FEBRUARY/MARCH 2009

traffic technology INTERNATIONAL

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TRAFFEX 2009
What to see and who to meet at this year's biggest traffic industry showcase

SHARING IS CARING
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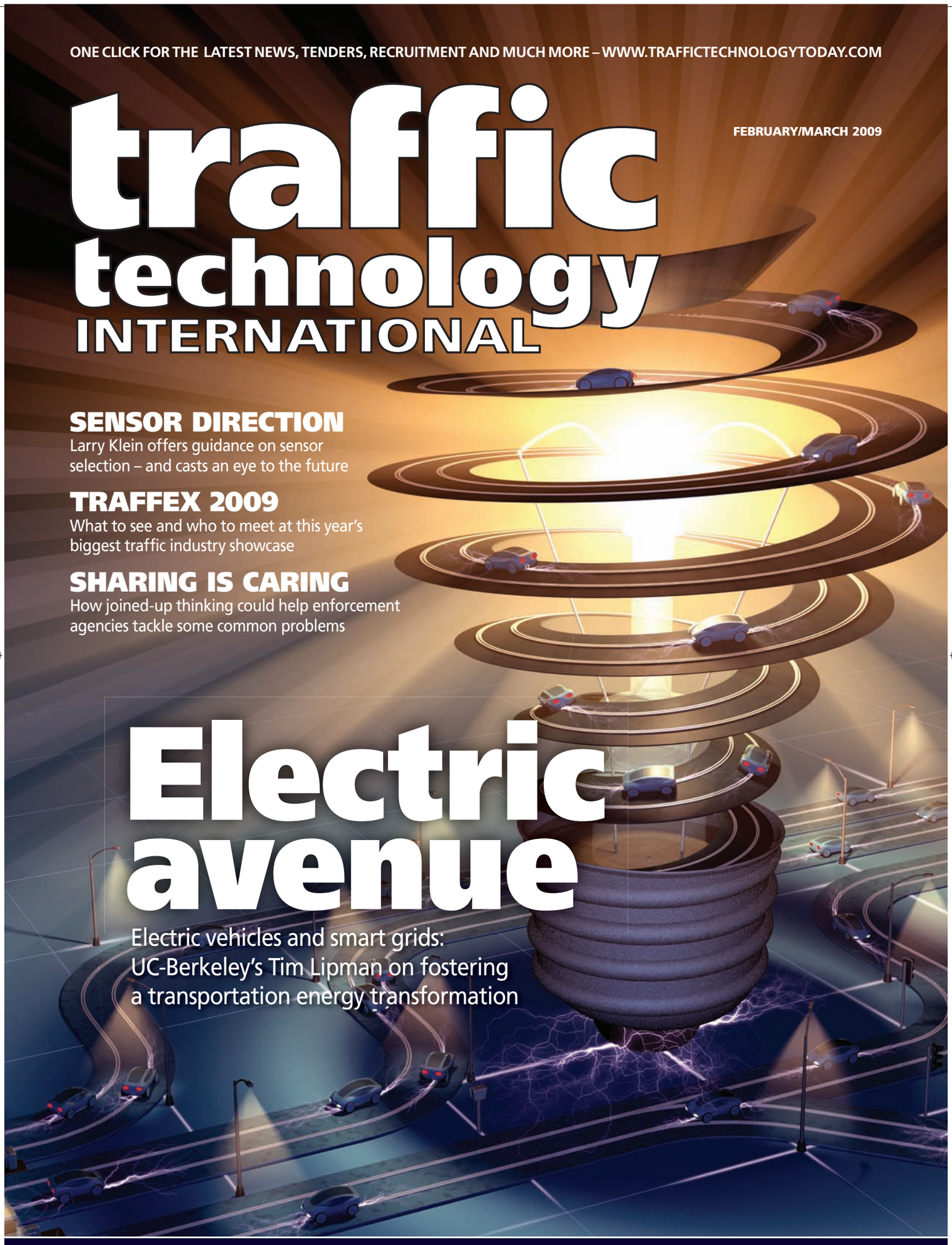

Electric avenue

Electric vehicles and smart grids: UC-Berkeley's Tim Lipman on fostering a transportation energy transformation

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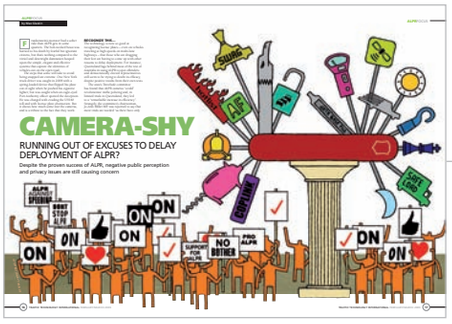

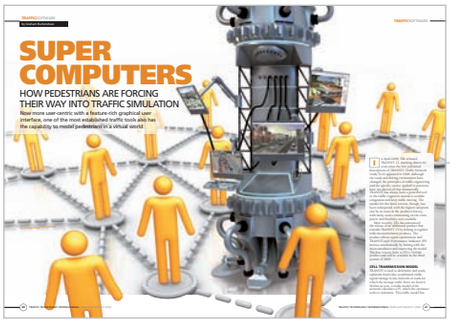

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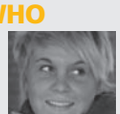
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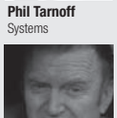
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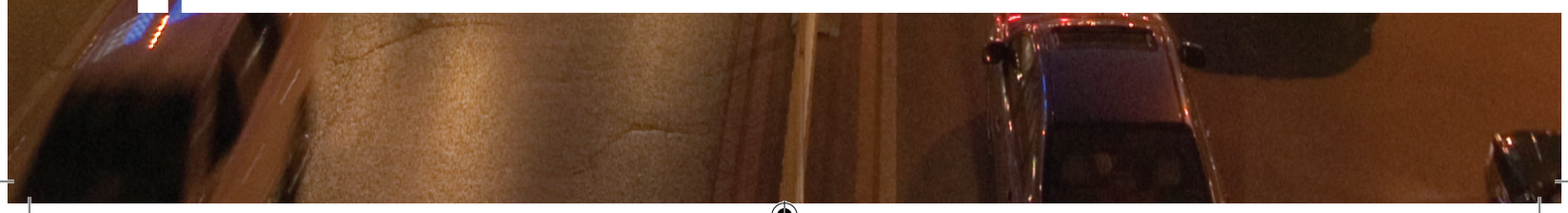


Signed, sealed, now deliver...

Although some way short of the US$2.2 trillion that the American Society of Civil Engineers feels is needed to bring the US infrastructure up to speed, something is better than nothing

Main: Ray LaHood with President Obama looking on
Below: A defiant Obama following the signing

Photo by Gerald Herbert/AP/PA

LLOYD FULLER

Washington, USA Less than a month after being sworn in, President Barack Obama put pen to paper on the *American Recovery and Reinvestment Act*, resulting in a relatively modest windfall for the US transportation sector. Newly appointed US Transportation Secretary Ray LaHood commented, "Transportation is a great enabler of economic growth, the lifeblood of commerce. It moves people to jobs and goods to the marketplace. Without strong transportation arteries, economies stagnate… We at the DOT are ready to go… I look forward to the sounds of shovels, hammers and bulldozers, and – in some cases – of moving shovels-full of dirt myself."

Secretary LaHood said the Act provided approximately US$46 billion for transportation infrastructure, including up to US$30 billion for the highways, US$12 billion for transit, US$3.1 billion for passenger rail, and US$3 billion for airports. In addition, the Senate bill also includes US$5.5 billion for a supplemental discretionary grant program. Eligible projects include highways and bridges, public transit, passenger and freight rail transport, and port infrastructure.

In the weeks leading up the signing, LaHood was said to have stated that there could be a role for the private sector in rebuilding the USA's

Dead zones?

Austin, Texas Hackers were able to infiltrate two mobile VMS and switch alerts to warn of zombie invasions. The signs usually warn of construction zones, but were reprogrammed to state 'Caution! Zombies ahead!!!' and 'Zombies in area! Run for your lives!'. Austin's Public Works spokesperson Sara Hartley claimed the messages were only up for a few hours. "This may seem amusing, but is really serious, and is a crime," she said. "We want to make sure traffic on our roadways stays safe."

559 …fewer people were killed on Spain's roads in 2008 – a drop of one fifth to 2,182 people over 2007 figures – according to Dirección General de Tráfico. Over the past 15 years, Spain has more than halved its annual road deaths, despite rapid traffic growth. The Association of British Drivers claims the results are due to investment in safety. Comparing the figures to the "woeful" UK stats, ABD's Nigel Humphries said, "Spain has invested greatly in engineering, ironing out blackspots, realigning and junctions, bypassing towns and villages, and replacing the dangerous roads with dual carriageways. They have also relied on good old-fashioned policing."

Light savers

Newcastle, UK Turning off streetlights to cut power bills and fight climate change could result in a tripling in the number of fatal road crashes, a new study has found. Researchers from Newcastle University stated there is evidence that streetlamps save the lives of "a significant number" (45% on average) of pedestrians, cyclists and motorists each year. Last year, one in five local authorities switched off lamps late at night to save money and cut carbon dioxide emissions.

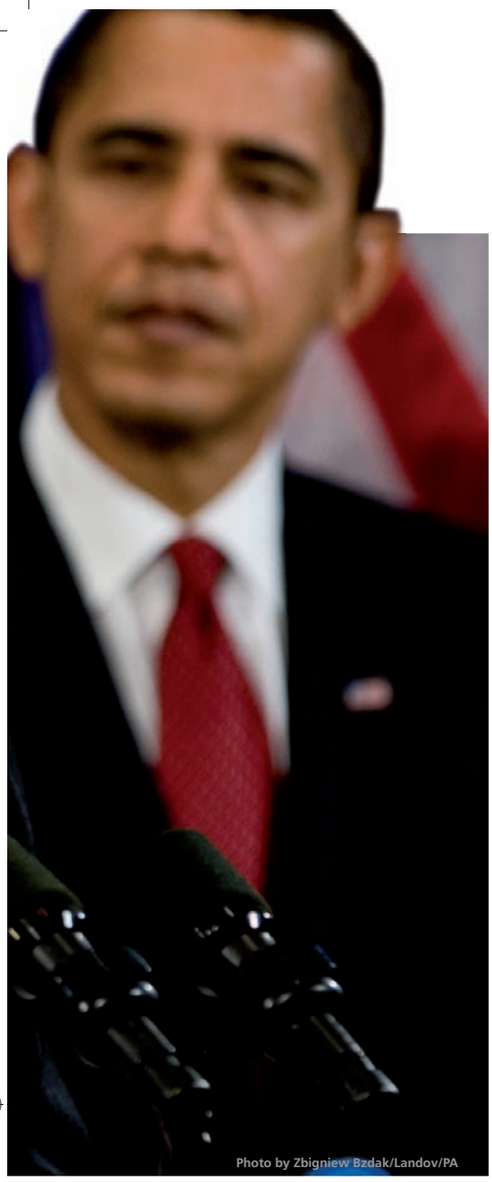


Photo by Zbigniew Bzdak/Landov/PA

transportation infrastructure – that PPPs and the tolling of new roads and bridges were "outside-of-the-box" ideas the US government should consider in reauthorizing the vital transport spending bill later this year. Additionally, it was claimed he referred to the Highway Trust as a "dinosaur", believing that ways to improve its funding sources would be one of the biggest challenges that Congress would face this year.

HOV lanes to target pollution

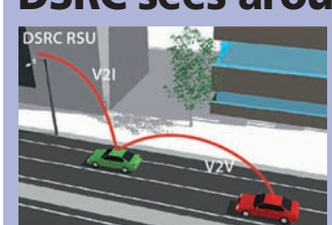
Lisbon, Portugal Some of Lisbon and Oporto's main access roads could see high-occupancy vehicle (HOV) lanes created in a move aimed at reducing the amount of traffic-generated pollution that affects both Portuguese cities.

EU action was recently taken against Portugal after it was discovered some of its key areas exceeded the maximum air pollution tolerance. One of the most polluted routes, the Avenida da Liberdade in Lisbon, exceeded its limit on 182 days of last year. Current legislation allows for pollution to exceed its maximum recommended limit on just 35 days.

The proposal aims to cut the number of cars in the cities, while increasing the number of people in those that remain. Vehicles with single occupants will be charged a premium rate to enter either city.

Humberto Rosa, Portugal's Environment Secretary, said, "The objective is to protect the health of all of us. We have serious air quality problems in the Greater Lisbon and Oporto areas. Studies have been conducted and potential measures have been presented. Authorities will now decide which to apply."

DSRC sees around the corner



Adelaide, Australia Researchers in South Australia have started tests of a DSRC system that issues warnings to drivers of potential intersection crashes, rear-end collisions, and lane drift. Professor Alex Grant, director of the University of South Australia's Institute for Telecommunications Research, stated, "DSRC essentially equips vehicles with the ability to see around corners and to predict and avoid dangerous situations." It will also enable traffic flow management and optimized route selection for drivers, reducing the costs of traffic congestion and greenhouse emissions. DSRC is a particularly promising development as it does not need line-of-sight to operate effectively, and Grant says it could be available in everyday vehicles as soon as 2012. Around 1,500 people die on Australian roads every year – and potentially half of those crashes could be avoided with DSRC's widespread use.

FOREWORD

Since *Traffic Technology International* launched in 1994, another 20 or so titles have joined it in the UKIP Media & Events publishing stable. We operate in diverse fields, from tire manufacture and aircraft interiors to automotive engine development and professional motorsport. We also have an incredibly successful exhibitions and conferences division – more than 25 events are held around the world each year. This has all contributed to UKIP Media & Events being listed among Europe's 500 fastest-growing companies, with revenue growing year on year. And my point? As 2009 marks *Traffic Technology International*'s 15th anniversary, we feel we're entitled to dust off our trumpet and reveal some of the projects we've been developing, as well as our innovative plans in the pipeline.

In 2008 *www.traffictechnologytoday.com* went live. Our online readers – 25,000 every month – benefit from a twice-daily newsfeed (yes, we actually update it twice a day!), audio interviews, and mission-critical data about project tenders. And for those looking for a new job or the ideal employee, our free recruitment section lists career opportunities around the world, with advertised positions regularly generating five or six potential candidates. We'll even pay you US$100 to write one of our blogs! Plus, as of February 2009 you'll be able to read *Traffic Technology International* electronically via an easy-to-use and interactive e-magazine, available to download from our website up to two weeks before the print edition even hits desks.

Returning to magazines, our recent launch, *Vision Zero International*, was so well received that we've responded to huge demand to publish it more regularly – a quarterly, starting with an April/May 2009 issue. We are also very busy working on a supplement related to violation enforcement, about which I will reveal more soon.

And we couldn't be more excited about the announcement we'll be making via our website at the end of February – an exclusive partnership with a major traffic industry event to produce an exciting new magazine.

We never stop developing our brands, we just don't shout about them at every given opportunity. But what separates us from the pack is that our products do the talking for us.

Nick Bradley
Editor
Traffic Technology International

A TECTONIC SHIFT IN TRAFFIC SAFETY

Just as computers will produce nonsensical output from nonsensical input, is the traffic safety community trying to solve its own problems using the wrong formulae?

by Al Gullon, Automobiles+Concepts+Environments, Canada

The recent launch of *Vision Zero International* caused me to muse over my now 12 years in traffic safety research. I quickly realized that the highlight of those years was the publication in April 2006 by NHTSA of the full report on its *100-Car Naturalistic Study* (after a curious year's delay from its completion by the Virginia Tech Transportation Institute (VTTI)). The press release at the time stated that "driver inattention was the leading factor in most crashes and near-crashes".

The *100-Car Naturalistic Study* tracked the behavior of the drivers of 100 vehicles equipped with video and sensor devices for more than one year. During that time, the vehicles were driven nearly two million miles, yielding 42,300 hours of data. The 241 drivers of the vehicles were involved in 82 crashes, 761 near-crashes, and 8,295 critical incidents.

The 'Naturalistic' study was 'inspired' by Tom Dingus, VTTI, and Mike Goodman, formerly of NHTSA. The *100-Car Study – Phase II* (although huge in itself) was focused on Northern Virginia/Metro Washington as a precursor (to test out instrumentation and analysis procedures) for a very much larger study (Phase IV), which will involve many more cars across North America. The study, and documentation related to it, is available to download on the NHTSA website.

It is intended that the base data should be available to other researchers interested in particular aspects of the traffic safety problem. However, there are many confidentiality issues involved and it is suggested that interested researchers should contact VTTI and/or NHTSA directly.

Although huge at over 400 pages (with another 400 or so in appendices), anyone at all interested in accident causality must find the time to download the 5.5MB file. There will not be a revelation on every page but you will feel the traditional bedrocks of traffic safety shifting tectonically under your feet. A prime example is that the study reveals more than 80% of collisions and 'near-crashes' have inattention as the precipitating factor and the authors admit on *p*349 (or *e*411 if you are reading it on-screen) that, "Prior estimates related to 'distraction' as a contributing factor have been in the range of 25%." Now there's a tectonic shift that will shake the 'speed kills' people right out of their boots.

Another 'shift' is the revelation that, of the 82 recorded crashes, only 15 were reported to police, which is hardly enough for statistical sampling, let alone 'official' records! And the 'conventional wisdom' now stands revealed as being based on the long-established GIGO principle of computer modelers – i.e. Garbage In = Garbage Out. ■

Please email feedback to al@alsaces.ca

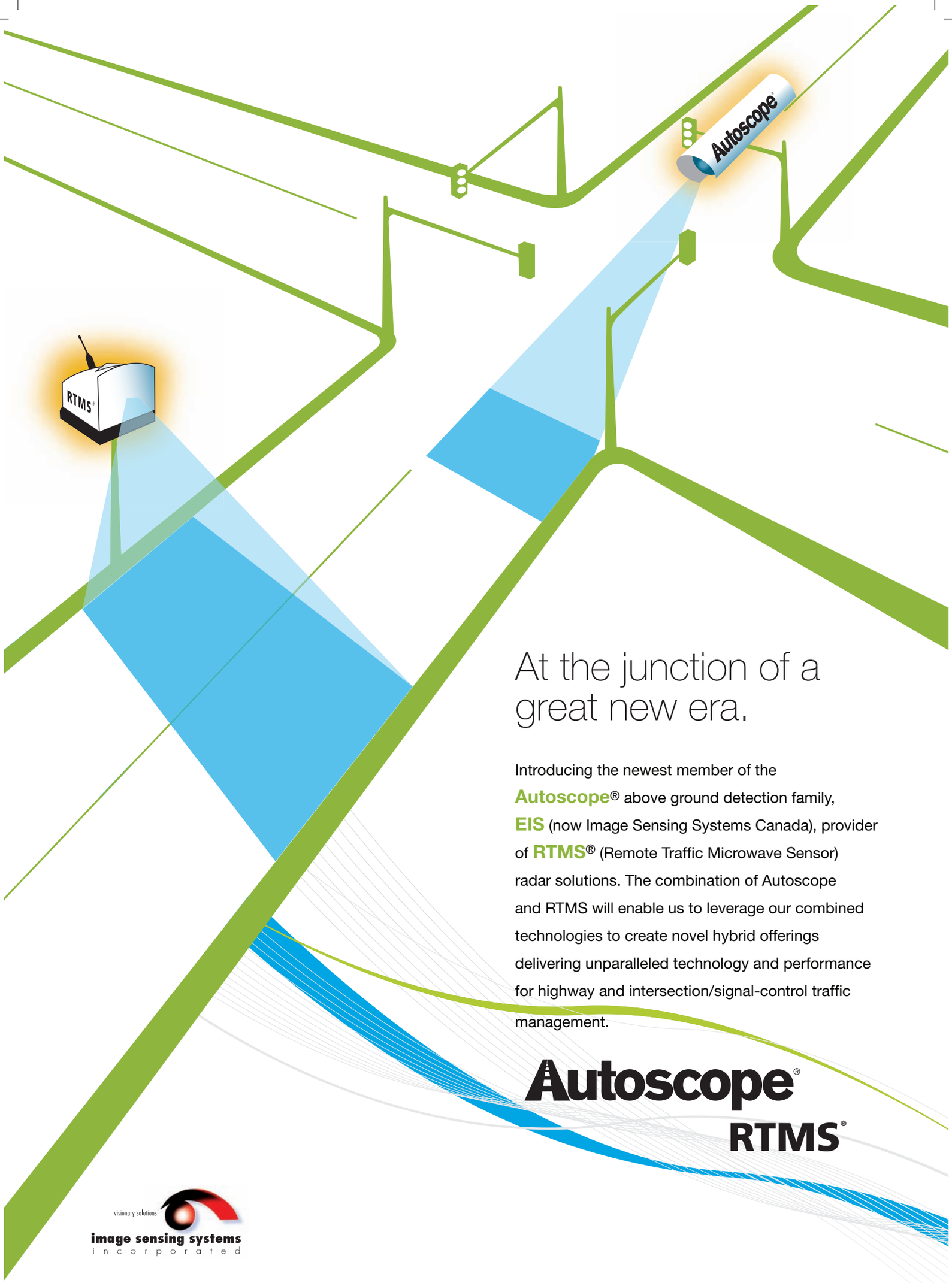
GTT wins patent infringement

Minneapolis, USA A US District Court judge in Minneapolis has issued a comprehensive permanent injunction in favor of Global Traffic Technologies (GTT) in its patent dispute with Tomar Electronics – just three months after GTT was awarded more than US$6.75 million in damages for past infringement by Tomar. GTT is behind the patented Opticom Infrared System for emergency vehicle preemption and transit signal priority. In its action against Tomar, GTT claimed that Tomar's Strobecom II traffic preemption system infringed multiple patents.

38 …percent improvements in traffic flow have been recorded on a 6km stretch of road in the German city of Münster, following the introduction of a Siemens Sitraffic Motion adaptive traffic control system. Overall, it was found to cut waiting times on the main route by 30-35% and lower the number of stops by 20-45%, with associated reductions in emissions and fuel consumption.

A done deal

Trondheim, Norway Q-Free will provide the main ETC and enforcement system for Slovakia. The contract was placed by SkyToll, which recently won the hotly contested tender. The GPS-based system is due to be installed and operational by the end of 2009, and Q-Free will service and maintain it for three years. SkyToll will bank US$1.14 billion for building and operating the system for 13 years from January 2010.



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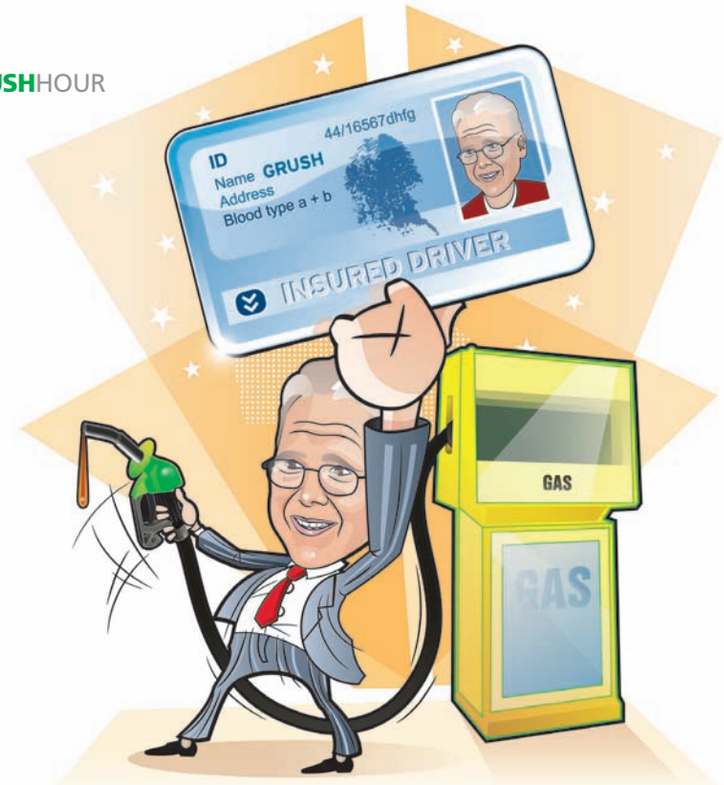

INSURANCE POLICY

Our resident expert on all things GPS proposes a new way of ensuring governments don't lose millions as a result of uninsured drivers. As you might expect, it's controversial

by Bern Grush, www.grushhour.com

Recent news headlines in the UK reported that uninsured drivers cost law-abiding motorists £400 (US$557) million annually. Another recently published report claims that this costs compliant motorists an extra £30 (US$42) in premiums each year. The UK is proposing new legislation to make it an offense to own an uninsured vehicle, to say nothing of driving one. This cannot be so simple, as there are many reasons to own a vehicle but not drive it – or to drive a vehicle that you do not own.

Perhaps there is another solution. Government-managed pay-as-you-drive (PAYD) insurance as a fall-back safety net can be imposed on every vehicle at the fuel pump. This can be set as a per-gallon premium, and immediately waived given proof of insurance.

Paying at the pump is not a new idea as a delivery mechanism for PAYD coverage. The problem is that such insurance is best scaled to a driver's experience and driving record – i.e. PAYD is not simply a distance-based insurance, but a weighted, distance-based insurance. Hence, paying by the gallon is very crude – although certainly more efficient than paying by the year. Furthermore, paying at the pump would be expensive on a per-mile basis, so would encourage purchase of more usual coverage, or even further encourage the offering of PAYD policies that are properly metered by distance, rather than gallons and scaled to the driver's record.

Pay-at-the-pump should not be the normal payment system. Rather, I propose it as a simplifier for rental-car insurance, temporary insurance lapses, occasional drivers of antique vehicles, borrowers of a friend's car, etc – as well as a fair way to make uninsured drivers insured.

The cost of adding the premium to fuel is small, but the cost of the payment-proof system and the associated labor of checking compliance before waiving the premium would not be trivial. The question is, can it be done for much less than £30 (US$42) per honest motorist per year – i.e. the extra uninsured drivers are costing Brits in annual premiums?

I believe it can be. It would require that insurance companies provide each insured driver with an electronic ID that contains information such as the insurance expiry date, vehicle description, license plate number, etc. That part of this equation would cost far less than £30. A more significant part is the cost to the operators of pumping stations for compliance checks, and the changeover costs for their cash-management systems. But if the pre-gallon premiums were set properly, the extra money in the system would leave the insured motorist whole, while taking uninsured drivers off the road. ■

Any comments to bgrush@skymetercorp.com

The name has been changed…

Washington DC, USA The US Research and Innovative Technology Administration (RITA) has introduced a new name and logo for its VII program that it feels better represents the full potential of the initiative. 'IntelliDrive' still refers to innovations that offer drivers greater situational awareness of events, potential threats, and imminent hazards within their vehicle's environment, but now encompasses a broader suite of potential technologies and capabilities than the original notion of VII. A new website has also been set up to promote its activities.

Traffax unveils monitor wizard

Maryland, USA Traffax Inc has shipped its first BluFax traffic flow-monitoring units to locations in the USA and Australia. The units operate by detecting the MAC addresses of Bluetooth signals from cellphones in passing cars. By positioning two units at distances of one to two miles, travel times are calculated from the relative detection times recorded.

Applications would include measuring travel times on both freeway and arterial roadways, measurement of origin-destination patterns, and also the tracking of pedestrian flows. As it directly measures travel times and space-mean speeds, the BluFax equipment is claimed to be one of the few technologies that offers the capability to accurately measure arterial travel times. In fact, demonstrated detection rates exceeding 5% of the total traffic stream yield sample sizes adequate for reliable measurement of arterial flows.

Traffax licensed the patent-pending technology from the University of Maryland, where it was developed with the support of the Maryland State Highway Administration.

For more information, please log on to www.traffaxinc.com

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TPMS to be law

Hanover, Germany Tire pressure monitoring systems are to be mandatory on all new vehicle models in Europe from 2012, under a new proposal from the EC.

Alexander Lührs, spokesperson for Continental, said, "About 90% of all tire defects are attributable to a slow leak in tire pressure, due to a small puncture caused by a screw, a nail, or a faulty valve. If the car driver receives early warning from a precise measurement system, he or she can either restore the proper tire pressure or, if necessary, have a new tire fitted."

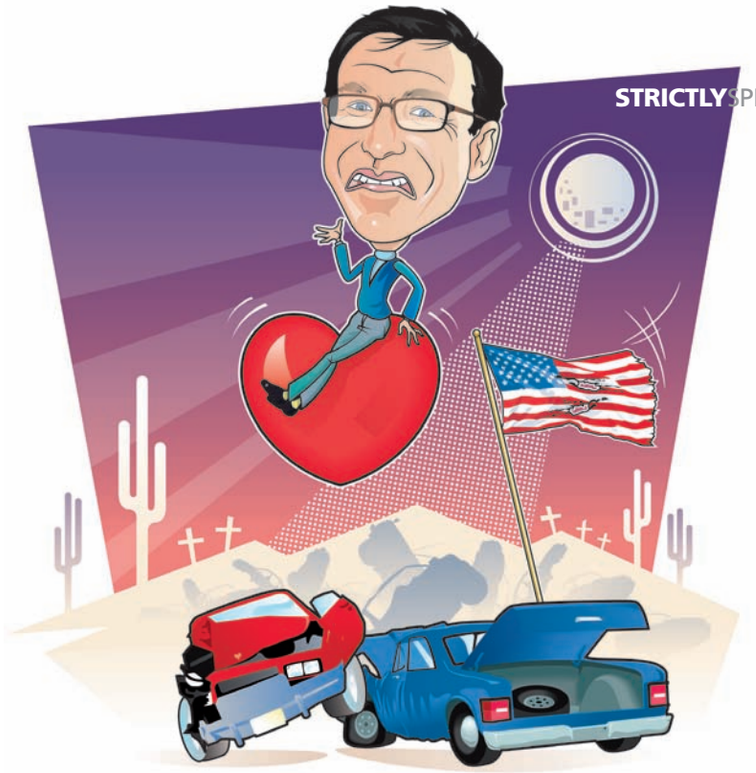
Lührs explained that one in three cars on Germany's roads has underinflated tires, and if all cars had tires correctly inflated, running costs in Europe alone could be reduced by Euro 3.4 billion (US$4.4 billion) a year.

Safety systems key to road toll

Itasca, USA The US National Safety Council says that in 2008 motor vehicle deaths in the USA fell to the lowest level since it began publishing its annual *Injury Facts* statistical report in the 1920s. The estimated annual death rate in 2008 was 13 deaths per 100,000 people, down 9% on 2007. The estimated annual mileage death rate for 2008 was 1.38 deaths per 100 million VMT – a 4% decrease from 2007.

"It is our experience that public education coupled with visible enforcement of safety laws can be some of the most effective ways to change behaviors and save lives," said Janet Froetscher, president and chief executive of the NSC (pictured below). Also contributing greatly to the lower rate is improved vehicle safety technology.

The estimated cost of crash-related deaths, injuries and property damage also fell to US$237.2 billion, which was 8% lower than the total in 2007.



FALLING OUT OF LOVE

A new report by the Brookings Institution suggests that Americans are falling out of love with their automobiles as a result of congestion. Is this an opportunity for ITS?

by Max Glaskin, technology writer, *Traffic Technology International*, UK

Let's take one of the latest reports about falling road use at face value – even though many question its accuracy. Let's assume that Robert Puentes of the prestigious Brookings Institution in Washington is 100% correct when he says there's a permanent shift from reliance on the car to other transport modes in the USA. (Let's ignore the fact that Brookings receives donations from foundations endowed by Chrysler, Ford and GM.)

Puentes says the modal shift away from cars began way back in 2004, well before gas price hikes and job cuts impacted on driving patterns. He says it could be that there's only so much driving a person can tolerate and many have hit that wall; they're getting out of their cars as soon as they can!

Now if that's not a golden opportunity for ITS, I don't know what is. Apart from pulling over for a comfort break or refreshment, most drivers I know would be happy to keep rolling along an open road for as long as their MP3 library keeps playing. What really grinds them down are unforeseen delays. So, trusting Puentes' analysis to the hilt, this is where our sector should be coming to the rescue. But Puentes is not that straightforward. He dutifully sticks to high-level public policy and recommends that federal gas taxes should be raised to compensate for the falling revenue caused by less driving.

It's a worthy and far from unique conclusion but what is of more importance is deciding how that money should be spent by the new administration. Thankfully the report hits the mark. It wants "new federal mechanisms to spark innovation in places that want to link disparate transportation, housing, energy and environmental policies to create better outcomes. New grants could be awarded to promote sustainable development patterns or reduce carbon emissions." Why be so coy, Robert? Any cryptographer worth his eyebrows can read between those lines and see that what he's talking about is ITS!

If drivers have been abandoning their cars because they can't tolerate congestion, ITS will alleviate the problem. If travelers want to know the most efficient modes that will get them from A to Z, ITS can do that. If maximizing vehicle efficiency across networks and among communities is mandated ITS will accommodate. If federal and state authorities are serious about reducing the environmental impact, ITS can also play its part.

Let's take Puentes' analysis at face value but be clear about his recommendations. "These travel trends and their implications, combined with heightened interest in rethinking how we pay for federal infrastructure, creates an opportunity to put forth a bold new vision for our transportation policy," he says. In other words, the fall in road use presents the best opportunity to deploy ITS wholesale. ■

Any comments to max@pavillion.co.uk

ON THE ROAD AGAIN...

In the pursuit of traffic safety perfection, the smart car has it all – the addition of some simple and effective driver assistance systems can potentially save thousands of lives

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

This issue I'm drawing inspiration from the lyrics of Willie Nelson's 1998 hit, 'On the Road Again':

On the road again
Goin' places that I've never been
Seein' things that I may never see again,
And I can't wait to get on the road again.

Oh yes, I want a smart car that literally and figuratively delivers Willie Nelson's lyrics. Yes, a good sound system is *de rigueur*, but I refer to more than that. I refer to the dire need to prevent run-off-the-road crashes, known in the traffic safety lexicon as 'single-vehicle road departure'. In keeping with the theme and title of this column, I refer to a smart car – a car so smart as to keep me 'on the road again'.

The alternative is, well, not good. Take the USA, for example, where statistics are readily available. Four out of 10 crash fatalities or upward to 16,000 deaths per year are due to this crash type. The problem is twice as prevalent in rural areas than in urban settings as speeds are higher and quick, and crucial emergency response is not so quick but, sadly, still crucial.

Road operators are doing the best they can. They engineer wide road shoulders replete with rumble strips. They mark road edges. They make smooth curves. But there are still millions upon millions of miles of still-not-perfect roads. Not to mention that drivers are decidedly still not perfect.

