

# 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 capability to establish one account and use one onboard electronic device across various toll agency operations has never really been a reality, although it has 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, while in most states that have various regional toll facilities, interoperability has been established within the state itself.

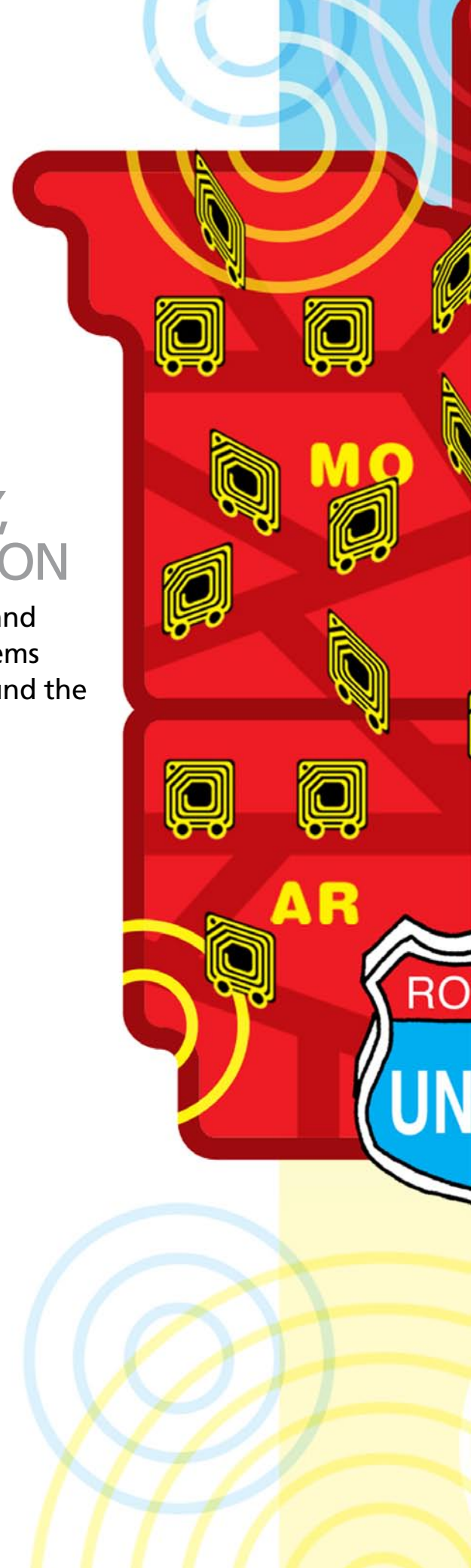
As ETC expanded from the few pioneering toll operations of the early 1990s, the need for toll interoperability between states and regions grew. There was little need for it when one or two agencies utilized ETC and were hundreds of miles apart, as the ubiquitous and extremely interoperable method of cash payment was sufficient. However, as ETC began to take hold in the IAG states in the northeast, the need for interoperability was immediate. Agencies established methods for exchanging transactions between other members of the IAG on a nightly basis. Although it may have

been more efficient to establish a single clearinghouse concept, the 'bottom-up' approach of the IAG created the desired result of customer interoperability.

### POLICY SHIFTS

Today, various policy positions have been espoused for funding transportation infrastructure through user pricing, while the establishment of a vehicle miles traveled (VMT) scheme is gaining momentum. Although it is not fully defined and the politics of elections defers the formulation of legislation to implement VMT for at least another year, it is an approach that 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 would be taken without a thorough vetting of the specifics with the toll industry.

Tolling has also been increasingly used for managing traffic through congestion pricing. Numerous HOV lanes have been converted to HOT lanes to take advantage of the existing unused peak hour HOV capacity. Various projects are under way





