

METRIC

Solar powered parking metre manufacturer, Metric has made adjustments to its machines so that they can cope with darker days and the problem of low batteries. After Nottingham County Council experienced teething problems with the pay and display machines Metric discovered that new software was needed to combat the problem. The answer was simple and now the machines effectively power-down when not in use and reactivate when money is inserted.

Metric is now assisting Nottingham to overcome a vandalism problem in the city. The solution to this problem will be the development of a protective panel for the solar powered machines.

SOLAR HIGHWAYS

Solar highways of Diss, Norfolk have developed what is claimed to be the UK's first temporary traffic lights capable of completely silent operation. The system uses solar energy as its principal energy source. The Gen-Sun provides an environmentally-friendly solution to any requirement for two-way temporary traffic control, from everyday jobbing applications to continuous working.

At the heart of Gen-Sun is a pair of 225 Ah sealed lead acid batteries which are trickle charged by two external 50W photo-voltaic panels. These panels operate as long as light is present, whether it is natural or artificial. Depending on weather conditions and operational requirements, an on-board state-of-charge monitor detects if the batteries drop below the optimum operating voltage. They are then easily topped-up in the field using the unit's built-in 11w/12v charger coupled to a suitable portable generator.

The long life, spill-proof batteries power at Highways Agency approved controller and 12v low maintenance LED traffic light heads. These heads, along with their stands and two 50m cable drums, are stored within the main unit for easy and safe transportation.

The Gen-Sun has been designed to allow rapid set-up on site, and a lockable roller shutter provides security and protection for the equipment.

A class counting act from Idris

Idris technology has over time become a complete Automatic Vehicle Classification system. Developer Bob Lees sees a very bright future for this technology in the tolling industry which is under pressure to count and classify vehicles to ever greater levels of accuracy.



In Snowdonia's National Park in Wales there is a rugged, windswept mountain called Cader Idris. It's a far cry from the tarmac, asphalt and thundering traffic associated with its namesake. Idris loop sensing technology was first developed for use in Wales but its name has little to do with a whimsical affection for a mountain. Idris stands for Incident Detection for Road Informatics and Safety.

The technology and its applications have moved on significantly since 1995 when the acronym was first coined. Idris today is used in tolling (both real and shadow), intelligent vehicle detection products, and advanced counter/classifiers.

Loop sensing technology is not new. The technique has been in use since the early 1960s. Its basic premise is simple. Run three wires in a loop in the road surface and a detection device will tell you when a vehicle passes over it.

'In its simplest form, a loop detector measures vehicle presence. It is either on or off,' explained Bob Lees of Diamond Consulting Services, the developer of Idris. 'The Idris technology adds a new dimension to the tried and tested method of vehicle

detection in the levels of accuracy achieved.'

Several factors influence the accuracy of the data. First, the loop site needs to be chosen with care to avoid interference from external objects or signals. Then the loops themselves need to be properly installed. Second, loops are positioned in the middle of the lane. When there are two or more lanes of traffic - as in open road or shadow tolling - vehicles often straddle lanes, and a conventional detector can't cope. Stop/start and stationary traffic can also cause problems for an ordinary loop detector, but Idris is able to separate vehicles and distinguish between two vehicles tail-gating one another and a car towing a trailer. 'The particular strength of Idris is its ability to cope with data recording in congestion. The problem is that there are no real gaps between cars when tail-gating occurs so the loop never goes off. In a data recording application, Idris analyses the signal wave forms and achieves 98-99 per cent accuracy, even in these conditions.'

In tolling even higher levels of accuracy are expected and it was this quest for improved accuracy that led Diamond Consulting Services to develop the system back in 1995.

Bob, whose background is in electronics, first installed Idris as an incident detection system in three tunnels on the A55 in North Wales, a Euro route leading to the port at Holyhead. The tunnels have unfettered access plus no hard shoulder and low traffic flows at night, so if a car breaks down in a tunnel the relevant authorities need to know about it as soon as possible. The accuracy of the system was most important so false alarms could be avoided. If a car does not exit the tunnel as expected, an alarm is triggered. In 1996, the UK government launched the Design, Build, Finance

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and Operate (DFBO) road schemes as part of the Private Finance Initiative (PFI). Under such schemes, private consortia became responsible for funding as well as building and/or maintaining specific sections of the UK trunk road and motorway network. The specification for these schemes required highly accurate vehicle data collection since each vehicle detected contributes revenue according to its class. This shadow tolling requirement is the basis upon which the UK government pays back the private sector.