But the pursuit of perfection can be taken in a smart car. Take, for example, Nissan's entry into this journey, one which I have had the recent pleasure of driving: Lane Departure Prevention, available to the market for, oh, about two years. I recently drove an Infiniti M-class sedan with this feature. A forward-looking camera system hidden by the rearview mirror looks for lane markings and when veering toward them your car – politely, gently, yet resolutely – points you back into the lane, akin to Mom's surreptitious nudge to keep Junior on the straight and narrow through a sermon. There is also a three-chirped tone so a more-than-a-nudge steering input can be provided by the now-alerted drivers.

It uses differential braking and an empirically derived algorithm to naturally point the nose of the car back into the lane. And to boot, the Infiniti also has adaptive cruise control (called Intelligent Cruise Control), which provides some measure of longitudinal control, almost all the way to when I decelerated to 20mph, at which point I took over and stopped the car. I tell you, I did not want to get out!

But is this enough? Can an automated and more forceful yaw or perhaps a more decidedly kinesthetic centerline algorithm be applied, like being forced to skate along the center of a large bathtub? Consider again, Willie Nelson, *Goin' places I've never been*. Maybe we'll get there in the future and in our – by then – very smart, lane-hugging car… And I will live in my car, even after it's stopped! ■

20 …mph zones are among the likely locations that UK drivers will see SPECS3 average speed enforcement systems appearing, after the technical testing phase for UK Home Office Type Approval was completed. The system is now recommended for full approval by the Roads Policing Enforcement Technology Committee, so authorities can proceed with the deployment of roadside installations, as its design principles and accuracy have been independently verified.

Who's in line for Redflex?

Melbourne, Australia Traffic safety specialist Redflex has said its board continues to evaluate non-binding proposals to acquire the company, but claimed those received so far "are not compelling and do not adequately reflect the underlying value of the business".

It said it has provided further due diligence information and management access to several parties and consequently has recently received further updated non-binding indicative proposals from some of them. It has also received a new unsolicited and non-binding expression of interest from another party, which has not participated in the process so far.

The board intends to continue to engage with interested parties regarding their further updated proposals, or provide them with initial information and management access subject to confidentiality agreements to see if there can be a substantially improved proposal to put to shareholders.

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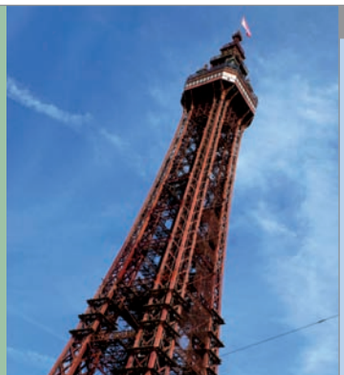

MARCH 3-5

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This is IBTTA's first event in Australia, and will tap into the growth of tolling in Australia, New Zealand, and other Asia-Pacific countries. The focus will be on all aspects of the Australian experience with toll concessions and operations.

@ **www.ibtta.org**

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@ **www.itssa.org**

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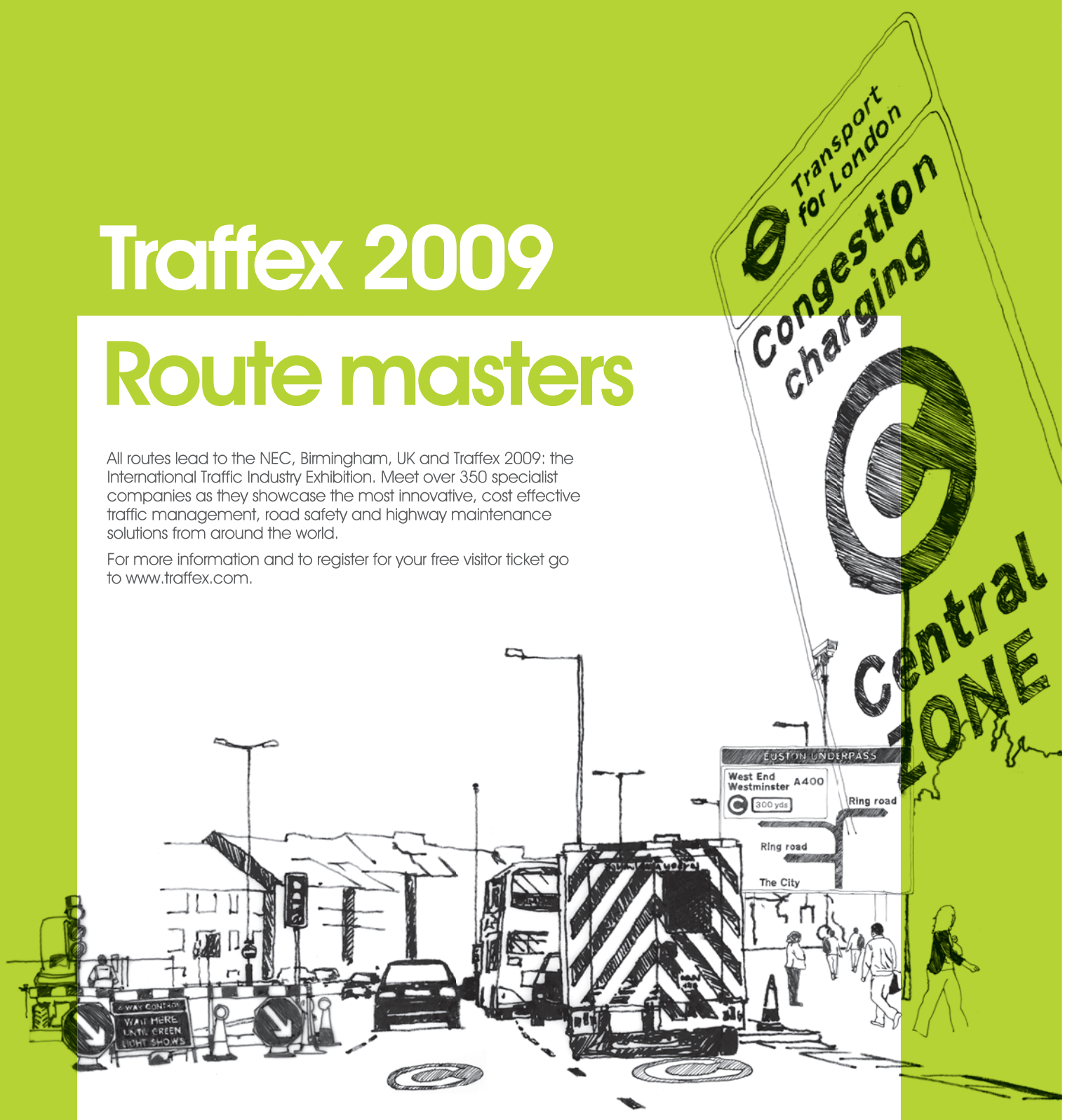

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by Max Glaskin

CAMERA-SHY

RUNNING OUT OF EXCUSES TO DELAY DEPLOYMENT OF ALPR?

Despite the proven success of ALPR, negative public perception and privacy issues are still causing concern

Frankenstein's monster had a softer ride than ALPR gets in some quarters. The bolt-necked beast was harried to his death by fearful but ignorant citizens, but that's nothing compared to the vitriol and downright damnation heaped upon the simple, elegant and effective systems that capture the identities of vehicles out on the open road.

The steps that some will take to avoid being snapped are extreme. One New York truck driver was caught in 2008 with a spring-loaded device that flipped his plate out of sight when he pushed his cigarette lighter, but was caught when an eagle-eyed Port Authority officer spotted the deception. He was charged with evading the US$40 toll and with license plate obstruction. But it shows how much some fear the cameras, and is a tribute to the fact that they work.

RECOGNIZE THIS...

The technology is now so good at recognizing license plates – even on vehicles traveling at high speeds on multi-lane highways – that those who are dragging their feet are having to come up with other reasons to delay deployment. For instance, Queensland lags behind most of the rest of Australia in using ALPR to spot offenders and democratically elected representatives still seem to be trying to doubt its efficacy, despite positive results from their own tests.

The state's Travelsafe committee has found that ALPR cameras "could" revolutionize traffic policing and, in limited trials in Queensland, they led to a "remarkable increase in efficiency". Strangely, the committee's chairwoman, Jo-Ann Miller MP, was reported to say that more trials are needed "as there have only

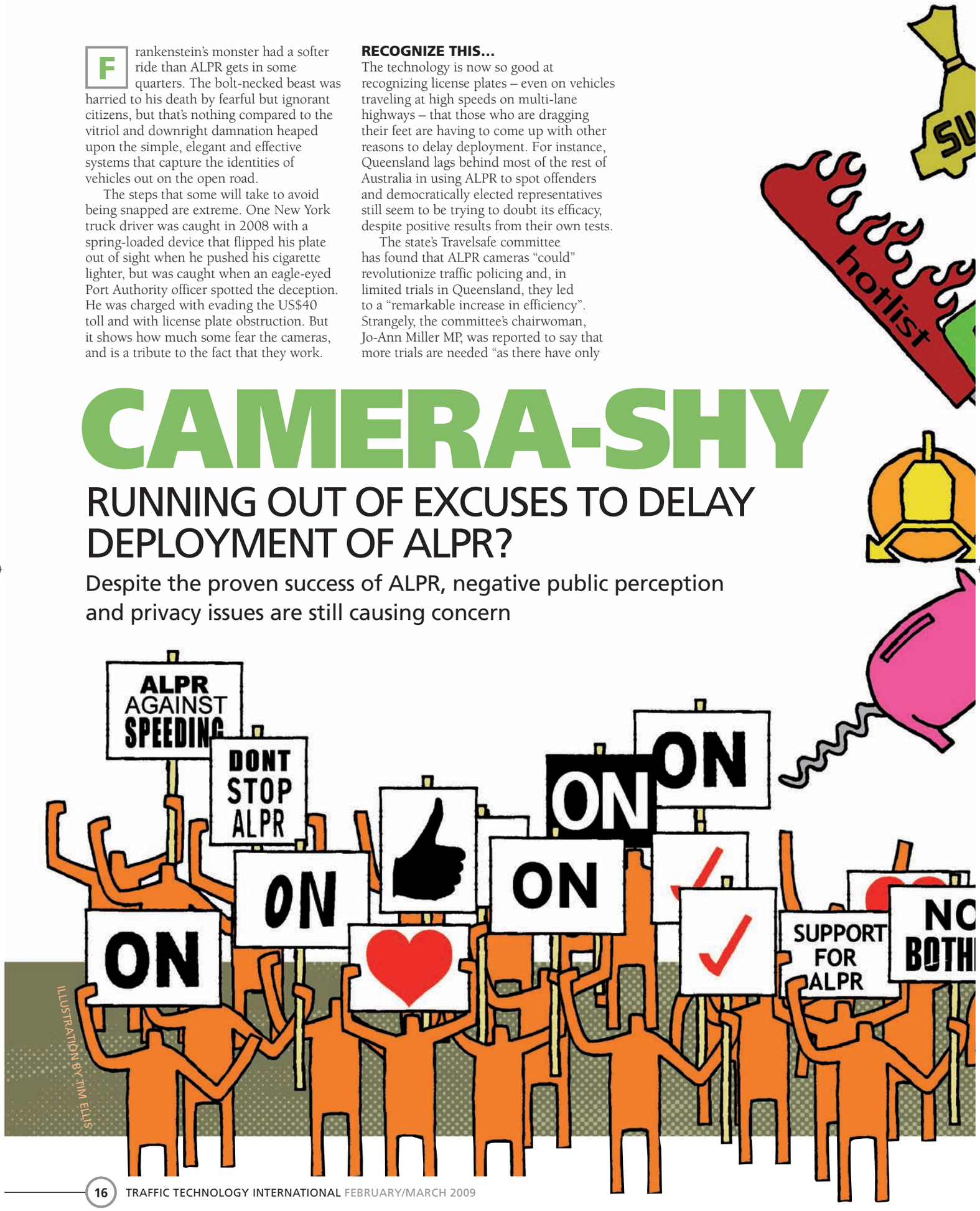
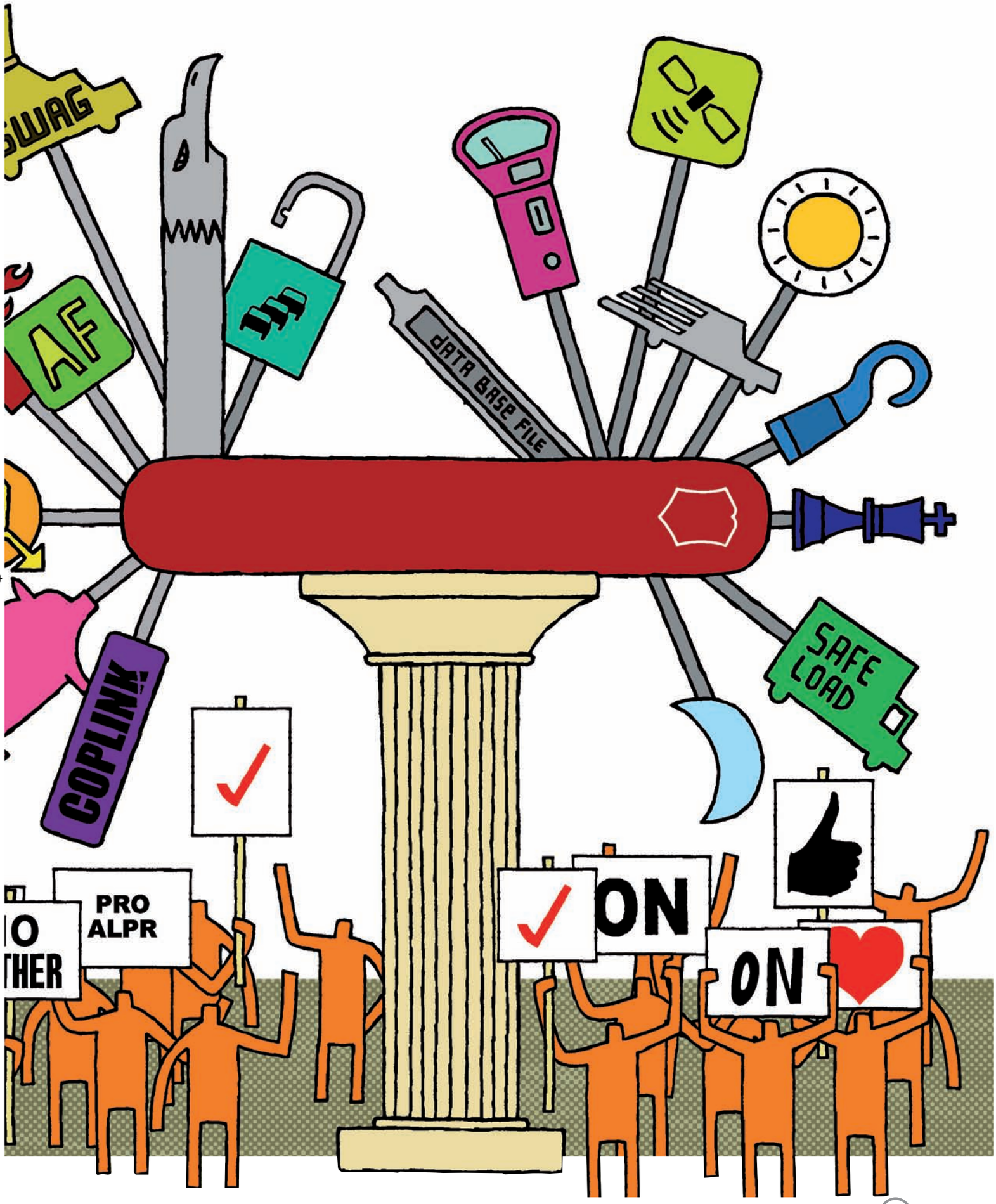


ILLUSTRATION BY TIM ELLIS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been two studies worldwide that have looked into the benefits". This, though, may be a political tactic to placate those who are concerned that it infringes human rights.

"We have listened to privacy experts from other states and incorporated their advice on the best safeguards that should be legislated for ALPR applications here," Miller said. "These are crucial to ensure public support for this new policing technology."

Similar views are held by the New York Civil Liberties Union, which is currently suing the New York Police Department to get more information about plans to deploy ALPR throughout the Lower Manhattan area. In fact, the technology is seen by many as a key component of improved security. Authorities in Maryland, Virginia and Washington, D.C. are planning to spend US$4.5 million on 160 mobile and 40 fixed ALPR systems to thwart potential attacks. "It puts a tool in the hands of police officers out in the street to help fight terrorism," explains Kevin Reardon, police captain in Arlington, Virginia.

A CASE OF TRUST

On the other side of the argument, some believe ALPR is simply not being utilized to its full potential by the highways and transport agencies. Daniel McMillan is an ITS expert at Detica – a London-based intelligence and security consultancy – and he thinks that ALPR should be used to much greater effect. "There are three reasons why that's not happening at the moment – public perception, operators' ignorance, and operators' fear," McMillan suggests. The public perception issue arises from ALPR being used mostly for enforcing the law on driving, so the public views it in a bad light.

"The public doesn't trust ALPR because it catches them when they are speeding. Of course, this does improve the safety of the network for everyone but, to the individual, ALPR is a symbol of Big Brother," he says.

Education of the public would change that perception and make it easier to deploy ALPR for other purposes. "The benefits have not been explained to them. A few headline news stories where ALPR has helped police to catch dangerous criminals would go some way to making the public realize it's a worthwhile technology," McMillan explains.

However, road operators have also come to perceive ALPR solely as a way to catch speeding motorists or to enforce parking, not realizing it could help them to achieve other goals. McMillan cites the use of ALPR by VOSA, the UK agency responsible for improving the roadworthiness of vehicles. "VOSA combines data from the cameras with its own information with that from the vehicle licensing agency, DVLA, and with weigh-in-motion data to determine whether lorries are exceeding their safe load limits. That benefits everyone as it improves safety."

Likewise, ALPR is used as part of the system to decide when hard-shoulder running should be opened or closed on the M42 in the UK. "These are examples of using ALPR for more than catching speeders and there can be many more applications, if only the road agencies changed their views," says McMillan. "Road operators are still playing checkers when the technology is available to play chess."

Operators in some countries restrain themselves from making more use of the data that their existing systems capture because they are scared that they may contravene privacy legislation. "Most government departments are scared of personal data protection and freedom of information laws so they dump most of the data very quickly," McMillan says. "ALPR allows them to deal with people as individuals and they aren't used to that at all, so they shy away from what that could allow them to do to improve the security or flow on their transport networks."

McMillan suggests that highways operators should be educated about ALPR's full potential, particularly when combined with other traffic monitoring and control systems, and then incentivized to use it in innovative applications.

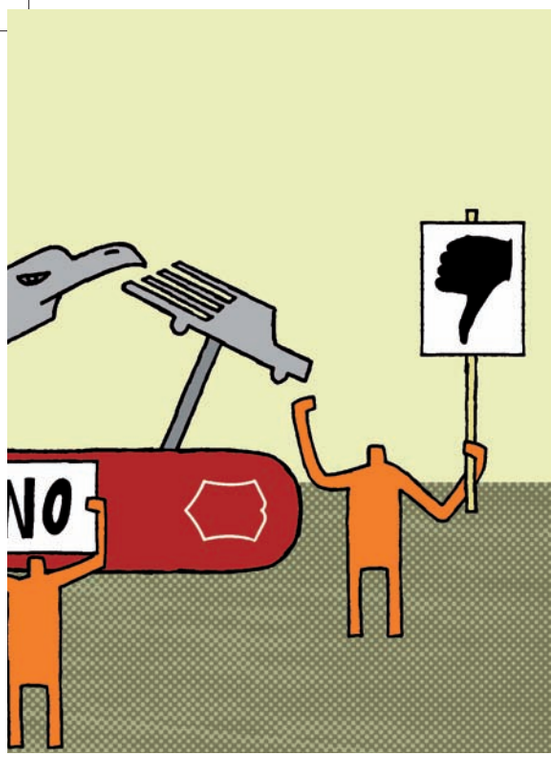
A PARTING SHOT

At least Mary E. Peters, the former US Secretary of Transportation, is aware that ALPR can accelerate the shift toward cashless tolling, a change

DEMAND AND SUPPLY

There is fierce competition among ALPR suppliers to upgrade their technology, with improvements and refinements being announced regularly. Recently, Premier Electronics said its new Autofocus allows a plate to be detected and read with color, black and white, or infrared cameras. Federal Signal's latest Spike HD integrates illumination, cameras and processor in a single ALPR product, which can read up to six plates at once.

Elsag's MPH-900 is now compliant with COPLINK software from Knowledge Computing Corporation. It is claimed to be the first available to law enforcers that is COPLINK compliant. The Watchman ALPR HD system incorporates intelligent vehicle tracking throughout the field of view, including bi-direction and junction mapping, and is capable of high-speed plate recognition from multiple lanes with fast moving high-density traffic. It has a new trigger algorithm to locate multiple plates in the same field of view. Inex/Zamir, meanwhile, has launched what is claims is the industry's first portable hand-held license plate capture system, the LY Portable Camera/Illuminator.



A HIT ON THE OPEN ROAD

Always on, low-error ALPR is a prerequisite for open road tolling (ORT) to prevent some drivers avoiding paying and public confidence in the fairness of the service being damaged. "The charging quality and the enforcement level have to be very close to 100%," says Michael Gschnitzer, director of global sales at Kapsch TrafficCom. "With ORT, there are no barriers to stop the fraudulent user. So we have to conserve the evidence of a non-paid toll for a certain vehicle/user and to achieve a valid payment process." ALPR has become the standard way to identify a vehicle. "Other methods, such as determination of vehicle make, type and color, do not offer unique results and will not work in a court case, which is the final step in a disputed enforcement case," says Gschnitzer.

"When the correct legislation and contracts are put in place, it [ALPR] can be used by third-party agencies to target other debtors"

that relies on ALPR for enforcement and for billing drivers who do not have tags. A week after the 183A toll road in Cedar Park, Texas, became the fifth all-electronic toll road in the state, Peters told the finance summit of the International Bridge Tunnel and Turnpike Association (IBTTA), "Technology has given us high-speed, open-road tolling (ORT)... But we are only just beginning to tap the potential of this simple but powerful technology. So I would like to issue a challenge to the toll road operators here today. You hold the key to speeding the transition to ORT, the key to attracting more investment, and the key to unlocking gridlock through dynamic pricing."

Everyone involved in developing ALPR will have been heartened by Peters' message to the IBTTA: "ORT can be installed quickly and easily, and I am asking you to commit to making tollbooths obsolete in the USA by the time the next surface transportation authorization expires. Let's send these relics the way of the horse-and-buggy."

And it's not just on toll roads where ALPR suppliers should be looking for new customers. "Technology is opening the door to easier, more sustainable ways to pay for and build roads and transit systems – ways that deliver fewer traffic tie-ups, better transit services, a stronger economy and a cleaner environment," said Secretary Peters. The FHWA's new Office of Innovative Program Delivery should be pointing toward innovative transportation projects that require 'smart' cameras.

REVENUE STREAM?

Secretary Peters' suggestion that new technology creates new possibilities for raising revenue for roads was supported by evidence released 10 days later in an announcement from the UK's Department for Transport. It revealed it had greatly reduced the level of road tax evasion, partly through the use of ALPR. Its annual survey showed that just 1% of vehicles are not licensed, a 40% reduction compared to the previous year. A fleet of vehicles and static ALPR cameras are used by the DVLA to detect and support enforcement action against users of unlicensed vehicles from a total of more than 10 million vehicle sightings per year.

The use of ALPR to collect payment is no longer restricted to road tolls, road tax and parking fees. When the correct legislation and contracts are put in place, it can be used by third-party agencies to target other debtors. Working in conjunction with Westminster City Council, the Metropolitan Police, and the Public Carriage Office in London, Philips Collection Services has recently created a special task force of ALPR-equipped vans to combat the use of unlicensed taxi cabs. Using a strategic location, the team mounts an overnight operation every two weeks, reading registration plates and coordinating with the other participants in the scheme to bring the offenders to book. The project is proving so successful that a daytime operation is now under consideration.

The same company has won other contracts across the UK capital and recently increased its fleet of ALPR vans to maintain service levels. Nick Bradley, CEO of Philips Collection Services, explains, "We are dealing with around 10,000 cases every month, so we knew we would have to upgrade our ALPR system." Philips has upgraded to Federal Signal's PIPS, which enables it to load a hot-list of license plates onto an onboard database and interact with it through the PAGIS graphic interface.

The ALPR cameras and software capture plates and crosscheck them against the hot-list. When a match is made, a signal is sent to the Federal Signal back-office database, where a server with mapping software can find the exact location of the suspect vehicle. GPS software is built into the revenue collection vans to enable location of the vehicle to be clamped or towed.

LET THE GOOD TIMES ROLL...

All the signs are good for the continuing growth in demand for ALPR. The Baltimore County Police Department, for example, has used one system to make 400 arrests since 2006, including armed robbery suspects, delinquent parents and drug dealers. "Most importantly, we have returned many stolen vehicles to their owners," comments Jim Smith of the Baltimore County executive. Now the department is to buy four more cameras. "[They] are the tool that will help us find the needle in the haystack, the one car out of thousands wanted for violent crime or theft in our county," affirms Jim Johnson, Baltimore County Police Chief.

Although ALPR is still regarded warily by some groups, reports such as that from Baltimore may gradually allay suspicions about these clever cameras so that they can take their place among the raft of technology which is already deployed to protect communities and support the transportation networks. Frankenstein's monster wasn't given the time or the good press coverage to win public support. It's up to the customers and suppliers of ALPR to use those resources to make it as attractive as Snow White.

by Graham Burtenshaw

SUPER COMPUTERS

HOW PEDESTRIANS ARE FORCING THEIR WAY INTO TRAFFIC SIMULATION

Now more user-centric with a feature-rich graphical user interface, one of the most established traffic tools also has the capability to model pedestrians in a virtual world

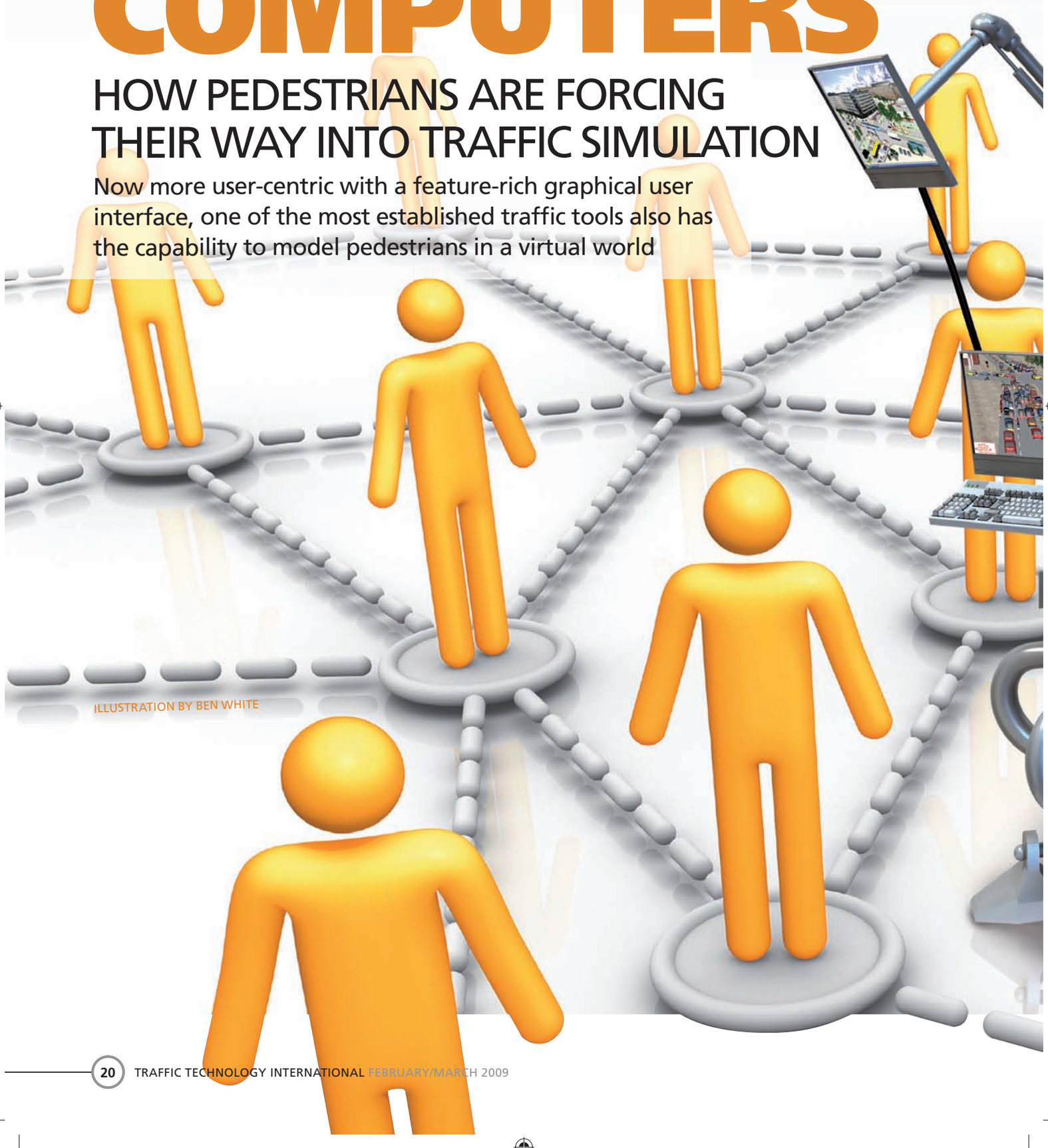


ILLUSTRATION BY BEN WHITE

In April 2008, TRL released TRANSYT 13, marking almost 40 years since the first published descriptions of TRANSYT (Traffic Network Study Tool) appeared in 1968. Although the roads and driving environment have changed, the principles of traffic engineering and the specific science applied to junctions have not altered all that dramatically. TRANSYT has always been a powerful tool in the traffic engineer's arsenal to combat congestion and keep traffic moving. The uptake for this latest version, though, has been widespread, with the highest adoption rate by its users in the product's history, with many users commenting on the extra power and flexibility now available.

More recently, TRL has announced the release of an additional product that extends TRANSYT 13 by linking it together with microsimulation products. The product allows signal optimization and TRANSYT-style Performance Indicator (PI) metrics automatically by linking with the microsimulation and improving the model. The first version links to PTV's VISSIM product and will be available in the third quarter of 2009.

CELL TRANSMISSION MODEL

TRANSYT is used to determine and study optimum fixed-time coordinated traffic signal timings in any network of roads for which the average traffic flows are known. Within its core, a traffic model of the network calculates a PI, which the optimizer seeks to minimize. This traffic model has

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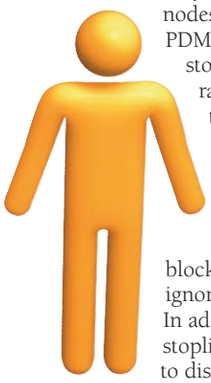
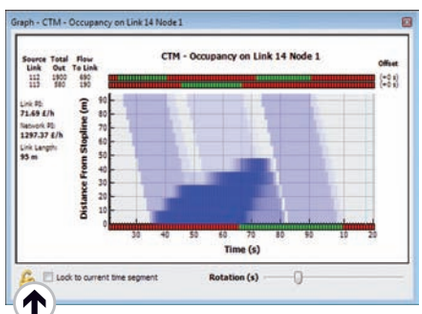
traditionally been based on a platoon dispersion model (PDM), which is fast to run and serves as a good approximation to reality. In particular, it does a good job of modeling the dispersion of platoons of traffic as they travel along the links between nodes (junctions). However, the PDM considers traffic queuing at a stopline to be stacked 'vertically', rather than stretching back toward the upstream junction. This can be a problem where traffic conditions are such that queues reach all the way back to upstream junctions, potentially blocking upstream links: the PDM ignores this blocking back effect. In addition, queues stacked at the stopline are assumed by the PDM to discharge from this single point; no consideration is given to the fact that vehicles at the back of the queue have further to travel to cross the stopline than vehicles at the front.



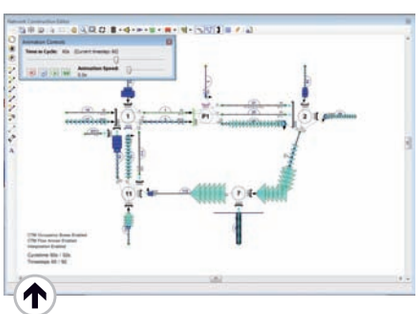
TRANSYT 13 includes an alternative traffic model, the Cell Transmission Model (CTM), which addresses all of these issues. The CTM splits a link into cells, each having an entry and exit function, to model traffic queues and movement along the link. In this way individual 'packets' of traffic can be modeled along each section of each link, meaning it is capable of modeling blocking back effects – invaluable when modeling congested networks. This new model makes it possible for a number of new graphical visualizations, including the animation of cell occupancies, flows and queues along the entire network, which clearly show platooning and blocking back effects. Visualizations are no longer limited to queues at the stopline: in TRANSYT 13, the CTM presents the full picture of the location of all traffic in the network at any instant in the cycle. CTM cell occupancy graphs serve as multipurpose diagrams that can be used as time-distance diagrams, queuing diagrams and more. These present an alternative way of visualizing network performance compared to the more traditional cyclic flow profile (CFP) graphs, and many users may find them more intuitive.

TRANSYT has historically used its own approach in the definition of signal timings, requiring the user to calculate and enter items such as preceding interstage values and link start/end lags. TRANSYT 13 retains this system for compatibility purposes, but also introduces a new mode whereby the user can work directly with standard stage and link/phase timings and intergreen matrices. The user can switch between the two modes at any time. Graphical visualization and editing modes within TRANSYT 13 make data entry much easier and less error-prone.

Interstages, stage minima, and other data items are calculated automatically; timings are then optimized to minimize the network performance index while satisfying all intergreens and other constraints. The new mode uses standard stage starts/ends and losing/gaining delays as an alternative to link start/end lags. Effective greens can be controlled explicitly using network-wide and link-specific start/end displacements. As well as double cycling, triple and quadruple cycling are also offered by the package.



A CTM Cell Occupancy graph showing queuing and time-distance information



CTM cell occupancy animation. Larger blocks/arrows indicate heavier flows

PEOPLE WATCHING COMES TO TOWN

A company at the forefront of the integration between pedestrian and vehicle modeling is PTV. Overseeing progress on the next generation of VISSIM (5.20) is the company's head of pedestrian model development, Dr Tobias Kretz: "The response to our efforts since Intertraffic 2008 has been good. We have noticed a lot of interest from people looking to do very large projects – some with more than 100,000 pedestrians."

