits – it's becoming the standard in-car kit for cell phones."

As all of these devices are both easily detectable and completely anonymous, it's a great way of gathering traffic data. Trinité hopes BlueTracking will prove to be more cost-effective than using inductive loops, video detection and license plate recognition to provide an accurate picture of what's occurring on the network.

Ottenhof goes on to say that the challenge he faces as

the product joins the market is getting others to see the potential: "We are out of the test stage, we know the system works well, and we are negotiating with people who are interested in conducting field experiments. And that's the determining factor. With such a concept, people need to see it with their own eyes!"

Ottenhof is delighted that BlueTracking has already been nominated for an award, saying that it's especially pleasing that a relatively young company (Trinité was established in 1998) is being acknowledged. "We have a strong history of innovation in software for traffic management," he says. "This represents a reward for all of our hard work over the past 12 years, and it reinforces the fact we are on the right track," he concludes.

www.trinite.nl

Footprint and energy-free

Power-free signage solutions are a growing trend in the ITS market. Traffic managers face problems such as installing message signs in locations that may be far from an electricity supply, while the need to 'go green' is ever-present. Solar-powered signs are both useful and environmentally sound, yet until now not many companies have brought such products to market.

In the past, French company **SES Signalisation** had offered small solar-powered signs but wanted to develop something bigger and more sophisticated. A research agreement was signed with scientific institutions including INES (National Institute for Solar Energy) and CEA (Atomic Energy Board) with the aim of designing the first VMS solution specifically for motorways and main highways that is completely free of energy. The result is Optima – a full-sized

solar-powered VMS that can be installed wherever needed without requiring a nearby electricity supply, while wireless comms mean it does not need to be situated close to the local comms network for operators to set the messages it displays.

Solar panels convert the sun's rays into electrical energy, which is stored in batteries. An electronic system of regulation enables an optimum output according to light levels, so the display functions well, even in poor weather conditions.

The company has been delighted with the response to the Optima, as Audrey Mesmin explains: "We're pleased to be nominated for an Innovation Award as it's acknowledgement of our knowhow in the VMS industry. We are proud to offer a new VMS solution that combines safety on the road with sustainable development."

www.ses-signalisation.com

A smooth operator on the traffic network

"The general idea behind Odysa is that you're attempting to smooth traffic flow by informing drivers about the recommended speed to use," states Arjan Bezemer from **DTV Consultants**. "This is not only to improve individual journeys, but also to keep everybody moving so that exhaust emissions are reduced."

Odysa stands for 'optimalisation through dynamic speed advice' and its ultimate goal is to enable journeys on traffic light-controlled roads to be completed without having to stop once. "A big advantage of the system is that you can create 'green waves' in between intersections that are a long way from each other," Bezemer continues. "These waves ensure that the flow of cars is regulated, keeping vehicles closer together so that the

capacity of an intersection increases as well."

DTV Consultants, Peek Traffic and Technolution launched the Odysa in-car pilot project on a section of the Eindhoven ring road. The aim of the pilot was to provide speed recommendations to road users via in-car equipment – going beyond the efforts in previous

projects that DTV had worked on, which relied on using variable message signs to disseminate information. Wireless communications systems send information to onboard devices (created by Technolution) within the vehicles participating in the project. The partnership between the three companies

began in October 2008, so where are we now? "We're in the middle of testing and have around 125 test subjects driving around, many of whom will have the equipment in their cars for six weeks," Bezemer reveals. "We will then be conducting a survey to find out what the drivers thought of their journeys with the Odysa system."

As well as feedback from drivers, data is being logged to assess their actual journey times and speeds, as well as data on travel times through the whole network in order to quantify the effect that the Odysa system has on traffic in general.

www.dtvconsultants.nl

The laser guidance system

A "Good ideas come from simple things around you," states Roelof Speelman from HOKA Verkeerstechniek, part of the **Royal BAM Group**. "This idea was born from a small experiment with a laser pen and a traffic sign." The idea Speelman refers to resulted from BAM's desire to be able to conduct its roadworks (many of which occur at night) as efficiently as possible. During works, exits and traffic lanes on roads and motorways are closed, which necessitates the covering-up of destinations on traffic signs. This is currently achieved using tape (black tape or yellow magnet strips), which wastes a considerable amount of the time allocated for the road closure.

Speelman had the idea of using a laser projector mounted on a mobile traffic sign to shine a stripe through the destinations, in doing so saving a large amount of time. The system can be regulated and controlled from another location (such as a control room) via specialized software. The laser strength is adjusted when it gets dark – all automatically. In addition to 'covering' the destination from a distance, it is also possible to project a letter, word or arrow. Projections are visible during the day, at night, as well as in different weather conditions.

"We are still in the development phase," Speelman says, in relation to the product's progress. "We (HOKA) will not develop the laser software and lights in-house, but we'll develop the operating system ourselves. We will therefore have our own control room from which we can regulate the total system at a distance."

Speelman is proud to have been nominated for an Intertraffic Innovation Award at this early stage: "As we are still in development, it gives us encouragement that other professionals in the industry believe in our innovation just as we do."
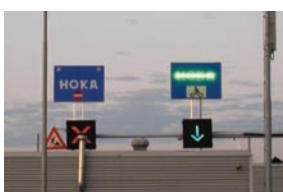
www.bam.nl

Ideal lift for maintenance

A Mark Stacey, **Crown International**'s managing director, explains how his company's latest innovation came to fruition: "A customer identified a problem with existing signs and infrastructure, and asked us to develop a solution."

The issue in question was the high maintenance costs of the fixed poles used for mounting traffic management equipment. In response, Crown devised the VMC – a wind-up/wind-down cantilever pole that can be used for mounting VMS, CCTV, speed-monitoring equipment and other traffic management apparatus.

The VMC eliminates the maintenance costs associated with fixed poles as crews no longer have to bring in manlifts, or close the lane to conduct their work. If a crew is changing a bulb on a message sign, for instance, all they have to do is park up at the side of the road, wind down the VMC to bring the sign down, change the bulb, then wind it back up again.

Although this may sound like a relatively simple idea, it's one that Stacey suggests is a world-first: "It's the first time this has been applied to mounting message signs by the side of highways," he continues. "We're applying for a patent, and we're not aware of any other application of this sort anywhere else in the world."

Crown International has already secured a contract for 30 VMC units to be used in a managed motorway scheme in Wales and the units will start being delivered while Stacey and his team are at Intertraffic Amsterdam 2010.

www.crown-international.co.uk

Parking on the green line

P Greener parking is the theme of this next innovation from **WPS Parking Solutions**. The Park & Recharge solution is an intelligent charging station for multiple electrical cars that can be integrated within an existing parking system. It features smart grid integration to prevent the local power grid from becoming overloaded and can conduct multiple car charging (up to 20 cars per controller unit).

On entering a car park, the electric vehicle is plugged into the charging station and activated with the entry ticket or subscriber tag at the central controller unit. When returning to the car park, the driver pays both his parking fee and the cost for charging his vehicle at the car park's paystation. After payment/disconnection, charging stops automatically.

The system can be used alongside a dynamic car park guidance system to reserve places for electric vehicles, while charging status and car location can be displayed at the paystation itself.

Pascal Appel from WPS explains the thinking behind this new solution: "We were looking at options to offer parking operators more service for their customers. We saw a movement toward greener transportation in the Netherlands and noticed that this was something we could become involved with."

Appel says that the first Park & Recharge units are now being built and that WPS has received an immense amount of interest from various governments and local authorities. "It has been overwhelming – we've had requests from all over the world. We realized a few years ago that parking alone is not enough and that we had to broaden our scope. The positive response we've had – which includes being shortlisted for this award – is confirmation that we're moving in the right direction."

www.wps-group.com

Joy of flow...

As one of the strongest brands in the ITS industry, we offer, as part of our "Joy of Flow" solutions, the latest environmentally-friendly products and services utilising the latest technology for an increasingly energy-efficient world...

Managed for the future

Open Traffic Systems' project manager Clint Burnette recalls the aim his team had in mind when they started work on their Open Parking System: "We wanted a global solution for parking management," he says. Given that the system is now shortlisted for an award, is it safe to say this aim was met? "Absolutely. It's not just a parking meter, but a complete parking management system. We handle the parking and the spaces, we do enforcement, bicycle rental, recharging of EVs, cellphone payments, and more. It handles pretty much all the aspects of a modern day city," he says.

At the heart of the OPS is the SAIPE parking meter – a futuristic unit that can be equipped with EV charging points and a bicycle locking system for drivers looking to easily switch modes for part of their journeys. The system also manages parking spaces, in doing so cutting the time it takes for a driver to find a spot and therefore reducing the congestion and emissions generated by people hunting for spaces.

