

Intelligent thinking about intelligent transport systems

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edition 1

- page 2 . Steve Tarry: Exploiting the benefits of ITS
- page 3 . Charlie Henderson (PA Consulting): The war on the motorist is over . lets have more speed cameras
- page 4 . Dr Adrian Withill (URS Scott Wilson): The case for training and education
- page 5 . Dr Alan Stevens (TRL): In vehicle generations
- page 6 . Ian Patey (Mouchel): Britain's motorways . putting customers at the wheel
- page 6 . Nick Reed (TRL): Too dangerous to make a call when driving? Don't have a driver's
- page 8 . Sharon Kindleysides (Kapch TrafficCom): Is localism a good thing for transport?

Exploiting the Benefits of ITS

By Steve Tarry

In the current challenging economic climate, increasing efficiency of operations is a priority for every business.

Transportation is no exception; here one of the most attractive goals is to increase efficiency in traffic management without necessarily investing in new infrastructure, and that is where intelligent transportation systems (ITS) can play a key role, especially when working closely with local authorities.

The appeal of ITS is its cost effectiveness in comparison with investment in conventional infrastructure. However, there is work to be done in telling the full story about the potential of ITS, delivering more for less and providing compelling evidence to inform investment decisions.

For local authorities, there will be an initial investment in acquiring the required knowledge, but any short-term costs should be more than outweighed by immediate savings. Benefits include being able to optimise existing operations through knowledge gained and by the longer-term benefits of being able to deploy future schemes more cost effectively.

How different might the future be with a wider appreciation and knowledge of the benefits of ITS?

The **current** situation is that local authorities are encouraged to consider investment in ITS; decision makers rightly need reassurance through the production of a business case that investment is appropriate. However, there is a limit to the evidence available to them on the actual benefits that will be delivered and the true costs involved. In such circumstances authorities may decide to avoid change and stay with what they know. This will mean that **the potential benefits of ITS are not exploited.**

In situations where authorities and investors do decide to proceed with the development of a business case, it is essential to complete comprehensive research to understand the true benefits of investment in ITS.

Unless adequate resources, both time and money, are dedicated to the evaluation of projects - and to the reporting of outcomes - there is a possibility that weaknesses in the methodology and limits placed on the extent of indicators assessed mean that authorities will remain uncertain about whether to invest further in ITS. Once again, **this will lead to ITS being underexploited.**

What **should** happen to ensure ITS is properly exploited in the future, is that appropriate resources be dedicated to undertaking a comprehensive project evaluation. This should include the recording of contextual information and a consideration of the transferability of outcomes, with robust results being made widely and freely available.

One proposal to ensuring this happens is that funding could be provided by investors, including central Government, on the basis that a thorough evaluation is undertaken and that the financial resources required for evaluation are ring fenced to ensure the work is actually carried out.

Payback would be short term, as the evaluation would help ensure operations are optimised and that the benefits from the investment made are fully realised and longer term, as the

design, deployment and operation of ITS improves and the cost effectiveness of further investment is enhanced.

Where there is a lack of physical resource or of appropriate expertise within the authority to undertake the evaluation required by investors, this could perhaps be undertaken on behalf of the authority using an accredited methodology or third party.

If this all seems a bit fanciful, this is a model used successfully within the United States, where, for example, a detailed analysis of ITS deployment tracking statistics, compiled over 14 years, has just been published documenting the diffusion of key ITS technologies throughout the country.

If ITS is to be used more widely at home, now is the time for the UK to adopt a similar approach.

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The war on the motorist is over - let's have more safety cameras

The war on the motorist is over+ declared the Secretary of State for Transport Philip Hammond in May this year. We have seen DfT end funding for new fixed speed cameras and a number of safety camera partnerships decommission cameras. We have also seen the debate over the use of safety cameras reignite following traditional lines.

Rather than restate this debate, I'd like to present a somewhat different view. Specifically, that there should be substantially more safety cameras and we should make more use of them.

Why? One of the principle arguments around the use of cameras is that they are %unfair+. Very few people argue that the camera evidence is wrong; rather they believe that the way they are used is inappropriate. Speed cameras only capture evidence for a single point (or for speed over distance for relatively short stretches).

And here I have a degree of sympathy with their argument . you could drive 20,000 miles a year, exceed the speed limit by 5mph only four times during that year and be banned. Similarly you speed excessively the whole time, slow down for the speed cameras (because you know where they are) and not face any reprisal. Very unfair.