What's interesting about the applications PTV is working on is the move toward the coupling of pedestrians and other modes of transport and urban spaces, working more on the conflict areas between vehicles and pedestrians. For instance, where pedestrians move when they leave the train station and engage with other modes of transport – e.g. walking to the bus station.

A natural use for any tool that can work with vast numbers of pedestrians is that of emergency evacuation. "We have already completed a large project, purely for information purposes," Kretz stresses, "where we created an animation to inform around 80,000 music fans about the location of emergency exits at a festival." Kretz says that the idea behind this application – whether for a music festival or evacuating a whole area – is to achieve a scenario where "no matter what might happen, everyone is better able to help themselves."

Kretz and his team are busy tweaking VISSIM 5.20 ahead of its launch and are making improvements to the GUI. This work follows another evolution that has allowed PTV to fully implement area-based walking behavior: "You can assign parameter files and redistributions to each individual area, to change the behavior there for whatever reason. Area-based walking behavior helps to model a huge number of situations."

MODELING FEATURES

TRANSYT 13 also allows the use of time-varying flows on entry links, which are then modeled as propagating through the network. In this way, realistic demand profiles can be input. The signal timings optimizer works across the entire profile, and so leads to timings that minimize delay across the entire modeled period – whether this is a traditional am/pm peak or any other time period. Multiple time periods can be stored within one file by using Demand Sets; these can be associated with different sets of timings and traffic or network properties by grouping data into one or more Analysis Sets. Now a single network file may contain multiple cycle times for use at different times of day.

Pedestrian links have always been available in TRANSYT but as traffic modelers consider the impact of pedestrian environment alongside road traffic, TRL has made them more explicit, and with TRANSYT 13 there is the capability to model the progression of pedestrians along complex crossings. As well as dedicated bus links, TRANSYT 13 also accommodates tram links. Many of the parameters used internally by the program to model buses and trams are now available for modification by the user.

TRANSYT produces a wide variety of output data and in TRANSYT 13 this has been expanded further and includes outputs such as wasted time, which indicates the amount of green time that is wasted due to blocking or entry starvation. Many data ranges

have been extended, and all outputs are now consistently available for each link as well as the entire network (and vice versa) – for example, fuel consumption figures are now available separately for individual links. The use of routes has also been enhanced in TRANSYT 13, with all data outputs aggregated and presented for each route.

Considering the urban environment, the need to merge networks has been a popular user request. This is handled in TRANSYT 13 by a special feature that merges any two networks. In this way, the user can prepare a set of 'building-block' network components and then combine these into larger systems for re-use with multiple projects, thereby reducing recreation and allowing for step-and-repeat processes.

USER INTERFACE

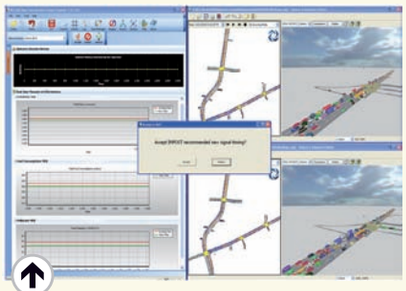
A brand new GUI is also a feature of TRANSYT 13 and provides a greatly improved, highly interactive, feature-rich and intuitive way of entering data, managing files and visualizing results. Data can be entered and viewed in a much more dynamic way than was the case in previous versions. Handy features include Data Grids, which provide a way to concisely view and edit almost any data in grid format. When working with large files, data filters and queries allow the user to focus in on particular areas of interest. A Flow Consistency Tool summarizes all flows into and out of each link and conveniently highlights in color those links whose flows are inconsistent. Working with data ›

City slicker

KLD Associates' Satya Muthuswamy, Wuping Xin and William R. McShane detail the development of an Adaptive Control Decision Support System for New York City DOT

An advanced real-time decision-support system is being implemented in New York City (NYC) for effective adaptive signal control. This integrates online simulation with actual field traffic controllers and detectors, thereby enabling real-time signal optimization while providing instant visualization of different control alternatives and time-dependent measures of effectiveness. A computationally efficient adaptive signal control algorithm has been developed, tested and integrated, which handles oversaturated and undersaturated traffic conditions, and strives to optimize cycle length, offset, and split in real-time.

There are a number of key elements to the system, such as multisource real-time traffic data – which includes those from wireless detectors and ETC card readers – and real-time data processing that takes advantage of parallel computing techniques. Other elements include signal optimization algorithms to handle oversaturated and undersaturated traffic conditions, just-in-time online simulation, and real-time comparison of different control alternatives (quantitative and qualitative). Additionally, it includes both operator-in-the-loop and autonomous modes.



The view available to the human in the decision loop

ACDSS has been built to make cost-effective use of the investments NYC has been making in ITS – the new Advanced Solid State Traffic Controllers (ASTC) and New York City Wireless Network (NYCWiN). This project is concurrent with efforts to migrate the legacy Vehicle Traffic Control System (VTCS) to the next-generation traffic control system (NYC_TCS). The NYC_TCS allows operators to control/manage traffic controllers in the field and update signal timing plans in real-time. Also, upgrades to the communication system support two-way data exchange between the controller and the TMC. This allows real-time data to be streamed back to the TMC, as the field detectors will be interfaced to the controllers. Hence, ACDSS uses these functions to provide operators with the tools needed to update signal timing plans responsively.

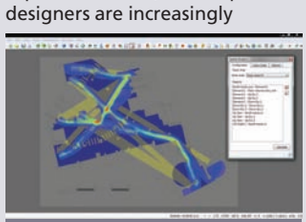
ACDSS is to receive detector data on flow and occupancy from the NYC_TCS system via a

SHARED SPACE

Until recently pedestrian simulation was an expensive, data-hungry, complex and time-consuming luxury that few but the highest profile projects could justify commissioning. But recent software developments by many established vendors have brought maturity and ease of use to pedestrian simulation tools, making them more accessible to a wide range of potential users.

The mainstream availability of pedestrian microscopic simulation – and more importantly shared-space simulation, where both pedestrian and traffic components are considered in the same environment – is the single biggest evolution in traffic planning capabilities since the introduction of microscopic traffic simulation in the early 1990s. These are exciting times, with developers of these tools being able to create a range of new opportunities for consultants, private developers, and public bodies.

But why is pedestrian shared-space modeling important? Today, the car no longer rules supreme. Indeed, urban space designers are increasingly becoming more sensitive to the needs of the pedestrian as a primary mode of transport. There is now a growing trend toward balanced urban space design, where the needs and quality of service provided to both vehicular and pedestrian users are evaluated in tandem.



Spatial analysis map showing areas of high POC

Initiatives to support the green agenda and health issues (i.e. making urban spaces less polluting and more attractive for people to walk in) are also key drivers for the move toward a balanced urban space policy. Finally – and most importantly – pedestrian safety is paramount when considering new urban road usage or revising existing facilities. Planning to improve pedestrian safety and the avoidance of pedestrian/vehicle accidents is a primary goal of today's urban planners.

In response to substantial market pull, Quadstone Paramics launched the Urban Analytics

web interface, forecast upcoming conditions, and in its prototype run concurrent simulation 'instances' of the results with the planned versus an optimized signal timing plan.

The operator is faced with the decision to implement the recommended plan or not, based upon a set of measures of effectiveness (MOEs) and the time since the last change. In its full implementation, the ACDSS can control some 12 arterials in autonomous (self-running) mode, with the operator choosing one arterial to directly control in real-time, obtaining MOEs by high-speed simulations that test planned and optimized signal timing.

ACDSS interacts directly with NYC_TCS. The communication between ACDSS and NYC_TCS is facilitated by a secure web-service interface. The web-service interface definitions lay out the data exchange for signal settings (query and refresh) and real-time traffic data (query).

The sensors to be installed in the field are G4 RTMS units, which collect volume, speed and occupancy data at select locations within the instrumented area. The overall ACDSS design concept deals with the reality that detectors must be employed cost effectively, must be strategically placed, and are sometimes imprecise. The IMPOST control policy was developed by KLD under NYSERDA (New York State Energy Research and Development Agency) funding, and addresses both undersaturated and oversaturated flow, as well as allowing arterial prioritization. This implementation is referred to as IMPOST+, and is the core module within the ACDSS. Other policies can be used in this module.

The Aimsun microsimulation model from TSS is used for online comparison of different control alternatives. This selection was based on the ability to mimic the multiple camera views and concurrent 2D and 3D views of the simulation. This need to to switch to views within the simulation to match the field camera locations was key. Also, Aimsun is a fast and efficient simulation that is flexible and user-adaptable. The end product of this is a component-based software package on top of the core adaptive control algorithm that provides real-time decision support for NYCDOT TMC operators. This means they can supervise and interact with the real-time operations of the adaptive control system, by verifying the algorithm-optimized signal timing plan against other alternatives before actually updating field controllers. This inclusion of real operators in the control loop is vital for achieving robust and reliable operations yet seems unavailable with existing adaptive control systems. Additionally, like other conventional adaptive control systems, the new integrated adaptive control decision support system also allows autonomous signal optimization without operator interactions.

"Aimsun is a fast and efficient simulation that is flexible and user-adaptable"

(Top) Victory Boulevard in Staten Island (Gannon Ave to Richmond Ave); (Above) Study sites, route 9A in Manhattan (between 34th and Houston)

ACDSS is being implemented along two arterials in New York City, Route 9A with 22 intersections in Manhattan, and Victory Boulevard with four intersections in Staten Island. The study sections are shown on the left. The main objective will be reducing travel time variability, minimizing congestion, and improving pedestrian service. In the following years, this new adaptive control system is to be expanded to cover additional NYC arterials.

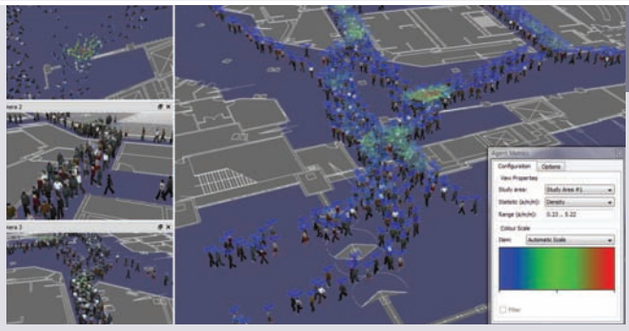
Offline preliminary tests with simulation indicate the system being implemented at Victory Boulevard achieves 8% average decrease in travel time, 6% average decrease in vehicle stops, and 7% average decrease in vehicle delay. Meanwhile, due to reduced delay and number of stops, the new system also results in a 3% reduction of emission level, as well as a 6% fuel consumption saving. It is also projected that deployment of the system would help reduce maintenance costs associated with signal re-timing by 20-35%.

This project is currently ongoing and is being sponsored by NYCDOT. The authors thank Mohamad Talas, project manager and his staff at NYCDOT, and colleagues at KLD, GPI, EIS, and TransCore. In earlier work, NYSERDA provided funding to develop the IMPOST control algorithm. For more information, please email satya@kldassociates.com

Framework (UAF) in September 2008. This software package is specifically designed to model pedestrian and shared-space environments using the same foundation of powerful analytics found in the company's traffic microsimulation tools. Other software vendors are following suit, with more than four commercially viable pedestrian simulation applications available, or in the early stages of release.

The new Quadstone Paramics software focuses on the key areas of shared urban space design: pedestrian crossing facilities; public transport terminals; special events planning; and safety analysis. Uptake has been swift, with 12 installations on five continents in less than three months, which is indicative of the speed at which the pedestrian simulation market is maturing as a whole.

There are a number of applications of the new software currently being deployed. In South America, Europe and Australia, analysis of pedestrian crossing facilities is being conducted. The tool is also being put to good use for large-scale urban space design in central Sydney, Australia. Innovative shared-space analysis and design studies are also being performed in Newcastle, UK. In another useful shared-space application, mass crowd management is being explored for the Kingdom of Saudi Arabia's Integrated Transport and Traffic Solutions for the Makkah Central area.



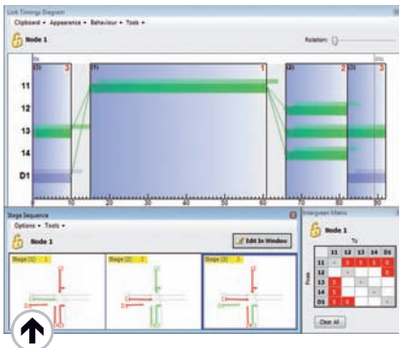
The screenshot shows level of service density and agent direction markers

How, then, does the easy and cost-effective availability of pedestrian simulation technology, including integration with traffic simulation, benefit the end-user base – specifically consultants, private developers and public bodies?

Visionaries in the consultant base can become early adopters of new shared-space technologies, positioning themselves at the forefront of this emerging marketplace, ideally placed to establish themselves as domain experts.

Mainstream consultants can now easily expand the portfolio of services they offer to their existing client base with a clear upgrade path from pure traffic simulation (in which they will be skilled users) to a new shared-space approach incorporating pedestrian aspects. In the simplest case, consultants can simply 'add value' to traditional traffic-orientated projects. Consider, for example, the classic Traffic Impact Assessment. With the UAF, the evolution of a simple traffic model to a shared-space model – including pedestrian flows, different crossing types, and powerful

TRANSYT 13 Graphical User Interface



New TRANSYT 13 signal timings screens

‹ in TRANSYT 13 is made easier by comprehensive document-editing features, such as undo/redo functions, copying/pasting from spreadsheets – a task list that summarizes any problems in the file – and a glossary/data-field finder.

The graphical Network Construction Editor (NetCon) is fully integrated in TRANSYT 13. Users can build and edit networks almost entirely from within this 'home' window, using a mouse to graphically connect links to nodes and other links. Other innovative features include the use of color overlays to indicate flow consistency, errors/warnings, and value comparisons. Signals, queues and CTM occupancies can all be animated and studied from this window, while graphics can now be exported to AutoCAD (DXF) for further use by design engineers and SVG formats.

Reports are available in HTML, with individual tables in a form that can be cut and pasted to any word processor or spreadsheet. Almost any data output can be plotted against any data input by using the *X-Y* graph generator. Clearly there are many possibilities for network analyses based on the use of this tool, and users have found it invaluable in exploring and explaining a variety of phenomena.

INTERACTION

TRANSYT 13 is fully backward-compatible with TRANSYT 12 and provides full import and export options. A TRANSYT 12 Data Viewer screen is also included, which shows an equivalent TRANSYT 12 data file at all times, where possible. For users who may be accustomed to TRANSYT 12, there are several 'compatibility' screens in TRANSYT 13 that replicate the layout of data items from previous versions.

Files from JCT's TRANED 2 product can be imported, and this includes the import of the graphical layout of the network.

Interoperability and joining up of key software products and workflow processes has never been more important in today's environment: traffic engineers do not have the time to model things in many different packages and data reuse is key. Individual nodes/junctions can be exported as OSCADY PRO files, and OSCADY PRO can then be used to optimize individual junctions or to automatically generate a set of optimal stage sequences. The optimal fixed timings produced by OSCADY PRO can then be cut and pasted back into TRANSYT 13 and the TRANSYT optimizer then run to coordinate the timings with other nodes in the network. Add the VISSIM link and the combinations become increasingly interesting.

This new version of TRANSYT has already generated some extremely positive feedback from traffic engineers. In developing this 13th version, TRL has responded to customer feedback, focusing heavily on the user interface, making the product more user-centric, but behind the exterior is building a product that can be extended for many years to come. TRANSYT 13 represents a move into a new era, while the TRANSYT VISSIM link product builds on the momentum from earlier in 2008. In doing so, TRL continues to place the science that it is known for into the hands of the traffic engineer. ■

"Interoperability and joining up of key software products and workflow processes has never been more important in today's environment"

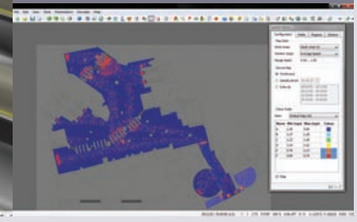
Graham Burtenshaw is a software manager at TRL. He can be contacted by emailing gburtenshaw@trl.co.uk. Alternatively, for more information about TRANSYT 13, please log on to www.trlsoftware.co.uk

analytics – is simple and cost-effective to implement.

As pedestrian simulation techniques mature and the availability of good quality, cost-effective tools increases, public bodies can be confident in requesting this type of modeling exercise. Tools such as the UAF can be used to accurately quantify the benefit of improved road schemes, crossing point accessibility, and shared-space planning to the taxpayer. In addition, the powerful 3D visualization techniques employed in traditional traffic simulation tools to aid public presentation can now be applied to pedestrian spaces, making it easier for public bodies to convey their plans to the public.

It's clear that pedestrian simulation and shared-space modeling is rapidly gaining acceptance in traditional traffic planning circles. Quadstone Paramics believes acceptance of these techniques will accelerate as consultants look to expand their offerings and ensure high return on investment. At the same time, public bodies can be empowered to push for more inclusive pedestrian-friendly solutions to traditional traffic-orientated problems.

Ultimately, it's the end user who will benefit from these new practices. Urban planners designing spaces we want to walk through. Buildings that ensure we can exit safely and quickly. Retail developments that are designed to make the dreaded Saturday afternoon shopping trip as painless as possible. And transportation hubs that are designed around a single goal – to move people as smoothly and quickly as possible. All are attainable with the new wave of shared-space simulation tools that innovative software developers and researchers are bringing to market. ■



UAF presentation graphics (left) in Paramics and (below) showing level of service speed, filtering by bands E and F

To find out more, contact Quadstone Paramics by calling +44 1491 416 600, emailing richard.millington@paramics-online.com, or visiting www.pedestrian-simulation.com

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TECHNICAL DIRECTOR,
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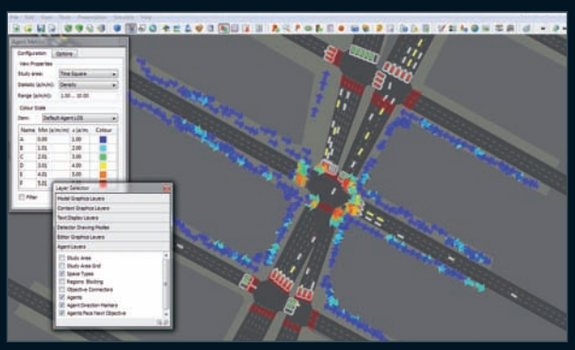
PedestrianSimulation

The Urban Analytics Framework

Simulating People and Traffic for:

- Urban Space Design »
- Pedestrian Crossing Facilities »
- Public Transport Terminal Layouts »
- Special Events Planning »
- Safety Analysis »



The Urban Analytics Framework from Quadstone Paramics

UAF built on

QuadstoneParamics

technologies

www.pedestrian-simulation.com

by Colin Wilson & Glenn Hansen

ILLUSTRATION BY MAGICTORCH

COMMON GROUND

THE NEED FOR MORE INTERNATIONAL COMPLIANCE IN ENFORCEMENT STRATEGY

The enforcement community on both sides of the Atlantic would benefit from sharing experiences in tackling common problems, and supporting agencies in their procurement of new systems and services

There are many similarities between automated enforcement in Europe and the USA but there are also interesting differences in the way that systems are deployed and operated, due in part to legal, operational and cultural differences between enforcement regimes in Europe and the USA.

Automated enforcement has been widely used in the European Union (EU) to detect and prosecute violations such as speeding and red-light running since the late 1980s. Around a decade ago, there was a gradual shift toward the use of digital technology to replace the – until then – ubiquitous wet-film cameras. It also saw automated enforcement systems being used to detect and record an increasing number of offenses.

Legislation permitting automated enforcement systems is nearly always set at the national level, although this is complemented by recommendations provided periodically by the European Commission. This reliance on national legislation throws up some anomalies across the EU. For example, states differ in their legal interpretation of who is responsible for apparently similar violations – the vehicle driver, the vehicle owner, or the registered vehicle keeper?

From a standards perspective, many EU member states require enforcement equipment to conform to national Type Approval standards before it can be deployed and operated. There is no pan-EU Type Approval standard and in the majority of schemes, public sector agencies perform most day-to-day enforcement operations. The role of the private sector is typically limited to system installation and maintenance. However, a small number of schemes now use private sector contractors in specific roles to support day-to-day operations, albeit closely supervised by the public sector agency which retains overall operational and legal responsibility.

In the USA in the 1980s, automated enforcement was introduced in support of more efficient toll payment systems. It was first used operationally for speed enforcement in the late 1980s and for red-light enforcement in the early 1990s, although uptake was much slower than for toll violation enforcement. Today, automated enforcement of speed and red-light violations uses a mixture of wet-film and digital enforcement equipment, although since about 2000 nearly all new equipment procured has been digital.

States have the responsibility to enforce most traffic violations, and most state laws have to be amended to specifically permit the use of automated enforcement technologies. In a few states, 'home rule' allows local jurisdictions to conduct automated enforcement without a specific state law. Most states that have decided to permit automated enforcement systems have established broad parameters for their use. Local jurisdictions then decide if they want to operate automated systems on the basis of these parameters. To date, only Delaware has introduced a statewide program.

Automated enforcement programs tend to operate a little differently in each state. The biggest difference is the accountability of the owner of a vehicle versus the driver of the vehicle. Some states hold the driver of the vehicle accountable for a criminal violation and frontal images are used to identify the driver. Most states now hold the owner of the vehicle accountable for civil infractions and only need to positively identify the vehicle.

The private sector has a much greater role in the day-to-day operation of enforcement programs in the USA. Working under the direction of the public sector enforcement agency with overall responsibility, it is relatively common to find enforcement programs in which large parts of the day-to-day operations have been outsourced to the private sector. In support of this, a number of the world's leading equipment suppliers offer turnkey services, which allow law enforcement agencies to 'buy in' to complete enforcement packages, including equipment and professional services.

SINGLE CAMERAS

In Europe, speeding has traditionally been enforced using a single roadside or gantry-mounted camera to detect and record what is effectively a 'spot' speed. However, with decreasing cost and increasing reliability, enforcement agencies are making more use

"As pressure on public authorities' resources has grown, soliciting private sector support to provide selected enforcement services has become more attractive in some regions"

of 'average speed' or 'speed-over-distance' enforcement systems on inter-urban roads and workzones in particular. These speed enforcement systems use two or more linked cameras to record and match vehicle license plates and thereby determine vehicle speed over a length of road. First used operationally in The Netherlands in the mid-1990s, today's commercially available systems, such as Speed Check Services' SPECS system, have proved successful at reducing average vehicle speeds over the monitored sections of road.

As automated enforcement has grown more effective and reliable – and as demands on law enforcement officials' time has continued to grow – an increasing number of offenses are being enforced automatically. These include new offenses designed to be enforced automatically from the outset, such as low-emission zones and access control schemes, and also offenses such as moving traffic violations (banned turns and yellow box violations in the UK, for example), which were previously enforced manually. With the increasing reliability and accuracy of weigh-in-motion systems, the use of automated enforcement to detect and gather evidence on overweight vehicles is also a very real prospect for the near future – and already in a number of member states elements of automated enforcement systems are currently being used to identify vehicles which may be overweight and need to be subjected to roadside checks using a weighscale. Although not safety-related, offenses related to non-payment of charges for the use of infrastructure, such as road tolling and congestion charging for example, also use automated enforcement.

The number of different applications of automated enforcement in the USA has not been as extensive as in the EU. However, automated enforcement of red-light violations has been very successful and is now in widespread use in 324 communities in 23 states and the District of Columbia. The automated enforcement of speed violations is less widespread, with operational systems deployed in only 11 states and Washington, D.C.

Automated speed enforcement is currently being used by 37 communities. With a small number of exceptions, it is concentrated in residential streets, not high-speed, high-volume roads. Some locations further restrict the use of automated speed enforcement technology to schoolzones. Also worthy of note is the fact that since the early 1990s a number of jurisdictions across the USA have deployed operational automated speed enforcement systems only to later remove them for a variety of different legal, operational and public acceptance issues.

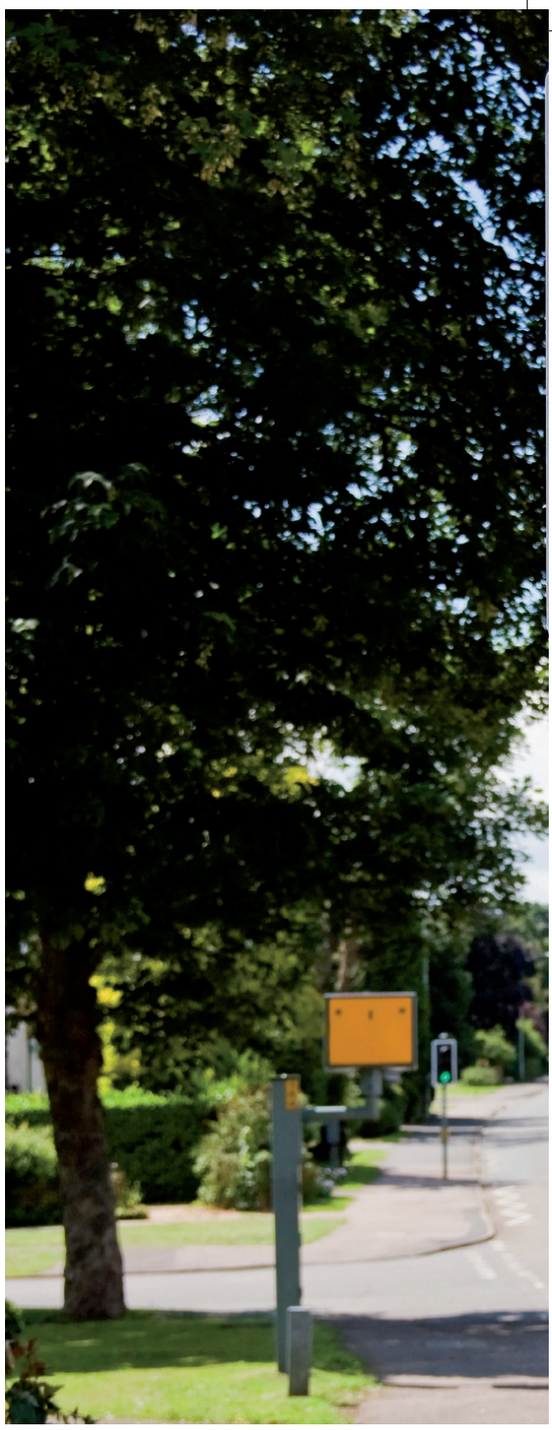
Another notable application of automated enforcement in the USA is the detection and recording of railroad crossing violations. Automated enforcement is also widely used for the detection and recording of offenses related to non-payment of charges for the use of infrastructure.

The use of automated enforcement technology to facilitate moving vehicles more quickly through toll facilities has expanded with little controversy, while applying automated enforcement technology for the purpose of improving safety has ignited heated debates in many places.

The enforcement community on both sides of the Atlantic faces a number of challenges in the next few years, including operational and procedural challenges and – given the growing use of technology in carrying out enforcement – technical and standardization challenges.

Policy needs to be based on scientific and empirical research rather than 'folk psychology' where ill-conceived and vested interests are to the fore in certain aspects of the media. A number of enforcement programs have struggled where the road safety message has been diluted and the more vociferous objectors have tried to claim the moral high ground by citing anything from 'Big Brother' to taxation. A better understanding of the safety benefits of automated enforcement helps people to appreciate the need for automated enforcement systems.

Redflex systems provide moment-by-moment situational awareness of problem traffic areas, including intersections



CONSISTENT STANDARDS

To the driver, national or local geopolitical boundaries are largely irrelevant, regardless of where they are traveling – each expects to be treated in the same manner as everyone else. The reality across the EU in particular is that 'fairness' is being compromised as in most cases legal, organizational and operational blockages mean that it is not possible to impose and enforce penalties on violators from other member states.

The increase in aggressive driving and the high percentage of crashes that occur at intersections has resulted in a surge of automated enforcement technology

Excessive speed is considered to be a major contributing factor to motor vehicle crashes and is therefore an important focus of highway enforcement efforts

In Europe there is now general agreement as to how cross-border enforcement could be achieved across the EU. New legislation to provide the legal building blocks is either already in place, or is currently under consideration. Perhaps most importantly, there is now a growing will at the national and European level to address this issue and to establish an effective approach to cross-border enforcement.

Standards are crucial to the consistent deployment of automated enforcement systems and to guarantee that they always provide data that meets the relevant requirements for evidence. The deployment of new enforcement technology in Europe is placing a greater emphasis on its consistent use across national borders and the importance of Type Approval as and when appropriate. In the USA, operational guidelines have been published by USDOT for the use of red-light camera systems and this year speed enforcement system guidelines were also published. Technology standards have also been developed by the International Association of Chiefs of Police with allied agencies. In general terms, and where appropriate, there are benefits to be gained if the standards aspects of new and emerging technologies can be explored earlier in the development process than is currently the case.

An increasing number of offenses that relate to the use – or rather the misuse – of roads in Europe are being created under civil or administrative law. Effective ways still have to be found to deal with the cross-border aspects of enforcing these types of offenses when they are committed by 'non-residents'. In the USA, a system of reciprocity between states has worked well. If, for example, a Maryland resident received a traffic citation in Virginia and did not pay the fine or go to court, the resident's Maryland driver's license could be suspended. But this type of reciprocity does not exist for civil sanctions, and as most of the automated enforcement infractions issued in the USA are civil, this is expected to become more of an problem over time.

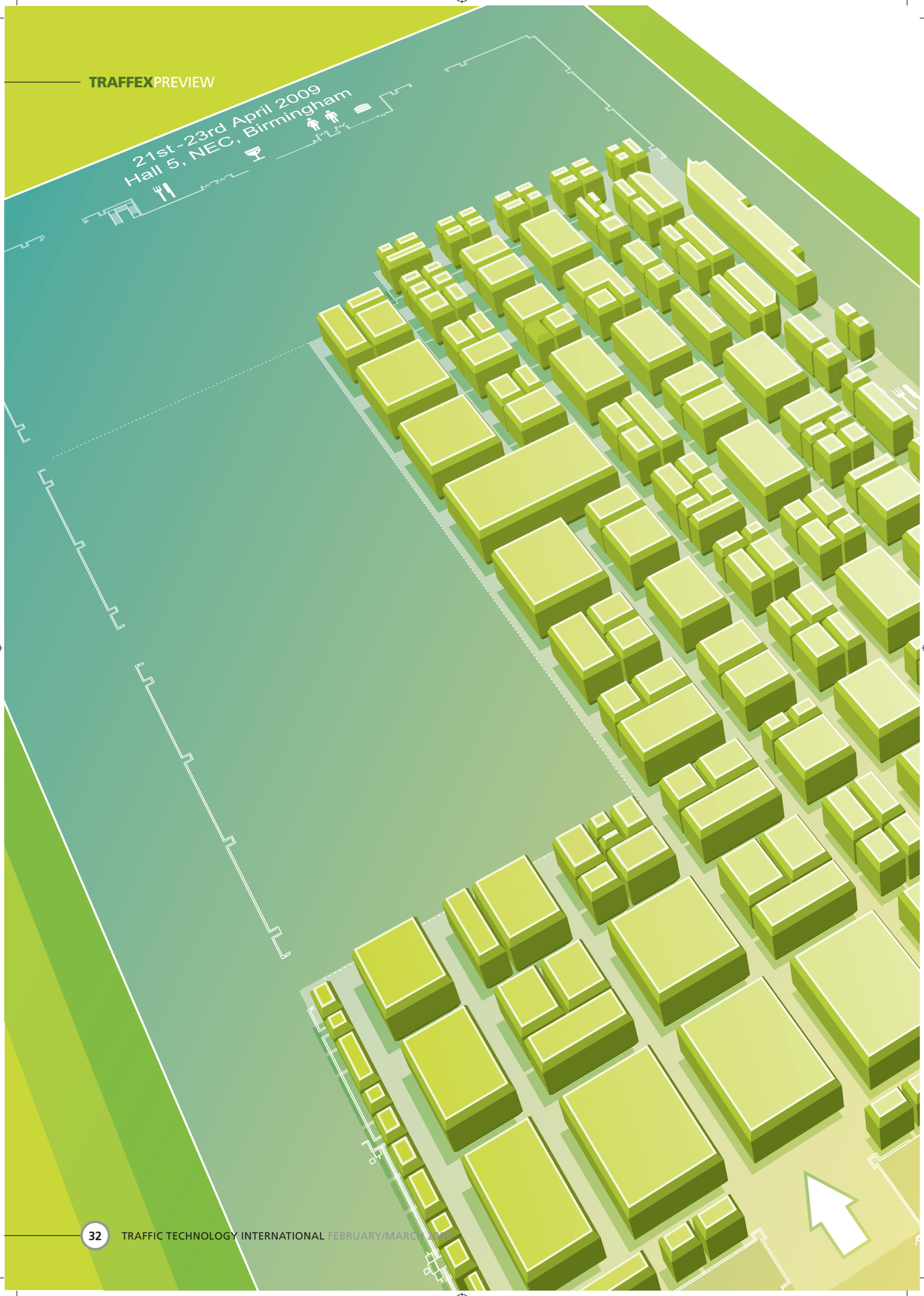
PRIVATE INVESTIGATIONS

As pressure on public authorities' resources has grown, soliciting private sector support to provide selected enforcement services has become more attractive in some regions. In the 1990s, US agencies started using public-private partnerships to support automated enforcement programs and one program was stopped and hundreds of citations dismissed when a court decided that the local government did not exercise sufficient control. Since that time, programs have been more carefully designed to ensure accountability. Agencies have to consider the environment under which any private sector involvement is sought. Under no circumstances can private sector involvement have – or be seen to have – an adverse impact on the judicial process.

It is generally accepted that funding for automated enforcement can only be justified as part of delivering a wider road safety policy targeted toward reducing fatalities and serious injuries. In healthier economic times, concerns about agencies using automated enforcement to raise money were one of the prime reasons for its slow adoption in the USA. In these tougher economic conditions – when many governments are borrowing increasing amounts of money to support ailing industries – it is even more vital that automated enforcement is not seen as an easy way to recover money by stealth.