Designing a system that recognizes parking as just one part of a city's transportation jigsaw is a very smart approach and one that is already paying off: "We launched the system in September 2009 and we've actually done our first installation of an integrated bicycle rental system and have received incredible amounts of positive feedback about our green solutions, particularly from countries where there is a great deal of bicycle use."

The other interesting element is the amount of work that's being conducted in-house, as Burnette explains: "We do all the development here in Spain – from the hardware itself (and even the chipboards) through to the software. We're not just a company that puts other company's solutions together – they're all ours."

Burnette is pleased to be nominated for an Award for the second year in a row: "It's important to us as we're a small company competing with a lot of large companies. It's good to see that original ideas are valued."

www.opentraffic.net

A meeting of minds

Moises Barea from **Circontrol** suggests it was a combination of historical experience mixed with modern technologies that led to the development of a new system for recharging electric vehicles: "Our parent company has a 35-year history in the energy efficiency systems arena, while Circontrol has a lot of RFID knowledge," he says. "Two years ago we started to develop a solution that blended our expertise, creating a vehicle recharging system." Controlling how to charge a fee for the electricity is where the RFID comes in. Customers using CirCarLife have prepaid RFID cards that get connected to the charging station.

CirCarLife is designed to provide intelligent electric vehicle recharge management with a standard charging method (230Vac-16A) and fast charging method (400Vac-63A). Recharging can be achieved in car parks with recharging boxes and on-street with bollards. It has a built-in anti-theft system so energy cannot be stolen by simply moving the charging cable from one car to another.

"We have a system connected to a software network that is able to manage and meter the energy to be provided," Barea continues. "This monitors the network and balances the electricity to all the cars that are connected."

CirCarLife officially launched in September 2009 and two associated product lines are being marketed to two different sectors – energy suppliers and car parks. The company is meanwhile already delivering charging points to a number of countries and Barea has received positive feedback from these customers, who, he claims, are "now taking our system as standard".

www.circontrol.com

Get the measure of road markings performance

The maintenance of road markings has long been a complex issue. Even as marking materials themselves have evolved to become more durable, they undergo a great deal of continual punishment and as such have a limited performance lifetime. Checking the condition of markings has involved placing handheld instruments on the road itself – not the most convenient (or safe) of tasks to conduct, even on a quiet road.

To make the surveying of markings safer and quicker, some authorities have ruled against using handheld equipment, opting instead to use heavy protection vehicles with truck-mounted attenuators. But such vehicles are still a slow way of assessing markings and the costs associated with the safety element mean that they aren't cheap either. They can also only do so much, with many test parameters (such as wet retroreflectivity) still requiring manual instruments.

Swedish firm **Ramboll** has come up with a new approach. The Road Marking Tester (RMT) performs mobile measurements of data and in one run can calculate parameters including retroreflection in the dry and wet, luminance coefficient, friction, and thickness. "It reduces manpower and makes big improvements in terms of safety and the need to disrupt traffic," says Ramboll's Roger Moller. "The measurement also becomes more efficient, which means you can cover more kilometers in less time. We can travel in the same lane at the same speed as regular traffic, so there is no disruption to the network."

The RMT was brought to market in July 2009 and has received a very warm response, with the only challenge being to get people to see for themselves the results that can be achieved. "People get so used to doing things the old-fashioned way," Moller feels. "In many people's eyes, the RMT is too good to be true!"

www.ramboll.com

HAVING REDUCED FATALITIES BY 75% SINCE 1972, THE NETHERLANDS IS REGARDED AS A LEADING LIGHT IN ROAD SAFETY. CONSEQUENTLY, SWOV'S **FRED WEGMAN** SPENDS MUCH OF HIS TIME ENSURING OTHER COUNTRIES ARE BETTER POSITIONED TO FOLLOW SUIT

Interviewed by Nick Bradley

The English philosopher and scientist Sir Francis Bacon once said: "Knowledge is power – but only if you know how to acquire it." Some 400 years later, the words have some resonance with SWOV's Fred Wegman. Working in the field of traffic safety since 1975, initially as a traffic engineer in Amsterdam, Wegman joined the Dutch Institute for Road Safety Research in 1977. Ever since, he has used knowledge as a tool to save lives and reduce injury on the roads.

The Institute advises the Dutch Ministry of Transport about traffic safety issues and receives around 75% of its funding from the government. SWOV's managing director is, however, keen to stress that it remains impartial, despite this financial support. "We can say what we like. We can go to the press, to parliament, all of our reports are published, and nobody can prevent them from being published," he says. Based on the evidence, though, it would seem that SWOV's advice is not to be ignored. "If you go back to 1972, we had around 3,300 road deaths in the Netherlands. In 2008, we reduced that to 750 – a reduction of 75%. I would say quite a lot of the improvements have been down to SWOV. We're not claiming all the credit, but many of our road safety policies have delivered results."

SUSTAINABLE SAFETY

Wegman points to SWOV's recent Sustainable Safety strategy, a report about which, *Ten Years of Sustainable Safety*, was published in November 2009. To all intents and purposes, Sustainable Safety is the Dutch variant of the Safe System approach and somewhat similar to Sweden's Vision Zero. "Sustainable Safety is not only related to the biomechanics of crashes," Wegman notes. "We have a more behavioral point of view." Following its adoption between 1998 and 2007, the number of fatalities in the Netherlands decreased by an average of 5% a year. The measures implemented – including construction of 30 and 60km/h roads and the addition of roundabouts – resulted in a decrease of around 300-400 traffic deaths (more than 30%), with benefits reportedly outweighing costs by four to one.

Although Wegman can look back with a sense of satisfaction, going forward he sees the challenge as being far more complex.

The major breakthroughs in reducing the death toll in the Netherlands from its 1972 level revolved around alcohol, speed and seatbelt legislation. "That maybe got us to the 1,500 mark, and then down to 1,200," he reveals. "In the past 10-15 years, though, there has been a stronger focus on engineering, with advances in vehicle safety enabling us to halve it once again."

Recently installed as Professor of Traffic Safety at the University of Delft, Wegman predicts the nature of the problems relating to alcohol, speed and seatbelt usage will be altogether different in the future, however. "In the Netherlands, fewer than 1% of the kilometers driven have alcohol involved. On the one hand this means we have been successful in hammering home the point to almost everybody that combining drinking with driving is not acceptable." But how do you address that remaining 1%? "It's much more to do with alcoholism – it's a wider societal issue," he feels. "Dutch police are finding that of the drivers they catch over the limit, they are double the limit and more, with very high concentrations of blood-alcohol content. It's a completely different problem and requires an entirely new solution."

The scenario is similar with seatbelt usage, as Wegman details further. "We have reached a stage where 95% of drivers are safely strapped in, but to get that remaining 5% to belt up will require new thinking," he says. "I believe we need to embrace a new era of interventions and I am very vocal about introducing seatbelt locks, alcolocks, and so on. I don't think we're yet at a stage where society will accept them, but I admire any country that has the guts to implement such programs, for instance in Canada, where repeat offenders are required to enrol on alcolock programs."

But, Wegman asks, why stop at repeat offenders? Why not have alcolocks in all cars? "The answer, of course, is that it's inefficient to target 100% of drivers to find just 1% of the offenders," he says. "The Swedes plan to introduce an alcolock program, but that has nothing to do with offenders – it's to do with Swedish cars. You need a lot of public support to do that, but it might be a solution to that remaining 1%."

EXPERT ADVICE
As a renowned expert in the field, Wegman is often invited to speak at traffic safety conferences, and he logs many thousands of miles a year sharing his knowledge in other countries. "I am impressed with the random breath testing strategy in Australia, although I must admit it seems counterintuitive to do it in this random way," he says.

In New South Wales, random breath testing was introduced in 1982, with 200 police officers specially recruited for the job. In the first year, they conducted one million tests, and road deaths were immediately reduced by 90%, stabilizing at a rate approximately 22% lower than the average

for the previous six years. Meanwhile, the decline in alcohol-related fatalities relative to the previous three years stabilized at 36% – an even greater drop than for total road fatalities. "They have recently started random drug testing in Australia as well, although I am yet to see any scientific evidence about the effectiveness of this particular approach," Wegman says.

The 61-year-old safety authority also thinks the achievements in Spain, Portugal and Ireland deserve highlighting. "Much of their successes in reducing road deaths have centered around infrastructure

> "I do not like to hear people say that this is the system we inherited from previous generations, so it's just the way it is. You should never accept the system as it is"

improvements," he says, "where there has been enormous investment in building high-performance roads, such as motorways.