What road safety policy is seeking to achieve is a change in behaviour, in particularly of those that speed excessively and frequently. Speed cameras are very good at measuring speed at a single point or over a pre-specified distance and targeting those points where there are concentrations of collisions. However, the way they are used at present does not really measure of behaviour.

My solution? More cameras, but (and this is the important bit) use them together as part of an overall compliance strategy. Such an approach would involve collecting data from all cameras and working out the level (on an on-going basis) of speeding associated with each vehicle. The keepers of vehicles that have been observed travelling excessively and consistently fast at camera locations over a period of time would be sent a warning notice. If their behaviour does not change, they could get fixed penalty notices from any subsequent camera observations.

There are, of course, a number of challenges around this. First, cameras would need to record every vehicle passing, not just those above the enforcement threshold. This would require all cameras to be digital, ANPR enabled and require greater storage. Second, how images are collected in poor light conditions would need to be revisited. Third, intelligence would be built up around the vehicle rather than the driver. And finally there would be public concerns around the creation of a national database of camera images.

While not perfect, I believe there are significant advantages over the current approach. The accidental speeder would no longer be punished, while the persistent offender would be targeted. Any safety partnerships want to give it a go?

The opinions expressed in this article are those of Mr Charlie Henderson and not necessarily those of PA Consulting

The case for training and education

Intelligent Transport Systems (ITS), which offer the delivery of quick and lasting benefits to travellers, are becoming more and more complex, taking advantage of developments in society such as improved communications media. There is a perfectly valid argument to suggest that ITS is becoming a shade too complex, when simple solutions would be ideal, but this debate can be left for another day.

The ability to identify a problem or opportunity where ITS can be of benefit and then to justify, specify, commission, implement, operate and maintain ITS is critical to the correct and optimum use of the technology. This applies to technologies such as traffic signals, tolling systems, managed motorways, CCTV, information systems and all associated hardware/software.

It might be argued that there are sufficient ITS specialists already and that there is no need to specifically and proactively encourage people to choose a career in the subject. It is suggested that this would be an incorrect assertion as, even in a period of budgetary constraints, and perhaps because of them, the use of ITS will accelerate. It would be extremely bad news for travellers and operators if there continued to be an insufficient supply of newly trained ITS specialists.

With a few notable exceptions, academic training in the area of ITS is severely lacking, just at a time when ITS can offer quick and permanent ~~wins~~ at relatively low capital and revenue expenditure. Perhaps this is due to there being relatively few opportunities in this discipline compared to civil or electronic engineering, but it is suspected that the availability of careers is not particularly well known when bright high school students are considering a degree course. Some formalised education in ITS might occur almost accidentally rather than it being a conscious positive decision due to the subject being included in some engineering courses. Happily, some good Universities offer ITS modules in MSc courses, but graduates may often take up careers in the Transport Planning field rather than subsequently specialise in ITS.

To enable the mass of ITS work to be completed and to allow for the anticipated continual volume of ITS work worldwide, specialist consultancies are retraining their junior staff. Indeed, many senior ITS professionals have learnt their ~~trade~~ whilst working full time, but crucially, this was when the technology itself was advancing. To gain this knowledge from scratch now would be a daunting task indeed.

Some excellent specialist training courses in discrete areas such as traffic signals or SCOOT based UTC are available, but as far as the author is aware, training on the techniques behind such important areas such as information and enforcement systems is only being delivered by professionals already working on this technology to their own junior staff.

Although the lack of professionals in the area of ITS is very comforting personally for those of us already working in the field, without a greater focus on ITS as a study area in its own right, the use of ITS as a tool for benefitting travellers will not and cannot be applied as widely and as effectively as should be the case.

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The opinions expressed in this article are those of Dr Adrian Withill and not necessarily those of Scott Wilson

In-Vehicle Generations

Having a professional interest in ergonomics is a curse. taps turn on the wrong way, domestic appliances don't follow expected stereotypes and much electronic equipment seems positively designed to irritate. So, it was refreshing when I finally joined the iPhone generation to find the human machine interaction (HMI) different but intuitive. For me, at last, technology is beginning to catch up with the hype.

Then it struck me that the next generation of drivers will own a smartphone before they own a car (not vice versa) and I can foresee significant implication in terms of their expectations and how the industry will need to respond.

5 to 10 years ago, the prevailing opinion was that (so called) 'nomadic' devices were a potential safety hazard and even factory fitted route guidance needed to be used with extreme care. Certainly, really early devices such as the Bosch Travelpilot and Columbus Navigator were cumbersome and distracting. Later, the vehicle industry produced some quite nice large screens guidance systems, albeit at considerable cost. But the pioneers have always been the nomadic device manufacturers, as witnessed by the rise and rise of Tom-Tom and other providers.