A greater sharing of ideas and experiences between enforcement agencies would assist in understanding and tackling common problems and help to support agencies in their procurement of enforcement systems and services, especially as the marketplace is becoming increasingly global. ■

Colin Wilson is from the IBI Group and Glenn Hansen works for Traffic Safety Solutions LLC. For more information, telephone +44 20 7017 1850, or email cwilson@ibigroup.com. Alternatively, email ghansen@trafficsafetysolutions.com


21st - 23rd April 2009
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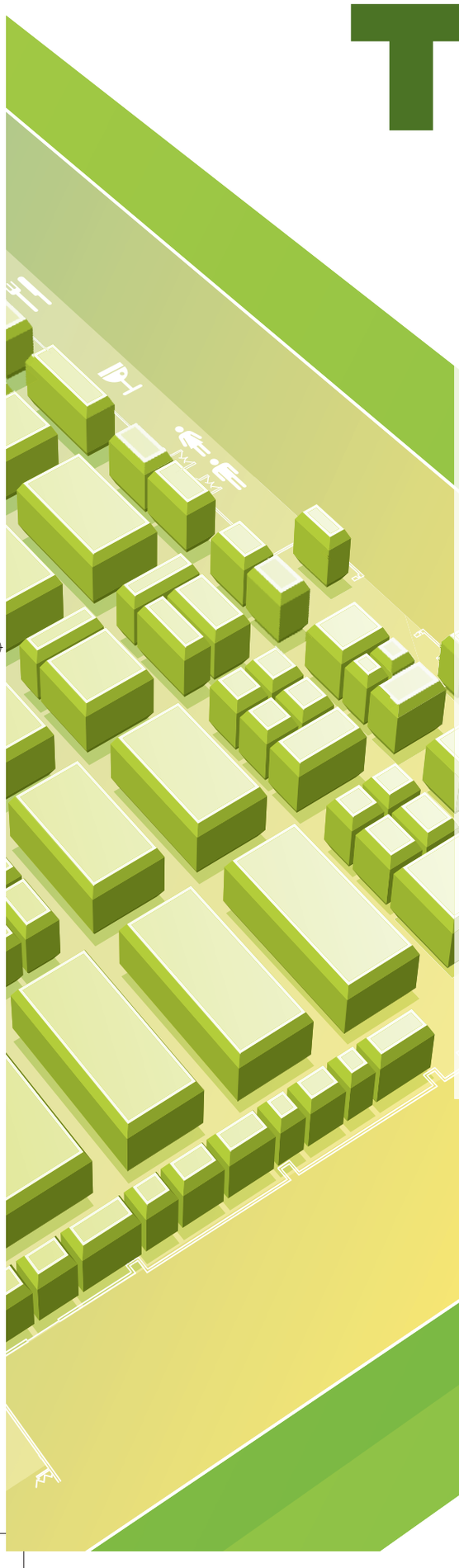
TRAFFEX PRESS

MORE EXHIBITORS, MORE VISITOR ATTRACTIONS

In a single visit, you will be able to see the latest and most innovative traffic management and road safety solutions from over 500 suppliers. If that isn't enough, you can even come and see us…



Traffex 2009 – the 24th international traffic engineering, road safety and highway maintenance exhibition – is taking place in Hall 5 at the NEC Birmingham, UK, from April 21-23 2009. The organizers say it will be the largest in its 30-year history, and will be co-located with Parkex (Europe's largest dedicated parking exhibition) and Street Design – a new event for urban design. Visitors will have the opportunity to see over 500 exhibitors from the world of transport, parking and street design all in one central location.

The event will also have additional special features such as the Passive Safety Zone, an area where visitors can see the results of live crash testing and obtain free advice from the experts on the use of passive safety products in designing safer roads.

Companies from the UK and around the world are using Traffex 2009 as the launchpad for their latest products and services – many will be showing in the UK for the first time. In addition, this year's event will feature a completely new purpose-built Seminar Theatre, offering visitors a wide range of topical briefings and insights from the traffic industry's leading experts. The three-day program will be free to attend and is organized by ITS(UK) and The Institution of Highways & Transportation.

Over the following pages, there is a sneak preview of some of the new products that you will see at the exhibition, as revealed to us by the people you will meet at the show. In addition, some seminar presenters have also given us exclusive access to their program topics. *Traffic Technology International* will in attendance (Stand H23) with our April/May issue, so if you fancy picking up an advance copy, renewing your subscription, or even letting us know about a potential article, please come and see us. We look forward to meeting you! ■

Traffex: a sneak preview

NEXT TOP MODEL

STAND F51

TSS-Transport Simulation Systems, event partner at Traffex 2009, will be launching the latest version of Aimsun 6.1, a highlight of which is a model of pedestrian movement by Legion. The pedestrian simulation model is completely integrated inside Aimsun as a plug-in and comes in different varieties. In its standard form, included with all Aimsun editions, it enables traffic engineers to model any kind of pedestrian crossing – be it signalized or not. Pedestrian-actuated and fixed-cycle signals can also be modeled, with vehicles and pedestrians interacting with a high degree of realism. The more powerful varieties of this plug-in cater for larger numbers of people and a wealth of pedestrian activities in urban areas. David Garcia, technical director at TSS says: "Legion for Aimsun represents a 'best of both worlds' for users. The quality of Legion's patented movement algorithms has been married with a characteristically efficient 'Aimsun way' of defining pedestrian objects. The process of building the model is the easiest possible and the unmistakable quality of Legion immediately shows in the outputs." Visitors will be able to discuss further features with TSS staff, including Garcia. The company's Alexandre Torday is also giving a seminar presentation (see *p*40 for further details).

www.aimsun.com

ITALIAN JOB

STAND D51

"For many years **Famas System** has been a dominant force in Italy," says Roland Kuntner, marketing and sales manager, Famas. "We attach great importance to R&D, with more than 25% of our staff working in that department."

One recent success story for the organization has been the implementation of a turnkey traffic monitoring system with 268 outstations for the Region of Emilia-Romagna in Italy. All stations are completely autonomous, are powered by solar panels and send their data via a GPRS network. The information in the central in-station can easily be accessed by the region and the other participating authorities via a web-based GIS server. This deployment is in line with a trend that Kuntner has been recently observing: "In our sector, a big trend is the increased use of the latest communication technologies, for faster and more cost-effective ways of supplying information," he explains. "I believe that the trends of the past years will continue, but with shorter innovation cycles, producing interesting benefits for both users and consumers."

Famas System is using Traffex to present its above-ground sensors range (named STAR) and its multifunctional meteorological and ice-warning station, MPG500 evo. It will also be the first opportunity to see the company's newest product, a traffic counter and classifier called MOBILTRAF, suitable for temporary and stationary installations.

www.famassystem.it

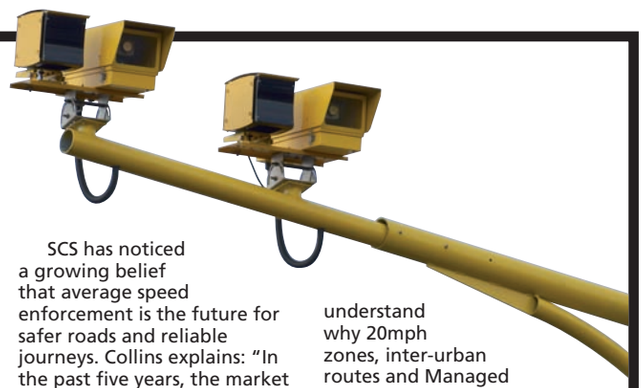
SEAL OF APPROVAL

STAND B20

The news that the SPECS3 average speed system from **SCS** (Speed Check Services) has been recommended for Home Office Type Approval (HOTA) will no doubt be one of the big talking points at Traffex. This means the company's Geoff Collins is looking forward to an exciting few months: "SPECS3 has been in development for more than four years, and now it has been recommended for HOTA, we can roll it out. It already looks as if 2009 will be a busy year for us, with an unprecedented level of interest from Safety Camera Partnerships and highways authorities."

"We've always worked with average speed enforcement solutions (being the only company currently to hold HOTA) but have recently noticed a big increase in enquiries. This ties in to our new products being developed, but also a greater understanding from the marketplace – including the government. Digital average speed camera systems are seen to be fairer and more effective."

One of the largest projects SCS has worked on was the M1 6a-10 widening scheme. "Our SPECS cameras were used to enforce a temporary 50mph speed limit during construction," Collins says. This was so successful that the number of casualty collisions halved during the construction period, compared to the previous three years. Also, traffic flows were maintained despite the roadworks.



SCS has noticed a growing belief that average speed enforcement is the future for safer roads and reliable journeys. Collins explains: "In the past five years, the market has grown from a handful of small projects to a significant installation base. As it is now understood that using average speed cameras dramatically reduces casualties and improves traffic flows, local authorities and highways authorities are designing schemes to improve existing routes or to replace older technologies, such as wet-film 'spot-speed' cameras. With solutions that issue very few tickets while improving safety and flows, it is easy to understand why 20mph zones, inter-urban routes and Managed Motorways may all use some elements of average speed monitoring."

SCS will be launching SPECS3 at Traffex and promoting the fact that the system allows the proven benefits of average speed control to be applied across networks of roads, along lengths of carriageway and as part of complex traffic management schemes. Collins himself will be presenting a more detailed discussion as part of the Traffex seminars.

www.speedcheck.co.uk

STAND D41

ONE-STOP SHOP

"Being a specialist in the design and supply of vehicle weigh-in-motion systems and traffic counters and classifiers, **TDC Systems** is experiencing increasing requirements for the provision of up-to-the-minute real-time traffic information," says the company's business development director, Tony Di Monaco. "The need for statistical traffic data is still there for traffic planning and infrastructure design. However, new partners such as road policing, UTMC, overload enforcement, and road safety organizations require the same data to be readily accessible."

Throughout 2009, TDC is planning to support and develop an integrated transport system and is seeking to form partnerships with other industry suppliers to provide integrated software and services. "One of the many benefits of integrating traffic data collection system outputs into one common user interface is that data can be made available from any source and presented in many ways to multiple users," Di Monaco explains.

In 2008, the UK DfT appointed TDC to carry out the maintenance of the Automatic Traffic Data Collection (ATDC) system outstation sites. The system comprises 197 ATDC core census classifiers and WIM classifiers, all of which are based on the industry-standard TDC Systems HI-TRAC 100 traffic counter classifier system. Another recent example of the work carried out in partnership with TDC customers includes the Derbyshire County Council Motorcycle Route Safety Project. The purpose is to provide accurate motorcycle data with a view to deploying additional targeted measures, such as motorcycle- and speed-triggered VMS, and journey time measurement.

"We are always investing in new products and trialing new technologies in line with requirements. We envisage that in future, data from the same systems will be shared by different users. In this way, traffic counters may provide statistical data for planning departments through a customized web interface and an officer in charge of policing may have a different interface displaying speeding HGVs on rural roads in near-real-time."

www.tdcsystems.co.uk

STAND C20

BRIGHT FUTURE AHEAD

Among the companies making a return visit to Traffex is **Swarco** – a joint appearance with its UK subsidiary, Dambach UK. A number of innovations will be on show, including the latest optical technology for LED VMS, a premiere of the new LaneLight bi-directional LED in-road marker, as well as a range of reflective glass beads and preformed thermoplastic marking systems. The established Futura LED traffic signal range will also be on display.

Swarco's Richard Neumann will be on hand to promote the company's plans for the coming months. "We have noticed more focus on cooperative systems of late and Swarco is part of international research projects such as CVIS, SAFESPOT, and COOPERS," he says. "Continued conversion to energy-saving LEDs with regard to traffic lights is another big trend, as is demand for innovative and environmentally sound solutions for keeping traffic fluid and making roads safer. Our aim in 2009 is to maintain our leading position in the traffic industry, despite a difficult economy, and to implement the reorganization of our German companies acting in the traffic management sector (Signalbau Huber, Dambach-Werke, Weiss-Electronic, and M-UniComp)."

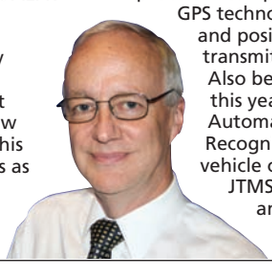
One large project that Swarco is just completing is the implementation of a modern traffic management system in the city of Bucharest (Bucharest Traffic Management System – BTMS), conducted with its Romanian consortium partner, UTI. The project is valued at Euro 18.5 million and Neumann describes it as "the most advanced traffic management system in Europe". The success of the project is based on the functional integration of eight main subsystems, including a UTC system, CCTV, Fault Management Systems and Performance Monitoring. Neumann says: "A Common Graphical User Interface is used to provide an integrated and common look and feel to the BTMS Central Operators for all the subsystems and functionalities. A number of the subsystems (such as Utopia, Flash, and Mistic) are ITS applications from Mizar Automazione, which has been part of the Swarco Group since May 2005."

www.swarco.com

STAND Z10

RECOGNITION IN THE FIELD

Manning the **CitySync** stand will be Lawson Noble, CTO. "Plate-reading accuracy has increased greatly and users can now expect percentage read rates in the high-nineties on fixed systems for fast-moving traffic," he says. "This means that NAAS-compliant ALPR can now be installed across motorways and provide not only low-accuracy traffic monitoring data, but also high-accuracy law enforcement data. This results in cost savings as a due sharing data between multiple agencies."



In 2009 CitySync will be launching the 'JellyBean', a powerful aerodynamic twin-lens ALPR camera, as well as the new 'Fox-i' intelligent ALPR camera. The Fox-i is a high-definition twin-lens intelligent camera with a very fast onboard processor complemented by GPS technology for time and position, and a 3G transmitter/receiver. Also being announced this year is an Automatic Vehicle Recognition system, a vehicle classifier, a full JTMS software suite and an SQL back-office system.

Noble has recently overseen a project where the Central Motorways Police Group (CMPG) in conjunction with Telent and the Highways Agency took delivery of 140 CitySync ALPR systems. "Most of these are Fox-HD cameras with color overview capability. These save time and money on installation and maintenance costs and the HD feature means that each camera can monitor two motorway lanes simultaneously. Dynamic control means that the camera is optimized from frame to frame as each vehicle passes."

At Traffex, visitors will be able to see the new JellyBean and Fox-i HD for the first time. In addition, CitySync will also be showing a new GUI on the JTMS system that allows users to drag-and-drop camera position onto a map for real-time journey time calculations. Some new compact ALPR roadside processors will also be on show.

www.citysync.co.uk

STAND Z64

SIGNS OF CALM

2009 is already shaping up to be an exciting year for one company in the traffic-calming field. **Fortel Traffic** is in the process of going 100% wireless, online, and global. Even during a difficult economic climate, company president Emery B. Dyer is observing some changes in the marketplace that he finds reassuring: "More companies and products appear to be spawning, attempting to initiate direct competition with devices that we have been offering for several years. We started developing our products based on getting results and not on predetermined specifications. The effectiveness of our products has caused the market's specifications to be written based on features we offer. The traffic calming industry has realized the importance of effective products and has tossed their old specifications aside."

Dyer has a number of case studies at his disposal to

support this point, including a tale of his company's signs surviving a hurricane completely unharmed – which speaks volumes for their durability. He is keen to highlight independent research that has been conducted on both Fortel Traffic products and their competition: "The county of Salt Lake, Utah concluded that our sign is the most durable in a study where no maintenance, power, or other intervention took place for more than two years. Our product was the only one left still working as if it were installed the day before."

Visitors to Fortel Traffic's stand will be able to see its latest traffic safety products, including SafeXing, which is geared toward saving lives at roads and crosswalks, and VSpeed Online, which aids device maintenance by allowing remote management, automated data downloads, and easy programming.

www.forteltraffic.com

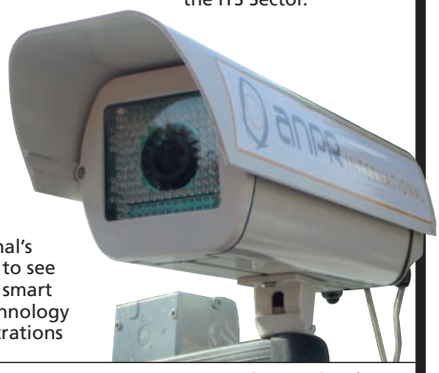
STAND B21

EYE ON TRAFFIC

Technical director Martyn Attwood will be busy meeting both new and existing clients on **ANPR International**'s stand. The company is currently seeing an increase in sector growth and demand for ALPR technology within the traffic industry on a number of fronts, and is observing the potential for new sectors to open up as the year progresses. Attwood explains what's happening next: "ANPR International is planning to roll out its latest technology offering, eyeTRAFFIC, to various sectors within the industry, and is anticipating the successful award of a number of strategic business contracts. We are expanding heavily as the industry invests in IT and technology-based solutions that offer a higher return on investment and lower long-term costs of both operation and deployment."

Visitors to ANPR International's stand can expect to see the very latest in smart ALPR camera technology and live demonstrations

of the power and capability of the eyeTRAFFIC ALPR network and back-office system. In addition, the company will be running workshops on a number of different topics and will also hold one-to-one sessions with interested parties to help explain and demonstrate specific aspects of ALPR in the ITS Sector.



www.anpr-international.com

STAND Z67

ADDITIONS TO ALPR ENFORCEMENT PORTFOLIO

Alslo in the ALPR field, **PIPS Technology** will be exhibiting the newest addition to its product portfolio, SpeedSpike. This is a time-over-distance speed enforcement system that can be deployed for a number of functions, such as urban speed enforcement, to eliminate rat-runs and local short-distance speed enforcement outside schoolzones.

Traffex 2009 will also be the first time the new Spike HD camera has been exhibited in the UK. Spike HD is an ALPR camera designed for use in high-performance applications where the ALPR function is needed across a full 4m-wide carriageway.

Paul Negus, managing director of PIPS Technology, explains that the company is noticing increased demand for complete ALPR systems: "Integrated digital LPR cameras incorporating both the camera and the recognizer within a single sealed enclosure (such as PIPS Spike camera) are the preferred choice. The basic method behind this is 'power in, plates out' with a choice of communications. This saves on system costs, complexity and installation timescales. Until recently, systems for ALPR have been a complex combination of cameras, illuminators and processors. This often led to difficulties in housing, mounting, connecting and powering all the different elements, not to mention the environmental impact."

This evolution of ALPR technology has allowed PIPS to win some high-profile contracts of late, the London Low Emission Zone (LEZ) being one of the most well known installations. "PIPS Technology supplied ALPR cameras to Siemens Traffic Controls," Negus explains. "The contract is for Federal Signal's PIPS Spike+ cameras. There are no barriers or tollbooths required for this enforcement system. The LEZ is enforced through fixed Spike+ ALPR cameras, which read the vehicle license plates as they drive within the LEZ and check them against a database of vehicles that meet the LEZ emissions standards, those that are exempt or registered for a 100% discount, or if the LEZ daily charge has been paid."

Another recent contract was for the UK Highways Agency's National Traffic Control Centre (NTCC) project. PIPS completed a contract to provide travel-time measurement ALPR outstations to Serco for the NTCC project.

This covered 1,000 lanes and 500 sites on motorways and the all-purpose trunk road network in England. Negus outlines the project: "The data is used to determine travel times along the road network. The project commenced in late 2002, with installation of the distinctive green site equipment and cameras, and the system was expanded in 2008."

www.pipstechnology.co.uk

STAND B30

INTELLIGENT DETECTION

Another person looking forward to his trip to Birmingham is seasoned Traffex attendee Stijn Vandebuerie from **Traficon**, who has been busy working on a number of congestion-beating strategies: "As traffic congestion increasingly affects our economy, quality of life and environment, highways agencies need to find solutions. Simply building new roads will not cut congestion. A solution that is being viewed as an efficient, quick and reasonably priced way to significantly improve the congestion problem is using the hard shoulder as a traffic lane during peak hours. This reduces road accidents, travel time and pollution."

"But, in order to implement this solution, a monitoring system capable of detecting obstructions and incidents – breakdowns, reversing vehicles, pedestrians and debris – must be put in place. Operators in the regional control center have to be 100% sure that the hard shoulder is clear of obstructions. And this is where Traficon comes in, with our field-proven, outdoor Automatic Incident Detection (AID) system."

In 2009, Traficon is focusing efforts on further deployments of its intelligent video detection technology in various tunnel and highway projects around the world, and Vandebuerie also believes there will be more news to come regarding the company's well-known TrafiCam – an integrated traffic video detector: "This vehicle-presence sensor has become very popular because it combines the benefits of video detection with the benefits of CMOS sensor technology in one easy-to-use, compact box. This concept also delivers promising results for traffic

data collection applications and we are keen on further proving this in 2009."

Over the past few years, Traficon has noticed an increasing demand for its video detection products from Scandinavia. In Norway, the company has already installed its VIP incident detection modules in various tunnels along the E18, and in 2009 more modules are being installed in the Festningstunnel, Bjørvika tunnel and Nøstvedt tunnel.

On the Traficon stand, visitors will be able to witness live demonstrations of the company's video detection products, particularly focusing on the benefits when used for hard shoulder monitoring. Naturally, the TrafiCam sensor will also be demonstrated, both for its use in vehicle-presence detection at intersections and for data collection applications.

www.traficon.com

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STAND B31

INTEGRATED APPROACH

UK company **Traffic Technology Ltd** is attending Traffex to showcase the latest radar-based monitoring and road safety products, alongside its Eco range of cycle and pedestrian instrumentation. It will also be demonstrating its web services.

Managing director Richard Toomey is observing a number of current trends in his sector: "We have noticed an increasing demand for soft transportation monitoring products, used for capturing flows of cycles and pedestrians. This is an important part of gathering data for the compilation of Local Transport Plans," he explains. "With internal IT systems requiring heavy maintenance there has also been a big increase in the use of our web-based data services for traffic", he continues. The company has increased its traffic surveys by 75% in the past two years, which now means Traffic Technology Ltd has the UK's largest fleet of SDR radar traffic classifiers.

Toomey outlines the next stage of expansion: "We plan to increase coverage in the UK with a new office opening in Halifax, Yorkshire, and a wider product and service range to cater for both on- and off-road (cycle and pedestrian) modes of transportation. Having increased coverage will also mean we can cater for the need for an accurate traffic survey service, which has been a growing sector."

In other news, Traffic Technology Ltd has been involved with the supply of radar monitoring and road safety equipment with combined web-based data services during the build phase of the 2012 Olympic Park. Toomey is now looking to the long-term future: "With the need to increase healthy, sustainable methods of transportation – and for us all to look at the impacts of our carbon footprint – monitoring technologies capable of capturing accurate statistics for these modes of transportation will be key."

www.traffictechnology.co.uk

STAND E21

ALL-IN-ONE SOLUTION

"Within the wider European safety camera enforcement market there is a growing tendency to outsource or 'rent' equipment and services following the program styles of the USA and Australia," says **Redflex Traffic Systems**' business development director, John Harris. "Without doubt the increased exposure of the newer Eastern European countries' accident rates and road casualty statistics has led to a demand for enforcement flexibility at the most cost-effective rate to the community, increasing the challenge of lower costs of supply through value-added service and maintenance provision," he continues. So what is Redflex doing to meet these increased demands? "We will remain in a leading outsourcing position, developing innovative digital camera solutions to aid continuous accident reduction and increase safety, assisting further in highway damage reduction using value-for-money expandable modular camera and detection solutions."

Harris believes that the company will announce a substantial increase in worldwide organic business growth through 2009. Growth in back-office processing through expansion into point-to-point enforcement and ALPR for vehicles of interest will also occur.

In other news, Redflex Traffic Systems was recently awarded a contract (worth approaching US$2 million over three years) to supply the Suffolk Safety Camera Partnership with portable speed enforcement equipment and fixed red-light and speed enforcement systems. The fixed red-light cameras are part of a new initiative to address red-light collision problems in the UK county, while portable laser and fixed speed systems will update current equipment and upgrade fixed speed systems from wet-film to digital photography.

On the Redflex stand, visitors will be able to see live data being transmitted from one or two UK Home Office Type Approval (HOTA) test sites, showing speed and red-light infractions, live video surveillance, and both front- and rear-image capture using a variety of detection techniques. Non-intrusive secondary speed verification (SSV) will also be shown using digital site mapping together with live links to police verification facilities.

www.redflex.com

STAND J90

A MORE FUTURE-FOCUSED VISION

In Spain, one organization is focusing its efforts in the machine vision sector to create smart ITS solutions. Ferran Lisa-Mingo is the managing director of **Imagsa**, and he explains the future-oriented outlook of his company: "As traffic problems increase much faster than the ITS budget of governments, the only possible direction for the community is to invest smarter in more intelligent systems, and machine vision is among the most promising tools for that purpose," he says. "The best choice for future ITS will be distributing intelligence. This means that current architectures with standard video cameras connected to a central control room should be replaced in the future by smart cameras, capable of extracting relevant information locally and sending it to those decision points at the right moment."

Lisa-Mingo believes that the future challenges of outdoor machine vision in cost-sensitive markets such as ITS can only be addressed with highly compact solutions: "The tight cooperation of the different parts involved is paramount to get a good result, without penalties posed by limitations on data-transmission bandwidth and latency. ITS markets will also benefit from this integration into all-in-one smart cameras, both by lower installation and maintenance costs and by the much lower requirements on data bandwidth."

Looking ahead to the coming months, Imagsa's plans for 2009 include participating in international ITS projects, such as dangerous goods transportation control, journey time monitoring, city-access control, and average speed enforcement. The company will continue to invest in R&D to develop the advanced artificial vision products it is known for.

Traffex is Imagsa's first chance to showcase its products to international customers. There will also be a series of live demonstrations of its high-performance ALPR system.

www.imagsa.com

TRAFFIC OPERATIONS: THINKING AHEAD

How traffic simulation allows engineers to fast-forward into the future

Written by Dr Alexandre Torday and Alex Gerodimos, TSS-Transport Simulation Solutions, Spain

The use of simulation for traffic engineering assessments at the planning level is now extremely well established. Simulation outputs lie at the heart of decisions relating to public transport priority, intersection design, toll plaza, and congestion relief schemes. However, until recently, the use of simulation for operational decision support was thought to be out

of bounds. So why was that and what has changed since?

'Non-believers' claim that CPU and data requirements for real-time applications are prohibitive. But are they? As part of its i-transport platform, the Land Transport Authority has built an Aimsun microsimulation model of the entire city of Singapore. The city of Madrid's Aimsun Online model includes 50% of Madrid city center. On a powerful computer, these models run between 10 and 20 times faster than real-time. As for their insatiable data requirements, the Madrid model is calibrated against data from 480 detectors and the Singapore model includes a full interface with SCATS, emulating adaptive traffic control to perfection. With mesoscopic and hybrid mesosimulation-microsimulation added to the mix, the possibilities increase and the technical challenges of the past become (important) implementation details.

But is there a need for all this? The answer is a resounding 'yes'. Granted, human competence and experience accumulated over the years enables today's traffic managers to handle repeatable local peaks, such as a queue on a particular motorway exit during the morning rush-hour. But the trouble comes with non-recurring events, such as incidents: these never quite happen the same way or in the same place. Trying to alleviate congestion by reacting locally very often causes unexpected domino effects that are even harder to manage, and this can easily spiral out of control, leading to hours of delays and frustration for everyone involved.

Real-time simulation is possible and can provide a valuable weapon in the form of foresight. By allowing operators to fill information gaps in space (across the

"Simulation outputs lie at the heart of decisions relating to public transport priority, intersection design, toll plaza and congestion relief schemes"

network) and in time (fast-forwarding to the future), simulation-based decision support frees up traffic managers to focus on what they do best – devising response strategies that the system evaluates against their often complex and conflicting objectives.

So is simulation-based decision support for traffic operations the future? What can be said for sure is that this used to be a technical question. It is now fast turning into a simple question of willingness to embrace innovation and to do the right thing.

Tuesday April 21
14.00hrs
Traffex

DIGITAL BACK-UP FOR PARKING VIOLATIONS

ROADflow is a new automatic digital enforcement system for traffic management

Written by Dr Chris Duffy, SEA Group, UK

ROADflow provides automatic enforcement of traffic offences, including parking and bus lane contraventions, compliant with the 2004 Traffic Management Act. This is achieved by detecting vehicles using ALPR, and then rapidly comparing the current time and the vehicle's position against a database of enforceable areas (e.g. restricted parking areas) and associated effective times of day, days of the week, and prohibition type.

If a match is found, ROADflow captures the potential offence in a self-contained evidence pack, which is retained within the camera until it can be offloaded for further processing. The evidence pack contains all the data required to manually validate the offence before issuing a penalty notice (PCN).

All captured license plates can be automatically checked against a list of vehicles exempt from enforcement (for instance, police cars, etc), and lists of significant vehicles, such as persistent offenders.

Key components to ROADflow include a roof-mounted camera unit, GPS position tracking unit and back-up, rugged mobile PC, evidence packs, and wireless communications link (or manual communications via USB).

In unattended (automatic) mode, a traffic restriction database – generated by the back-office – is used to arm the ALPR trigger. This database then details the location, contravention types and times of operation of each enforcement zone.

For mobile operation, the ALPR trigger is armed with reference to the traffic restriction database using the current location and time. For static operation, the vehicle is parked within one of the predefined enforcement zones and the camera is positioned to capture vehicles performing a moving contravention. The system can then capture evidence automatically.

In attended (manual) mode, the system operates as an attended CCTV system. Evidence packs are triggered by the operator and the camera orientated manually.

"ROADflow provides automatic enforcement of traffic offences, including parking and bus lane contraventions, compliant with the 2004 Traffic Management Act"

The evidence generated supports the primary evidence recorded separately by the operator in the form of contemporaneous notes.

For both modes, evidence packs are collected and cached by ROADflow until the end of the shift. They are then either removed manually via a USB stick, or automatically via Wi-Fi when the vehicle returns to its base.

The ROADflow equipment is suitable for mounting in a range of vehicle sizes, from Smart Cars to large vans. In permanent, unattended mode, no operator intervention is required, which allows it to be fitted in buses and multi-purpose vehicles (e.g. maintenance vans) as a 'fit-and-forget' system.

An XML file format is used to define enforcement zones. This allows integration with back-office GIS used to manage traffic restrictions. The evidence pack XML format enables integration with back-office systems for reviewing evidence and issuing PCNs.

Monday, Nov 17
13.30-15.00hrs
Traffex

Dynamic message signs & traffic information systems

Traffex
21–23 April 2009 | The NEC, Birmingham
Hill & Smith Arena Stand K100

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SAME DATA, BUT A DIFFERENT MESSAGE

Three web applications using the same Highways Agency data for different purposes

Written by Brian Hunt, managing director, Zircon Software, UK

The Highways Agency (HA) manages the trunk roads in England. These cover the country's major routes, but leaves out a lot of the main roads that are used by both local and through traffic. At 5,130 miles, the network represents only 2% of all roads but carries a third of all traffic and two-thirds of all freight!

The network stops at the Welsh and Scottish borders.

"Vigil users are able to tune their system so alarms are raised only when traffic conditions reach a threshold indicating the onset of diversion from the motorway"

The M4, for instance, has no traffic information west of the Severn Crossing, despite the fact that the motorway continues west of Swansea. The M6 (like many brides in the past) changes its name at Gretna Green and becomes devoid of traffic information as far as the HA is concerned.

However, in spite of these drawbacks, information on the state of the network is essential to the majority of road journeys in England.

The HA collects a wealth of data from its network. Converting that into useful information can be a challenge, especially considering the various applications that require it. Zircon has developed three web-based systems that take data produced by the National Traffic Control Centre (NTCC) and presents it as information used in three disparate applications.

The HA Information Point (HAIP) is a kiosk application used by the general public during journey breaks. It provides a local and national view of the network, enabling drivers to make informed decisions about their journey ahead. Monitoring and analyzing use has enabled a better understanding of travelers' information requirements, while taking an inter-urban journey.

The Regional Integrated Data Display (RIDD) is used by operators in Regional Traffic Control Centres to help manage the HA network. It provides a view of the network conditions in an easily assimilated graphical view. The operator may drill down to look at detailed information to help manage specific incidents, or may retain an overview of his whole control area.

Vigil is a product that provides Local Authorities (LA) with information about traffic conditions on the HA Network in their area. It forewarns of the possibility of large amounts

of traffic diverting off the motorway onto local roads and allows steps to be taken to manage the increased load. Vigil users are able to tune their system so alarms are raised only when traffic conditions reach a threshold indicating the onset of diversion from the motorway. This, along with a facility to convert geographical maps into schematics, means that the same product can be offered to all LAs in England with a minimum of configuration.

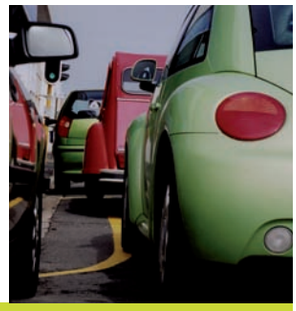
Developed by Zircon, the systems essentially use the same data, although it is selected and presented in a different way for each to optimize their different uses in improving journeys.

TRAFFIC CONTROL AND THE GREEN CARD

The environmental benefits brought about by network management systems

Written by Glyn Rhys-Tyler, Newcastle University, UK

Historically, highway network management has focused mainly on the objectives of delay minimization, capacity maximization, and safety. Network management for environmental benefit has to date tended to be limited to interventions such as queue management and relocation, route information via VMS and other communications methods, and public transport priority. The efficacy of such systems is constrained by the quality, timeliness, and spatial resolution of network data. However, emerging sensor technologies – combined with innovative communications and e-science applications – present an opportunity to develop far more sophisticated network management tools for policy-makers and network managers.



"Such a pervasive sensor and communications network has the potential to facilitate the development of the next generation of network management systems"

Integrating expertise from electrical engineering, computer science, environmental science, and traffic engineering, research at the UK's Newcastle University is turning theory into reality. As a member of the MESSAGE project consortium, funded jointly by the UK Department for Transport and Engineering & Physical Sciences Research Council, Newcastle University has deployed a wireless environmental sensor network in the town of Gateshead, linked to a UTMC-compliant database. The system is also currently being deployed in the city of Leicester.

It can be characterized as having high spatial resolution in three dimensions, small physical size (easily integrated into street furniture), relatively low cost, having the potential to collect data on a range of variables (e.g. air quality, noise, CO_2, traffic flow), and delivering this data in real-time.

Such a pervasive sensor and communications network has the potential to facilitate the development of the next generation of network management systems, allowing planning and operational decisions to be made on the basis of sound scientific evidence. Although some existing traffic control systems have the capability to incorporate estimates of environmental variables into objective functions, the availability of high-resolution, real-time data across a range of variables presents the opportunity for a step change in the efficiency and sophistication of network management, tailored to the local context.

Sensors do not have to be just static. Experiments have taken place in Newcastle installing pervasive sensor technology on vehicles and pedestrians, linked in real-time to the communications grid and database, to provide dynamic data. Work is ongoing to link the UTMC-compliant database to microscopic traffic simulation models, both to aid model calibration and to facilitate faster than real-time assessment of future traffic management scenarios.

Work is also planned to link the high-resolution pervasive sensor network to three-dimensional atmospheric emission-dispersion models, to improve model validation, and to provide a potential feedback loop to the traffic control systems.

