REALITY CHECK

THE CONVERGENCE OF POLICY, TECHNOLOGY AND JURISDICTION

With the policy case for interoperability developing and technology and business practices evolving fast, it seems a truly connected ETC network in the USA is just around the corner. But haven't we been here before?

Interoperability has challenged the toll industry on a global basis. The ability to establish one account and use one onboard electronic device across various toll agency operations has never really been a reality, although it's been accomplished in the USA in those areas where proximity of state and regional toll agencies dictated.

Customers who regularly crossed state and regional boundaries led to the formation of the Interagency Group (IAG) in the northeastern USA, and in those states outside the IAG where various regional toll facilities exist, interoperability has been established within the state itself.

As ETC expanded from the few pioneering toll operations of the early 1990s, the need for toll interoperability between states and regions grew. There was little need for it when one or two agencies utilized ETC and were hundreds of miles apart, as the ubiquitous and extremely interoperable toll payment method of cash was sufficient. But as ETC began to take hold in the IAG states, the need for interoperability was immediately apparent. Agencies established methods for exchanging transactions between other members of the IAG on a nightly basis. Although it could be debated whether it would have been more efficient to establish a single clearinghouse concept, the IAG's 'bottom-up' approach accomplished the desired result for the customer.

POLICY SHIFTS

Today, various policy positions have been espoused for funding transportation infrastructure through user pricing, and the establishment of a vehicle miles traveled (VMT) scheme is gaining momentum. Although it is not fully defined and the politics of elections may defer the formulation of legislation on transportation policy for at least another year, VMT has gained some favor among policy analysts. As a result, interoperability has suddenly become a part of the national agenda. Although it could be dictated in future federal legislation, it is unlikely that such an approach will be taken without a thorough vetting of the specifics with the toll industry.

Interoperability goals may also be driven by programs designed to manage traffic. Tolling has also been increasingly used for congestion pricing. Numerous HOV lanes have been converted to HOT to take advantage of the existing unused peak-hour HOV capacity. Various projects are under way with USDOT funding established under the Urban Partnership Agreement (UPA) program, the primary goal of which is congestion management.

TRANSPORTATION JURISDICTION

The move toward VMT as a source of infrastructure funding has not escaped the attention of state DOTs. The potential for