Smartphones are a next generation product from the Information Communications Technology (ICT) industry and, importantly, one that is embraced by a new generation of users and hence a new generation of drivers. To the ITS professional they provide an open in-vehicle platform including location capability, communications, processing, and HMI. So, with phone 'apps', they become a low cost route to market for a wide range of telematics and associated services.

The vehicle industry and safety regulators have never been able to respond to technology at anything like the pace of the ICT industry. (Arguably, this can be beneficial in the long run as banning Travelpilot and Navigator would have depressed and delayed roll-out of in-vehicle route guidance). But, what is the role of the vehicle industry and safety regulators in the face of this next generation of products and drivers? What is clear is that drivers want the easy-to-use and familiar functionality of their smart-phone. They will seek access while driving, so I believe we need to make this access as safe as possible. Hand-held use just doesn't make sense in a car, so design for hands-free operation is a must. At minimum, I'd expect assurance of safe fixing and possibly a standard interface for communicating with vehicle systems. The former is probably an issue for regulation/certification, the latter more for industry agreement.

As usual, technological development presents benefits and challenges. The driver as well as the vehicle-based ITS industry has a lot to gain from the availability of this new open platform.

The opinions expressed in this article are those of Dr Alan Stevens and not necessarily those of TRL

Britain's motorways: putting customers at the wheel?

The term 'customer' is ubiquitous today. When taxpayers like you and I can be described as 'customers' of HM Revenue & Customs, it is unsurprising to hear the term applied to road users.

Yet drivers lack important customer credentials. Choice and purchasing power are two vital conditions for any true market. As drivers we're not short of spending power. But we don't have *purchasing* power because roads are free at the point of use. And we can't choose who supplies our service. Nearly all roads are built, maintained and operated by Government, central or local.

It's not a new thought to claim that service improves where customers have the authority which choice and purchasing power convey. But road tolling has acquired a bad press, largely thanks to our own past decisions. We're used to a world where road transport yields a big slice of Government revenues. Even if we aren't happy with our driving experience, we're loath to pay any more.

Sadly, the deal for road users may soon get worse. Fuel duty is rising, to help fill the void in the Government's coffers. Meanwhile the motorway system - by far our most important strategic transport infrastructure network - is showing increasing signs of strain. Long term traffic growth will resume when the economy starts to grow again. But Government capacity-building investment, through the 'managed motorways' programme, will be constrained for years to come. So the lack of customer power really does matter, not just for road users, but for the wider economy too.

The private sector is happy to get on with financing, building and operating the sophisticated traffic management systems that can beat motorway and town centre gridlock at peak hours. The resultant economic benefits will repay this investment many times over and relatively quickly.

We don't actually need radical policy shifts in order to offer choice and better service. One simple option would be to re-balance Vehicle Excise Duty. Those needing to use the most congested motorway sections at peak hours could pay a standard rate, giving unrestricted access. Others in more remote areas or whose travel needs are flexible could pay a discounted rate, with a top-up if they ever needed to join in the rush hour traffic. The Government could set aside a portion of the revenue stream from the standard VED rate so that vital network investment is funded.

Formal road tolling is not on the Government's radar. But turning drivers into real customers would benefit all of us. Perhaps it's time to consider simpler ways of moving forward?

The opinions expressed in this article are those of Mr Ian Patey and not necessarily those of Mouchel.

Too dangerous to make a call when driving? Don't have a driver...

Karl Benz is acknowledged as inventing the car, patenting a car design in 1885. However, it was the 1903 Fiat 24-32HP that set the template for the way in which cars are driven. Steering

wheel and gears are adjusted manually and this was the first car to use an accelerator pedal. Today, although electronics now modulate our inputs to steering, braking and throttle systems, the way in which a vehicle is controlled is essentially the same. The driver is required to see the road ahead, navigate safely along the road whilst responding to any emerging hazards or changes in conditions by appropriate use of the steering, speed or gear controls.

Telecommunications has a parallel history to that of the automobile with Bell's patent for the telephone filed in 1876. Mobile telephony and cellular networks were established a century later and today, mobile phones are essentially ubiquitous. This is illustrated by some startling statistics from the International Telecommunication Union. In the UK, there are more than 130 mobile phone line subscriptions per 100 inhabitants whilst across the world, two hundred thousand text messages are sent every second.

