

EVR: the new security and OTC solution?

Electronic vehicle registration has significant Homeland Security potential but could also be the cost-effective key to making open road tolling truly work. Hal Worrall makes the case



A vision of the past? EVR technology offers a viable and cost-reducing alternative for the infrequent customer

Since the 1990s, when Canada's 407 project, the Melbourne CityLink, the Cross Israel Highway and the toll projects in Santiago, Chile, were developed, Open Road Tolling (ORT) – that is, truly cashless collection, as recognised colloquially by the tolling industry – has been a technological reality. The success of these ORT Greenfield projects has caused toll agencies, including the Port Authority of New York and New Jersey, to announce studies to consider converting to ORT, while the North Texas Tollway Authority has set 2010 as the year for completion of its full conversion. As was the case with the application of Electronic Toll Collection (ETC) many years ago, others are taking a 'wait-and-see' attitude to the possibility of all-electronic solutions.

While some questions remain as to whether full ORT is a practical goal, tolling is a crucial and growing strategy in new infrastructure proposals. ORT offers the promise that toll facilities can operate with a higher level of efficiency while providing convenience and safety without the delay inherent in manual/traditional toll collection. Still to be answered is whether toll leakage increases will outweigh cost savings, whether concerns over public privacy impede the adoption of

ORT and what adjunct technologies could improve the chances of ORT deployment success. Electronic Vehicle Registration (EVR) is an emerging solution that can address these issues. It is currently moving towards adoption and deployment in several countries around the world and deserves serious consideration by the players in the US tolling sector.

EVR: the ORT answer?

EVR involves affixing a passive Radio Frequency Identification (RFID) tag to a vehicle for the purpose of permanent identification. The tag is placed on the vehicle at the time of registration and is a means of preventing either counterfeiting of license plates or the movement of license plates between vehicles. The tag contains minimal registration information and the Vehicle Identification Number (VIN).

As Homeland Security grows in importance, interest in EVR technology will accelerate. Great potential exists to use RFID to identify and track vehicles of interest either with fixed reading points or with mobile units. Design features of EVR ensure that tags remain with the vehicle from the time of initial registration and if removed will cease to operate, with the result that the

vehicle is then considered to be an unregistered vehicle. The application of RFID to vehicle registration has developed independent of the consideration of its use in toll collection but the potential for use in conjunction with tolling is evident.

Tag manufacturers are now capable of producing an EVR suitable tag at a very low cost. The technology employed has been adapted from the disposable low-cost tags used to track freight pallets. Historically, RFID tags used in tolling have varied in cost from \$10-30 depending upon whether they are passive (no battery and shorter read range) or active and feature ancillary features such as lights, displays and beepers. EVR tags could be produced in large quantities for significantly less, as little as \$1-5. This cost structure makes the use of RFID in the application of EVR very attractive and if adopted could make it a viable solution in the reduction of toll violations.

EVR is currently being considered in South Africa, Brazil and Mexico. Given that the necessary reading devices are simple and can be either fixed or mobile/handheld, there is a logical case to position EVR readers at ORT points for both EVR validation and to gather vehicle registration information that is usually obtained using Automatic Number Plate Recognition (ANPR) technology, for use in identifying casual toll users. Knowing the VIN provides information on the make and model of the vehicle, the year, class of the vehicle and a host of other data. As a registration mechanism and a tool in Homeland Security strategies, EVR could be extremely effective. However, it is EVR's ancillary capabilities which make it so potentially useful for ORT applications.

While ANPR is a proven technology, EVR offers a more direct method of identifying the vehicle and determining the registrant's address. Back office costs can magnify when converting to ORT and EVR may offer an opportunity to reduce the labour costs of reviewing images. Since the infrequent customer represents a large portion of the non-transponder transactions and the only alternative to ETC is commonly a violations-based process, labour costs for reviewing images can be reduced considerably by EVR. The more efficient process of identifying the vehicle via RFID as opposed to a video image conversion could positively affect operational costs for a toll facility that chooses to convert to ORT.

Although there is great promise in EVR technology, it should be considered complementary to ETC and not a replacement. ETC serves the frequent customer base and EVR is most applicable to the needs of the infrequent user. While it may be possible to develop an ETC system that requires no transponders, frequent toll road users would be denied the capabilities and payment relationships that transponder accounts provide. It is in the interests of toll operators to provide various means for the customer base to pay electronically. Frequent customers, infrequent customers and moderate users of the toll road deserve payment mechanisms that are most convenient to their needs. EVR offers the potential to bring infrequent users into a legitimate and sanctioned toll payment relationship and to do so more



Canada's 407 project was among the first to realise cashless open road tolling

accurately without human intervention. Privacy concerns may be a factor but the increased concern for security will be a balancing element. It remains to be seen how broadly EVR technology will be implemented, but the ancillary benefits to ETC and the enhanced ability to convert to ORT will be significant factors. Such is the case in South Africa.

An EVR case study

The Republic of South Africa has suffered from significant license plate counterfeiting and to a lesser extent the practice of exchanging plates between vehicles. Accordingly, South Africa initiated an EVR programme called Electronic License Disk (ELD). It is anticipated that the solution will be a 915 MHz passive RFID technology. This will be in addition to transponder technology used for ETC (ETC in South Africa is based on the CEN 278 5.8 GHz ISO standard).

Because there are many low-volume roads on the South African National Roads Agency (SANRAL) system, ETC is in its infancy and has been implemented on only one concession. However, South Africa will be hosting the 2010 Soccer World Cup and there are plans to significantly improve the transportation system in and around Johannesburg and Pretoria, the site of the games. This project will be initially developed by SANRAL and is planned to be all-electronic. Nearly 300 miles (500 km) of roadway will ultimately be constructed or expanded with 150 miles (240 km) being improved and upgraded by 2010. This will result in one of the largest high-volume ORT systems. Some of the urban sections currently carry nearly 200,000 vehicles per day. The plan is to construct the roadways in time for the World Cup soccer event and subsequently apply tolling to the network.

Because of the vehicle registration challenges experienced in South Africa, it would be extremely difficult to utilise license plate image technology to enforce toll payment. While ELD and ETC have been developed separately by different agencies, the presence of ELD will significantly improve registration accuracy and will make ANPR more practical. Therefore, SANRAL is working very closely with the national vehicle registration office to ensure that the ELD project will support the requirements for ORT.

EVR: a solution for the US?

There are certainly privacy implications of EVR and the resistance to such a concept in the US could be considerable. Technologically it is possible to implement a national EVR system but the considerations for privacy must be addressed. Procedures must be implemented to ensure that the privacy rights of the individual are not violated. However, privacy concerns will be balanced with the desire to have effective homeland security and the protection that such a system might afford the citizens of the country overall. Mandatory and stringent controls on the use of such information will be necessary just as controls have been developed for sensitive information that is collected today.

Summary

Technological changes such as ETC have occurred before in the toll industry where agencies and customers have had to adapt. Over time we have learned to modify and embrace ETC technology and the same can be done for ORT and the introduction of EVR. As concessions become more prominent in the US and public toll agencies find ways to avert public concern for lost revenue, more conversions to ORT will occur. Clearly, EVR technology offers a viable and cost-reducing alternative for the infrequent customer that is central to the business strategy of converting to ORT. While the primary purpose of EVR is more accurate vehicle registration, it is potentially the catalyst for increased ORT conversion, higher levels of customer satisfaction and a healthier toll industry. ■