by Dr Harold Worrall

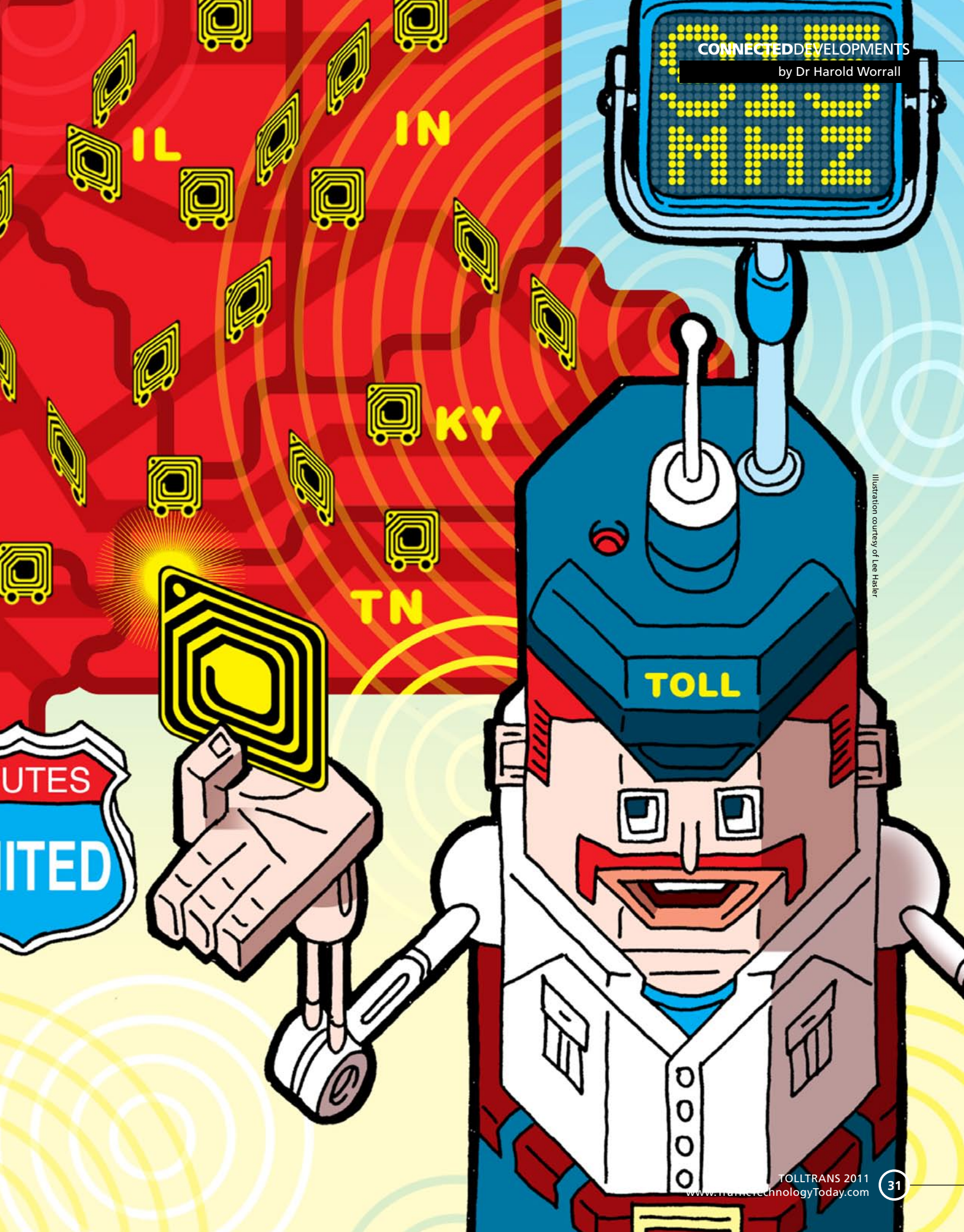


Illustration courtesy of Lee Hasler

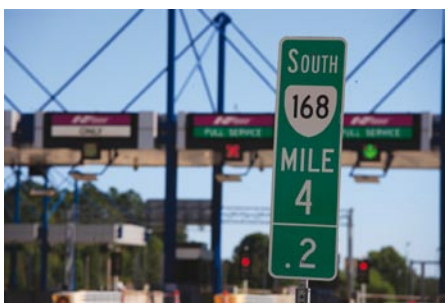
Could the ETC deployments in the USA join up?

Interoperability exists within the state of Florida, with FDOT's widely used SunPass transponder

tolling – and in particular All Electronic Toll Collection (AETC) – to generate revenue and to manage traffic flow should be considered statewide policy, as it's the state DOT's responsibility to ensure the viability of the transportation network overall. Central to this agenda is the Interstate Highway System. The 44,000-mile network carries the vast majority of the inter-city freight traffic and the urban sections are crucial to managing congestion. This organizational dynamic will likely play an important role in the approach to US interoperability.

Some inter-city turnpike toll authorities are organizationally included within the structure of the state DOT. In other cases, turnpikes are independent agencies funded through toll revenues and administered through boards and commissions appointed by the governors and the legislatures of those states. Urban expressways that are focused more on providing for local intra-city transportation capacity are typically organized with significant local representation on the governing boards. The potential for these regional agencies to confuse statewide policy agenda on interoperability is a real possibility.

Interoperability has become a hot topic of discussion not only within the tolling community but also financial institutions,



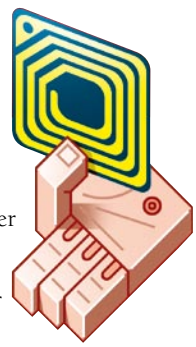
Interoperability is a hot topic for toll operators

"RFID TECHNOLOGY STANDARDS WOULD HAVE BEEN AN IMPORTANT FOUNDATION TO NATIONAL INTEROPERABILITY HAD THEY EXISTED FROM THE OUTSET"

legal entities, fleet management companies, cellular providers and automakers – all of which are attempting to determine what their roles should be. We've certainly come a long way but there is still far to go. It may come about through the Alliance for Toll Interoperability (ATI) and the adoption of standards and/or the deployment of electronic vehicle registration (EVR).

The ATI group has released a request for proposal for the private sector to provide a clearinghouse operation that will initially establish toll interoperability for any customer having an account with a participating toll agency. The concept is to attempt to read the transponder and, failing that, to capture the license plate number of the vehicle. These transactions would be sent to the central clearinghouse to determine if the license plate number can be associated with a valid account at another toll agency. If a match is successful, the toll is charged to the 'home' account. Obviously, it would be more efficient if the transponder from the 'home' agency could be read directly by the 'away' agency, but the establishment of interoperability based on the license plate will provide a transition period for transponder and reader technologies to converge.