"In Ireland, where I have conducted some work in the past few years, much of the country is now linked with motorways, whereas 10 years ago you would have had to have driven on rural roads from village to village to get from one side of the country to the other. Now they are making inroads into reducing traffic fatalities, there is a culture of road safety developing as a result." Wegman also reserves credit for the many motivated and educated traffic safety professionals in the UK, as well as acknowledging that the systematic cooperation between the national Department for Transport and the local- and regional-level authorities is a laudable model.

SAFE SYSTEM APPROACH
"You should never accept the system as it is," he insists. "I do not like to hear people say that this is the system we inherited from previous generations, so it's just the way it is. You have to try to make it fundamentally safer than it is today – and that's the point of Sustainable Safety; it's about sustainable development and making sure that we leave our children and grandchildren a system without flaws." Ultimately, in Wegman's opinion, the rulebook is there to be rewritten. "Take rural roads, for example. If you were designing a system from scratch you would never have such roads – if two cars traveling at 80km/h have a frontal crash, the chances are both drivers will die. Why do we have these types of roads? It's a similar situation with cyclists. If a car hits a

cyclist at 50km/h, the chances are the cyclist will be killed. You should ideally segregate both modes, which is why we have many cycle tracks in the Netherlands. But if you aren't able to do this, you must reduce the speed of the vehicle to 30km/h, at which point the cyclist has a better chance of survival. Failing that, why not make them more visible to one another? These are fundamental changes to how we would like to see the system functioning as a whole."

With his scientific hat on, Wegman suggests the danger of traffic lies in speed, the differences in mass between road users, and the physical vulnerability of human beings. "Road safety is all about getting rid of the kinetic energy generated by speed and mass," he says. "With biomechanics, we can better 'organize' a crash – i.e. manage the speed and mass to protect the human body, and so minimize the risk of severe injuries or fatalities. This is why I am in favor of roundabouts – it's hard to kill yourself on a roundabout because you have to reduce your speed," he says.

THE APPLIANCE OF SCIENCE
One of the many things to admire about Wegman and his scientific approach is that it engenders a forthright attitude that is perhaps needed when dealing with the subject of road safety. He demonstrated this as much at the launch of the *Second Report of the Commission for Global Road Safety* in Rome in 2009, at which he questioned the "overambitious" targets in halving the number of road deaths globally by 2020.

"I am in favor of ambitious targets," he maintains, "but these targets have to be realistic as well. If you have targets that cannot be met, they can act as demotivators for society. We knew in Europe when we set the 50% target that it was impossible, and I wrote to the European Commission telling them as much. Maybe 30% in 10 years' time – in this part of the world perhaps – but 50% globally? It's not realistic."

The Dutchman notes with interest that the FIA Foundation has recently revised the target – it's now a 50% reduction in the number of people killed compared to the number that would have been killed had nothing been done at all. "This is achieveable," he asserts. "I am always happier when 'ambitious' and 'realistic' are used in the same breath."

Such an approach has guided Wegman over the course of the past 30 years, and it's one he hopes will live on in the Netherlands long after he has retired. "I hope when that time comes that road safety is still a priority. Politically we don't need it to be a top priority – we can still do our jobs just as well – but I just hope we are still continuing to make improvements. We had 750 traffic fatalities here in 2008. In 10 years' time, I would like that to be 500, and in 20 years' time maybe 250. If I see signals that we are reaching those goals, I will be very satisfied. We haven't reached the finish line yet." ∎

ENHANCED INTELLIGENCE FROM THE MACHINE VISION SECTOR WILL, PATRICK GAILER PREDICTS, ALLOW SOME ITS APPLICATIONS TO DO MUCH MORE IN THE FUTURE

Interviewed by Kate Dury

Although an electronics engineer by trade, Patrick Gailer has spent the past 10 years working in project management. Today he heads up business development at Stemmer Imaging, a Germany-based company known in the main as a distributor of machine vision products. Gailer is, however, keen to highlight that Stemmer does far more than merely sell other company's products.

"We have been involved in traffic applications for several years; it's not a new thing for us," he says. "But where we used to only supply components – cameras, lenses, lighting, etc – we've recently been focusing on integrating our own software package that we already had for machine vision, and making it more useful for traffic. We're not offering a complete, finished product but more of a technology tool that integrators can use to develop their own products.

"The idea is to give the cameras that are already being used in a number of applications – ETC and speed enforcement, for instance – more functionality," Gailer adds. These cameras are already high-end, with comparatively high price tags, so any way of bringing added-value features to them is going to be attractive to those people tasked with investing in such systems.

As the 36-year-old Gailer explains, ALPR is the perfect arena for such added value. "Take an access control application. The cameras are used only to get an image of a vehicle that is trespassing, and the vehicle's license plate information is then extracted from the image. Yet in that image there is far more information than just the license plate data. At a very basic level, the image shows you that a vehicle is present. So if you can have software to detect vehicles incorporated into the camera, you don't then need any other type of sensor to detect vehicle presence. With regard to getting increased value from an image once it's captured, the machine vision industry has the tools to extract more information from an image. Without bringing machine vision expertise to the traffic market, we would not be able to move beyond simple plate recognition."

RECOGNIZE THIS
This idea of using ALPR applications to do more than just recognize plates (speed detection, for instance) is a trend within the traffic market, and one that Stemmer is only too keen to respond to. "We have our own optical recognition tools (based on our 30-year history in industrial imaging) ready to recognize much more information. Our Common Vision Blox (CVB) is a library of different software tools for extracting information from an image [see sidebar]. It doesn't have to be a camera image either; it can come from a radar or any other image-providing source. The market is looking for information beyond ALPR and we provide a technology to help people achieve that."

As well as diversifying the range of tasks performed by ALPR, improving recognition accuracy is a focus of much attention within Stemmer's R&D department. By their nature, object recognition tools are trainable, and the resources required to train the software about what to search for are not insignificant – hence the reason that Stemmer looks for industry partners that have the time and financial resources to assist on this front.

"The market is looking for information beyond ALPR and we provide a technology to help people do that"

One ongoing collaborative project centers around improving recognition rates at night: "We can currently recognize vehicles up to 99% of the time during the day and in all weather conditions. We hope this project will eventually yield similar results for detection of license plates at night."

Stemmer also collaborates with a number of its tolling and enforcement clients on feasibility studies for various detection applications. There are two main themes to these studies: one is detecting vehicle type (e.g. car, bus, van, etc) and the other involves make and model recognition. "The vehicle type detection work is for applications such as bus lane enforcement and tolling or speed enforcement on roads where trucks are restricted to a lower speed than cars," Gailer says. "We conducted a feasibility study with Transport for London a few years ago in bus, taxi, lorry and van detection for the congestion charging zone. The make and model recognition, meanwhile, is aimed more at tasks such as red light enforcement."

The interesting aspect of such work is what it could potentially lead to in the future. For many enforcement applications, several sensor technologies are used for detection: you could have an inductive loop in the road to detect the vehicle itself, a second sensor to detect vehicle type, and a third (the camera) that creates the image from which license plate information can be extracted. In a few years' time, though, could there be a camera that automatically looks for vehicles, detects the type and extracts the license plate data? "That's the dream, yes," Gailer confirms. "We have the technology ready to do this but we will have to work with suppliers in the traffic market to develop such a product. We're a partner that's capable of offering these kinds of solutions to companies that already develop products for the traffic industry."

Indeed, Stemmer has been working with a number of these suppliers for some time already, and counts among its customers many of the big tolling and enforcement players, including Jenoptik Robot, Sagem Sécurité, RedSpeed, Kapsch and Efkon.

The automatic reading of roadsigns is another interesting area of research for Gailer. A big problem with such systems is that the appearance of roadsigns can be affected by the weather. "CVB Manto, one of the tools within our CVB system, can provide a solution," he suggests. "Trials have shown that image-processing systems based on CVB Manto can reliably recognize roadsigns that have been 'learned'. Speed limit recognition systems are already available on some cars, but could eventually be available on all cars. Drivers might also receive warnings that they are intending to drive the wrong way down a one-way street. Other possibilities include pedestrian and cyclist detection, safe distance, identifying lane markings, and so on."

Ultimately, Gailer is not content with simply maintaining Stemmer's already impressive traffic portfolio; he has big plans to drive business forward: "We already stand as a leader in machine vision on the factory floor. In time, I hope we can replicate that success in outdoor applications and become one of the biggest providers of technology into the ITS and traffic markets." ∎

Recognition process

One of the tools in Common Vision Blox, CVB Manto, is ideal for real-time recognition of vehicle types. It uses correlation, geometrical connections, texture and color as techniques for identification. A nonlinear multi-resolution filter independently transforms the picture, determines the relevant features of an object, and enters them in a feature vector. "A neural network then separates the object classes on the basis of these features. The neural technology is known as a Support Vector Machine (SVM), which works by creating a decision surface with optimal generalization ability." In layman's terms, this is the ability to recognize objects not contained in the training set. Essentially the system learns the patterns of interest from a set of training images and calculates a confidence factor for its classification choice for each test image. For traditional neural networks, there is a finite number of training images that the system can deal with – known as 'overfitting'. "When this point is reached, the effort to separate classes becomes too difficult and error rate saturation occurs. The SVM approach does not suffer from this," Gailer says. "So CVB Manto has the ability to classify objects with an accuracy previously unavailable."