THE FUTURE OF SPEED ENFORCEMENT

How an average speed enforcement system could produce some extraordinary results

Written by Simon Griffiths, technical director, RedSpeed International, UK

It is widely acknowledged that the UK is one of the leaders when it comes to automated enforcement, with in excess of 3,000 fixed speed cameras deployed. Public perception of the cameras is hard to manage, particularly when the popular press sells the technology as a cashcow and unfair to drivers. Their benefits are often overlooked – until there is a fatality.

It could be argued the UK has reached saturation point with fixed speed systems, with public patience drained. Certainly the UK safety camera or casualty reduction partnerships face tough decisions in the short-term. Funding has altered; annual budgets are passed down to be spent on road safety in general. Revenue raised from fines goes immediately back to the Treasury. Faced with the costs of upgrading existing wet-film sites with new digital cameras, decision-makers need to decide whether to continue investing in spot-speed technology or look for alternatives.

"Average speed enforcement is demonstrating higher levels of compliance than spot-speed in a number of European countries where it has been deployed"

A number of options are available. Variable message signs, speed bumps, and traffic-calming measures have all seen some success. But automated enforcement manufacturers are offering a new alternative to fixed or spot-speed cameras. Average speed enforcement cameras are a familiar site at roadworks sites on motorways. Their use is not exclusive to these fast-moving highways though. The networked systems lend themselves well to both towns and suburbs. Hospitals and schoolzones in particular can benefit from the deployment of a camera at each end of the street. The enforced zone would be extended beyond the 200m range of a fixed camera.

Whereas some cameras are deployed on multi-lane highways, RedFusion (a multipoint-to-multipoint, multi-lane average speed camera developed by RedSpeed) is capable of enforcing multiple speeds along a route. If cameras are deployed at entry and egress points and at any point along the route where the posted speed limit changes, the driver's average speed will be determined for the length of the journey along the route.

Average speed enforcement is demonstrating higher levels of compliance than spot-speed in a number of European countries where it has been deployed. This leads to reduced criticism that the cameras are there purely to raise money.

There are opportunities for other enforcement applications to be incorporated into these ALPR-driven systems. Already in the USA, cameras are being considered for Amber Alert cases to identify and alert authorities to vehicles suspected in child abductions. Where legislation will allow, they could also be used in road user charging. If the end-users are willing to accept the next generation of cameras, the future of speed enforcement could still be at the side of a road – at least until car-makers perfect in-vehicle technology.

Tuesday, April 21
14.00hrs
Traffex

by Timothy E. Lipman

ELECTRIC AVENUE

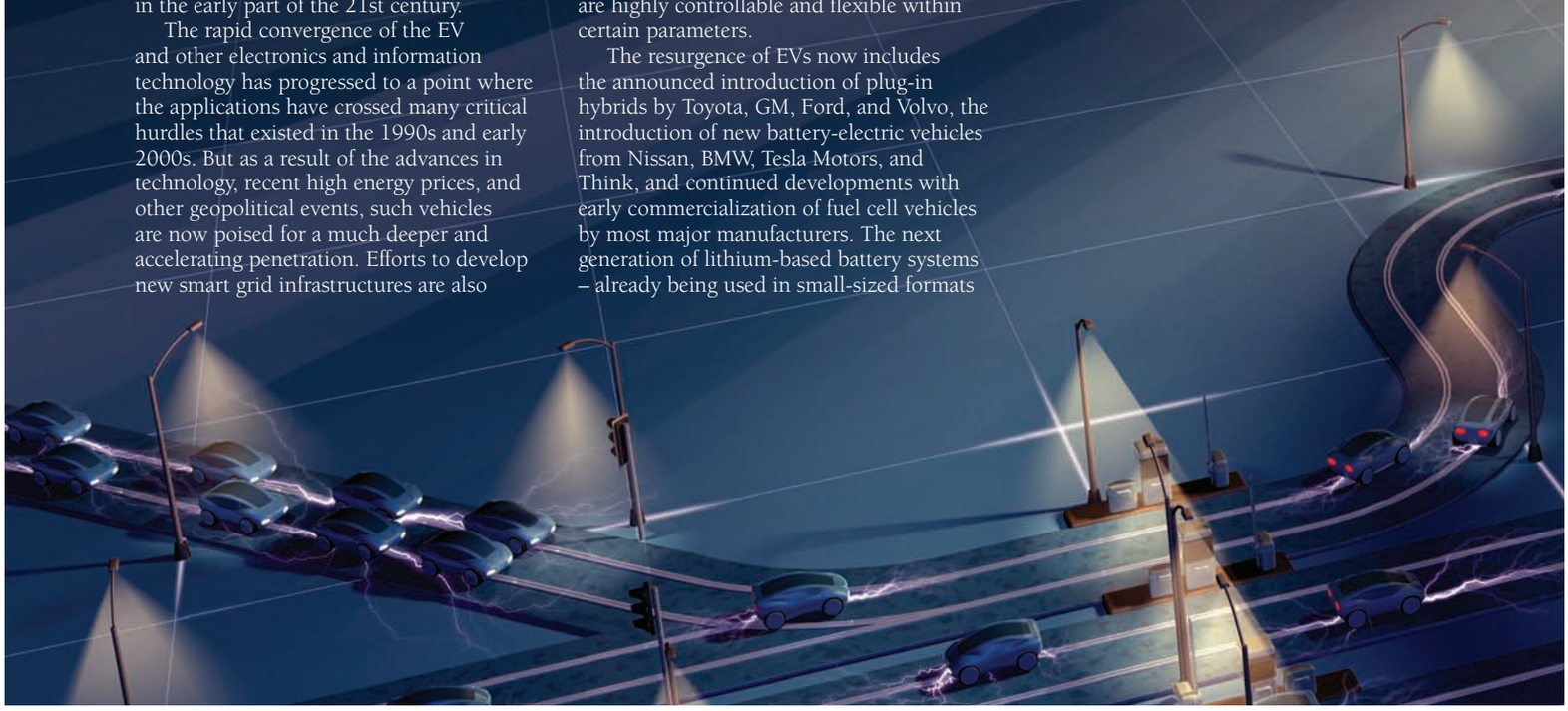
FOSTERING A TRANSPORTATION ENERGY TRANSFORMATION

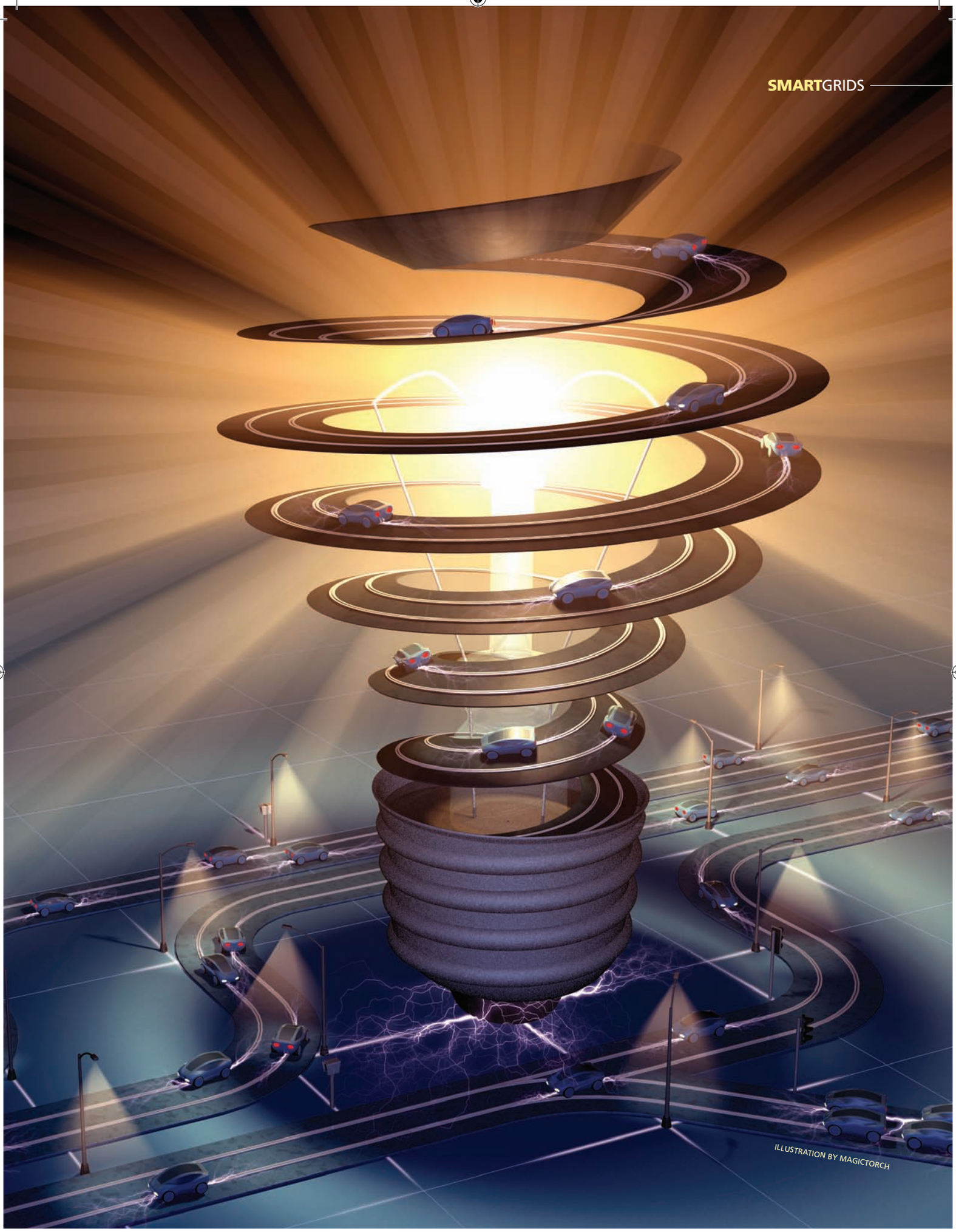
The transportation, electrical utility, and IT sectors are on a collision course as a result of the increased interest in electric vehicles. Their intelligent integration will, however, be vital to address energy and environmental concerns

The parallel but converging developments in vehicle propulsion advances, smart electrical grid infrastructure, and IT and ITS technologies have staged a major collision between the transportation, electrical utility, and IT sectors due to the increased interest in electric vehicles (EVs) to address energy and environmental concerns. It may in fact be that artful integration of these sectors will be pivotal for the success of more fully electrified vehicles, poised for market entry in the early part of the 21st century.

The rapid convergence of the EV and other electronics and information technology has progressed to a point where the applications have crossed many critical hurdles that existed in the 1990s and early 2000s. But as a result of the advances in technology, recent high energy prices, and other geopolitical events, such vehicles are now poised for a much deeper and accelerating penetration. Efforts to develop new smart grid infrastructures are also proceeding, with advanced metering, system control, and microgrid concepts based on new small-scale generation sources, such as microturbines and stationary fuel cells. The developments in utility grid monitoring, control and forecasting techniques suggest that electrical grid generation and load can be more coupled in the future, with responsiveness in terms of demand helping to take pressure off the generation side. EVs can be a key part of that, as their loads (typically slow charging overnight) are highly controllable and flexible within certain parameters.

The resurgence of EVs now includes the announced introduction of plug-in hybrids by Toyota, GM, Ford, and Volvo, the introduction of new battery-electric vehicles from Nissan, BMW, Tesla Motors, and Think, and continued developments with early commercialization of fuel cell vehicles by most major manufacturers. The next generation of lithium-based battery systems – already being used in small-sized formats





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for cameras, cellphones and laptops – are now being adapted for the higher power and energy requirements in the automotive market. Companies such as SAFT/Johnson Controls, A123Systems, NEC, Matsushita/Panasonic, and Ener1 are leading the charge in this development area.

An additional important cross-current to the further development of EVs is the imposition of renewable portfolio standard (RPS) rules in most US states, as well as in several other countries that require increasing purchases of renewable power by regulated electric utilities to sell into their local markets. Many municipal utilities have also subscribed to these types of increases. However, the difficulty is that the lowest-cost renewable electricity source to help meet the RPS goals is often wind power, which has an intermittent character that does not always provide a good match for the fluctuations in the demand for power – peaks in the late afternoon and early evening, particularly in the summer months. EVs that charge at night would provide additional load to help absorb the wind power that is produced during off-peak periods, helping to facilitate the penetration of larger amounts of renewable energy in a symbiotic fashion.

THE FORMATION

EVs are fundamentally different from conventional vehicles in how they draw their fuel. Unlike liquid fuels such as gasoline and diesel with high energy densities (120,000BTUs per gallon or about 34MJ per liter in the case of gasoline), EVs rely on electrochemical batteries (and/or fuel cells in fuel cell vehicles) with energy densities of around 2MJ per liter to provide motive power. This large (17-fold) disparity in energy density is partly offset by the much more efficient electric driveline in the EV, but still remains a formidable challenge.

French utility company EDF and Renault are collaborating on a large-scale zero-emissions transportation and travel system

"Concepts such as this evoke images of a future transportation system that is more flexible and efficient, and more embedded and integrated with the electricity system"

Mazda is focusing on hydrogen power and eschewing electric vehicle development

A single hydrogen tank in the back of Mazda's 5/Premacy Hydrogen RE Hybrid

Designs such as plug-in hybrids can help to make the transition to more fully electrified vehicles, along with some other ideas such as battery swap stations, where drivers needing extended driving range for longer trips could swap out the spent battery for a charged one in a process taking, by various estimates, as little as five minutes or as much as 15 minutes. This would be in the context of a system where the EV (or at least the battery) is provided to the user as a service, along with the capability to make use of public charging infrastructure. For example, a company called Project Better Place is pursuing just such a model, with pilot EV as mobility service programs planned for Denmark, Israel, and the USA.

Depending on the size of the battery in the vehicle – and whether it is a hybrid, plug-in hybrid, full battery EV, or fuel cell hybrid – the battery pack is capable of interacting with utility grids in far more complex ways than are at first obvious. There will be considerable flexibility as to when electric vehicles – coupled with smart utility meters – will be able to charge at times (during the night mostly) that are lowest cost and most beneficial to electric utilities. In some areas, such as California, the low value of power at off-peak times is a hindrance to the penetration of otherwise low-cost (and environmentally beneficial) wind power. A growing market for power during these off-peak periods by electrified vehicles could help to facilitate the penetration of intermittent renewables, leading to important side benefits.

MODEL CITIZENS

EVs can be enabled to act as model citizens of the utility grid by providing ancillary services to the grid when they are plugged in. These services – for which utilities pay substantial sums of money – include regulating the frequency of the grid (at 60Hz in the USA), providing power spinning reserves that can be called up at short notice, reactive power correction (such as the provision of VARs), and providing voltage support at the ends of long feeder lines. Of these, grid frequency regulation may be the most interesting option as it is a highly valued service that requires rapid response in ramping up or ramping down generation or load in response to real-time needs to balance the power grid in specific geographic regions. The power balancing in these regions is known as managing the area control error (ACE). Vehicles could also act as emergency power sources, to provide power to houses, hotels and hospitals in times of electrical power outages.

The provision of these ancillary services has come to be known as vehicle-to-grid power (V2G). What is perhaps poorly understood is that although some V2G functions would require bidirectional flow of power both to and from the vehicle (such as the provision of emergency backup power), some other V2G services, such as grid frequency regulation, could be achieved both ways (known as regulation up and regulation down) by simply speeding up or

LEVEL 1: 120Vac, 12A, 1.44kVA, 60Hz, single-phase, NEMA 5-15R plug standard. Typical charging time of eight to 14 hours. Requires 12A maximum continuous current with 15A (minimum) branch circuit protection
LEVEL 2: 208/240Vac, up to 32A, 6.7/7.7kVA, 60Hz, single-phase, SAE J1772/3 plug standard. Required safety features include grounding or electrical isolation, personnel protection from shock, a no-load make/break interlock, and a safety breakaway for the cable and connector
LEVEL 2+: Likely to emerge in the revised SAE J1772, this would be similar to the current Level 2 but with higher current levels for fast charging – up to 400A at 240Vac
LEVEL 3: 480Vac, up to 400A, 192kVA, 60Hz, three-phase, no plug standard yet. Same safety features required as Level 2

Table 1: The above shows the various conventions for the charging levels of electric vehicles

"EVs can be enabled to act as model citizens of the utility grid by providing ancillary services to the grid when they are plugged in"

slowing down the battery charging of blocks of vehicles charging in an ACE region.

The idea behind V2G is that even without bidirectional flow capability from the vehicles, utility regulation services could be provided by electric vehicles with significantly sized batteries (greater than around 5kWh, or up to three times larger than today's hybrids). With bidirectional flow, other types of services, such as spinning reserves and emergency backup power, would be possible. In order to participate in the markets for ancillary services in particular regions, a vehicle ancillary service aggregator would bid blocks of vehicle-based services into the power markets in blocks of 1MW, and arrange for making payments to the vehicle owners for the services provided. In California, for example, these services are bid into the power market through the California Independent System Operator. Studies have shown that vehicle owners could net a profit depending on the type of vehicle.

CHARGING STATIONS

Electric vehicle charging station and power plug standards have been developed in the USA, Japan and the European Union. In the USA, the primary standards are SAE J1772 for conductive charging and SAE J1773 for inductive charging, and these are currently being updated and revised. Previous efforts for EVs in the 1990s focused on inductive charging, which is now for the most part giving way to a focus on conductive charging systems. In the revised J1772 for conductive charging, the SAE appears to be adopting a completely new standard made by a plug design that is currently manufactured by Yazaki, replacing the older Avcon-based standard. The conventions for charging levels for electric vehicles are shown in Table 1.

General Motors' Saturn Vue plug-in two-mode hybrid SUV is scheduled for 2010

It is important to note that the Yazaki-based J1772 modification would allow for Level 1 or Level 2/2+ charging, but not Level 3 charging as a modified Avcon-based standard might have allowed. However, the Yazaki's small size and low cost, coupled with its medium power capability and the lack of clear need for high power charging, suggests that this is probably a good compromise. In general, a modified plug is considered desirable even for Level 1 charging as the traditional three-prong plug with exposed conductors is considered potentially somewhat risky for routine outdoor usage in inclement weather. The Yazaki design offers recessed conductors, with greater safety.

Pricing is an issue when it comes to providing public charging opportunities for vehicles, along with the primary charging of the vehicles at the household. Regulated utilities can legally charge for power sales at public charging stations, but it is legal to charge for parking by length of time as well. So this issue could be handled by making the hourly parking charge slightly higher for spaces where electricity is being provided to plug-in vehicles, and in effect bundling the electricity for battery charging with the use of the parking space.

Some companies, including Coulomb Technologies, are currently engaged in working with municipalities and other groups to install a new generation of electric vehicle charging infrastructure. Other organizations such as GridPoint are working on the interface between the vehicle and household electricity meter, with great capabilities for integrating the charging of electric vehicles with utility programs to manage electricity demands on the grid.

SMART INTEGRATION

ITS technologies include a broad array of computer, communications systems, in-vehicle systems, sensors, display and signage, and other technologies deployed to improve the management, efficiency, and safety of transportation networks. Examples of ITS application include electronic toll collection, roadside variable message signs, transit system real-time network status systems, incident detection and management

ROADSIDE ASSISTANCE

Car-makers might be pushing forward with the development of electric and hybrid vehicles, but all will be in vain if an adequate infrastructure is not created. If there is nowhere to recharge or refuel, is Joe Public going to buy an eco-friendly, feel-good, low-carbon, energy-thrifty car? Likewise, nobody is going to install public charging points and hydrogen pumps unless enough Joes already have green machines on the road. It's a chicken and egg scenario.

In France, a series of announcements by energy supplier EDF indicates there is movement in the provision of public charging points there. In partnership with Renault, EDF aims to establish an Electric Mobility Operator to "supply customers with the infrastructure to recharge an EV and to manage its range". In other words, Renault will make the electric vehicles, EDF will supply the juice, and a third entity will install, manage, and operate the charge points.

Honda's FCX Clarity with the Home Energy Station IV and (left) Volvo's ReCharge Concept

EDF also has plans with PSA Peugeot Citroën, including a commitment to define "business models capable of driving the commercial development of electric vehicles".

This is all well and good and such labors should, one day, bear fruit. However, Park and Power – which supplies recharging points from its base in Brighton, UK – is around right now and eager to install more of its recharging towers. "There's definitely a case for vehicle manufacturers to invest in infrastructure," explains Richard Jupp, director, Park and Power. "In two years' time they expect to be selling plug-in hybrids in quantity."

Across the Atlantic, Richard Lowenthal, CEO of smart charging specialist Coulomb

systems to minimize system delays from accidents, and information technology systems to improve the efficiency of goods movement. ITS takes advantage of a range of communications protocols, including cellular phone networks and Bluetooth.

In addition to the more traditional applications of ITS for efficiency and safety, it can also be employed to help facilitate the introduction of EVs and enable their integration with future utility smart grids. Some apparent applications of ITS in this regard include refueling location, route mapping, and other information services to facilitate ease of locating refueling facilities and trip-planning. It could be called upon for smart refueling systems that would use in-vehicle navigation systems, GPS, and communications systems and protocols to locate and query availability of nearby electric charging and hydrogen refueling stations in real-time. It could even be used for fuel reservation systems, potentially linked to smart refueling, whereby fuel could be reserved and paid for over the internet or by cellphone. Parking systems could also be an option, where alternative fuel vehicles would have prioritized parking rights in some locations as an incentive for vehicle purchase. Consider also smart car-sharing services that incorporate electric-drive vehicles, or wireless automatic vehicle locator and emergency response systems that would allow users of alternative fuel vehicles that get stranded due to lack of fuel or vehicle malfunction to receive rapid assistance and advice on nearby vehicle towing/repair services.

Taken as a whole, concepts such as the above evoke images of a future transportation system that is more flexible and efficient, and more embedded and integrated with the electricity system than at present. Although overall electricity consumption can be expected to increase as a result, overall consumption of primary energy will decrease, particularly as power-generation sources for the utility grids also improve in efficiency and rely more heavily on renewable resources over time. Much of the vehicle charging will be at off-peak times, so increased demand for construction of new powerplants to support vehicle recharging is expected to be minimal until the number of plug-in vehicles becomes quite large.

The MINI E underlines BMW's ambitions to reduce fuel consumption and CO_2 emissions in road traffic

Around 500 MINI Es bound for the USA will allow BMW to evaluate ownership potential for vehicles supplied with an electric power supply

PERFECT PACKAGE

The combination of developments in electric vehicle and smart grid technology coupled with concepts involving ITS to lower adoption barriers are making possible a

Technologies in Campbell, California, believes that local authorities can show leadership when it comes to installing infrastructure for hybrid EVs. "The municipality of San Jose is preparing a request for proposals for charging stations, and Santa Monica is also interested," he says.

It is clear that vehicle OEMs have to establish new networks of relationships if the market for alternatively fueled vehicles is to thrive, rather than just dealing with Tier 1 suppliers and sales outlets. GM seeks technical and practical answers from Coulomb, which talks to municipalities and electricity suppliers.

Similarly, Epyon, a company based in Delft, the Netherlands, that provides ultra-fast charging solutions, has been busy networking to pave the way for the country's first public lithium-ion battery charging system. It will be used initially by mail company vehicles in a short trial before being rolled out across the city of Rotterdam. The vehicles are built by Qwic of Amsterdam, and the power supplier is Eneco.

London's Westminster Council is hoping to improve air quality by installing EV charging points

Crijn Bouman, Epyon's CEO, says the company is focusing on fleet owners and believes that Epyon's patented fast-charge systems will attract them. Bouman says, "Technically, a lithium-ion battery can be charged up to 90% power in six minutes, but 15-30 minutes is often used for practical applications. The trick is not to ruin the battery life. Our charging is computer-controlled, and it monitors the battery during charging, including its temperature, current, the voltages going in, and the voltages going out. We also store information on the history of the battery, and have a system that recognizes the battery and responds appropriately."

Toyota's partnership with EDF for its plug-in hybrid (PHV) has substance, as it succeeds trials made during 2007 in France. A right-hand drive PHV has been incorporated into EDF Energy's fleet. In Japan, Toyota is running a similar project on its own, and in the USA, its collaboration with the University of California is still in the early stages.

"It's essential to collaborate on establishing the infrastructure for public charging," explains ›

"A key linkage between EVs and smart grids will allow myriad interactions to benefit both the transportation and electricity sectors"

vision of a much cleaner and lower-carbon transportation system. By starting to detach the fueling of vehicles from the global petroleum industry and connecting it to the electricity sector, it then becomes possible to focus on making the grid cleaner and more sustainable as a way of improving the environmental impacts of both stationary power and transportation.

The development of plug-in vehicles is a natural process to accompany a major expansion of the utility grid toward renewable power sources. As some renewables, such as wind and solar are intermittent, considerable battery capacity connected to the grid in the form of electric vehicles can help the grid to adapt to these fluctuating power sources. This can help to enable the large penetrations of residential and commercial solar PV, solar thermal-electric, and utility-scale wind power that are needed to make deep cuts in carbon emissions and reduce the dependence of the transportation sector on petroleum fuels.

Meanwhile, the emerging smart grid revolution can be used to facilitate real-time pricing of power and ability for vehicles and other energy storage systems to participate in power markets down to the household level. This would be a revolutionary change in how utility grids provide power and ancillary services, and how generation and load is balanced in real-time to optimize grid operation. The combining of electric vehicles, smart grids, and rapid expansion

Daimler and energy provider RWE have introduced the 'e-mobility Berlin' project

of renewable power appears to be the best hope of achieving the goal of radical decarbonization of transportation over the first half of the 21st century, and a level of reduction of 80% below 1990 levels of emissions by 2050.

Several recent trends are converging in a way that can foster a transformation in the transportation sector. Technologies for EVs have evolved and are better than ever, with lithium-based batteries on the brink of use for great numbers of vehicles, and electric motors and power electronics much more advanced and lower cost than they were in the early 1990s. Similar to solar PV 20 years ago – a promising technology, but not yet ready to compete commercially – early EVs faced similar hurdles. But also similar to solar PV, cost has declined and performance has increased to the point where the commercial prospects are now very bright.

A key linkage between electrified vehicles and smart grids will allow myriad interactions that will benefit both the transportation and electricity sectors. Smart grids will help to send price signals to consumers that reflect the true costs of producing and delivering energy during the day, help to manage power demands by optimizing vehicle charging, and help electric vehicles to operate as model citizens of the grid by helping it to accommodate intermittent renewables and by providing other grid ancillary services.

To foster this transformation to a transportation system that becomes increasingly electrified and progressively cleaner, lower carbon, and more sustainable, national and local governments need to develop programs to more efficiently reward or penalize the most and least efficient technologies. Possible measures include those such as carbon taxes or cap-and-trade schemes, as well as potential incentives that would reward buyers of more efficient vehicles at the expense of buyers who insist on buying vehicles that are less efficient than average. Governments should also consider other incentives for buyers of the cleanest vehicles (such as high-occupancy vehicle lane access), and bundling incentives for buyers of a both a plug-in vehicle and a solar PV system for their house or condo roof. The world desperately needs better solutions for providing transportation services with lower environmental cost, and fortunately these are finally becoming practical and affordable. ■

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Etienne Plas at Toyota's European HQ. "We see there is growing interest among public authorities in PHVs, and it's also important to know that the PHV can be recharged at home.

"There's a number of issues," Plas continues. "Indeed, infrastructure is one of the points, as is technology, but there's also cost, so we're quite far from being able to expand in a more active way."

BMW, meanwhile, is keen to build on its experiences with hydrogen. It built 100 hydrogen-fueled internal combustion engine 7-Series, most of which went to the USA where there are more facilities in place to support such trials, including the Hydrogen Highway in California. "When we brought the Hydrogen 7 cars to the UK we tried to build a filling station

BMW's Hydrogen 7 runs on liquid hydrogen or gasoline

and found that people thought it would be very dangerous," says a BMW insider. "They remembered Hindenburg and associated it with hydrogen, even though the reality is that hydrogen is no more dangerous than petrol. In fact, in some circumstances it is less so. The only way the development of the vehicles will move forward is if the necessary infrastructure is put in place. We have shown that the cars are real and work."

Representatives of the German car-maker have been holding discussions "at the highest level" to encourage the government to help, and think the message seems to be getting through. The company also considers that progress with infrastructure to support fuel cell vehicles will benefit its own hydrogen IC plans. Our source explains, "Hydrogen IC vehicles need liquid hydrogen, but if you store that at a filling station there can be some gaseous hydrogen given off, and that can be used by fuel cell vehicles."

Political will, commercial ambition, new collaborations, and public awareness are the keys to breaking the deadlock. In little more than two years, major manufacturers will be selling their HEVs. Soon after, hydrogen vehicles could be available. Unless people start putting money where their mouths are, the lack of infrastructure will lead to a lose-lose situation. But if the right decisions are made early enough, both the chicken and the egg could be winners. ■

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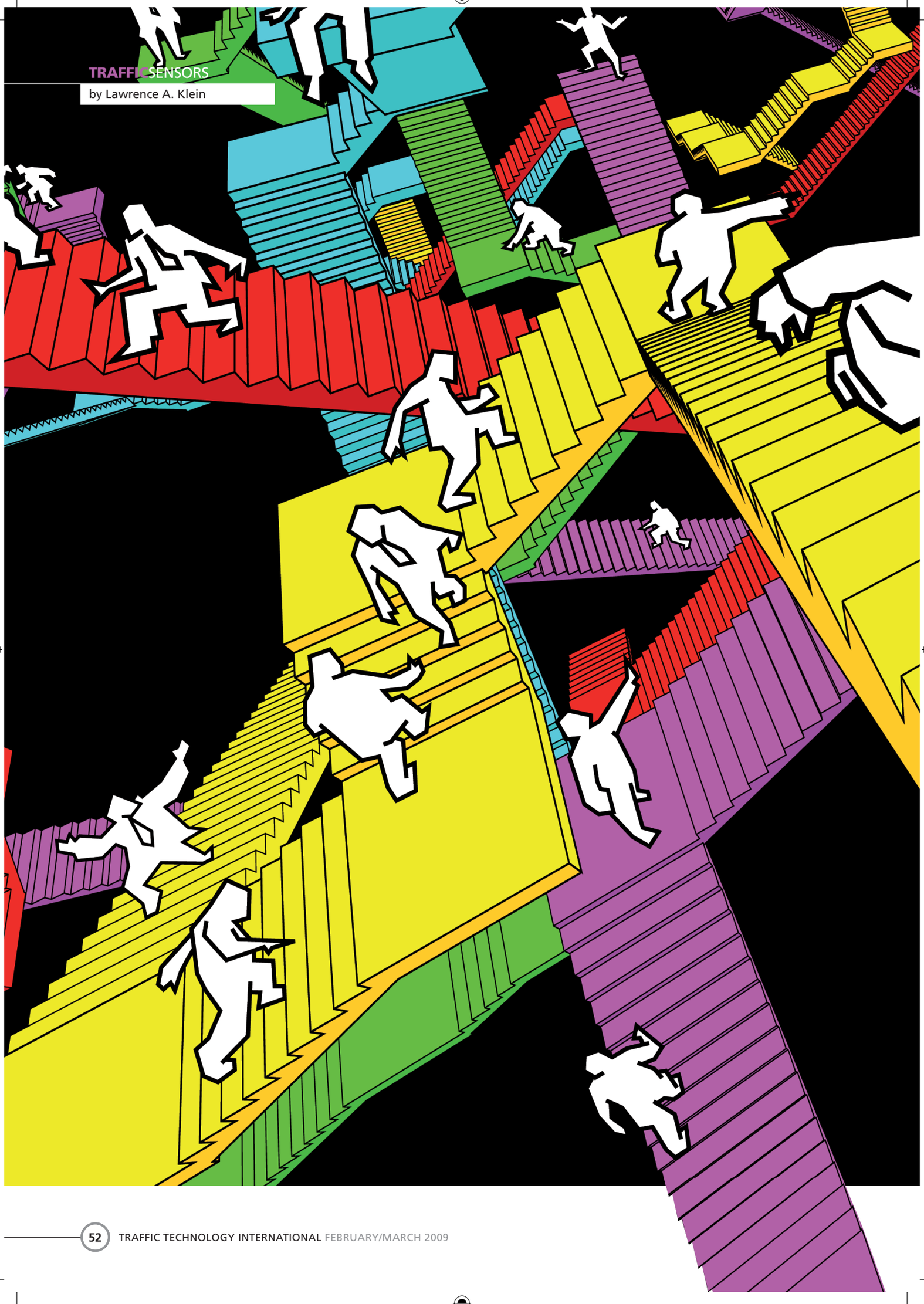


SENSOR DIRECTION

GUIDANCE ON TECHNOLOGY DEPLOYMENT

Selecting the best sensor for a task can sometimes be an uphill battle for traffic engineers, with a number of factors to be assessed and a variety of technologies from which to choose

The success of any ITS deployment depends in great part on the proper selection, design, installation and maintenance of sensors, which are utilized in diverse applications, ranging from vehicle presence detection and traveler information services to incident detection and enforcement.

TYPES OF SENSORS

In-roadway sensors are embedded in the pavement or the subgrade, or taped or otherwise attached to the surface of the roadway. Over-roadway sensors are mounted above the roadway or alongside it. The inductive-loop remains the most widely used sensor in modern traffic management. A metal object, such as a vehicle passing over or stopped within the sensor's detection area, decreases the loop's inductance, producing a signal that is transmitted to the electronics unit. This unit analyzes the signal, interpreting it as the presence or passage of a vehicle, and sends an appropriate call to the controller.

Current electronics units can provide samples at a 40kHz rate to the traffic controller. Such signals, combined with algorithms that re-identify vehicles at downstream detection stations, offer the capability to compute-link travel times. Although single inductive loop detectors directly convey information concerning vehicle passage and presence, other traffic flow parameters, such as density and speed, must be derived from algorithms that interpret or analyze the measured data. Dual loops spaced a known distance apart alleviate the speed-measurement caveat.

Other in-roadway sensors include magnetic sensors, which can be placed underneath a roadway or a bridge, and magnetometers. Both are passive devices, and do not transmit energy. A magnetic sensor detects changes in the Earth's magnetic field caused by the passage of a nearby vehicle that contains ferrous material. A magnetometer measures the difference in the Earth's magnetic field caused by the passage or presence of a vehicle. Its ability to function as a presence sensor enables it to detect stopped vehicles.