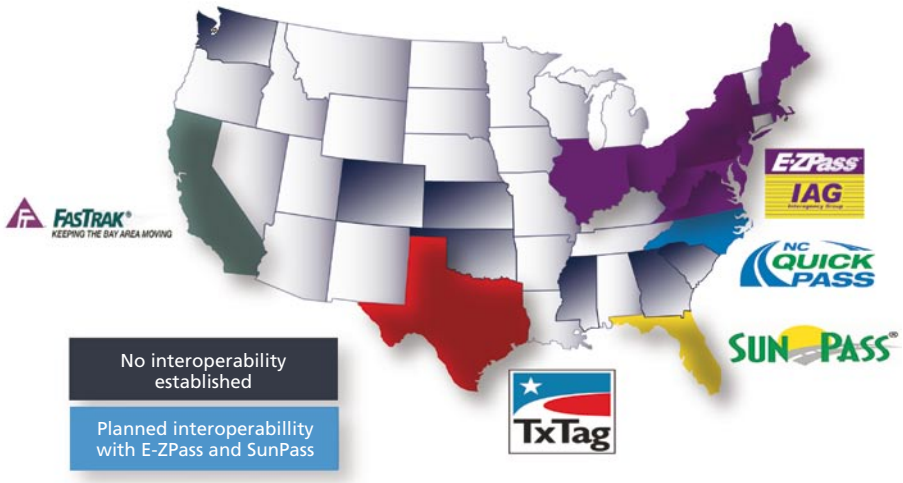
Of course, there is always the possibility of the emergence of a disruptive technology. If the precise location of vehicles over time could be established with telephony or a GPS/satellite-based technology at a reasonable cost, interstate interoperability within the USA could become a reality much more quickly.



Furthermore, a national vehicle registration process such as that currently being implemented in a number of countries (including Mexico) would be the equivalent of placing an RFID toll transponder on the entire US vehicle fleet. As the vehicle registration process is an annual procedure, transponder ubiquity could be accomplished within a one-year registration cycle.

STANDARDS PROCEDURE

RFID technology standards would have been an important foundation to national interoperability had they existed from the outset. However, technology standards are not sufficient to establish interoperability, as evidenced in the EU where the CEN (Committee for European Normalization) standard was established initially. Contractual, procedural and jurisdictional differences continue to be the primary factors in establishing interoperability. In the USA, the lack of RFID standards was primarily the result of patented technologies applied to ETC. In an attempt to capture as much of the ETC market as possible, vendors used technology patents to protect market share. Attempts were made to



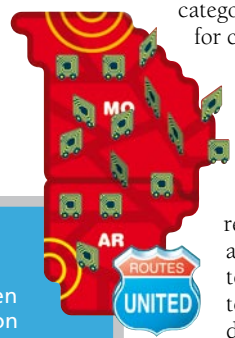
Some interoperability exists already in the USA – in the IAG states, and Florida, California and Texas

establish standards through the IBTTA in the mid-1990s, although private sector interests – and the lack of a business case for national interoperability at the time – stifled the process. The later establishment of 5.9GHz as the standard for ITS in the USA led to the formation of OmniAir. This organization of public and private sector members has continued to develop the 5.9GHz standard and to establish certification processes for that standard.

To date, though, ETC deployment is in the 915MHz range. The US toll industry is gradually adopting standard non-proprietary RFID or multi-protocol detecting devices in the 915MHz range. Such technologies are the first step in bridging the gap between existing ETC technologies. The recent entry of ISO-18000 6C as a non-proprietary open architecture in the 915MHz range has garnered the attention of several states, with Washington State DOT having already confirmed it as the standard. The technology has also begun to be adopted outside of the USA as a foundation for EVR and ETC.

At the same time, the federal government has started to engage in the discussion about RFID standards in preparation for future federal funding legislation. In the short term, though, an interim solution for the toll industry is needed to establish nationwide interoperability and will likely continue to serve the toll industry for some time.

Meanwhile, customers of toll systems – and in particular interstate truckers – are left having to deal with the various transponders and accounts that must be established to pay interstate tolls without stopping. This issue is of national importance to remaining globally competitive. It is worth noting that customers have unique needs for ETC payment. Frequent interstate travelers are unique and different from infrequent interstate travelers – that is vacationers in passenger cars are different from a fleet of tractor-trailer combination vehicles. Each category of customer has unique needs for convenience in establishing and maintaining an account, the choice of payment method and privacy considerations.



DOWN THE ROAD

The future of US interoperability remains unpredictable but it does appear that several factors are leading to a greater probability of national toll interoperability. As policy debate develops for federal transportation funding over the next year, it is likely that VMT definition will advance. Several states with contiguous sections of major interstate routes have initiated discussions about tolling the interstate in their respective states, and are preparing proposals for USDOT approval.

Also, many sections of the interstate system are reaching the end of their design life and will require major reconstruction to service the continued growth of interstate travel. And most of the states through which these highways pass have insufficient funding to pay for such reconstruction. Tolling is likely the only reasonable solution. This major interstate funding strategy will not be possible without addressing national toll interoperability in some fashion.