MICHIGAN DOT IS CENTRAL TO THE INTELLIDRIVE PROGRAM, SPEARHEADING THE FIELD TRIALS TO DEMONSTRATE HOW IT CAN ALLEVIATE CONGESTION AND ENHANCE TRAFFIC SAFETY. GREG KRUEGER REVEALS MORE

Interviewed by Louise Smyth/Photography by Lex Kembery

Many US transportation professionals begin their careers in reasonably hands-on roles within departments of transportation, yet wind up moving over to the private sector to take jobs a little further back from the coalface. Greg Krueger has done exactly the opposite. Not one to opt for an easy life, he left a role at one of the big consultants to become a traffic and safety engineer for Michigan's metro region, immersing himself in the day-to-day management of the traffic operations center in Detroit. Today, he remains with Michigan DOT (MDOT) and is currently responsible for managing its entire ITS program.

A large part of Krueger's remit is to drive forward development within Michigan's IntelliDrive program, something about which he is incredibly passionate. It makes perfect sense to locate IntelliDrive testing efforts around the auto industry in Detroit – Krueger freely admits there are "selfish economic development reasons" for ensuring that the necessary expertise

stays within Michigan and doesn't relocate to another state. He is, however, keen to stress that MDOT is not only part of the IntelliDrive movement as a result of favorable geography; it has long been regarded as one of the more progressive DOTs: "We have been leading the pack for technological advancement for traffic management operations," Krueger explains. "We introduced a proper traffic operations center way back in the 1950s, and we were one of the first states to embrace ramp metering. IntelliDrive is just the next step and is something we've been talking about for a long time, just waiting for the technology to materialize."

LONG TIME COMING…

A recurring theme when talking with Krueger – and one that he says people may be "sick of hearing" from him – is the continual sense of frustration that all things IntelliDrive are just not happening fast enough. He regards the USDOT's five-year plan (2009-2014) as "not sufficiently

aggressive", further stating that it should have been a two-year plan due to the time that it takes after approval to actually get technologies deployed. His stance here is unrelenting: "It really does need to move faster. I don't know if it will but it needs to, otherwise people will start to lose faith that it will ever happen."

Perhaps this explains why Krueger is so enthusiastic about one recent sign that the time for talking may finally have been superseded by the time for action. "Our big thing right now is that we're in the process of developing a test facility on Telegraph Road, which will be a five-mile stretch of signalized urban highway with around 24 traffic signals. This will be the first test deployment of its kind on a major signalized urban corridor," the excited 39 year old explains.

The Michigan Test Bed is very well known in IntelliDrive circles for testing multiple technologies with multiple participants, and the ITS community will be watching developments on Telegraph

broadcast information, Siemens Eagle traffic controllers (modified by the company for this project) will broadcast signal phase and timing information, and then a number of car-makers will be involved with testing in-vehicle equipment for developing safety systems. Testing on Telegraph Road is scheduled to begin later in the year.

SAFER FOR EVERYONE

There is a whole consortium of automotive OEMs participating in IntelliDrive testing – including Ford, Nissan, Toyota and GM – spanning the whole range from the high-

> "It will redefine surface transportation over the next 20 years, but we need to do the research now or continue to lose 40,000 people a year on our country's roads"

end premium models down. It's refreshing – and unusual – to observe technological development that doesn't only take in the expensive end of the market. So why is IntelliDrive so inclusive? "Because your ability to arrive safely at your destination should not be affected by your ability to afford a high-end car," Krueger states. "Also, part of the beauty of IntelliDrive – and the appeal to OEMs – is the potential to make vast improvements for significantly less money than any safety or anti-crash feature that's available today." Not just more democratic then, but cheaper – the appeal for cash-strapped car-makers is obvious!

The spirit of cooperation that will determine the ultimate successes of IntelliDrive only goes so far, however. The fine line between sharing knowledge and giving away company secrets has made itself gradually more known in Michigan, leading to a remarkably innovative solution: "We're working with the local NASCAR track to set up their facility as a neutral test site. Later this year we'll be deploying a traffic signal at their facility to allow testing and deployment of active safety features and multiple manufacturer testing – for instance, getting a GM and a Ford vehicle to talk to one another and keep them from crashing at an intersection. You don't want to do those first tests at a live intersection; you want a quiet place. But you couldn't use GM's test facility as they'd have to close it down and allow Ford guys on, so this provides a neutral – and huge – ground for a lot of those tests to take place."

Smart ideas such as this are all well and good, but there is one element of the

whole IntelliDrive movement that looks set to remain a challenge long into the future. "Funding is always going to be an obstacle we have to overcome for deployment," Krueger acknowledges. "There's no question that we have to figure out how to pay for this. Obviously the more funding you have, the more you can develop. But we've been in a challenging state for the past couple of years as the program shifted from VII to IntelliDrive. As we start to adapt and embrace other technologies for communicating to and from a vehicle, we need to embrace the private sector more than just the government.

"Cell phone providers and the like have got a major role to play in this that many of us have seen for the past five years or so. However, the group of people that was in charge when this all first started didn't recognize that. So we've had to shift focus and that's been a bigger time lag than funding issues, but I think now that the program focus has changed to open up and allow for that, we're going to see the research and development really accelerate over the next two to three years."

As much as Krueger's optimism is representative of the momentum behind the newer framework (VII to IntelliDrive was far more than just a name change), when it comes to Michigan itself, the need for improvements – and soon – is becoming ever more apparent. "We have one person die on our roads every eight hours, and that is simply unacceptable," he says. "Once it's fully deployed, IntelliDrive will be the first real tool that can eliminate crashes and alleviate congestion. It will redefine surface transportation over the next 20 years, but we need to do the research now or continue to lose 40,000 people a year on our country's roads."

It's apparent that whatever the ultimate destiny of IntelliDrive, it'll take time for new technologies and infrastructure to be deployed and for the domestic fleet of vehicles to get anywhere close to becoming autonomous cocoons of safety. But, in the shorter term, what does Krueger realistically think we can achieve? How will a typical Michigan highway look in 10 years' time?

"I think that if you were to look at it overhead from an aircraft, you might not notice anything different, but in your day-to-day driving, you'll start to see some really big differences," he predicts. "You'll start to see devices appearing in cars that are preventing crashes, that are platooning flow more smoothly than it is today, using curve speed warning systems and the like. You'll see third-party tools such as NAVTEQ, TomTom and Garmin in-vehicle devices start to integrate a lot more traveler information – a great deal more than just how to get from A to B; but how to get there safely. These kinds of things are starting to hit the market in bits and pieces right now. But in 10 years' time they will be the norm in every vehicle on our roads." ■

Road closely. Previous traffic signal testing utilizing IntelliDrive technologies has been at just one or two intersections, whereas this deployment will be on a densely spaced arterial with very high traffic volumes, as Krueger explains in more detail. "The intent is to begin the development process with our partners on applications for traveler information and safety that are associated with receiving information about the traffic signal status – when the next phase is and so on. It's a realistic deployment. We can deploy IntelliDrive on a signalized corridor very quickly – we have electrical power, we have traffic signal poles upon which to place the antennae, so we have the ability to deploy quickly, as opposed to stretches of urban freeway where there may be a number of technical challenges." Of course, signalized corridors and intersections are also where the most crashes occur, so it makes perfect sense to tackle them sooner.

In terms of the specific technologies being tested, dedicated short-range communication (DSRC) will be used to

Walk on the safe side

This new CMOS-based 3D detection system not only ensures better safety for pedestrians at intersections and crossings, but because it manages and controls traffic lights more intelligently it substantially improves efficiency, thus providing significant cost-savings

by Kate Seth, Traficon, Belgium

Deep within the belly of Traficon's Wevelgem headquarters in Belgium there is an office – rather a technical laboratory – that simply oozes IQ. For this is where the company's range of advanced traffic management products come to life. It's where the algorithms are written, it's where the sensor analytics takes place, where hardware is engineered, finetuned and perfected – it's basically where video detection becomes 'intelligent' video detection. Within these clean, white walls, the overarching goal is to create the ultimate intersection – efficient, flowing, safe, and smart – a seamless cog in the ITS infrastructure that improves mobility for all road users.