Contemporary over-roadway sensors provide a viable alternative to inductive loop detectors for many applications. Examples include: video image processors, which use cameras mounted on poles adjacent to the road or on traffic signal mast arms over the road; microwave radar; laser radar; ultrasonic; and passive infrared sensors

ILLUSTRATION BY SLAVO VALIGURSKY

Microwave radar sensors can detect both stopped and moving vehicles by measuring the distance between sensor and vehicle

installed either alongside or above the road; and acoustic sensors installed alongside the road. The mounting configuration is a function of the intended application.

When a sensor is installed directly over the lane of traffic, its view and its ability to collect data is not impaired. But when a sensor is mounted alongside a roadway and views multiple lanes of traffic at a perpendicular or oblique angle to the direction of traffic flow, tall vehicles can block its view of distant lanes, potentially causing an undercount or false average speed measurement.

An over-roadway sensor's detection area – that is, the area of the roadway within which a vehicle is detected and data is collected – is a function of mounting height and aperture size, offset of the mounting location from the lanes to be monitored, viewing direction, elevation changes and curves in the road, vehicle mix, and objects that can block the view.

CHOOSING A SENSOR

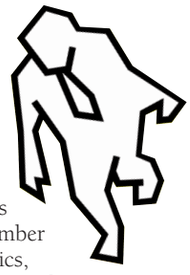
The past two decades have seen innovations in vehicle detection, particularly for over-roadway sensors. The new devices are better able to meet the expectations of the ITS community by providing enhanced data with greater accuracy – within purchasing and life-cycle cost constraints.

Choosing a sensor for a specific task depends on data parameters, data accuracies, spatial resolution, detection area, availability of data transmission media, location-specific installation requirements, initial cost, and maintenance burden that the sensor will impose. Sensor selection for vehicle detection at intersections may impose other constraints linked to the implemented traffic signal control strategy. For example, sensor location and data processing interval requirements vary among traffic adaptive signal control algorithms, making some sensor types unacceptable for some control algorithms.

Assistance in sensor selection, purchase, installation, evaluation and maintenance is available from the FHWA via the *Traffic Detector Handbook* and the *Summary of Vehicle Detection and Surveillance Technologies Used in Intelligent Transportation Systems Handbook*; ASTM standards such as E 2300-06: Standard Specification for Highway Traffic Monitoring Devices; E 2532-06: Standard Test Methods for Evaluating Performance of Highway Traffic Monitoring Devices; and E 2561-07a: Standard Practice for the Installation of Inductive Loop Detectors; and various books describing sensors and testing methods.

IN-ROADWAY SENSORS

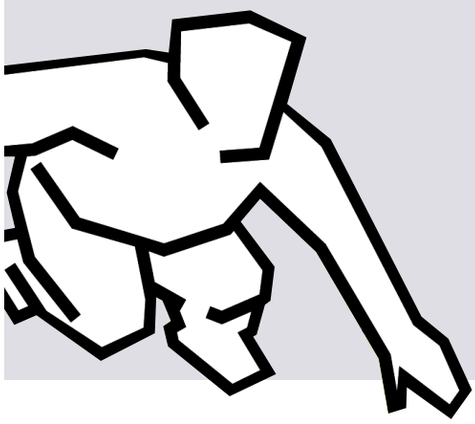
Installing and maintaining in-roadway sensors such as inductive loops and magnetometers can disrupt traffic and pose a safety risk. However, in-roadway sensors continue to be used for a number of reasons, including aesthetics, integration with axle counting and weigh-in-motion applications requiring sensors under or on the road surface, cost and safety issues associated with mounting over-roadway sensors where existing structures are unavailable, and policies that prohibit over-roadway sensors in certain locations. New and properly installed inductive loop detectors can also provide more accurate data than many over-roadway sensors when they are coupled with the advanced electronics units available from several manufacturers.



The good performance of in-roadway sensors is due in part to their close proximity to the vehicles passing over them. They are insensitive to inclement weather such as rain, fog and snow. Their main disadvantage is their in-roadway installation, which necessitates that a pavement cut or small hole be made in the road. Improper installation and pavement deterioration from poor design, heavy commercial vehicle traffic, and weather can degrade the operation of in-roadway sensors. Street and utility repair can also impair loop integrity. This means effective loop installation, acceptance testing, maintenance, and repair programs are required to keep these sensors performing optimally.

Passage-detecting magnetic sensors, despite limited applications, have managed to retain some popularity largely due to their ruggedness, long life, and minimal maintenance requirements. Modern presence-detecting magnetometers require only small holes to be drilled or

NEW ENTRIES IN THE FIELD



Sensing specialist IEE and traffic system supplier Weiss-Electronic agreed in late-2008 to jointly develop a pedestrian sensor for traffic lights. The JV draws upon IEE's experience in 3D sensor technology for people-sensing and Weiss's expertise in traffic to develop a solution that offers benefits over current push-button systems. Able to detect pedestrians within a certain range of the traffic light, the system differentiates between single people and groups, and triggers the traffic light.

Designed to be installed at an approximate height of 3.5m to discourage vandalism and misuse (a recurring problem with traditional push-button systems) this new system functions by emitting modulated infrared light that is reflected by nearby pedestrians. A chip measures the transit time ('time of flight') of the reflected light from each pixel, and generates a 3D rendering of the monitored area.

IEE's sensor works by emitting modulated infrared light that is reflected by nearby pedestrians

A test has taken place in Luxembourg. The sensor detects the presence and number of pedestrians waiting at the light and transmits the data via radio signal to IEE's development center in Contern. The goal is to refine the detection algorithms developed by IEE according to Weiss-Electronic specifications, gather data about pedestrian behavior at traffic lights, and test the sensor efficiency in various weather conditions.

Synonymous in the field of video detection, Traficon has recently introduced 'TrafiCam x-stream' – a video detection sensor for intersection control,

cored in the roadway, followed by sensor insertion and sealing with fast-drying epoxy that minimizes perturbations to pavement integrity. They also feature radio transmission of vehicle detection data to roadside receivers, eliminating pavement cuts for lead-in wires. But their relatively small detection area may require two or more sensors to be placed side by side to guarantee the detection of lane-straddling vehicles and motorcycles, especially when 100% presence detection is required (e.g, at actuated traffic control signals).

OVER-ROADWAY SENSORS

Over-roadway sensors require installation of mounting structures, such as sign bridges, masts and poles, when they are not already present; power and data cables; sensor alignment; and calibration.

Video image processors (VIPs), sometimes called machine vision processors, consist of one or more cameras, computers for digitizing and analyzing the imagery, and software that assists in setting up detection areas and interpreting the images in a manner conducive to producing traffic flow data. Image analysis is performed by algorithms that examine the variation of motion and color or gray levels in groups of pixels (picture elements) contained in the video frames. A VIP system can provide a rich array of traffic flow data across several lanes and in multiple areas in one lane, and classify vehicles by length (usually in up to three bins) and report vehicle presence, volume, lane occupancy, and speed for each class and lane. They also register turning movements and lane changes.

Installation and maintenance (including periodic lens cleaning) require lane closure when a camera is mounted over the roadway. VIP performance may be affected by vehicle shadows; day-to-night transition; sun glint (particularly with an east-west camera alignment); vehicle-to-road contrast; inclement weather; and water, salt grime, icicles and debris on the camera lens. Reliable night-time signal actuation requires street lighting for optimum presence detection and speed measurement. Some models, though, are resistant to camera motion caused by strong winds and vibration of the mounting structure.

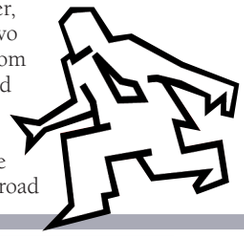
Microwave radar sensors that transmit a frequency-modulated waveform – which enables measurement of the distance between the sensor and a vehicle – can detect stopped and moving vehicles. These devices are sometimes referred to as presence-detecting microwave radars. They can be mounted alongside the road at a suitable setback distance to detect vehicles in several lanes. When mounted above a particular lane, they can detect vehicles in multiple areas in a single lane. Data supplied by presence-detecting microwave radars includes volume, lane occupancy, speed, and vehicle class by length.

Microwave sensors that transmit a constant frequency waveform and do not have the ability to detect range are Doppler motion-detecting sensors. They detect only moving vehicles, so cannot detect those at stop-lines, in queues, or in congested areas. These sensors find application in speed measurement. For example, they are used by private companies that sell travel-time data to travelers and transportation agencies.

Other over-roadway sensors include the laser radar, passive infrared sensor, acoustic sensor, ultrasound sensor, and sensors that employ a combination of technologies. The laser radar sensor transmits energy in the near-infrared spectrum, which is just above the visible wavelength spectrum. Up to 11 standard and 20 user-defined classes can be reported by the sensor. However, when mounted over the roadway, its operation can be affected by fog or blowing snow if such conditions restrict visibility to less than the distance from the sensor to the road, typically 6m (20ft). Similar to other over-roadway sensors, its installation and maintenance, including periodic lens cleaning, require lane closure. When mounted at wheel height, the laser radar can support tolling operations by providing axle count for vehicle classification.

ASIM detectors use passive infrared, or a combination of detection technologies for increased reliability and accuracy in any weather

Passive infrared sensors transmit no energy of their own. Rather, they detect energy from two sources: energy emitted from vehicles, road surfaces, and other objects in their field of view, and energy emitted by the atmosphere and reflected by vehicles, road



featuring IP addressability to allow local and remote control and MPEG-4 compressed streaming video.

TrafiCam x-stream is an integrated camera and detector offering vehicle presence detection and MPEG-4 image compression, and provides detection and monitoring of moving and stationary vehicles at signalized intersections. Vehicle presence information is transmitted to the traffic controller so that signal timing can be adjusted dynamically, resulting in reduced waiting time, improved traffic flow, and less pollution. "IP networks are a huge trend in the traffic industry right now," suggests Robin Collaert, Traficon product manager. "Besides configuring and checking the system, the user is able to monitor the intersection both on site and from a remote location. Installation is simple: only two wires need to be connected and configuration can be conducted in less than five minutes."

TrafiCam x-stream provides detection and monitoring of vehicles at signalized intersections

The RTMS (Remote Traffic Microwave Sensor) – originally developed by Canada's EIS Traffic, but now owned by Image Sensing Systems (ISS) – is becoming increasingly popular, with the recent announcement of a string of new contracts. ISS completed its first major installation of 71 G4 RTMS units last year for Caltrans in California. An automatic lane-calibration program ensures a fast and streamlined set-up process for transportation management customers. In this installation, Caltrans opted for solar power in the majority of the units, as well as wireless communications for quick deployment, remote monitoring capabilities, and high reliability.

The G4 RTMS system provides traffic volume, speed, occupancy and classification on California's I-5 and Highway 205, allowing Caltrans to better manage traffic. It is also being used for queue detection, ramp metering, and vehicle detection on the Marquette Interchange Project in the Milwaukee, Wisconsin area. The data collected is used to provide real-time information to drivers via local VMS. Brian Scharles, manager of technical services at TAPCO (the company responsible for installation) cites ease of installation in particular ›

surfaces, or other objects into the sensor aperture. Real-time signal processing is used to analyze the signals for the presence of a vehicle. The sensors are mounted overhead to observe approaching or departing traffic and in side-looking configurations. Infrared sensors are utilized for signal control; volume, speed and class measurement; detection of pedestrians in crosswalks; and transmission of traffic information to motorists. Passive infrared sensors with a single detection area measure volume and lane occupancy, responding to vehicle passage and presence. Those with multiple detection areas can also measure vehicle speed and length.

Acoustic sensors detect sounds produced predominantly from vehicle tire and engine noise. When a vehicle passes through the detection area, an increase in sound energy is recognized by the signal processing algorithm and a presence signal is generated. Sounds from locations outside the detection area are attenuated. A microphone array and adaptive spatial processing enable the sensor to monitor up to five lanes when mounted in a side-looking configuration. The output data is volume, lane occupancy, and average speed over a specified period. Vehicle presence is provided by an optional relay interface.

Ultrasound sensors transmit sound energy at a frequency between 25-50kHz, which is above the human audible range. Most ultrasonic sensors are mounted overhead and transmit pulse waveforms. The portion of the transmitted energy that is reflected back toward the sensor allows measurement of the distances to the road surface and vehicle surface. When a distance other than that to the background road surface is measured, the sensor interprets that measurement as the presence of a vehicle. The pulsed ultrasound sensor provides vehicle count, presence and occupancy. Ultrasonic sensors that transmit constant frequency waveforms also measure speed using the Doppler principle and are manufactured specifically for the highway infrastructure in Japan.

Peek Traffic's latest VideoTrak IQ system

Combinations of technologies are utilized to improve detection accuracy and provide a variety of traffic flow data. Such sensors combine passive infrared presence detection with ultrasound or Doppler motion detection. The passive infrared-ultrasound combination offers presence and queue detection, vehicle counting, and height and distance discrimination. The passive infrared Doppler sensor is designed for presence and queue detection, vehicle counting, speed measurement, and length classification. It relies on the Doppler motion detection to measure high to medium vehicle speeds and the passive infrared to measure vehicle count and presence. The passive infrared Doppler ultrasound sensor provides vehicle classification (up to eight classes), count, speed, presence and queue detection, occupancy and time gap detection, and detection of wrong-way drivers.

A LOOK AT THE FUTURE

The world of traffic sensors is changing rapidly as manufacturers develop new technologies and retire older models. Low-cost, long-wavelength (8-14µm) infrared sensors that incorporate uncooled microbolometer focal plane arrays are in development to support vehicle detection. Novel approaches that produce low-cost antennae – able to change their field of view without any moving parts – are being applied to aerospace applications. Accordingly, traffic management may see new two-dimensional presence-detecting radars in the not-too-distant future, as the cost is lowered for these scanning antennae and associated radar electronics. Such devices offer the promise of forward-looking, multiple lane detection without vehicle occlusion or setback issues.

There is a need for continued evaluation of new innovations as they are introduced to the market. Such evaluations should be performed on a national, regional or state level to optimize the efficiency of the testing process. Incorporating test standards, such as those developed by ASTM, into the process will assist in establishing uniformity in testing and reporting procedures. ■

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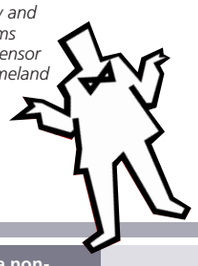


as a benefit: "They were extremely easy to deploy and we were able to place the units at locations where other model detectors would not operate."

Further afield, ISS also shipped 275 RTMS G4 systems to traffic management specialist Isbak in Turkey. "The road network around Istanbul already has many RTMS units, and this latest procurement is a continued expression of confidence in the technology," enthuses Graham Heywood, ISS Europe. Heywood believes the inherent features of the RTMS G4 explain its increased take-up. The systems require no cabinet integration for interface, provides coverage of 12 lanes, features a built-in IP video camera, has a minimal power requirement, and is available in the globally accepted standard NTCIP1209 protocol.

Quixote's new trans-Q is a non-intrusive radar classifier for measuring traffic data

The trans-Q sensor from Quixote (QTT) utilizes radar to detect traffic count, speed, and length, and is an alternative when other portable traffic sensors cannot be used due to location, safety, or other regulations. It detects all passing vehicles and data is retrieved with a PDA or wireless Bluetooth connection. "Non-intrusive sensors are imperative as traffic volumes increase on the USA's highways," Jerry Waldman, midwest region territory sales manager for QTT explains. "Measuring weather and traffic data from the side of the road is an excellent complement to intrusive sensor technology, especially for customers who need to retrieve valuable pavement data from precarious roadway applications."

QTT's new Thermo-Q sensor, meanwhile, uses infrared technology to detect pavement temperature, and provides remote readings in all types of weather. An optional design of the thermo-Q includes adjustable features (pan and tilt) and the capability to measure multiple surface temperatures.

The company's Optic-Q uses multispectral imaging to detect pavement conditions, and is ideal for providing essential pavement condition data in areas of roadway that are known trouble-zones: roadway configurations that include sharp corners, or bridge structures where intrusive sensors cannot be located due to structural design issues. ■

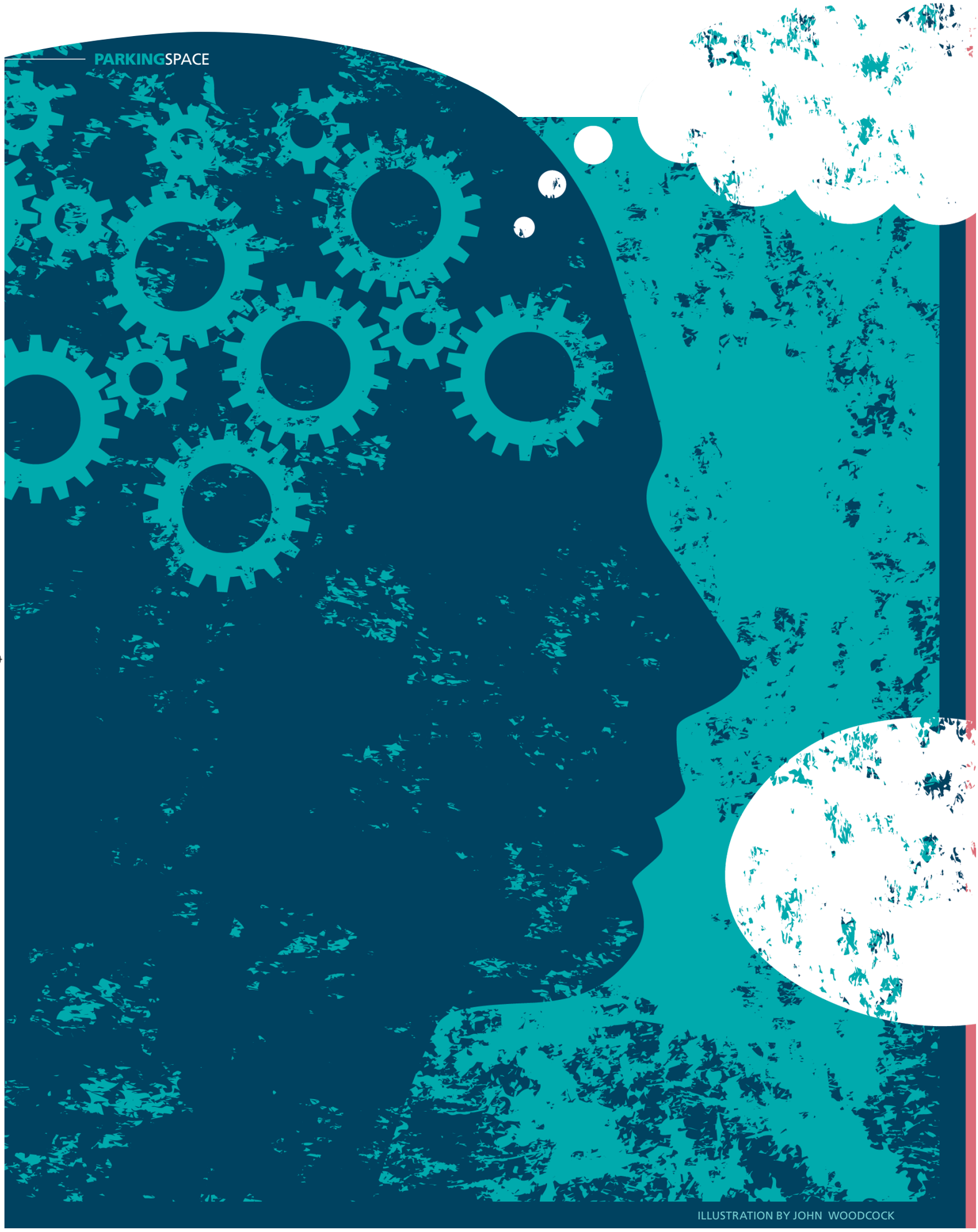


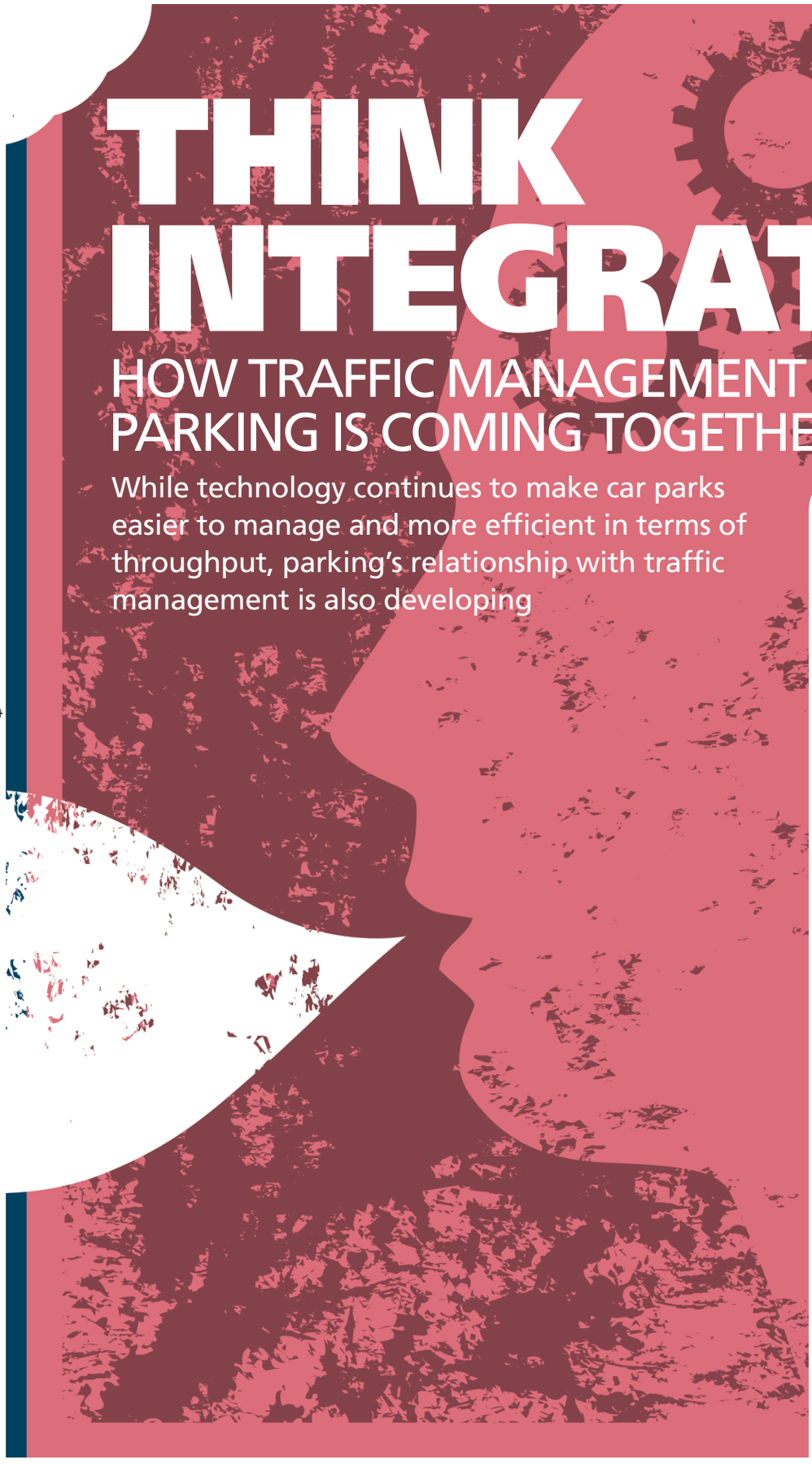
ILLUSTRATION BY JOHN WOODCOCK

by Louise Smyth

THINK INTEGRATION

HOW TRAFFIC MANAGEMENT AND PARKING IS COMING TOGETHER

While technology continues to make car parks easier to manage and more efficient in terms of throughput, parking's relationship with traffic management is also developing



Having been on the expensive receiving end of parking enforcement several times (and heard all the jokes about female drivers and their parking abilities), the research for this feature was approached with some trepidation. But what was unearthed was a sector deadset on improving the end-user experience.

What is notable about the following examples of innovation is their wide-reaching approach. Parking can no longer be considered a separate entity to traffic management; the integration of the two is key in making progress toward more efficient road networks. Real-world examples such as Transcore's efforts in combining tolling and parking applications illustrate what can be achieved with an holistic approach.

Sustainability is at the heart of this bigger picture. Both the traffic and parking sectors have an obligation to strive for a better future in terms of vehicle emissions and carbon footprints. This is not about hugging trees or wearing hemp pants, it is about responsibility. We've created the current environmental situation – it's not unreasonable to suggest that we do all we can to rectify the damage we've inflicted. And if the end result means added bonuses of not needing to find the correct change for the parking meter, of being directed to the exact location of your vehicle after an intellectually demanding shoe-shopping expedition, and never having to worry about losing a paper ticket, then who could possibly argue against it?

What the following case studies demonstrate is that parking is a field that has many interesting developments in progress – strategies that can help address a range of transportation problems, as well as assist in achieving a variety of transportation, land-use development, economic, and environmental objectives. ■

TICKETLESS SOLUTIONS COME TO TOWN

RFID-based Automatic Vehicle Identification (AVI) is a fast growing sector in the USA

Companies such as Transcore have spent years evolving AVI technology and diversifying into many applications in the security and access control markets. For David Tilley, parking operations director, an important part of his role is explaining the value of this approach to non-technical experts, such as stakeholders and consultants: "What works well is to state that it's simply a tag and a reader. In layman's terms, the reader acts like a flashlight and the tag in a vehicle acts like a mirror – it is the combination of both that is used to bounce back (or communicate) a tag ID to the reader. Then the reader communicates with a host system that performs a multitude of tasks. So it is a data-collection tool. It communicates information, and what you can do with that data solves many problems."

"The attributes of AVI translate into ROI, improving user experience, controlling shrinkage and improving efficiencies of operators"

The price of AVI technology has dropped as it has evolved and entered the mainstream, which has allowed Transcore to develop new applications. But there are challenges in the parking sector in terms of competition, not just from other RFID vendors, but from alternative technologies. "With regard to alternate technology, such as proximity cards, then price usually comes into play, as do the attributes of RFID technology compared with others," Tilley explains. "Hospitals, university campuses, executive garages and gated communities are all finding that AVI is enhancing throughput, improving security and automating payment. Whereas a proximity card system means that you have to find your card, roll down the window and present it to the reader before access is granted.

"The attributes of AVI translate into return on investment, improving the customer experience, being able to control shrinkage (the theft that occurs at car lots), and improving efficiencies of operators by minimizing the amount of in-lane effort required, as well as reducing their audit costs."

Improving the 'regional customer experience' is where Transcore is currently seeing wide growth. "Intelligence built into tags and readers means we can offer great flexibility," Tilley explains. "Parking operators can use the prevailing toll tag system in their region so that toll patrons can use their tags to park, drive on the tollway, and gain access to their gated community – one tag serving many applications."

Airports are a natural target for this usage and Transcore has rolled out AVI technology at a number of terminals. The latest success story is the enabling of interoperability between the statewide SunPass tolling system and Tampa International Airport in Florida, to allow toll patrons to pay for airport parking via their toll tag. The main challenge with such installations is not associated with technology; rather it is the back-office and the politics of deploying such schemes – deciding whether the toll agency or the airport is responsible for processing the parking transactions, for instance. But Tilley believes there is now the necessary political will and the required wider understanding of the benefits of such systems that will allow Transcore to promote a much wider take-up of the technology. This is enhanced as the drive toward cashless transactions for all aspects of travel continues. "The tipping point of the level of acceptance is starting," he concludes. ■

LICENSE TO BILL IN PARKING FACILITIES

Although ALPR is established today, it is capable of being put to far greater use

Parkeon has developed a system for off-street parking that integrates ALPR with Pay & Display (P&D) schemes, designed to automate enforcement. At the heart of the solution is the e-Gateway module within the company's Parkfolio Neo centralized management system. One of the functions of the module is to act as a portal to enable the ALPR/enforcement server to communicate with Parkfolio Neo using Simple Object Access Protocol (SOAP) requests.

Vehicle license plate details are scanned and captured by a camera as drivers enter a car park. The information is then sent to an ALPR/enforcement server. Motorists then have a predetermined period (five to 10 minutes, for instance) in which to enter their license plate on a P&D terminal using an alphanumeric interface on the screen. They then pay for parking with coins or a credit card in the usual way.

"Political will is needed but there's also a dilemma – if you charge high emissions vehicles more for parking, then they'll simply park for less time"

Details of parking transactions (i.e. date, time, amount paid, duration, license plate data) are transmitted by the P&D terminals via a GPRS wireless network to the financial database within Parkfolio Neo, which runs on a PC in the operator's office.

The next step in terms of developing integrated ALPR/parking solutions is to use the existing technology to do more. Parkeon's geomarket director, Bob Barnes, is exploring ways to diversify the applications the company can offer. As with many issues in the parking industry, the hurdles to progression are political rather than technical. "Local Authorities are eager to show their green credentials and it would be possible to use ALPR to charge parking related to emissions," he explains. "Political will is needed to take this step but there's also a dilemma – if you charge high-emission vehicles more for parking, then they'll park for less time." Forcing drivers away is bad for local businesses and parking operators.

Instead, Barnes believes that strategies to improve the end-user experience are more valuable. Cashless parking is very much on his radar right now: "We're moving there, but it is dependent on the customer's desire to do it."

He regards the rise of contactless credit cards as the way forward in encouraging operators to make life easier for their patrons, describing parking as a 'killer application' for the technology. Parkeon is already getting a slice of the action: "We are working on an upgrade kit to incorporate contactless credit card technology and chip-and-pin into existing P&D machines, and are working on trials in Westminster, London.

"The way contactless credit cards have been set up in the UK is to have a £50 credit on the contactless side, where you don't have to verify your presence. If you go over that limit – something that is easily done when parking – then you have to do a chip-and-pin transaction. If you had to run and find an ATM, you could receive a parking violation before you get back, which is why we are incorporating chip-and-pin with contactless machines, so if a user does get their contactless side rejected, they can still pay on their card."

Going green is also where Parkeon is heading. An entire London borough's equipment was recently replaced with solar-powered P&D machines that also accept credit card and chip-and-pin transactions. ■

MANAGEMENT THAT'S BETTER BY DESIGN

Offering entire parking management systems is one way to make life easier for operators

One company promoting integrated systems is the German-headquartered Designa. Its PM Abacus system is used worldwide. Stefan Lamp, responsible for managing several of Designa's projects, explains how the system works. "It is fully networked. All of the devices within the system communicate with each other via a standard TCP-IP Ethernet network. The advantage with this method

"License plate recognition enables operators to create 'lost' tickets using the license plate detail so nobody can try to cheat the system"

is that we can re-use existing structures. Installation is easy as no special wiring is needed. It is based on open standards, which minimize the amount of proprietary hardware and software devices needed. PM Abacus is based on the Microsoft SQL database, which users are familiar with."

The system undertakes a number of tasks that fall under the banner of intelligent management. These include daily control of the equipment, issuing tickets, auditing, and reports. Potential problems can be flagged up by observing system events – a handy tool for scheduling maintenance work. A 24-hour hotline provides technical support.

What this boils down to is the need to have less staff on the ground at car parks: "This is the nature of fully automated systems: older systems need a lot of manual intervention. We are strong in automated paystations, for example, so there are lots of unattended Designa parking systems in the world. If there is a problem, the customer will ring the intercom and somewhere in the city there will be a center where multiple parking garages are connected." If we look at the potential of such systems, then it's feasible that one day those dedicated parking centers could merge with TMCs and bring parking and traffic applications under one roof.

As with Transcore's large projects, Designa is also observing great interest from airports. Lamp was responsible for managing Designa's award-winning work at Dublin Airport in Ireland: "It is a large and complex installation. There are around 30,000 spaces, with a throughput of approximately 12,000 vehicles a day."

Lamp regards the fully integrated LPR system as one of the project's key achievements: "This enables the operator to create supposed 'lost' tickets by using license plate data, so nobody can cheat by claiming 'I came in 10 minutes ago'." Whitelists can be created for staff members, while blacklists can be used to keep out or alert the police to the presence of criminals.

Another noteworthy facet of the project was the use of LPR for a taxi management system. The technology is used to open the barrier that allows registered drivers access to a 'first-in first-out' holding area, thereby keeping taxi parking contained and ensuring fair distribution of work.

The latest new project Designa is working on is a creation that Lamp describes as a 'server farm'. "This is very interesting for larger parking operatives," he explains. "We have started the server farm with a German operator which owns more than 30 car parks. We have removed the servers from individual car parks and reconnected the equipment to one central server." If you have 30 servers, every one of them needs maintenance, can fail, or can even be stolen. Paying a monthly fee to Designa for its ASP (Application Service Providing), allows one central server in a secure location to remove the whole headache. ■

PARKING, POLICY AND PUBLIC INTEREST

Creating sustainable transport networks means incorporating parking into strategies

One man on a mission to make parking 'the cornerstone of an integrated transport and emissions policy' is Peter Johnston, who works for Zeag. Following the 2004 Traffic Management Act that requires all UK authorities to appoint a traffic manager and also to reduce carbon emissions, Johnston sensed a positive change in momentum. He wrote a white paper on the topic, offering a number of solutions in the hope that people would start listening. "It is estimated that up to 20% of emissions in urban areas are parking related," he stated in the paper. "This includes people looking for a space, queuing to enter or leave car parks, and entering towns purely for parking. Thus a major reduction in transport-related carbon emissions can be achieved by looking more closely at integrating parking with traffic management."

"The parking manager is traditionally interested in getting people in and out of his facility. Once they hit the roadway, his interest ends"

At the heart of Johnston's approach is the desire to keep drivers on side: do not force cars out of urban areas unless you wish businesses to go with them. He cites the 'poor take-up' of Park & Ride schemes as evidence that people don't want to leave their cars behind.

Yet every driver has a 'parking nightmare' story, so why is it taking so long for things to change? "The biggest barrier is getting everybody joined up," Johnston says. "Budgets for parking and emissions come out of different pots. A parking manager is traditionally only interested in getting people in and out of his facility. Once they hit the roadway, his interest ends."

One of Johnston's beliefs is in the value of variable-price parking: "Most centers have parking guidance boards informing motorists of the number of spaces. By adding to that board a price per hour, you can drive them from one to another. You make the ones in the most congested areas most expensive and those in least congested areas cheaper. You can even link price to issues such as air quality.

"Some of these strategies are very simple and we have the technology in place already. Modern equipment lets cars into and out of car parks more efficiently: simply linking the exit barrier with nearby traffic lights so that when cars come out they can get into free-flow traffic rather than queuing removes all those stationary, polluting vehicles."

Much of Johnston's approach relies on common sense and on seeing the bigger picture. When he explains that by closing off two levels of a six-story car park until demand is actually high enough to warrant them (thereby saving on lighting and monitoring costs), it's amazing to hear that this is not done everywhere.