The system of vehicle control developed on the basis that the driver would be able to apply continuous attention to the driving task. A mobile phone call, more than listening to an in-car stereo or talking to a passenger, demands attention that can affect a driver in a variety of ways. Reaction time, lateral control, situation awareness and visual scanning patterns have in various studies shown to be impaired when a driver attempts to hold a concurrent mobile phone conversation.

Research in 2009 by Ofcom showed children in the UK typically get their first mobile phone aged ten. Consequently, as a child, teen and young adult an individual establishes strong affinity for their phone and with the entertainment, information and services it can provide. They are then asked to sever that relationship when they begin driving. It is therefore unsurprising that the temptation remains to answer a call, respond to a text or update a Facebook status whilst driving. Similarly, the opportunity for a professional user to remain productive whilst driving as a result of the extra functionality that smartphones now offer provides a similar temptation. It is not without foundation that one such phone is referred to colloquially as the 'CrackBerry'. So while the driving task is as challenging as ever, technology has made the risk of driver distraction more pervasive than ever.

Technology may have provoked a problem but it may also provide the antidote. A widespread network of autonomous, networked electric vehicles that can move people (or goods) safely from A to B without intervention from the user would dramatically change the way transport systems work. This would enable the traveller to indulge in whatever distraction they choose while being conveyed to their chosen destination in privacy and comfort. Implemented correctly, it would bring a step change in safety and would obviate the need for vehicle ownership for many users. Issues of vehicle maintenance and insurance disappear for the user and infrastructure maintenance could be implemented far more easily on a network where vehicles can be automatically directed away from roadwork sites. A potential problem for vehicle manufacturers is that if an autonomous vehicle can transport a passenger without intervention, it removes a familiar, obvious and direct way in which vehicle manufacturers differentiate their products from one another. Furthermore, we have strong social bonds with our cars that many may find it difficult to break.

The idea of large numbers of autonomous vehicles on the road network may seem fanciful but Google surprised many with the news in October 2010 that it had regularly sent autonomous vehicles out onto routes in California, covering some 140,000 miles in test drives. This follows the significant progress made in Europe under the PROMETHEUS project in the 80s and 90s and the outcomes of the various DARPA Challenges in the US. There are undeniably major technical problems to overcome and a system of autonomous vehicles would be simpler to implement given a clean slate. It may be that making the transition to autonomy in the context of transport networks that are already being stretched is the greatest challenge of all. However, the recent successes hint that the goal is getting closer and the safety, efficiency and environmental benefits that would accrue from the widespread implementation of this technology suggest to me that we should be purposefully pursuing this goal.



Is Localism a good thing for Local Transport?

Transport in a local setting is emotive and it appears to me that the smaller or more rural the environment is, the more emotive the topic becomes.

I live in the smallest city in England surrounded by fields and fens and the main challenge to journey time reliability here is often how many tractors are on the road at any point in time, and I have a sneaking suspicion that not fixing potholes is the formal approach to implementing speed reduction measures on our sole A-class road. Transport is certainly a local issue, people need to move around their locality for work and recreation, but this doesn't necessarily mean that all the transport related decisions should be taken at the local level. Most local Councillors are generalists and rightly so, they don't have the time and inclination to make full investigations into local traffic issues to differentiate between those who shout the loudest and those who have a genuine need or to carry out an analysis of problems to identify and prioritise the different issues.

A frequent response to traffic problems from the local burghers seems to be an appeal to build a bypass, virtually irrespective of the root cause of the problem and the fact that road building is expensive, environmentally damaging and crucially that ~~there~~ there is no money+. There then follows a highly polarised debate based on hearsay and rumour with the occasional interjection from the Local Authority that nothing has been decided before the whole matter disappears only to resurface a few months later. Alternative approaches such as implementing ITS based solutions are rarely mentioned, whether this is because road building is big and sexy and must be the answer, or because we, the ITS industry, are really not very good explaining to the laity that ~~there~~ there is another way+. In this time of funding cuts, what little money there is must be spent wisely and we as an industry need to promote smart solutions, to help expand the repertoire of frugal solutions available to Local Transport Planners.

This may mean befriending your neighbourhood Council, giving free advice to Local Authorities and suggesting options to them that don't bring your organisation as much money as some other options might, but surely any projects that are carried out however small the scale to make improvements are better than no projects at all? And surely it's in all of our interests, Big Society or not, to ensure that our local representatives have sufficient information to enable them to make the best decisions?

The opinions expressed in this article are those of Sharon Kindleysides and not necessarily those of Kapsch TrafficCom

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