Over the past 12 months, this hub of innovation has been where the finishing touches have been applied to Traficon's most recent solution, SafeWalk – a pedestrian detection system that integrates stereovision technology and smart detection to enhance pedestrian efficiency and safety at intersections of all shapes and sizes. "Traficon's mission is to create safer and smoother traffic, and up until now that has revolved around vehicles," says Stijn Vandebuerie, marketing and communications manager. "But pedestrian safety and efficiency fit in with our mission. Traficon is a firm believer in Vision Zero, so if there is anything that we can do to help prevent people being killed or injured, we'll be doing our best to make a positive contribution."

The burning issue of vulnerable road users has reached a new level of intensity in the past few years, according to Vandebuerie's colleague, Michael Deruytter, product manager for SafeWalk. The task of integrating vulnerable road users, such as pedestrians, cyclists, etc, with vehicle users will become increasingly challenging in the future. Cities are already crowded, with people on foot, two wheels and four wheels jostling for right of way. "You are going to need more intelligence to ensure that people can survive in this new urban jungle," Deruytter insists. It just so happens that intelligence is what Traficon does best.

TECHNOLOGY WITHIN
The main technology within SafeWalk is similar to that found in Traficon's TrafiCam lineup of video detection sensors, with complementary metal oxide semiconductors, or CMOS sensors, at the heart. "In SafeWalk, though, we are using two CMOS sensors to generate three-dimensional information," Deruytter says. In essence, the two CMOS sensors are the eyes within SafeWalk, while the intelligent video processing capability is the brain, mimicking how we humans see and perceive aspects such as depth, height and motion.

CMOS sensors are the imaging technology of choice for high-volume applications – your cell phone probably has one – and have cut a healthy slice of the imaging market alongside CCD sensors, which are employed in many high-end imaging applications, such as digital photography, broadcast TV, industrial imaging, etc.

There is much debate over the virtues of both CCD and CMOS sensors. The latter are known for superior integration (more functions on the chip), power dissipation (at the chip level) and reduced system size. A past criticism of CMOS sensors has been that they deliver all of the above benefits to the detriment of image quality, but the reality is that they can offer excellent imaging quality when designed properly.

"The important innovation with SafeWalk is not just the CMOS sensor," Deruytter explains. "It's the combination of two CMOS sensors in one product – that is quite unique. There has been much university research into three-dimensional vision, but what works in the world of academia doesn't always translate commercially."

OPEN INNOVATION
Jo Versavel, Traficon's retiring chairman and CEO, is a proponent of what he refers to as 'open innovation', meaning you collaborate with the very best parties to deliver added value to a product. Because of this, Traficon was assisted in the development of SafeWalk by experts in a variety of disciplines, not least in product styling. "Our expertise at Traficon is video image processing, so we also outsourced expertise relating to the integration of the 3D stereovision technology, to ensure that the sensors worked in unison." Designing and engineering a sensor that must be placed

This smart new sensor reduces unnecessary delays to both pedestrians and motorists

With the introduction of SafeWalk, Traficon now offers a complete video-based solution to make any intersection more intelligent

in every environmental condition – yet also has to look aesthetically pleasing – was a challenge, in Vandebuerie's opinion. "Our brief to PiliPili was to design a pedestrian detector, not a camera," he says. "You don't want a sensor to look like a camera; you don't want people to think that they are being watched, that they're a character in a George Orwell novel. Urban aesthetics is important to us. In the end, I think we came up with a product that is a winner on all levels."

The fact that SafeWalk effectively converts two-dimensional images into three-dimensional information is paramount to its technological cunning. Such information is useful and necessary as it enables it to distinguish between real objects and irrelevent background information, such as shadows and reflections. "Basic video detection algorithms that operate using motion detection or background segmentation lose the object, whether that be a person or a vehicle," Deruytter continues. "After a certain time they just become part of the image, blending into the general scene. For this type of application, where you have people waiting around to cross a street, stereovision three-dimensional technology is the best way to go. We don't use this in TrafiCam because vehicles have a fixed shape. Pedestrians, on the other hand, behave completely differently; they are moving their arms, they might have umbrellas, be in wheelchairs, they might be small children, and so on. This technology allows for a much higher level of logic. You know exactly when the pedestrian enters the zone, what they're doing when in the zone – you get much more information about their behavior.

"When we looked at the competition," Deruytter adds, "we analyzed sensors that detect pedestrians, but they do not know whether they're waiting to cross or whether they're just passing through the zone. With SafeWalk, we can track pedestrians in the zone; we know where they've come from, and in which direction they're heading. This all helps in maintaining efficiency at the signal, for the pedestrian and also for vehicle drivers." At the same time, this limits frustration at the intersection and reduces vehicle idling time, thus impacting positively on the environment, while it also has important cost implications in terms of keeping traffic on the move.

Deruytter recalls a presentation he saw in Australia regarding the true cost of congestion, and while he cannot vouch for its validity, what we do know for sure is that congestion costs the US economy some US$78 billion every year. "We do not like to pluck figures out of the air," Deruytter states, "but let's assume that an intersection has 5,000 vehicles passing through it a day and that 5% of those vehicles stop needlessly for, say, 15 seconds at a time. That's an hour of delay a day at every single intersection. Then let us attribute a cost of, say, 50 cents (which we don't think is unreasonable) to somebody's time – if they miss a meeting or are late for work, etc. That works out at Euro 900 a month!"

PUT INTO PRACTICE

The theory is being into practice in an ongoing examination in Dublin, Ireland. In this scenario, SafeWalk is being trialed in order to improve the on-time performance of buses that have been continually stopping for pedestrians who are activating pushbuttons, crossing without waiting for their signal, and subsequently causing buses to stop for no reason at all – a problem that we have probably all encountered at some point. "The situation is made worse because the authority in Dublin has invested considerably in bus-only lanes, yet the buses are being delayed unnecessarily at pedestrian crossings, completely undermining the investment in the special lanes. However, based on what they have witnessed so far, they are impressed with SafeWalk – it's made the whole interaction between pedestrians and vehicles more efficient."

Efficiency is one thing, but as its name suggests, SafeWalk is first and foremost a tool to enhance safety. The recently published World Health Organization (WHO) *Global Status Report on Road Safety* states that just under half of the world's 1.2 million people killed on the roads are pedestrians, cyclists and riders of powered two-wheelers – a total figure that the WHO predicts could double by 2030 if the appropriate steps aren't taken. Although vehicle OEMs will continue to develop advanced driver assistance systems for protecting pedestrians – pop-up hoods, night-vision, and automatic emergency braking, for instance – such systems will take many years to filter through the entire vehicle fleet, if ever. SafeWalk is right here, right now, and will be saving lives and reducing injuries a whole lot sooner. ∎

To find out more information, please contact Traficon by telephoning +32 56 37 22 00, emailing traficon@traficon.com, or alternatively log on to www.traficon.com

Intertraffic

CONNECTING INNOVATION TO INFRASTRUCTURE

CHINA

International trade fair for infrastructure, ITS traffic management, safety and parking

- In conjunction with China Transpo 2010
- Visiting audience of high profile decision makers
- Dedicated pavilion for international exhibitors
- Convenient all-in NEW TO MARKET concept
- Co-organised by TTEC
- Online visitor registration on www.intertraffic.com

Beijing Exhibition Center
China

26.27.28 MAY
2010

Organised by:

AMSTERDAM RAI   TTEC

Intertraffic® com

The eco-system

This newly launched variable message sign harnesses the power of solar energy to ensure that all roads – whether near a power supply or not – benefit from vital traffic information. Sustainable and ecological, it ticks all of the green boxes

**by Audrey Mesmin, SES Signalisation, France**

The use of solar power in the ITS industry is growing and could prove to be a sound decision in terms of both commercial potential and environmental gains. A number of traffic management organizations are working with solar power for a variety of applications, but it's often used in tandem with traditional electric or battery back-up; it is fairly rare to find a traffic product that relies solely on the sun for all of its power needs.

When considering the most appropriate products for solar power, traffic signs (particularly VMS and other types of message sign) represent an ideal partner for the technology. Power-free solutions are bound to appeal to those purchasing signage for areas where feeding electricity to a sign is challenging, or for locations where signs have previously needed to be placed at a less than ideal position just to be near the power supply. They also help traffic agencies to reduce their ecological footprint, which is a huge selling point as 'going green' becomes ever more of an integral part of transport strategies. Also, given the sheer volume of signs out on our roads, the market potential for vendors of such products is apparent.

RESEARCH, DESIGN, DEVELOP

For these reasons and more, French sign specialist SES began researching how to bring solar-powered traffic signs to market. The company was already offering a range of small signs powered by solar panels for minor roads, but wanted to take this knowledge to the next level. SES signed a research agreement with scientific institutions including INES (Institut National pour l'Energie Solaire – National Institute for Solar Energy) and CEA (Commissariat à l'Energie Atomique – Atomic Energy Board), with the aim of designing the first VMS solution specifically for motorways and main highways that was completely free of energy.