Thankfully Zeag is finding other companies that share a progressive vision. Recent work with Bosch saw ALPR integrated into a system to offer a ticketless service for regular users. Another tie-up with Extreme CCTV allows a video link to paystations so that supervisors can swiftly deal with any queue-causing problems that arise when there is a problem at a machine.

Johnston's next task is to promote the move to cashless parking via 'wave-and-pay' card technology: "This speeds up transactions and prevents queues. There is another benefit, too. Every time you put a ticket or card into a machine, it wears out the card reader – with wave and pay, there is no long-term wear and tear." ■

Photography by Alexis Kembery

by Nick Bradley

IN THESE DAYS OF ECONOMIC UNCERTAINTY, IT MAKES A REFRESHING CHANGE FOR SOMEONE TO BE 100% CONFIDENT IN THEIR BUSINESS. **BERNARD GREENE** IS THE OPTIMIST IN CHARGE OF CA TRAFFIC AND TECHSPAN

The UK is, according to some analysts, teetering at the edge of an economic precipice, the likes of which haven't been seen for a century (if you believe the headlines). So talk of expansion plans, new products and breaking ground in new markets is most unexpected when I meet Bernard Greene, managing director of the UK-based Hill & Smith subsidiaries CA Traffic (formerly Counters & Accessories) and Techspan Systems. "The recession hasn't affected business yet," says the 56 year old. "I think Techspan will be okay given the UK government's declarations regarding managed motorway investment. CA Traffic may find it is affected more in its core UK market, but this will be more than made up in terms of export sales."

Overall, though, Greene feels the ITS market might not be as susceptible to the downturn as other industries, but nevertheless advises that "staying calm, managing costs more stringently, and exploring new potential and partners" will be key to weathering the storm. "Consumer markets are obviously subject to the spend decisions of us all," says Greene, who took up his position in November 2006 after being network operations director at Trafficmaster. "The government agencies we deal with have more structured budgets and longer-term plans. No doubt there will be reductions, but we'll have to make sure we secure as much of the money as possible."

Greene has the experience and business acumen to back up the ambition. At the age of 21, he started working for GEC Traffic Automation as a contract planning engineer. "It was a grand title that didn't require any engineering skill or qualification," he says. "At the interview, I remember being surprised that people actually made traffic signals! GEC Traffic was a big player back then and I was fortunate enough to work with some very good people. I became involved in the operational management of large and small contracts, at home and overseas. I could see how the whole enterprise worked, from quoting to handover. I was given more responsibility as time went on and grew with the job."

UPON REFLECTION

Looking back on his career, Greene considers how the road network has developed, as well as the ability to manage traffic. "The advent of microprocessor technology and some ingenious software has led to great improvements in traffic flow management," he states. He recalls the first linked traffic lights in the UK town of Slough, Berkshire, which provided a 'green wave' for a smoother flow of congestion: "I remember thinking at the time that it felt good to be involved in such an industry." Reassuringly for those now starting out in traffic management, some 30 years later Greene is equally enthusiastic, perhaps spurred on by what he describes as his proudest career achievement yet – being appointed MD of CA Traffic and Techspan.

"This is a huge responsibility that my previous experience and career have prepared me for. Hill & Smith has a strong reputation in the UK roads infrastructure market, and its acquisition of Counters & Accessories and Techspan was proof of its intent to expand and develop the group into the technology and ITS sector. My brief was clear. For CA Traffic it was to grow the business by 60% within two years. For Techspan it was to ensure that

"I think UK technology has an edge, and I think that UK thinking on ITS will – given a little time and a strong strategy – be seen as something the USA could warm to"

the management of the Highways Agency Framework Contract we were awarded in December 2006 was set up to fulfill and maximize the opportunity." Valued at approximately £60 million (US$85 million) to Techspan, this was vital to the company's immediate future profitability. Although Greene says he is reasonably satisfied with progress so far, you get the impression he is not one to blow his own trumpet; instead, he claims to be "optimistic" about the future for both companies.

"CA Traffic has always been a profitable business," he goes on to explain, "and has a great product focused on a sector of the UK traffic data market." That said, he admits that CA Traffic's product range was at one time not suited to growing a turnover, in the UK or overseas. "I proposed to the Hill & Smith Board a capital investment plan for a new journey time system and our own ALPR camera product. We started development on a 'clean sheet' and have integrated the latest technology to package key functions into a very compact product." Such terminology is somewhat familiar to technical journalists (it's *de rigeur* for any press release), but Greene is convinced that CA Traffic's 'Evolution' product will open up new export opportunities for the company. Development doesn't stop there, however. The Londoner also reveals that Traffex (April 21-23, NEC, Birmingham, UK) will be the launchpad for a brand-new traffic data instrument, the details of which he says he will reveal at the exhibition. "The impact of both of these investments will be felt in 2009," he says.

EXPORT ADVICE

Commercially, Techspan is in an entirely different place to CA Traffic: "The company has two very important Framework Contracts that are being serviced in the UK. The challenge in this case is to develop overseas opportunities for our variable message signs (VMS) product range, in much the same way as CA Traffic." Could this therefore explain why both companies had a noticeable presence at the 15th World Congress on ITS in New York? "It was as much about information-gathering as anything else," Greene reveals, "but I think ITS(UK) put up a good show and we received some surprising interest. I have always liked the USA, and we do export one product there from within the CA Traffic range, which has been reasonably well received." Clearly, though, Greene is eager for more business in the USA and reveals that plans are underway to test the water further in the latter part of 2009, and he is confident that his products will step up to the mark. "I think UK technology has an edge, and I think that UK thinking on ITS will – given a little time and a strong strategy – be seen as something the USA could warm to." On a similarly patriotic note, Greene believes the UK road infrastructure is one of the best in the world, and cites the development of the Department for Transport's (DfT) Urban Traffic Management & Control (UTMC) initiative as a prime example of this British innovation.

CA Traffic has only recently produced a UTMC interface for its classification products, although Greene feels it is a bit too early to predict how it will develop. "Our Evolution ALPR Journey Time System has been designed to be compliant with UTMC Version 2. Techspan also has UTMC-compliant signs, although we have recently been beaten on price, so a major rethink concerning our approach to this market is needed," he says candidly.

GOOD SIGNS

Techspan has supplied UTMC-compliant VMS to many local authorities in the UK, including the City of York – one of the DfT's original demonstrator schemes. The signs were installed on and approaching York's outer ring road, and provide real-time driver information regarding parking and traffic conditions. CA Traffic is also developing fully UTMC-compliant products. The Active Traffic Management (ATM) scheme on the M42 in the Midlands has generated global interest, and ATM is being rolled out on the busiest stretches of motorway across the UK. "We have a great deal of expertise to offer in this area. I believe markets worldwide will embrace these new strategies. We've already seen ATM based on the UK model being implemented in the USA."

Techspan was actually involved in the very first scheme of this type, having been awarded the contract to develop the electronic signs for the original M25 London orbital controlled motorway project in 1994, in which variable speed limits were first introduced. More recently, Advanced Motorway Indicators (AMI) have been installed on the M1 motorway in the South of the UK (from junctions 6a to 10). Certainly VMS could be in for a 'boom' time in the years to come, as authorities look to create more capacity out of existing infrastructure – and at considerably less cost and environmental impact than constructing additional lanes.

Such prospects are all food for thought for Greene, although he seems most excited about CA Traffic's Evolution ALPR product. "It's traffic data, it's what we do," he enthuses. Designed to take the 'mystique' out of ALPR, the product actually started life as a journey time system, but has since evolved into what he refers to as a very flexible ALPR data warehouse. "Ease of use is key, as is the business model," he says. "Being a hosted web server, we take a lot of the IT problems away from the client. I strongly believe that clients want solutions that require minimum effort, which is what Evolution delivers. Our main business driver is the sale of the EVO8 camera."

CA Traffic has welcomed the enquiries about Evolution and EVO8 since their low-key unveilings at Intertraffic in 2008. "It has been exercised by a number of organizations, and this has created unexpected opportunities, which we have been working on over the past couple of months," confirms Greene. The system can be used for origin and destination surveys and more recently has been adapted to provide very detailed speed survey functionality. Its ease of use – it can be set up on a tripod in a matter of minutes – makes it very adaptive for short-term surveys.

So, with an ambitious business plan that revolves around product launches and new markets, the future looks anything but turbulent for Greene and his colleagues. "I am determined that CA Traffic and Techspan won't be among the casualties," he says. "I am in no doubt that some of our competitors are finding it tough, and some of the 'leaner' ones should be okay. I wouldn't like to be one that needs millions of turnover to support overheads! All small, innovative businesses struggle to get access to the bigger buyers and systems. But this is a part of my challenge for 2009." ■

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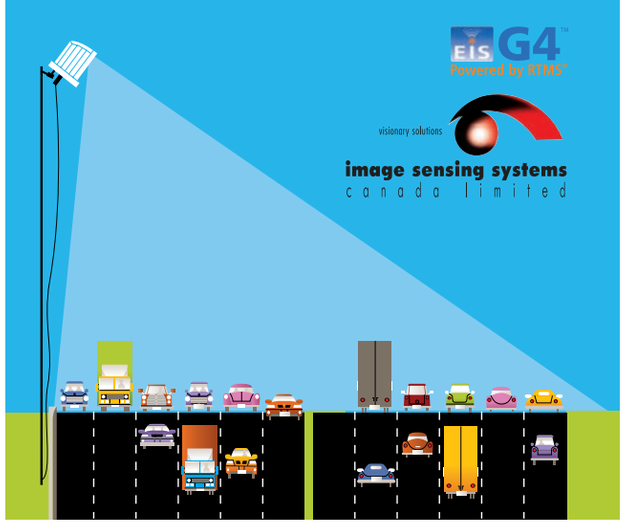

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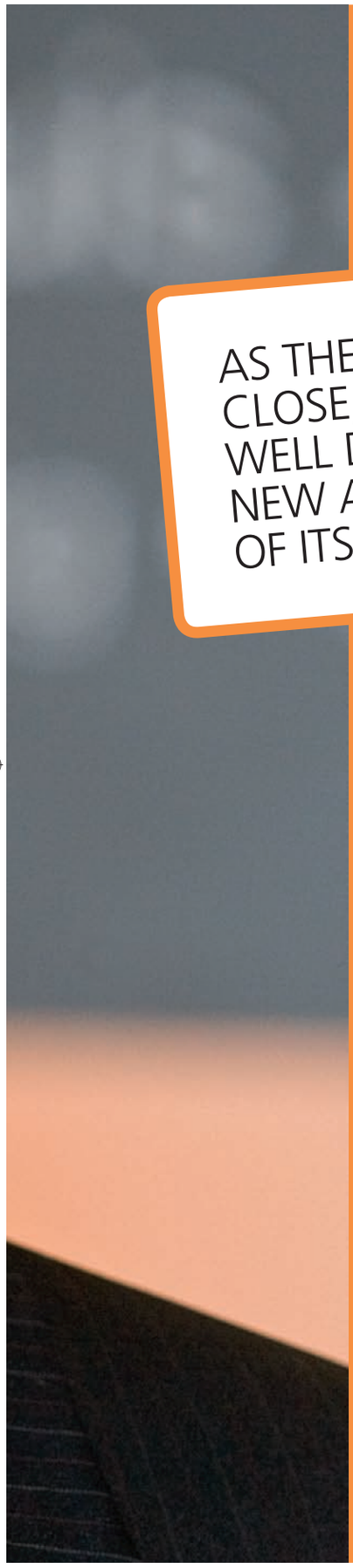

AS THE 15TH WORLD CONGRESS DRAWS TO A CLOSE, MICHAEL NOBLETT REFLECTS ON A JOB WELL DONE, BUT ISSUES A CALL TO ARMS TO THE NEW ADMINISTRATION: IGNORE THE POTENTIAL OF ITS AT YOUR PERIL

Some people claim they've seen the future and that it promises a world of breathtaking wonder. Others fear the future because they believe it will be no better, or even worse, than today. Fortunately, there is a third group of people who are solidly grounded today, and want to make tomorrow better.

Having spent a little time with Michael Noblett, I'd put him in category three. Being fully immersed in ITS, that would be reason enough for him to have his head in the clouds and live life with *The Jetsons*. On the other hand, the fact that connected ITS has yet to be deployed extensively could easily make him a doom-monger. Yet Noblett, the chairman of the organizing committee of the 15th World Congress, has avoided these paths because he is a man who combines vision with pragmatism and energy.

PRESSURE RELIEF

Mind you, his energy levels were being sorely tested the day that we met: it was day three of the New York event, of which he'd been in charge of the planning for more than three years while still holding down the chairmanship of an ISO committee, the chair of an ITS America forum, and a day job at Connexis. There were 48 hours still to go before he could say "job done", but he gave up a fair chunk of his scarce time to talk about the immediate prospects of ITS, the event itself, and his plans for Connexis.

He believes that two parallel pressures can be resolved by implementing ITS. "The market demands have begun to focus the departments of transportation, and the engineering demands have begun to focus the automobile companies onto a more clever solution for the problems they face," Noblett says. The demands confronting the DOTs are to make roads safer and more efficient. "We still kill 42,000 people a year on our highways at a cost of about US$300 billion, not forgetting the human tragedy," he states. "At the same time, if you look around our big cities, like here in New York, you can't build any more roads; you can't build any more bridges and tunnels – there's just no place to go. So, if you want to come from a safety side, it turns out that you really need to get toward ITS and, if you want to come from an efficiency side, you arrive at the same solution.

"If we begin to deploy these technologies and start chipping away [at that US$300 billion cost] the saving will so far outweigh the economic cost of doing it and, as there are no other solutions available out there, we believe you pretty much have to go in this direction."

New York saw the first, fully integrated demonstration of vehicle-to-vehicle and vehicle-to-roadside communication technologies and services

The demands confronting the auto-makers are to make their vehicles safer, Noblett explains. "The car companies have done a marvellous job. They've made the cars crashworthy, they've put in airbags, stability control systems, seatbelts, and so on. They've begun to put in advanced crash warning systems so they've got cameras that are used for ACC and can sound an alarm inside the vehicle if there's an imminent crash. They are doing everything they can – but the vehicle is only aware of what it can see and do in its immediate environment."

TALKING THE TALK

According to Noblett, vehicle-to-vehicle and vehicle-to-infrastructure communications provide the solution. "If you extend the vehicle's view outside of the vehicle and give it more information about its environment, you can prevent those crashes before they occur. The more information the vehicle has, the further its view extends, and the more its safety applications can be developed."

"They [the car-makers] are doing everything they can – but the vehicle is only aware of what it can see and do in its immediate environment"

Although improving safety and saving human lives should be enough to justify most public and private investments, modern economics often requires further reasons and Noblett has an answer to that. "[It's the] efficiency side that pays for it," he suggests. "If you're not motivated by saving those lives, well, every time there's an incident, even though it's not a fatal incident, thousands of commuters get stuck, burning fuel, listening to the radio. It's estimated that *40%* of the congestion is caused by incidents! The bonus is that if we deploy ITS and get rid of that 40% of congestion we'll actually go on to get even greater benefit because once the incidents are starting to be reduced the traffic management centers will have a whole set of tools that they can use to manage road usage and road flow."

Those ITS tools would facilitate optimizing the use of existing roads without having to spend billions on more lane building, Noblett explains. "There's enough roadway network out there," he continues. "For instance, if it was to be used in off-peak hours it could be managed by road pricing. There are lots of people who can make their trip at a less busy time and we could gain efficiencies just by ensuring the right people are out there at the right time."

SEEING IS BELIEVING

The 15th World Congress on ITS went far beyond just talking the talk. Out on the streets of New York, it was walking the walk, or more appropriately it was demonstrating ITS on a city center circuit and on some five blocks of 11th Avenue, which were closed to other traffic. "The reason we went that far is that, in the USA, Congress is getting ready to write the next Transportation Bill, which will govern us for the next four to six years. So our goal was to have proof in the streets of New York that the technology excuse is off the table. You know what, it works – the stuff really does what it says it's going to do!" Noblett states with attitude.

Then he throws down the gauntlet. "With the technology excuse off the table, what we need is for Congress to act. It's time for them to write the legislation that deploys this wireless safety net for smart cars," he says. He has no doubt at all that the ITS industry is up to the task. "It takes a 15-minute walk around our exhibition floor here to answer that question. The guys are ready," Noblett says. "You've got eight of the world's largest car manufacturers out there; they've got the stuff integrated in their cars right now. The standards were developed by the USDOT and they are available right now. The roadside units are all available, right now. This isn't smoke and mirrors; this is for real. We're ready to go."

Having made his point that everything that Congress would want from ITS is available, Noblett relaxes a little and shows some empathy with the auto-makers. "Now, the car companies, they have a couple of barriers. They can't afford to build a car that has technology on it that works regionally," he explains. "In other words, no car company is going to build a car with technology that only works in New York. What they want is a commitment to a nationwide deployment so that when these cars start coming to market, they work the same everywhere they go. Europe has recognized that as well and they actually set aside the same safety frequency that we've set aside in the USA so that it works there. So it's a big deal." Congress should note it carefully, unless it wants another emphatic call from Noblett.

BUSINESS PLAN

Getting ITS inserted into the Federal Transportation Bill is no easy task, and neither was organizing the World Congress. "We decided to run it like a business and we put it together just like you would for a small start-up company," Noblett details. "We went away and got all the nuts and bolts and collected all the corporate memory of all the people who had put these on in the past and built a plan.

"Like any good business plan, we set goals. We found out what was the best World Congress we've ever had in terms of key metrics, such as exhibition space, number of attendees, number of sponsors, registrants, and so on. Our goal was to beat all those by at least 20% and then we made some stretch calls to see if we could beat them by even more. So we had two different sets of goals and created a plan."

How did it turn out? "Until now, this organizing committee – a group of volunteers I've been honored to lead – has exceeded all my expectations. It turns out that having that plan and setting those goals was a fairly significant portion of getting our energy focused," he says. "I'd recommend that approach to any large project you have in your life."

By the time that this interview is published, Michael Noblett will be well under way with the rest of his life. He'll be fulfilling his role as vice-president Global Automotive Initiatives for Connexis and the World Congress should be a satisfying achievement at the top of his CV. It may now be in the past but it has offered great help in preparing the ITS sector for a realistic future. ■

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LARRYYERMACK

by Sally Cranfield

HE'S BEEN CHAIRMAN OF ITS AMERICA, LAUNCHED E-ZPASS, AND IS NOW ONE OF THE TOP PEOPLE AT TELVENT. YOU'D THINK A MAN LIKE THIS WOULD BE FULL OF SELF-IMPORTANCE, BUT **LARRY YERMACK** TALKS INDUSTRY FIRST, HIS OWN INTERESTS SECOND

Larry Yermack is in his element when we meet on his Telvent stand at the 15th World Congress on ITS in November 2008. He's in his home city, his company's stand is bustling, and the ITS Advisory Committee of the Federal Highway Administration is due to drop by in the next half an hour. Outside, a chill wind is blowing off the Hudson, but, here in the Jacob K. Javits Convention Center, Yermack is glowing with warmth and expectation.

"I'm a New Yorker," says the president of transportation for Telvent in North America. "I was born and bred in New York and when I was chairman of ITS America back in 2001 there was a committee created that chose New York for the 2008 World Congress. So I've been looking forward to having this in my hometown for a long time. This really is a personal pleasure."

Just along the aisle is a stand that Yermack is particularly delighted to see, belonging to the New York City Department of Transportation. "You know, that's where I got my earliest position, where I could specialize in transportation," he says. "It was back in 1982, and I was the first deputy commissioner of New York City DOT, working for Ed Koch. I'd been on the City Hall staff up to that point."

SMART MOVES

From there he became the chief financial officer of what is now Metropolitan Transportation Authority Bridges & Tunnels, and launched E-ZPass. He made a smart move to Parsons Brinckerhoff Farradyne – a business that, in July 2006, was acquired by Telvent. "At the time of the acquisition there were around 235 employees, but since then around another 135 have joined us," Yermack reveals.

So business is good? "Governments are increasingly looking to improve the efficiency of their systems and, in the USA, they're increasing their ability to do capacity enhancements and system expansions. They're looking to develop smarter operations," says Yermack, generously giving an overview of the prospects for the industry as a whole. "And the other big opportunity is on the tolling side. Toll agencies, expansion of tolling systems, greenfield toll projects, congestion charging, and HOT lanes are all very exciting and have, in a sense, joined the conventional wisdom of the debate on transportation policy."

That may indeed be correct for ITS in the USA in general, but it fails to explain how Telvent in particular is progressing. When asked, Yermack is happy to reveal a little about his own company's approach. "Both the playing field and the ability we have as a company have changed dramatically since the acquisition by Telvent," he says. "Telvent understands that clients are not looking to select their software from vendor A, hardware from vendor B, integration services from C, and maintenance from D. They're looking for turnkey solutions, for someone to come in and give them off-the-shelf solutions, and that's what Telvent does."

One barrier for a business operating in this way is the lack of common standards

Photography by Alexis Kembery

"I think that the technology [5.9GHz] is close, but the case hasn't been made to the agencies as to why they need to make considerable additional expenditure to achieve increased functionality"

Yermack is responsible for Telvent's growth and development, financial management, technical oversight and operations

among different customers. Yermack is pragmatic about the interoperability of tolling across regions, something that would surely enhance his company's ability to do business. "I've been involved in the tolling interoperability debate in this country for nearly 20 years, and the good news is although there's no national interoperability, we're seeing a lot of *de facto* regional interoperability – as new toll roads come up they adopt the extant tag," Yermack says. "At Telvent we are tag agnostics. We'll integrate any of the vendors in the US market. The agencies are looking for highly accurate open-road tolling systems, and to be able to maintain them efficiently at a moderate cost." He cites Telvent's tolling solution and its independent verification.

Yermack suspects that national interoperability for long-distance drivers and commercial vehicles may come through video tolling. "And then, some day, we'll see the new 5.9GHz tags. I think that the technology is close, but the case hasn't been made to the agencies as to why they need to make considerable additional expenditure to achieve increased functionality."

The powers that be are also being told that ITS can help to achieve another target – sustainability. Yermack is the chairman of ITS America's Environment Task Force, and he is certain that the technology will help to reduce the nation's impact on the environment. He is cautiously optimistic that the benefits are being understood. "We've begun to develop the case for why ITS is an ally of sustainability, and that argument's going to be carried forward in Congressional debates next year on cap-and-trade legislation [to limit emissions] and, the year after that, on reauthorization," he explains. "I believe that, at this point, the most important things we can do are make the case for the technology as a way to reduce congestion, to allow people to reroute traffic, and to encourage modal shifts from cars to transit. We need to be part of the national debate on sustainability."

THE GREEN ECONOMY

He sees the environmental debate as a door that, when fully opened, will benefit ITS as a whole. "It's a huge opportunity and I think the industry is rapidly becoming aware of it. We've been talking about this in the ITS community for just 18 months," says Yermack. "There's an argument made by people far smarter than me that the transformation of our economy into a green economy is not just the key to reversing climate change, but also the key to economic revitalization in the USA.

"The fact is that we at Telvent believe in sustainability as a core principle," he continues. "The firm is putting a great deal of energy into examining our own carbon footprint and trying to achieve carbon neutrality. Environmental stewardship begins at home. It doesn't begin with our clients, it begins with us. So, for us, it's a core principle, but I believe it is also good business for this industry."

Yermack also points out an important challenge that needs to be overcome if the ITS sector is to convince the world of its green credentials. "To those outside of ITS, we are not necessarily seen as an ally of sustainability. We're part of the highway business to a large extent," he says. "So to the skeptic we have to overcome the perception that we're part of the problem. We can do some good, but we have to educate people about what we're doing."

While most of the industry has focused on reducing congestion through ITS, Yermack has been keeping an eye on the rising interest in alternative fuel vehicles as a solution to develop sustainable transportation. And he sees this as another door waiting to be pushed open. "If there are going to be plug-in electric vehicles, not only does the energy sector need to redirect the grid to provide the energy to them, but also our clients need to be involved in providing the necessary infrastructure along the roadside, as well as for exchanges of batteries and for all those things needed to make plug-in electrics effective. So we in the ITS sector do have a role in it," he explains.

With this and other more mainstream prospects, Yermack is confident that the industry to which he has devoted more than a quarter of a century is ready to roll. "What I'm beginning to pick up from our press coverage and from Congressional staffers and members of Congress is that we're at, or maybe near, a tipping point in the understanding that ITS is a really valuable tool," he says.

Drawing a comparison with the situation more than two decades ago, he says, "When I got started in this business, ITS was at best peripheral. We were talking about what was so wonderful about ITS, but we were talking to each other. Now the public has tuned in, Congress has tuned in, and mainstream media has also tuned in, and I'm happy with that." Yermack scans the exhibition hall with a sense of satisfaction, for all the world a son of New York who has brought a friend home for tea. ■

by Dan Manor, Image Sensing Systems Canada, Canada

Zero-setback detection

Easily mountable on existing roadside poles and fully programmable to support a variety of applications – in any weather condition – the RTMS radar sensor is making some serious waves in the field of traffic detection

Urban traffic control is a relatively undeveloped area of advanced traffic management, in which ITS disciplines have shown they can yield high benefits at low cost – i.e. relief of congestion through better management of traffic in the existing grid. Yet urban traffic has all the ingredients for successful ITS deployments. For instance, there is a high concentration of vehicles; cities being the ultimate destination of the majority of traffic. The widening of roads to increase capacity is not an option, and improved signal coordination is clearly an achievable congestion reduction method.

URBAN CHALLENGES

One difficulty in the deployment of ITS in the urban environment is the complexity and cost associated with the deployment of detection systems and sensors to support such systems. Clearly, to perform near-optimal signal control requires accurate real-time data – and lots of it. Until recently, though, this meant a difficult choice among several alternatives.

Stop-bar loop detectors are difficult and expensive to maintain as a result of frequent failure and the need to stop traffic during maintenance. They also provide only part of the data required for effective signal timing control. Video detection at the stop-bar, meanwhile, alleviates such maintenance headaches, but is still unable to provide the most essential information – the length of the queue at each approach. Advance or system detectors – commonly called 'midblock' detectors – can complete the picture and provide the necessary data for full and even adaptive control. However, they have been associated until recently with high cost, resulting from installation constraints and communications requirements.

New developments now allow the addition of midblock detectors to urban traffic control systems at a fraction of both the deployment and maintenance costs. There are a number of advantages to be gleaned from the placement of midblock detectors. As well as measuring the actual queue length in real time, they measure link speed, while providing positive indication of a long queue, long before gridlock forms. That said, there are a few limitations. For instance, expensive communications and power lines may be required far from the intersection. In addition, it may require special poles for deployment, which further complicates the installation.

Older loop detector technology for traffic detection is both expensive and impractical for midblock detection and hence used sparingly.

MICROWAVE RADAR

However, a new innovation is now available for accurately and reliably monitoring midblock traffic at a fraction of the cost of in-road loops. It combines a multilane microwave radar detector with a wireless

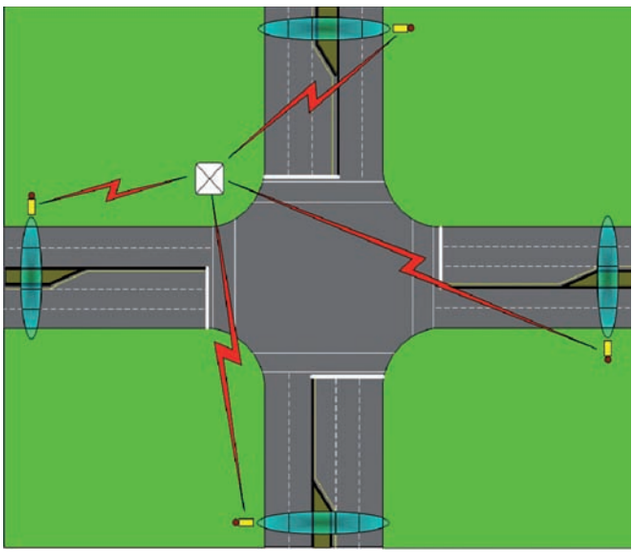


Figure 1 shows the Detection Event Reporting architecture setup

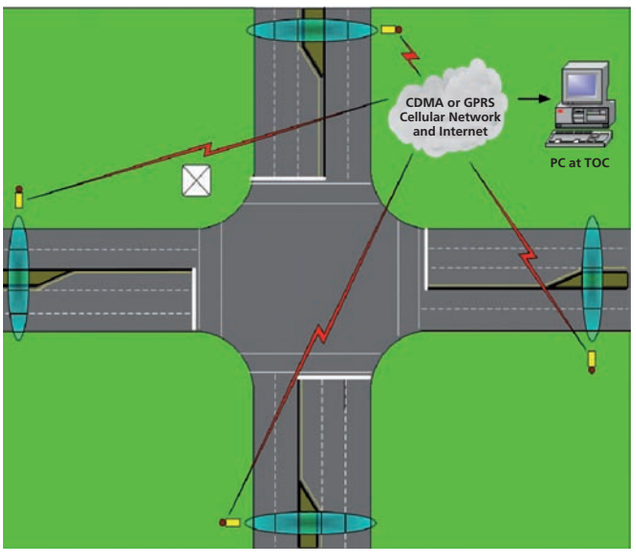


Figure 2 shows the Statistical Data Reporting architecture setup

High concentration of vehicles in an urban scene

Figure 3: The RTMS detection system can be mounted on existing poles close to the curbside

Figure 4: Zero setback capability makes the RTMS an ideal solution for urban traffic control

modem. Such wireless detection stations have proved their mettle in highway ITS applications, but have been largely overlooked by urban traffic engineers.

There are two architectural alternatives for the addition of such wireless midblock detection to an existing UTC system – Detection Event Reporting and Statistical Data Reporting. In the former, the presence of every vehicle detection is reported on a second-by-second basis, so is suitable for adaptive traffic control systems such as SCOOT. A Statistical Data Reporting architecture – in which statistical averages such as volume, occupancy, and per-lane average speed are periodically reported – is suitable for quasi-adaptive schemes in which timing plans are built and switched based on real-time data collection. Each of these architectures has its own special advantages and limitations.

In the Detection Event Reporting scheme (Figure 1), the detector immediately reports the detection in each lane. Data can be typically provided as contact closures, which interfaces directly with the existing controller. There are several advantages of this scheme. First, the traffic controller is typically ready (hardware and software) to receive the inputs, so no changes are required. Second, full and detailed information is delivered, allowing unrestricted processing in support of various adaptive control algorithms. Third, the data can be processed separately and differently during the green and red cycles. Another advantage is that the radio communications channels are highly reliable, and user-owned. Finally, data communications from the controller to the TOC can use existing channels.

Statistical Data Reporting (Figure 2) bypasses the entire network of traffic controllers and provides its data directly to the TOC. Data provided is statistical in nature and does not provide sufficient detail for some applications. There are benefits with this scheme also. For example, the wireless detection system does not burden the traffic controllers, while the communications transport is conducted by service providers.

Both schemes provide valuable and timely data cost effectively, allowing quick deployment without requiring changes in the traffic controller's software or communications network. In addition, both schemes are scalable, allowing for deployments that support anywhere from a single intersection through a busy arterial to a full area-wide solution.

ZERO SETBACK

Until recently, a main limitation of the microwave radar detectors was the need for a significant setback distance – i.e. the distance from the sensor to the first detected lane. Although this requirement is of less significance in the highway traffic management environment, urban traffic measurement is achieved from close distance and does not allow for the introduction of special poles. Existing poles are often very close to the curb, as shown in the Figure 3 and Figure 4 above. Another limitation is that of providing power to a detector on a midblock pole, often a luminaire pole. Many luminaire poles have only night-switched power.

With the introduction of the new RTMS radar by Image Sensing Systems Canada, most of these issues have been dealt with. The new RTMS supports a zero-setback requirement, which allows any existing pole to become a midblock detection station. This obviates the purchase and installation costs of a pole and makes for simple, safe and quick deployment. The low power consumption of such a station makes it feasible in many cases to utilize solar or UPS power right on the pole.

For poles that have power on a continuous basis, RTMS allows a clean non-obtrusive detection station, which can be powered from 110 or 220Vac with no need for a pole cabinet, as all of the power supplies and radio modem parts are included within the small sensor enclosure.

The proven cost-effective method of utilizing wireless traffic detection stations has now penetrated the urban traffic control market with a presence in a number of cities with high congestion and few alternatives. The new zero-setback capability of RTMS means that any existing pole in the city can now be used to improve the flow of traffic. Coupled with the 'all-in-one' RTMS G4, it simplifies the detection station and reduces its cost, while maintaining highly reliable and accurate all-weather operation. ■

To find out more information about RTMS G4, please contact Image Sensing Systems Canada by telephoning +1 416 785 9248, emailing zsafa@imagesensingca.com. Alternatively, please log on to www.imagesensingca.com

by Dirk Hübner & Christoph Schwietering, Heusch/Boesefeldt, Germany

Watching and warning

ASDA and FOTO models based on three-phase traffic theory were developed to determine travel time and detect incidents – and then adopted in the demanding real-life environment of the Hesse traffic center in Germany

Any ITS application requires good knowledge of the traffic situation. This applies to information services and especially to active traffic management, where decisions are often based on the level of service or amount of congestion.

Methods based on local information detect incidents and determine travel or delay times at the place of measurement. Another method of determining travel time is license plate recognition (LPR), which gives very precise values. Unfortunately, this information is only available after vehicles have passed a bottleneck, which is much too late for re-routing applications to prevent other drivers entering the corresponding area. The exact position of congestion cannot be determined at all using LPR.

Evaluation and analysis of a large amount of measured traffic data taken from local sensors has led to a deeper understanding of congested traffic on highways and was the basis for Kerner's three-phase traffic theory.[1] This philosophy distinguishes between three different traffic phases: free-flow (F), synchronized flow (S), and wide-moving jam (J). Based on the three-phase traffic theory, Daimler AG developed the models ASDA and FOTO to detect and track spatiotemporal traffic patterns.

TRAFFIC MODELS

The three phase definition is solely based on measured spatiotemporal traffic patterns on highways. In phase F, vehicles may drive freely, they can change lanes and even overtake. In contrast, traffic in phase S is already semi-fluid, linking movements of vehicles to each other. Overtaking and lane changing is quite restricted or even no longer possible. In phase J, traffic is so dense that vehicles come to a complete stop or move only at very low speed. The different traffic phases are characterized by three parameters – speed, density, and volume. Based on local measurements these parameters are used to perform a spatiotemporal evaluation of the different traffic characteristics, leading to the differentiation into the three traffic phases.