WHAT'S THE STATUS IN THE USA?

Currently, near-term national interoperability in the USA remains unlikely. Tolling is a patchwork of various technologies heretofore incapable of creating an interoperable environment. Not only that, vendors of ETC equipment have traditionally been unwilling to read transponders manufactured by other vendors, or to allow their transponders to be read by others – in fact, there have been lawsuits threatened and filed on the subject. Although it appears that this impasse has begun to lessen as the VMT policy agenda develops, the issue nevertheless remains.

Some interoperability does exist through the Interagency Group (E-ZPass), though, as well as within the states of Florida, Texas and California. These interoperable environments are depicted in the figure above. It's taken these organizations two decades and significant investment to develop back-office systems, business rules and procedures to provide interoperability for their customer base. However, the capability to establish interoperability between them all has remained elusive.

The E-ZPass tag used in northeastern USA offers interoperability between IAG states

"…THE WILLINGNESS OF THE PRIVATE SECTOR TO READ TRANSPONDERS FROM OTHER VENDORS WILL INCREASE THE PROBABILITY THAT A NATIONAL INTEROPERABLE SYSTEM CAN BE DEVELOPED"

Although some major segments of the interstate highway system are a part of turnpikes and expressways in the USA, the responsibility for the system rests with the state DOTs. They are intimately familiar with transportation regulation and liaise with their federal counterparts frequently. The involvement of state DOTs and toll agencies in national toll interoperability discussions will likely advance the process, and could additionally improve the communications with USDOT on the establishment of federal RFID standards for electronic toll collection.

As the transportation policy debate continues, shifts in toll technology are also occurring. The private sector has developed various versions of multi-protocol readers and transponder technology has become more robust in the 915MHz range. Coincidentally, passive transponder technology has reduced the costs of transponders significantly and because sticker tags have no battery maintenance costs have come done also. The advance of open architecture and the willingness of the private sector to read transponders from other manufacturers will also increase the probability that a national interoperable system can be developed.

In the midst of all these events, the toll industry is moving rapidly toward an AETC environment. Several agencies have converted to AETC and many more are in the process of implementing or are studying AETC's potential. As these implementations occur, technology and business processes will advance and the knowledge required to implement VMT will become more available. In the interim, the activities of ATI to process interstate transactions through a central clearinghouse based on license plate data will help the industry transition to interoperability.

In summary, the policy case for US national interoperability is developing and the technology and business processes required to implement national interoperability are becoming a practical reality. The business case for the private sector will be the larger market for their products and services resulting from the broader implementation of tolling technology. US national interoperability is close to becoming a reality, alhough the propensity for lengthy debate, political uncertainty and the potential for jurisdictional conflict could delay development. ■

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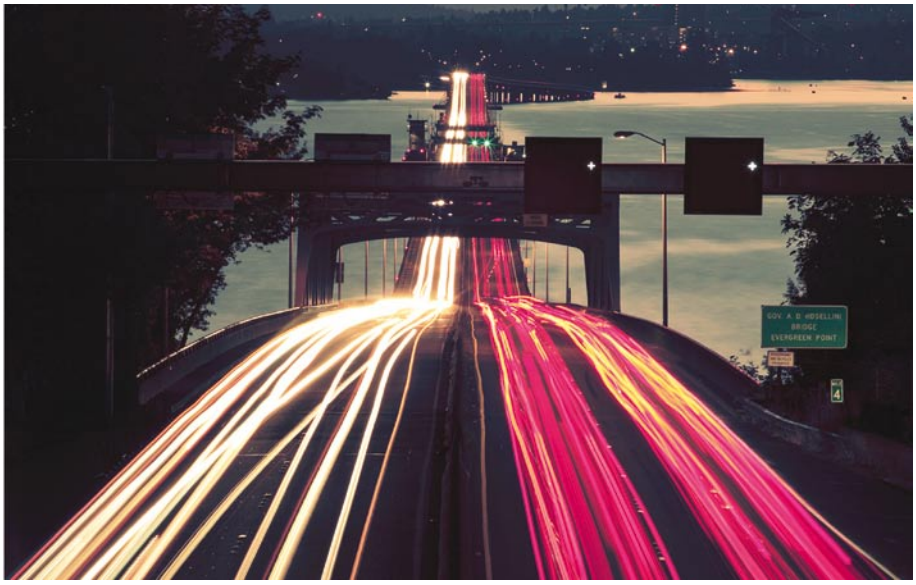

Boldly going where no DOT has gone before, Washington State DOT is to deploy ISO 18000 6C transponders for the front-end of its 'Good To Go!' electronic toll collection system