The result of this work has been the unveiling of the Optima – a full-sized solar-powered VMS that can be installed wherever needed, without requiring a nearby power supply. In addition, it offers wireless communication so does not need to be

SES has launched its first full-sized, solar-powered VMS for motorways and main highways
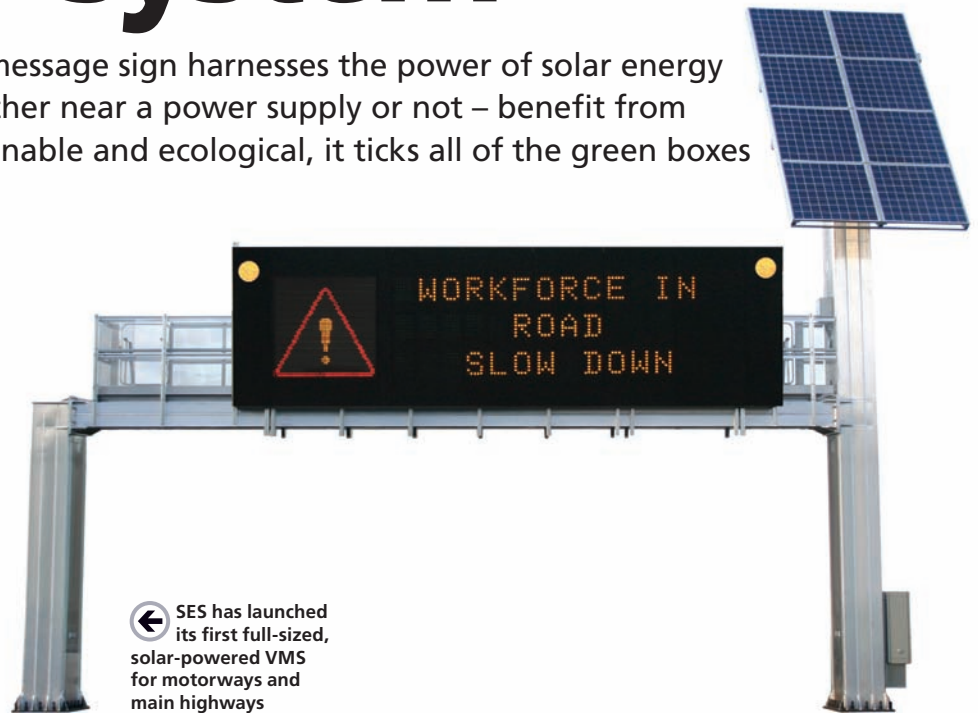
situated close to the local communications network in order for operators to set the messages it displays. This freedom of location even has safety benefits. Motorway managers no longer have to compromise on where signs are placed; they can choose the safest location, both in terms of minimizing driver distraction and in regard to the optimal part of the road to display the information messages in order for drivers to react.

Solar-powered signs also allow road authorities to make financial savings. No mains supply means no connection or civil works costs, while excavation works largely decrease as well. Additionally, running costs are greatly reduced as no electricity

The energy module, with batteries that store solar power, is buried in the ground

is being consumed and there are fewer components that require maintenance.

HIGH PERFORMANCE, LOW POWER

Despite the obvious green credentials, SES was keen to develop a sign that did not compromise at all when it came to performance. The Optima VMS is therefore compliant to the EN12966 European standard, is totally autonomous, as well as guaranteeing a 24-hour display.

Research by SES and INES also led to a new VMS architecture concept. The result is smart electronic boards, low power consumption LEDs, and optimized management of communications, all leading to a huge reduction in power consumption.

The solar panels convert the sun's rays into electrical energy, which is stored in batteries. An electronic system of regulation enables an optimum output according to light levels, meaning that the display functions well even in poor weather conditions. The energy module is composed of batteries that are designed for use in VMS; they are weatherproof and don't require maintenance, while a solar power regulator provides maximum power to the batteries around the clock. The energy module itself is installed in the ground on the road verge. ∎

Please contact SES by calling +33 247 62 66 92, emailing audrey.mesmin@ses-signalisation.com, or visit the company's website at www.ses-signalisation.com

Eagle eyes (and ears)

The continuing expansion of a real-time traffic data network in the Paris region has enabled the relevant authority to put a new solar-powered, pole-mounted video and acoustic sensor system to the test, giving traffic managers a bird's-eye view of the roads

by Jean-Hubert Wilbrod, Neavia Technologies, France

The Paris region road operator, DIRIF (Direction Interdépartementale des Routes d'Ile-de-France), is responsible for around 800km of motorways and speedways in France's capital. In order to deliver real-time traffic information to Parisian road users, the authority utilizes the SIRIUS network, which coordinates data from around 2,400 measurement cabinets that are collecting and amalgamating data from inductive loops embedded within the roads.

Despite the quality of this data being high, many road operators are faced with intrinsic problems when reliant on such in-ground sensor networks. As well as aspects such as lifetime and reliability – which are obviously important considerations with any equipment – there are specific issues inherent to inductive loops. Factors such as roadworks, resurfacing, and road widening can lead to loops being inappropriately postioned in relation to the trajectory of vehicles. A more recent phenomenon is cable theft, a criminal trait that has been borne from the global high cost of copper at around Euro 1-4/kg. With cables routinely laid in the median strip and near the hard shoulder, they are often not systematically buried, so are an easy target for crooks looking to make an easy buck. Yet each theft can result in a lack of traffic data for days and sometimes even months.

And as we often read within these pages, when it comes to replacing cables or repairing inductive loops, traffic must be restricted to one or two lanes, possibly diverted, or even roadworks carried out at night, leading to added congestion and extra costs. Additionally, in this particular scenario in Paris, the expansion of the traffic data network to the outer regions where electricity and telecommunications networks are not always readily available means that infrastructure is much further away from the center of the network.

The A86 – including the A86 West – is being built to relieve traffic congestion and improve traffic links to the suburbs of Paris

PROJECT OBJECTIVES

A new DIRIF-coordinated project to deliver the expanded network more smoothly has three specific aims in mind, as Victor Dolcemascolo, project leader at DIRIF, details further. "The first goal is to test the system and evaluate it in terms of accuracy," he says. "The second is to complete the coverage of the sensor network in the south west of Paris, in conjunction with the opening of the tunnel linking the western part of the A86 with the southern part of the A86. The third objective is to evaluate the capabilities and the long-term behavior of a non-intrusive traffic sensor."

The sensor in question, EagleVia, is designed by France's Neavia Technologies for high performance and fast installation at any location. With an emphasis on very low power consumption, a small solar panel provides power for all functions of the device, negating the need for any power cabling whatsoever. Moreover, EagleVia communicates via radio technology so doesn't require any telecommunications cabling. To achieve these performance and

Digital pictures from the EagleVia sensor

EagleVia provides vehicle counts, flow speed, classification, occupancy, congestion alarms, and pictures of the road

power reduction goals, video was selected as the primary technology, and is ably enhanced by acoustics should poor visibility of the road become a problem, due for instance, to adverse weather conditions. Equipped with three CMOS cameras and eight microphones, when mounted from the top of a pole, EagleVia not only attains an accurate view of the road but also listens to the road.

As a result of internal signal processing, the new innovation detects vehicles, measures their speed and classifies vehicle type. Aggregated data can then be sent cyclically. All data and pictures are transmitted by radio either on license-free bands from the EagleVia sensor, or via an integrated GPRS modem.

PROJECT OUTLINE

A key criterion of the DIRIF project is to comprehensively evaluate the new Neavia technology, beginning with installation and continuing with objective comparisons against several different kinds of inductive loops in terms of system integration, operation and maintenance.

The test site – located in the vicinity of Versailles – is 13km long and includes a part of the A86 motorway and a part of the N12 motorway (the A86 is actually the second beltway of Paris and the N12 accesses the A86 from the west). Both motorways have three lanes, with average daily traffic around 60,000 vehicles in each direction. In the end, 26 EagleVia sensors will be installed – 13 on either side of the motorway.

Installation was split into two stages. The first four sensors were mounted in mid-2009 over the course of just two days, between 10.30-15.30hrs, meaning just the inside (slower) lane was closed, leaving traffic to flow freely in the other two. The installation process was incredibly easy, even for an inexperienced subcontractor. The pole lifting and fixing, installation of the solar panel and battery enclosure mounting, sensor mounting and adjustments were completed in just two hours. This was reduced by a further 30 minutes by the time the last set was installed, so at the end of the second day all of the data and pictures were available to view over the internet. Moreover, working behind the safety barrier to mount or adjust EagleVia is much safer than working on the road – a fact that the installation crews appreciated greatly.