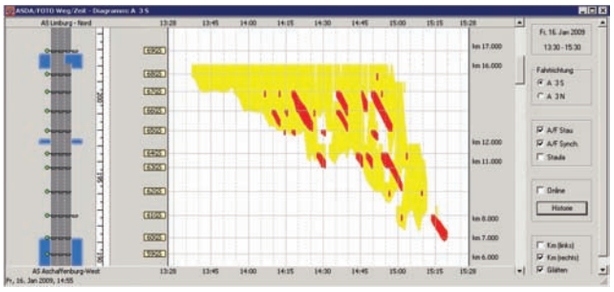
Empirical criteria show that traffic phase S is in most cases characterized by the fact that the front of an area of S facing downstream remains stationary at the bottleneck. In contrast, the front of phase S facing upstream is not stationary at all. Depending on the traffic flow entering upstream, it may move either upstream or downstream. In the case of phase J, neither fronts remain stationary; both move upstream with a specific velocity and their movement is not slowed down by other bottlenecks, with the velocity of the downstream front remaining constant. The upstream front is affected by the number of vehicles entering phase J.

FOTO detects the current traffic phase at a specific position and time, as well as the dimension of areas of phase S, including the up and downstream front. ASDA detects the up and downstream front of areas of phase J and tracks their movement in position and time. Both operate on local traffic measurements. ASDA and FOTO are able to determine the spatiotemporal development of the fronts of congested traffic phases between local sensors, even if none of these are situated inside the congested area. The fronts are tracked between the sensors using the stationary measurements up and downstream. The quality and precision of ASDA/FOTO has been proved in a number of evaluations. Both models operate in different environmental and traffic situations, calibrating parameters automatically based on the measurement values.

The Frankfurt area has high traffic volumes at peak hours, so good management systems are crucial

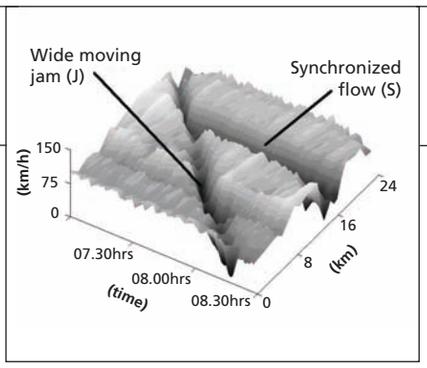
REAL ENVIRONMENT

The first application of ASDA/FOTO in a real-life situation has been made in Germany, in the federal state of Hesse. An intensive evaluation using a prototype system was successfully completed and resulted in the decision being taken to fully integrate ASDA/FOTO into the Hesse Traffic Centre (VZH).



Inside the busy control room at the Hesse Traffic Centre in Frankfurt, Germany

Real traffic situation detected by ASDA/FOTO (screenshot is from the traffic center's user interface)



Examples of traffic patterns J and S

The VZH has responsibility as management and information center for the motorway network in Hesse and ranks among Europe's largest traffic control centers, controlling the motorways around Frankfurt International Airport (Germany's biggest airport). This region is a European transportation hot-spot where intra-German and European international routes meet. Near the airport is the Frankfurter Kreuz – Europe's most important motorway junction – the meeting point of the German A3 autobahn from Arnhem and Cologne to Frankfurt, Nuremberg and Passau, and the A5 autobahn from Hattenbach to Frankfurt and Karlsruhe, and Basel in Switzerland.

The VZH central control and information system, developed by Heusch/Boesefeldt, is based on a GIS kernel and has been built using a real-time data middleware product (GeoDyn2), which combines extensibility with scalability. The VZH already integrates 19 subcenters, 40 chains of dynamic rerouting signs, and detects traffic conditions every minute via 3,400 sensors. The system is distinguished by its sophisticated traffic engineering processes and models to determine traffic situations, make predictions and support decisions, as well as by the capability to calculate and predict delay times and the extent of congestion at roadworks and during peak hours.

The results of the congestion detection and prediction system are used together with knowledge of the motorway network, to research rerouting recommendations. The dissemination of the recommendations to motorists occurs via rerouting systems and VMS. Information is provided to police, broadcasting stations, or service providers via RDS/TMC or DATEX 2.

As a result of the service-oriented, open architecture of the central system, integration of ASDA/FOTO has been straightforward. The central database includes the entire highway network and the positions and attributes of roadside devices (such as sensors or VMS), so the models need no additional configuration. In any case, the ASDA/FOTO models only need a small number of parameters and are therefore easy to maintain, even if the network or number and position of the sensors changes. The software integration was also accomplished easily using the extendable, configurable data model as well as open programming and the service interfaces.

Input data provided by the sensors is traffic volume and vehicle speed per lane, for passenger cars and heavy goods vehicles. The models deliver their output according to the sensors' one-minute cycle. They detect the phases S and J (synchronized flow or wide-moving jam) and the position of the corresponding area of congested traffic. This includes characteristic parameters such as the velocity of the movement of the congestion front in case of wide-moving jams, or the mean speed inside an area of synchronized flow. In addition, travel times between highway junctions are determined, as well as the delay time caused by congestion. The travel and delay times are automatically shown on VMS, together with text information about incidents.

GOOD ACCURACY

The results from the Hesse road network have shown that the models are able to achieve good accuracy in recognizing and tracking congestion patterns and giving travel and delay times. They are easy to maintain, and no special effort is necessary to maintain high-quality output. Automatic provision of travel and delay times on VMS provides valuable information for drivers and is enhanced by rerouting recommendations. The use of good traffic modeling products is essential for effective traffic management systems. GeoDyn2 simplifies the integration of such products. ■

References
[1] *Kerner, Boris S,* The Physics of Traffic*, Springer Berlin, ISBN 3-540-20716-3*

To find out more information, please contact Heusch/Boesefeldt by calling +49 241 9669 0, emailing info@heuboe.de, or log on to www.heuboe.de

by Frank Long, JAI, USA

Picture perfect

High-quality images are essential for maximizing performance in vision-based traffic applications, and therefore can also have a subsequent impact on increasing revenue. The new systems of today yield better pictures than ever

The vision system has become a key element in a range of traffic applications, including border control and red-light enforcement. The best systems today support these tasks by capturing high-quality images of vehicle plates and the surrounding scene in various weather and lighting conditions. These images enable ALPR, vehicle fingerprinting software, and back-office systems to collect tolls efficiently, identify violators, and perform other tasks that lead to increased revenues and reduced operating costs.

Operators realize that better image quality yields better results in terms of higher read rates, better vehicle fingerprinting, and easier violation enforcement. For this reason, recent requests for proposals (RFPs) now include a variety of new image quality requirements, in addition to the core requirements of high ALPR read rates, a moderate cost, and compatibility with existing installations.

Vendors have responded with new vision systems such as the VIS-CAM 500 from JAI. Similar to other variants in JAI's VIS-CAM series, this high-performance, multicomponent system comprises a camera, lens, weatherproof enclosure, various illumination options, and an external light sensor capable of calculating exposures for up to 20 connected systems. It also contains some new technology targeted at the most requested image quality enhancements.

THE BIG PICTURE

Many new RFPs call for higher resolution than the 800,000 to 1.4 million pixels found in most current systems. When calibrated for readability of the plate, they typically provide a horizontal field of view less than 10ft (3.2m) and a vertical field of view of no more than 7ft (2.2m). This can cause readability problems depending on vehicle position in the lane, or when capturing information on trucks or other tall vehicles.

The new VIS-CAM 500 provides a resolution of over three million pixels. Its 2,048 (H) x 1,628 (V) resolution provides a field of view of 15ft wide (4.7m) by 12ft high (3.7m). This enables a single image to capture a more complete view of the vehicle, including trucks with multiple plate positions, DOT information, and separate container identification numbers.

With a total system dynamic range of 140dB, the VIS-CAM 500 can provide better scene detail (top) than traditional systems (above) when dealing with low-light or high-contrast situations

Despite its large field of view, the VIS-CAM 500 can still operate at speeds that are more than sufficient for high-speed traffic. This includes a continuous rate of 19fps, as well as support for instantaneous triggering to ensure consistent positioning of vehicles within the field of view.

Another requirement finding its way into recent RFPs is the desire for better handling of scenes with wide variations in light and dark (high dynamic range). Examples of where this might be needed include resolving plate images covered by dark shadows, capturing both plate images and vehicle occupants for HOV enforcement, or capturing scene details in night-time images.

New vision systems such as JAI's VIS-CAM 500 combine high resolution, high dynamic range, and zero-smear to maximize image quality

The VIS-CAM 500 combines a low-noise design (>56dB signal to noise ratio) with a patent-pending light sensor and dual-slope processing algorithm to deliver a total system dynamic range of almost 140dB. It uses the external light sensor to continuously read ambient light conditions, then calls the dual-slope algorithm to set the proper exposure for the dark areas of the scene while adjusting the brightest areas so they don't over-saturate.

The latest RFPs are also seeking vision systems that avoid bright reflections (smear) that 'wash out' isolated parts of the image. Shiny plate frames are the leading culprit, but glare from bumpers or windows can also cause critical data loss. Systems such as the VIS-CAM 500 address this by using a 'zero smear' technology that minimizes the spillover of excess electrons between adjacent pixels on the sensor. The result is cleaner images with minimal data loss.

TRUE COLORS

RFPs also require full-color scene images to enable better vehicle identification for matching or enforcement. For older systems, this often resulted in organizations investing in two separate cameras. The VIS-CAM 500 provides all of the above enhancements in monochrome and color versions, with enough resolution to provide license plate reading and scene detail in a cost-efficient, one-camera configuration. For operators striving to maximize the performance of their traffic systems, the VIS-CAM 500 represents an attractive next step. ■

To find out more information, please contact Frank Long at JAI on +1 408 383 0300, email fml@jai.com, or log on to the company's website at www.jai.com

by Richard Sabga, Luna Road, USA

A visible difference

Harnessing the sun's energy to illuminate roads at night is a useful way of combining nature and technology. Going beyond this and adding further capabilities has enabled the creation of a truly smart solar-powered product

Research consistently proves that you are three times more likely to be killed in a traffic crash at night than in the day. The reason? So much of a driver's reaction is dependent on vision and at night there are fewer visual cues in the environment than there are during daylight hours, which has a subsequent adverse effect on distance visibility. Of course, it is not just a matter of less light equals more danger. Other factors, such as fatigue, reduced concentration, slower reaction times, and poor weather conditions are all challenges that are amplified during the night.

APPROACH TO SAFETY

While automakers develop smarter in-vehicle technology to reduce the risk of night-time driving (LED headlights, night vision, etc), an equally crucial strategy is to make the road itself as safe as possible. As a designer, manufacturer, supplier and installer of a range of traffic safety products, Luna Road is looking at enhancing the night-time visibility of a road's direction using intelligent road studs.

Unlike conventional retroreflective road markers, Luna Road lights feature solar-powered LEDs, so are emitters of light, rather than simply reflectors of it. And while vehicle headlights or streetlights do not actually illuminate the direction of the road itself, Luna Road lights can provide miles of night-time road visibility.

Each individual light is comprised of a solar panel (poly-crystalline silicon/single-crystalline silicon material), an internal battery, a light sensor and LEDs. During daytime hours, there is always a certain level of general ambient light in the environment. The solar panel (which consists of photovoltaic cells made from specially tailored semiconductors) absorbs the sunlight and ambient light, converting the photons (particles of light) into electrons, and then into electrical energy. This energy is subsequently stored in the internal battery.

Luna Road lights use a variety of colored LEDs

General charging durations for the lights are calculated to be around eight hours of sunlight or general ambient light during the daytime, to yield a minimum of 12 hours of illumination during night-time hours.

The company offers two different types of battery storage capabilities: a Ni-MH rechargeable battery and an ultracapacitor storage device. Rechargeable batteries generate and consume electricity through chemical reactions, leading to slower responses and deterioration over time. The usual charge/discharge cycle is around 1,000 times at maximum performance, giving the Ni-MH battery a two- to three-year lifespan. The ultracapacitor storage device has a charge/discharge cycle of approximately 100,000 times, which enhances the life cycle of the light markedly and increases the physical performance and environmental efficiency of the technology.

As the sun begins to set and the ambient environment starts to darken, the light-sensing device determines the luminous intensity in the environment and then sends a message to the LEDs to activate them. Customers deploying these lights are able to set a desired luminous intensity level (also known as lux level) for the activation of each light. This means lights can be customized to be activated during different environmental conditions that bring with them different light intensities.

The LEDs can also be tailored. A range of colors is available, so authorities can visually differentiate stretches of their roads. The customer can even determine the exact RGB levels, to develop specific color codings for their needs. The number of LEDs to be placed in each unit is also down to preference. The LEDs come in two modes – constant light or flashing. Those who select flashing LEDs can even specify a desired number of flashes per minute.

A basic yet high-endurance polycarbonate material is a cost-effective option, although the lights are also offered in super-strength aluminum alloy. All models are designed to have a loading capacity of around 20 tons per vehicle tire.

In Trinidad & Tobago (where many projects have been completed) feedback was gathered from a number of elderly drivers who suffered from cataracts. The effect of Luna Road lights was so positive that many of them said they were able to see, for the very first time, the exact direction of the road from a long distance away. ■

For any authorities intrigued by the potential of these lights, Luna Road offers pilot project demonstrations of the technology in action. To find out more, email info@lunaroad.com, or visit the company's website at www.lunaroad.com

by Graham Wallace, ESRI, UK

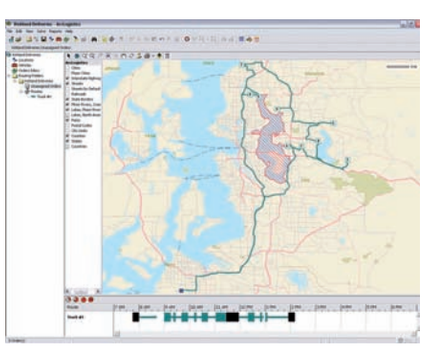
Straight to the point

GPS is an established tool in many industries, pinpointing the location of vehicles, vessels and goods. But what impact will GPS technology have on the next generation of traffic management and logistics systems?

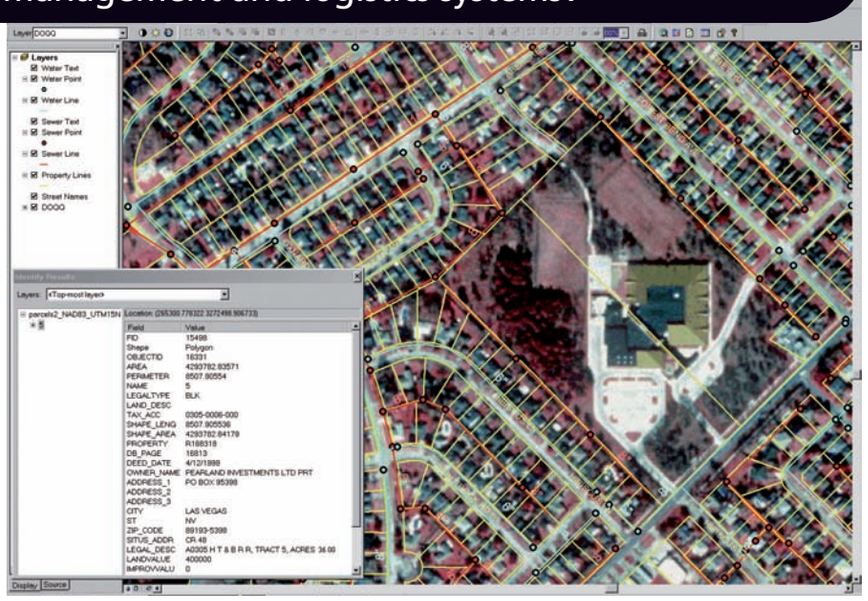
Until now, GPS has been a high-end technology – with all the attendant implementation costs. This is set to change with the advent of GPS-enabled cellphones, as is the technology required to adapt them for mass market use. GPS-enabled cellphones and the Blackberry are currently emergent devices. However, in three to four years the technology should be common, and the accompanying reduction in price will spawn a range of new functions.

At the same time, one of the challenges for industries such as traffic management and logistics will be recognizing an axiom of the telecoms sector – technology advances are always *just* sufficient to create a solution that *just* about works. So, real challenges and pitfalls exist in the quest for GPS enablement.

The most important challenge will be identifying what needs to be GPS enabled and how to manage what will be a vast flow of data. Commercial vehicles increasingly come with CANbus to store data on fuel consumption and more than 40 vehicle performance metrics – many of which can be linked to GPS. The temptation will be to GPS enable as much as possible as soon as possible – but this is the point at which the cost benefit of creating and managing the GPS data needs to be assessed. What will the data be used for? Does the cost of collecting it outweigh the expected benefits?



Routes and schedules created in ArcLogistics



Map snapping is the vital link between a vehicle's GPS signal and the road network itself

MAP SNAPPING

Even with a relatively small number of GPS-enabled commercial vehicles, there is a need to distinguish data that has to be uploaded/downloaded on the move, relative to data transfers that can be made once the vehicle arrives at its destination or at a periodic service. For the data supplied on the move to be useful, it has to be capable of linking a vehicle to the road network accurately, cost-effectively, and at high speeds, while being able to handle large volumes of data. This is called map snapping and is provided by GIS vendors. Map snapping is the vital link that transforms GPS data into usable information by making it context-sensitive.

The quality of context-sensitive GPS information is likely to be such that the conventional wisdom within the logistics industry – to use low-cost IT point solutions wherever possible and to ignore the benefits of IT integration – will undoubtedly be re-examined by the sector leaders. Accurate and usable context-specific spatial data will create the data management disciplines that underpin the next wave of operational cost savings. These developments will also spawn the emergence of integrated components, such as links between the vehicle tracking database, the fleet management scheduling system, and the labor-planning module – all of which will become more commonplace.

At the heart of all this will be the use of GIS-enabled technology, acting as the middleware, enabling GPS data to be linked and processed at high speeds and with high levels of accuracy and consistency. This work will unlock IT savings in many of the larger companies that have focused on improving profits via acquisition rather than streamlining their system costs.

Although data transmission protocols are on the verge of being agreed, the absence of commonly accepted data management structures could prove to be costly. GPS enablement could transform large segments

of the traffic management and logistics industries, but the key to unlocking the information will be to use standard components that can be built once and linked via effective GIS-enabled middleware. This activity will underpin the long-awaited phase of systems integration within the logistics industry – activity that will undoubtedly drive cost savings, and which is perhaps a logical response to the commercial pressures of the current economic climate.

Routes can be analyzed on actual network drive times

STANDARDIZING THE COSTS

Further activity will focus on standardizing the costs of GPS data transmission. Although there are some exceptions, for the most part the costs of switching between mobile operators and usage-based tariffs, all complicate the cost-benefit calculations of creating and transmitting GPS-enabled data, unless pan-European contracts have been agreed between fleet managers and mobile operators. This will undoubtedly be resisted by the mobile operators, but widescale GPS enablement is likely to drive the standardization and commoditization of mobile data transmission and commercial mobile tariffs. This will affect the long-term profitability of the mobile industry, and create a common GIS platform or standard to underpin cost-effective data transmission.

GPS enablement will stimulate a variety of long-term structural changes, including more focus on rigorous standards for data collection, the emergence of common systems components linked by spatially enabled GIS software, planned systems architectures, and systems migration activity. Pressure will also mount on mobile operators to align tariffs to encourage greater levels of automation and management by exception in the quest to secure ever better operational efficiencies that deliver planned cost savings and profit improvements. For future traffic management and logistic systems to be a success, the industry should address these hidden dimensions of GPS enablement. ■

Graham Wallace is business strategist at ESRI (UK), a provider of geographic information systems. For more information, please log on to www.esriuk.com

by Malcolm Smith, Vitronic, Germany

The fair road to tolling

Vehicle classification is a recent and welcome advance in automated tolling. Not only does it lead to more flexible and fair charges for different sizes and weights of vehicles, it has a notable impact on toll collection efficiency

Toll roads, bridges and tunnels – which motorists must pay a fee to use – are designed to bypass busy areas to ease traffic congestion, generate funds for road upkeep and repair, and often provide substantial revenues for governments and private companies. Highly beneficial in the main, they also present a challenging set of problems associated with the collection of the correct tolls from users.

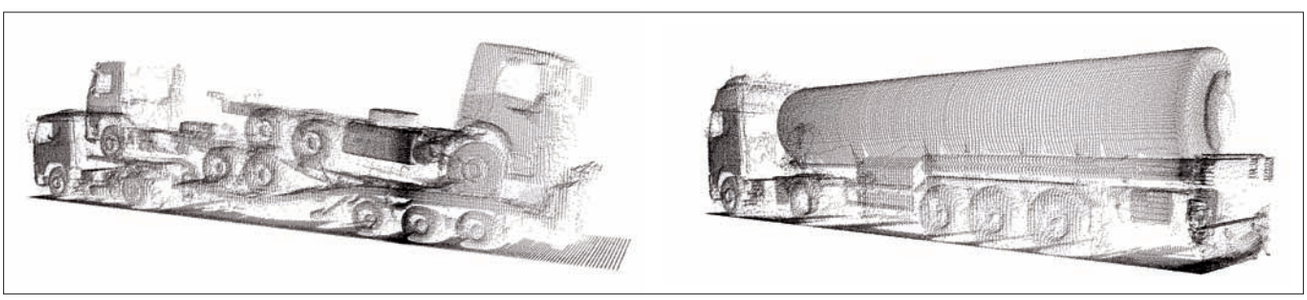
TO FLOW OR NOT TO FLOW

Toll collection techniques fall into two categories: free-flowing, where traffic flow is unaffected; and non-free-flowing, where vehicles have to stop or slow down in order to pay the toll. The choice of toll collection technology will have a substantial impact on the efficiency of the toll collection process. Toll collection efficiency compares the amount of toll revenue collected to the cost of collection. Toll road operators need to ensure that the maximum revenue is collected. Their customers – the motorists – want free-flowing traffic and no delays. For the operator, these sometimes conflicting needs have been resolved by favoring toll collection over traffic flow, which is particularly true with non-free-flowing systems. But as traffic density increases, the balance changes. Toll collection lanes and booths may struggle to handle peak volumes, resulting in reduced revenues and frustrated customers. Automating the toll collection process, so it becomes free-flowing, can often be the most cost-effective solution. However, free-flowing toll collection requires systems that will perform checks an operator finds easy, but which present notable technological challenges.

Most toll charges vary according to vehicle type; the bigger it is, the more the driver gets charged. By visually checking the vehicle, an operator knows which category a vehicle falls into, whether it has a trailer, and which weight band it is likely to fall into. Two vehicles arriving together can be easily distinguished from a single vehicle with a trailer, while a car with a roof box will not be mistaken for a commercial vehicle.

AUTOMATED COLLECTION

Automated toll collection depends upon systems that accurately and reliably perform these checks and classifications at high speed. They must perform at night, in poor



Vitronic's Tollchecker^{avc} system allows detailed 3D classification and guarantees 100% exact separation of vehicles, even those traveling in tight formation

In the German truck-tolling system, Vitronic technology supports unconstrained traffic flow and in doing so the highest levels of mobility

weather conditions, and must work together with other systems that identify the vehicle so that the correct toll can be collected from the vehicle operator.

Advances in laser technology and reliability have enabled Vitronic – a German company that specializes in traffic systems – to develop its Tollchecker*avc* and Tollchecker*freeflow* systems, which use lasers to generate a three-dimensional model of each vehicle entering the tolling area. Tollchecker*avc* uses three lasers mounted as a single unit on a pole at the roadside to scan a vehicle as it enters the tolling area at speeds up to 40km/h. Mounted 10m from the toll barrier, the system has enough time to scan and classify the vehicle before it actually arrives at the barrier.

Smart computer systems enable Tollchecker*avc* to filter out inaccuracies caused by vehicles varying their speed and even reversing in the classification area. Vehicle separation can be as little as 0.2m and the system will determine the vehicle's height, width, and number of axles. It is even possible to set height, width and axle limits to prevent large or heavy vehicles accessing the tollway. Capable of working with cars and trucks from 1m to 30m long, Tollchecker*avc* can also determine the vehicle's classification before the whole vehicle has passed by its lasers. For road operators, the system's freestanding construction means no in-road loops or sensors, thereby reducing installation costs and disruption.

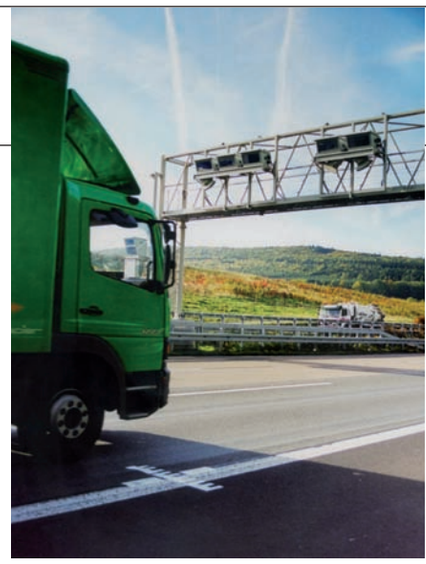
TollChecker*freeflow* operates with one gantry per location and requires no roadside installations

FREE-FLOW AND EASY

Already in use in the LKW-MAUT German heavy goods vehicle tolling system, Tollchecker*freeflow* achieves a classification accuracy of better than 99% in all weather conditions, and classifies more than one million vehicles daily in a free-flowing traffic situation.

To maximize the benefits of automatic vehicle classification during toll road charging, a system of vehicle recognition is required. Reading vehicle license plates is, of course, the accepted method. Again, such systems must be reliable, able to differentiate vehicle license plates in inclement weather conditions, and with extremely high levels of accuracy. Free-flowing traffic systems will want systems that can work across multiple lanes and deal with the problems of tailgaters and toll evaders.

Tollchecker*freeflow* – an ALPR-based system from Vitronic – uses high-resolution cameras, triggered by a special laser detection sensor (lidar), to capture images of passing vehicles' license plates. It interprets these images using computer algorithms and OCR techniques. In addition, it reliably identifies national and international license plates on multiple parallel lanes, irrespective of the speed or indeed the position of vehicles. Even during poor weather, strong sunlight or snow, TollChecker achieves extremely high levels of license plate reading rates.



Advanced technology means TollChecker*freeflow* achieves very high levels of plate read rates

This solution is also able to operate with only one gantry per location and requires no roadside installations, meaning that it can be constructed in a short amount of time and without greatly disturbing traffic flow. Having classified the vehicle using the 3D laser-dimensioning device – and captured its license plate as well as an image of the driver – the toll road operator now has the means of charging for the road's use without necessarily stopping the vehicle to collect payment. TollChecker will work with onboard dedicated short-range communication (DSRC) units, which confirm that the vehicle details are valid.

Combining systems such as these gives the toll road operator a means of introducing a free-flow toll collection system that will enable them to meet the demands of their customers: free-flowing traffic that is not delayed by the toll collection. ■

To find out more information, please contract Vitronic by calling +44 115 840 8244, emailing malcolm.smith@vitronic.com, or alternatively visit the company's website at www.vitronic.com

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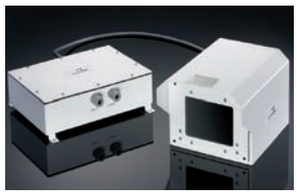
An exacting science

501 Automatic camera inspection is an extremely complex science, but important for applications such as ALPR. Only the most experienced and technically minded lighting professionals are able to develop systems that match that of manual inspection.

VLT is currently working on the most complex part of the camera inspection system: the illumination. A constant amount of light is required for automatic inspection, which should resemble natural light on a sunny day. However, illumination does not revolve around light on its own, and encompasses the use of filters and lenses. Only an optimized combination of these three elements enables a high and constant light quality, which is necessary to achieve similar or better results.



VLT's added value is to offer an optimized combination of light, lens and filter, thereby providing the highest contrast for every imaginable situation.

The company distinguishes itself with a solution-focused approach, and can customize standard products to suit requirements.

CONTACT

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+31 413 260067
info@vlt.nl
www.visionlighttech.com

One room with a view

502 UK-based car parking specialist NCP's new National Operations Centre (NOC) – which is claimed to be the world's largest centrally controlled parking operation – is using Siemens technology to oversee security, payment, and customer services for 200,000 NCP car parking spaces in 25 cities across the UK – from one room.

Allowing operators to connect remotely to each entry and exit system, CCTV camera, and pay station in any NCP car park, Siemens said it is also able

to resolve 95% of customer problems, such as malfunctioning machines, within minutes.

NCP's Neil Robson says, "The CCTV cameras are positioned at barriers to capture HD footage of license plates. When a non-payer is identified, we are able to issue a notice of contravention to the DVLA, along with CCTV footage showing the plates of the vehicle. The DVLA will then notify the driver that they have committed a parking offense and may be liable for a fine. The system is live and has already resulted in a number of successful prosecutions."

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"The transformation of our economy into a green economy is not just key to reversing climate change, but economic revitalization in the USA"

see page 70

Take it to the bridge

503 Sirit has received an order for RFID Title 21 (T-21) toll equipment to be installed on the Golden Ears Bridge, near Vancouver, British Columbia, Canada.

Starting this quarter, the company will provide toll readers and transponders along with installation services for the Golden Ears Bridge Project, which will link Maple Ridge and Pitt Meadows with Surrey and Langley, British Columbia.

The tolling system contract was awarded to the New York-based InTranS Group, which has partnered with Sirit to provide the RFID toll technology. The initial contract is valued at approximately US$300,000 and includes T-21 lane equipment, lane-level installation for six high-speed open-road tolling lanes, and 5,000 T-21 transponders. The customer plans to deploy in excess of 20,000 transponders in the first 12 months of operation.

"We are very excited to be part of this important Canadian project, which will improve travel times

and reduce regional congestion in the lower mainland of British Columbia," said John Freund, vice-president, Sales, Sirit. "It also represents the first RFID T-21 toll installation in British Columbia and Canada."

"We are excited to have won this project and are pleased to have Sirit on our team," explained Michael Conlon, InTranS project manager. "Sirit has a strong legacy in tolling systems and unique expertise in the design, development and installation of T-21 toll technology. We look forward to working with them on the Golden Ears Bridge Project."

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Digital parking patrol

504 Bournemouth is the first local authority in the UK to adopt a new and innovative way of dealing with the problems caused by dangerous and anti-social parking. The aim is to improve safety outside schools and to ensure that bus stops are kept clear of parked vehicles while keeping the traffic moving.

The current use of on-street civil enforcement officers (CEO) is extremely costly and inefficient as motorists return as soon as the CEO has moved on, so using cameras could prove to be far more economic and effective.

Using powers arising from the 2004 Traffic Management Act, Bournemouth Borough Council purchased a ROADflow digital mobile traffic enforcement system from West Country-based technology firm SEA Group. The mobile system is loaded with the geographic locations, traffic regulation orders, and the times of enforcement zones on the Bournemouth road network.

The vehicle patrols the streets and automatically captures evidence of probable parking offenses at a number of locations. This is then transferred to a dedicated 'review station' for processing of each case. The new software will enable all data and video evidence from ROADflow to

be processed alongside all other penalty charge notices issued by the Council's team of CEOs.

James Duncan of Bournemouth Borough Council said, "This system will reduce the number of road casualties, particularly those involving children, and will improve the reliability of the bus service and ease congestion."

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Q We asked some our US contacts what President Obama's new Administration should do first in relation to the ailing US transportation sector?

A "After the dust settles on a stimulus package, President Obama's Administration will need to address the Highway Reauthorization Bill and try to reach consensus on how to improve the manner in which we build, maintain, operate and sustain the US surface transportation infrastructure.

The Obama Administration will first set a Capstone strategy and policy to adopt a universal, user-based, vehicle miles traveled pricing regime to replace the existing gas tax, encourage public transport, and be environmentally sustainable.

The Administration will work very hard in the next years to establish a short, demanding timeline for designing and implementing a federally supported mileage-based road user fee system over the next half dozen years through the new Appropriation Bill. This will define the system architecture, support pilot programs, and set requirements for phased deployment by states with its VII 5.9GHz communications, automated technology, new generation of cashless payment systems, and federally backed enforcement legislation."

Jack Opiola
principal,
Booze & Company, UK

A "Reduce dependence on foreign oil and protect the environment by making CAFE standards reflect real-world driving, not lab tests! We know 'your mileage will vary'. Why? Because OEM design is aimed to pass NHTSA's dynamometer tests, not to maximize actual mileage. With the right objective, some engineers believe that the amount of OEM R&D needed to achieve a 20% mileage improvement in lab tests could produce a 35% reduction in real-world fuel consumption and emissions. Telematics systems can collect the performance data wirelessly. The required onboard sensors are already there. Telematics can also help drivers adapt their style to optimize mileage."

Rick Weiland
senior vice president – executive advisor, Ygomi, USA

A "The Administration should work with Congress in the upcoming reauthorization process to re-establish a national vision for our transportation system that focuses on saving lives, time, money and improving quality of life. Federal programs should be streamlined and refocused around achieving this vision, while defining sustainable funding methods that balance the need for adequate and predictable revenue with market pricing mechanisms to optimize system utilization and performance. Critical to success will be to establish a culture of performance measurement to ensure resources are used wisely and are achieving national goals. If these shifts occur, operations and proactive system management will continue its transition from an afterthought to the core of transportation service delivery."

Pete Costello
senior manager, Public Sector, Inrix, USA

A "I think the new Obama Administration should identify the top 25 most congested urban interstate corridors and then institute a national pilot program to toll them in the peak and shoulder hours. Toll rates should be set based on maintaining a traffic condition that can be quantified and verified – not to optimize revenue. The Administration should also establish a national tolls infrastructure bank that is able to provide the initial capital necessary to start the tolls program, and offer state pension funds the opportunity to invest public funds into the bank with a guaranteed reasonable rate of return. Use the revenue stream to service the public debt and reinvest all excess funds back into the transportation corridors in which they were collected, including subsidizing transit."

Matthew Click
senior associate,
Cambridge Systematics, USA

A "The Obama Administration should avoid the temptation to do 'pothole-patching programs' (low-impact building programs) and move instead toward 'shovel-ready', sustainable technology programs that enhance transportation modes, reduce congestion, mitigate carbon impact, and provide high returns for the investment. These should be projects that build for the future, not projects that are short-term fixes. It's our chance to achieve higher transportation efficiencies and move strongly toward really interoperable technology systems. The needed solutions exist today and are very affordable. Oh, one more thing – let's keep the money inside the USA please!"

Dick Schnacke
vice president, Transcore, USA

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

With 5.9GHz proved in a tolling environment in Denver, how would you make the case – or even not make the case – to a toll agency for its wider deployment?

email answers to traffic@ukintpress.com

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