'Idris is proven to exceed the UK 1999 DFBO Specification,' said Bob. This only allows a one per cent error rate on volume and three per cent on length based class without statistical bias and in all traffic conditions. 'The new Labour government rather put the brakes on DBFO schemes when it came to power in 1997 but by then we were getting interest from the USA, principally for real tolling applications.'

Traditional technology in this market is above ground - light curtains and lasers operating in a variety of combinations to count and separate. In response to the demands of the tolling market, Idris's counting and classification capability was further developed to detect axles, the favoured method of vehicle classification. The established technology for axle detection relies on an electro-mechanical treadle or some form of piezo resistive strip. Axle loops, according to Bob, are a much better bet.

'A well-laid loop will last as long as the road surface. It won't break and because there are no moving parts it is very low maintenance. Piezo strips and treadles, however, rely on mechanical deformation - they degrade over time.'

And just as importantly an Idris axle loop can detect axles accurately and uniformly, as well as features such as raised axles and twin rear wheels. Idris has, over time, become a complete Automatic Vehicle Classification system (AVC) - totally self-contained and off the-shelf. This offers huge advantages in terms of reduced maintenance costs takes much of the risk out of the process of building an AVC system.

As so often happens with technology, as soon as one problem

A rack mounted computers runs both the lane controller and the Idris software. The Idris detectors can be seen in the top right hand corner.



has been addressed another is identified, and toll operators are making even more demands by dividing the classification of data into more categories. The advent of people carriers and four wheel drive/off road cars has already muddied the waters since light curtains can misclassify such vehicles as trucks instead of cars due to their shapes. They can distinguish between cars and other classes of larger vehicles by directing a beam at a certain height at the front of the vehicle. With a normal car this would be over the bonnet and it would be registered as such. People carriers have shapes much more similar to buses and trucks than cars, leading to incorrect classification.

Bob said the Idris loop-only system also works better in high speed tolling lanes which today's drivers have come to expect. There can be a fair degree of bounce on roads which will affect the accuracy of a traditional treadle or piezo strip. Passing over an Idris loop at highway speeds does not affect its performance.

An AVC system like Idris works in conjunction with an Automatic Vehicle Identification system (AVI), matching tags to vehicles for enforcement purposes. It works in all types of toll lane - manual, automatic coin machine (ACM), express - on ramps or in traditional plazas and for pre- or postclassification. Idris will trigger an enforcement camera if a vehicle with an AVI tag does not match up to its registered rate, or if the driver pays the incorrect amount at an auto toll. This it can do to within one foot

of the nominated trigger point.

Idris is licensed to Peek Traffic, exclusively in certain territories, and the technology is used in a number of Peek products. Apart from Idris's use in tolling applications, Idris is incorporated in the ADR6000 which is a data recorder for use in situations where traffic conditions are too challenging for a conventional counter/classifier.

Another two Peek applications which utilise Idris technology are Prism and Safepath. Prism is an intelligent vehicle detector which can, for example, identify buses and gives them signal priority. Safepath does a similar job for large vehicles that are leaving a motorway or dual carriageway and are calculated to be travelling too fast to slow down for an upcoming junction. Prism does not rely on onboard tagging systems and so does not restrict the movement of vehicles around an operator's area.

The future potential for Idris is clearly enormous. Congestion charging and other road pricing schemes are high on the agenda in the UK, and Britain looks set to open its first toll road around the north of Birmingham. In Europe, where toll roads have been an accepted as part of motoring culture for decades, the drive to install open road tolling and ensure inter-operability throughout the European mainland means Idris is a cost effective choice for retro-fitting to existing plazas as well as installation in new build facilities.

Bob also forecasts an interest revival in its Idris's original application. 'Incident detection is now back in the forefront,' he said. 'Incidents like the Mont Blanc tunnel fire have alerted people to the dangers and costs of similar incidents. Millions of pounds were spent re-opening the route, not to mention the inconvenience of the tunnel's lengthy closure.'

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