Measurement evaluations include traffic counting, speed measurement, occupancy measurement, and classification. Special attention was paid to occupancy. Unlike loops, occupancy is not a physical quantity inherent in EagleVia, although it is a major factor in the algorithms leading to travel-time evaluation and congestion detection. That said, a very good correllation was observed between the inductive loops and the EagleVia sensor, leading to the conclusion that the availability and the quality of data from Neavia's solution are more than suitable to feed the entire system.

As EagleVia can be installed in locations where there is no wired network present,

the interconnection with the system could not be compared to inductive loops, which are directly connected to a wired network along the motorway. But EagleVia provides both traffic data and digital pictures of the road, and digital pictures are highly valuable to traffic managers. With loops, traffic data feeds into the SIRIUS system automatically and in real-time, so the selected solution utilized a database as a means to exchange data. EagleVia sensors thus write the database with pictures and data, which is quite straightforward as a result of the GPRS connectivity. From the control room, traffic managers can thus view the pictures directly by accessing the database, which can also be accessed from the front end of the SIRIUS system, from which all traffic data is collected in real-time for further processing.

CONCLUSION

After the first six months of continuous operation and based on data collected from the first four EagleVia sensor installations, more than a million traffic data events and more than 100,000 pictures have been processed, without any reported major technical defects or for that matter vandalism, and overall availability exceeding 98%. The system has also been analyzed in all environmental conditions – from sun, rain, snow and fog to temperatures plummeting to -10°C and rising to 30°C. Moreover, the maintenance comparisons were extremely favorable, with no need to clean the lens, and picture quality remaining high for a period of six months. There was also no need to clean the solar panel, with regular and sufficient charges noted. As a result of these early and promising indications, DIRIF concluded the EagleVia experiment to be a success. ∎

For further product information, please contact Neavia Technologies by emailing jean-hubert. wilbrod@neavia.com, telephoning +33 1 45 13 05 90, or alternatively please log on to www.neavia.com

One for the road

State-of-the-art truck weighstations are keeping dangerously overloaded trucks off the Qatar highway network, in doing so promoting road safety and reducing pavement deterioration. As a consequence, overweight violations have been greatly reduced

by Husam Musharbash, Traffic Tech Group (Middle East/Gulf)

The Middle Eastern state of Qatar is in the midst of an extraordinary economic boom. The massive construction developments within Doha, Qatar's capital city, and the surrounding regions – as well as a general increase in population – have resulted in a subsequent rise in the volume of commercial truck traffic and other vehicles on the road. This has reportedly increased at a rate in the region of 10% every year.

Although such investment is good news, it has led to some worrying side effects. Similar to many other developing countries, crashes in Qatar have increased with the larger vehicle presence, which has caused great concern for authorities. In response, therefore, numerous ITS projects are being implemented, including the deployment of signals at roundabouts, workzone ITS, and a freeway management system – each contributing to the country's efforts in putting safer transportation infrastructure in place. In addition, tighter control on truck weight limits was deemed necessary, after an axle load survey in 2007 revealed that over 83% of those heavy vehicles weighed on the Salwa Highway (an international road connecting Qatar to the Saudi border) were exceeding legal weight limits. In 2008, the Salwa Road Project Management Team (SRPMT) took the decision to start truck weight enforcement and contracted Traffic Tech for the weighing operations, initially implemented using portable scales.

FROM PORTABLE TO PERMANENT
The first month of truck weight enforcement on the Salwa Highway reduced overweight violators to 30%. Appreciating the results, the SRPMT moved forward with long-term implementation and contracted Traffic Tech to build six truck weighstations as part of a larger project to design and build the Salwa Highway's Freeway Management System.

The weighstations were completed in 2009. Each has four main stages. At the

Data collected through WIM systems can be used for both real-time and offline functions, integrated through appropriate information systems

station approach, there are mainline sensors covering all four lanes in one direction of the freeway, which are used as a permanent traffic data collection station – an ITS component that forms part of the highway's road asset management system. The other parts cover the weight enforcement aspect. Trucks will initially pass through the ramp screening scale, at which potential overweight violations are identified. In addition, this section is also equipped with an Over-height Vehicle Detection System (OVDS) that warns of overheight violations. Next up is the multi-platform static scale, where overweight violations are verified with static weighing. Lastly, a bypass lane captures information concerning trucks that avoided the weighstation altogether.

WEIGH IN MOTION
The mainline, ramp screening and bypass lanes are equipped with advanced weigh-in-motion (WIM) systems supplied by Canada's International Road Dynamics (IRD). Through Quartz sensors and/or piezoelectric sensors mounted in the road, data such as axle weights, gross vehicle weight, speed, spacing between adjacent axles, vehicle

length, and vehicle class, is all captured while the trucks are actually moving.

All trucks should enter the weighstation if it is open. An electronic ('Open/Closed') sign located before the ramp screening scale will indicate if trucks should report or not. The ramp screening scale is a single lane equipped with Quartz WIM sensors, inductive loop sensors, overheight sensor and a megapixel camera. A snapshot of each truck will be taken after passing the sensors and each picture will be assigned to its corresponding truck record. Specific data collected in the ramp screening includes axle weights, gross vehicle weight, truck speed, spacing between adjacent axles, total truck length, truck class, date and time, vehicle record number, overweight status, overheight status, and finally a truck image. The data obtained from the ramp screening is sent to the operator's workstation for live monitoring and will also be saved for future use for report generation.

Based on a truck's measurement and the data captured, they are automatically classified and compared to a compliance table. If a truck exceeds any of the thresholds for its class, traffic signals will automatically direct it to report to the static scale, otherwise it will be directed to leave the station without any further delay.

If some suspected trucks choose not to report to the static scale for weight verification after being directed to do so, they'll be detected and will appear in the operator's software as a 'running violator'.

A multi-platform static scale follows the ramp screening scale. Through static weighing, it verifies overweight violation of those identified in the ramp screening. A traffic signal located after the static scale then automatically directs confirmed violators to the parking lot for issuance of a violation ticket. Those that have no violation will be permitted to exit the station. If, however, a truck driver opts to exit after being directed to the parking lot, a snapshot will be taken by a camera located at the exit lane so this truck will also appear in the operator's workstation as a running violator.

Bypass lanes detect trucks that ignored the 'Open' sign of the weighstation – a stage

that consists of piezoelectric WIM and inductive loop sensors installed in all four lanes of the main highway, as well as high-speed image-capturing cameras. Truck details including its photograph will be stored in the system to be recalled at any other time for further enforcement purposes.

← **Showing the damage – severe rutting – that overloaded trucks can cause to roads**

↑ **Sensors embedded in the road capture information on vehicle gross weight, speed and axle classification**

RESULTS AND MOVING FORWARD

So what's been the result of all of this added truck enforcement? First of all, there has been an amazing decline in violators – from over 83% in 2007, it dropped to just 5% in September 2009. Reaping the benefits of this safer transport operation on the Salwa Highway are the daily motorists. With trucks conforming to limits, truck-related accidents have been greatly reduced. Drivers, on the other hand, also have less to worry about.

Weight enforcement visibility is limiting overweight violations, and hence is reducing road deterioration and road maintenance cost – a fact supported by the fourth power rule on the relation between percentage overweight versus percentage reduction in road pavement life.

With the underlying benefits of truck weight enforcement proved, 16 more truck weighstations are under contract with Traffic Tech – awarded by the Public Works Authority – to be implemented throughout Qatar, five of which are currently under construction on North Road. A separate contract, meanwhile, was carried out for one truck weighstation on the Dukhan Highway. In the end, there will be 23 truck weighstations that will constitute a national truck weight enforcement system covering Qatar's entire road system. ■

For more information, please contact Husam Musharbash at Traffic Tech Group (Middle East/Gulf) by emailing ttg@traffic-tech.com, or alternatively visit the company's website at www.traffic-tech.com

Turkish delight

501 Turkish traffic expert Isbak has been responding to the demand for more environmentally friendly products and services. Solutions such as power-saving LED lights and controllers and CO_2 emissions-reduction planning studies, are popular with both suppliers and customers. Another trend is toward advanced enforcement. Starting with red-light violation detection, such solutions have become more wide reaching and are being deployed for a variety of applications, such as stop-sign enforcement.

Isbak recently completed a turnkey project in the Turkish city of Kayseri, which included an enforcement system, surveillance system and central command and control room, and received very positive feedback from the Kayseri Police Department, particularly in regard to enforcement reliability.

Expanding in its market since 2004, Isbak looks set to continue this in 2010. Exports are improving year on year and the company now exports to 14 countries. At Intertraffic, a range of different enforcement and traffic information systems will be shown.

> **STAND 11.808**
>
> Isbak
> +90 212 294 29 00
> isbak@isbak.com.tr
> www.isbak.com.tr

"This sector is awash with intelligent solutions to transform mobility. These solutions are acknowledged in the Intertraffic Innovation Awards"

A screen star is born

502 The building of new control rooms and renovations of existing ones has led to a boom in the demand for videowall systems, feels eyevis. The growth in video signals and traffic management systems that need to be visualized has also contributed to this boom.

Throughout 2010, the company expects to grow in terms of market share, international presence and, of course, turnover. This optimistic point of view is based on several new launches, which eyevis will be offering throughout the year, including new LED-lit rear projection cubes, LCD monitors, and new features of its wall management software solution.

eyevis is using Intertraffic to showcase its latest technology. Its stand will feature a videowall comprising 3 x 2 70in LED rear projection cubes with WUXGA resolution. This new technology provides brilliant colors and almost maintenance-free operation for more than six years. eyevis's main priority, though, is to present complete systems, including display hardware, graphics controllers and software solutions.

> **STAND 11.806**
>
> eyevis
> + 49 7121 4 33 03 0
> info@eyevis.de
> www.eyevis.de

Trend-setting tactics

503 Kapsch TrafficCom's main market segment is ETC. In this segment, the overwhelming trend is toward urban charging schemes, an application that has been a difficult topic to address for many years, as charging schemes in urban environments are politically sensitive and require a timely and intensive involvement of the public. Nevertheless, the need for such schemes is intensifying, because environmental protection and effective traffic control are key benefits of ETC. Municipalities can also expect refinancing from charging schemes that can then be used to improve infrastructure.

Kapsch believes that ETC will play a major role as an enabling application for many ITS traffic safety and traffic management applications. Demand for ITS applications is growing fast but there is still a lack of financing to prove a solid business case to ITS companies and service providers within the value chain. ETC can serve as the connecting element to cross the chasm between early adopters and the majority of potential users.

The company's presence at Intertraffic will focus on other areas than tolling solutions. Kapsch will be showing traffic management systems, video-based Incident Detection Systems (IDS) for tunnels and highway surveillance, urban charging and access control, as well as parking management solutions based on CEN-DSRC OBUs and antennae.

Using the Intertraffic event for these purposes represents a wider business strategy, as Kapsch is planning to increase its presence in the field of urban traffic solutions in 2010. This includes city charging schemes, solutions for access control to off- and on-street parking zones and applications for speed and red light enforcement. Interurban tolling systems will play a major role for the company, both this year and in years to come.

> **STAND 11.825**
>
> Kapsch TrafficCom
> +43 50 811 1710
> petra.hamm-fierthner@kapsch.net
> www.kapsch.net

Smart systems approach

504 Famas System has been working for more than 15 years in the development, installation and maintenance of products and systems for traffic monitoring and management, as well as meteorological and ice warning applications. In 2010, Famas will continue to focus on the development of new products and solutions in these areas, as well as extend its distributor network with qualified partners worldwide.

In company news, Famas System was recently awarded a contract to start work on building a real-time traffic monitoring network in Italy, which will be one of the biggest of its kind in Europe. At Intertraffic Amsterdam, it will be presenting a new mobile traffic counter and classifier, MOBILTRAF 300, along with its well-known STAR500 sensor and the multipurpose outstation MPG500evo.

The MOBILTRAF 300 – now also available in a particularly compact version (MOBILTRAF 300C) – is a microwave-based unit that counts and classifies vehicles from the side of the road. Combined with its low power consumption, many communication features and easy installation, the MOBILTRAF is an ideal solution for traffic surveys that require high-quality vehicle-by-vehicle data, over periods of up to 20 days, supplied locally and/or remotely.

The STAR500 sensors have now proved their performance and accuracy levels in a number of installations worldwide. Famas regards them as the ideal aboveground solution to replace existing loop-based systems and/or realize new traffic monitoring sites where high-quality vehicle-by-vehicle data is required.

The multipurpose outstation MPG500evo, through its capacity to combine meteorological data, ice warning and traffic monitoring, provides knowledge of what happens on the road and how those parameters are connected, so is ideal to support decision-makers in complex situations.

> **STAND 11.818**
>
> Famas System
> +39 0471 827100
> roland.k@famassystem.it
> www.famassystem.it

Q | What do the technological advances in the road markings industry mean for the traffic engineer and for the end users of roads?

A "Structured markings and the use of cold plastics are the advancements that Basler Lacke is working on. How the traffic engineer benefits from these comes down to security: they know that they can rely on the quality of these markings. Road markings historically do not have a great record of durability over time, but cold plastics mean that engineers can be confident that once the marking is applied, it will last longer than other road marking products. For the end user, it's all about visibility. The greater visibility offered by the latest generation of markings (particularly noticeable during poor conditions such as a rainy nights) means more guidance and improved safety for all road users – whether they are drivers, PTW riders, or on bicycles."

Albrecht Paulos
product manager, Basler Lacke, Switzerland

A "Part of Prismo's recent product development has focused on making roads safer at night and/or in wet conditions. Understandably, it is at these times when accidents are more likely to occur. Our Clusterbead technology uses clusters of tiny high refractive index glass beads to improve the retroreflectivity of road markings from car headlights. The Clusterbeads are adhered to the surface of the road marking, meaning that they remain effective even in wet conditions. They are used in a number of our products, including Colourbright – a cost-effective, accident reduction system that is able to achieve a retroreflectivity of over 800mcd – a level of brightness at night under headlights that is previously unheard of. Clusterbeads also have the remarkable property of reflecting the white light of the headlights in the color of the surface to which they are embedded, so that the light coming back to the driver from red Colourbright is red light, not white. They can also be added to thermoplastic and MMA lines to improve retroreflectivity. This means that Prismo road markings with Clusterbeads are easier to see when driving conditions are poor. As a result, roads are safer for drivers, and traffic engineers have a viable solution for accident black-spots, as well as helping to reduce infrastructure costs. If your road is lit with solar studs, you have no need to put up additional streetlights and wires, etc – there are savings in terms of both environment and costs."

Jonathan Fish
marketing manager, Prismo, UK

A "Most traffic engineers and road users only associate night-time road markings with traditional cat's eyes and street lighting. They may not be familiar with intelligent road studs containing LEDs that provide enhanced road delineation from dusk to dawn. Such road studs are visible from up to 10 times farther away than cat's eyes reflectors and are proven to improve night-time road safety. As well as being installed at known accident spots, they can also be used to provide additional safety benefits in areas where street lighting is neither cost-effective nor desirable, particularly in rural areas."

Martin Dicks
founder and technology
consultant for Astucia, UK

A "The main technical advancements we're working with are the use of solar power and the use of LEDs – and they are set to have a revolutionary impact. Currently, retroreflective road markers are used on a mass scale, yet the benefits of using light emitting as opposed to light reflecting technology are immense. Using LED studs means even if your headlights are off, or it's a foggy night with poor visibility, you can still see the road ahead, so this advancement has a direct effect on safety for the end user. As well as aiding end users, solar power greatly benefits the engineers. This breed of technology removes the need to rely on current energy sources and reduces infrastructure costs: if your road is lit with solar studs, you have no need to put up additional streetlights and wires, etc. There are huge environmental and economical savings."

Richard Sabga
director of sustainable
development, Luna Road, USA

A "Ultimately, for the end users the safety of driving will be enhanced. The big advancement now involves shifting to a very different point of view with regard to how roads are illuminated. Previously there were many security issues involved with illuminating the whole road using streetlights; effectively trying to create 'daylight' at night-time. Now, with the use of reflectors and more LED-driven modules, you can save a lot of energy by not illuminating the whole street – something that no doubt appeals to the traffic engineer. This means that environmentally it's much better; there are considerable savings in terms of both money and energy, but this approach of illuminating the road itself also offers the driver a better guide to what's ahead."

Mario Goldbrich
head of safety, Swareflex, Austria

TTi **READERS ARE INVITED TO ANSWER THE BURNING QUESTION FOR THE APRIL/MAY 2010 ISSUE:**

Conducting maintenance work on our roads should not be a dangerously high-risk career: how can we improve safety at workzones?

email answers to traffic@ukintpress.com

There are many reasons for comprehensive traffic monitoring. This is the most important.

New product, proven quality. The ROBOT innovation and product quality remains the basis for outstanding traffic safety systems from JENOPTIK.

Improved road safety: communities and towns all over the world rely on our ROBOT technology, tried and tested for more than 75 years, for the monitoring of traffic lights and speed limits.
As the global market leader in the photographic traffic monitoring sector, we cover the entire process chain of traffic safety technology – and ensure that the streets in more than 80 countries are safe to drive on at any time.

Traffic safety with **robot** technology