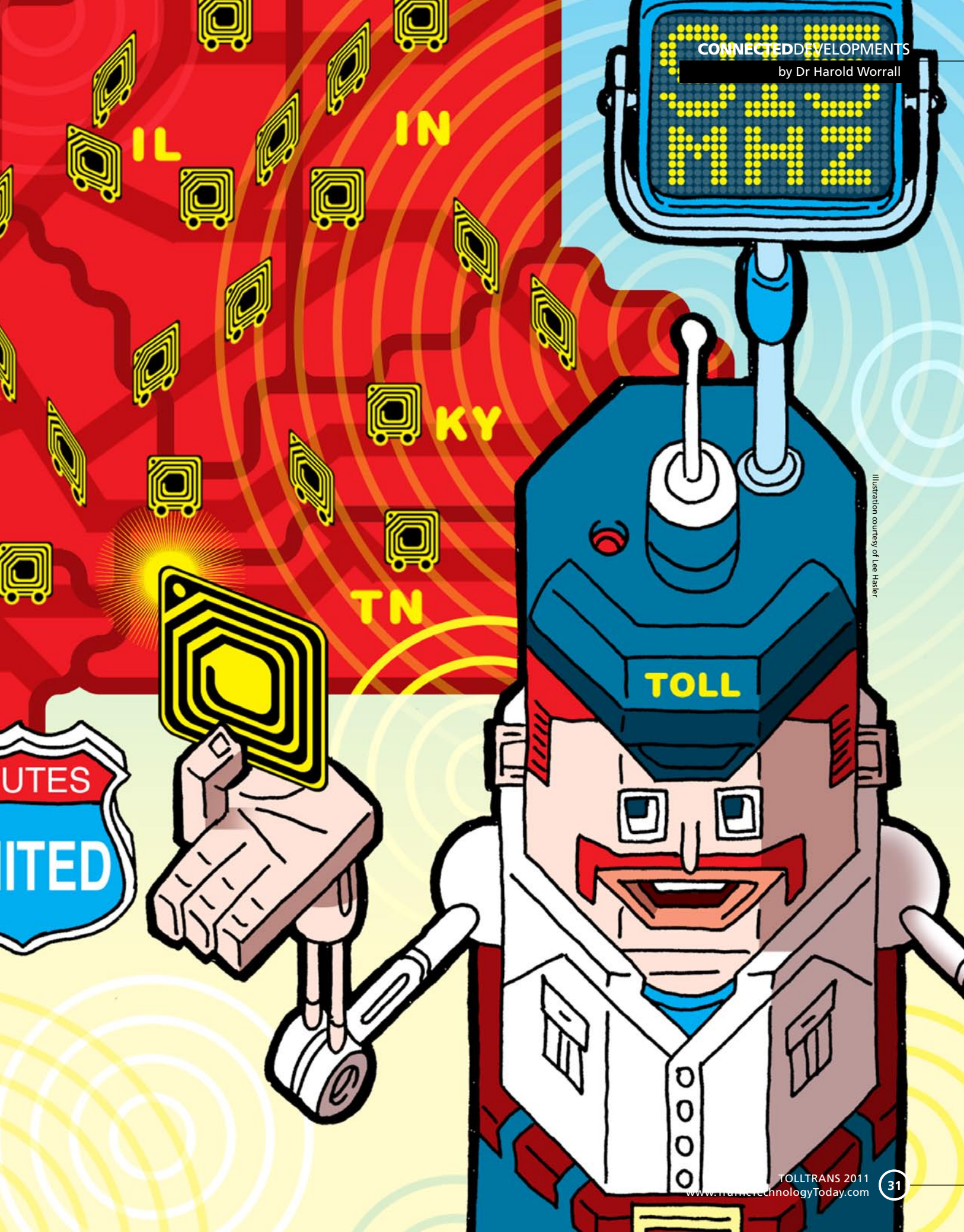


Illustration courtesy of Lea Hailer

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Ⓜ Could the ETC deployments in the USA join up?

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

with USDOT funding established under the Urban Partnership Agreement (UPA) program. A primary goal of this program 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 tolling – and in particular All Electronic Toll Collection (AETC) – to generate revenue and to manage traffic flow is of interest to state transportation departments as it's their 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 intercity 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 intercity 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 the 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. Some states have confused these policy agenda and the resulting jurisdictional conflict has led to a less than ideal environment for interoperability.

**THE HOT TOLLING TOPIC**

Interoperability has become a hot topic of discussion not only within the tolling community but also financial institutions, legal entities, fleet management companies, cellular providers and auto manufacturers – all of which are attempting to determine what their roles should be. We have come a long way toward interoperability 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



**NEW TECHNOLOGY? BANG FOR YOUR BUCK IS KEY**

For some people the 'buzz' surrounding tolling interoperability (including the debate about the technologies to facilitate it) is a source of bemusement. In this 2011 edition of *tolltrans* alone, for example, Steve Heminger, the executive director of the Metropolitan Transportation Commission in San Francisco, questions whether or not it's something the USA could live without. His answer was that it probably could. TransCore's John Mike, senior vice president of Revenue Management Systems, is certainly in agreement.

"Interoperability is a great academic conversation, but can that academics be transformed into a money-making machine?" he asks. "Interoperability has to be a push-pull application and what we don't see from the

marketplace at the moment is the pull." Mike is by no means doubting the technical feasibility however. "The technology to achieve it is here – it's been here for a long time," he says, alluding to a number of multi-protocol tags already available (including TransCore's 'eGo' tag that complements the company's Encompass readers).

"5.9GHz is another great academic exercise," Mike continues, although he debates whether it's "ready to go" just yet. Citing not only the incomplete technology architecture standards, he suspects that harmonization with Europe is also some distance away. "Whether it's high-end 5.9GHz or low-end 6C,

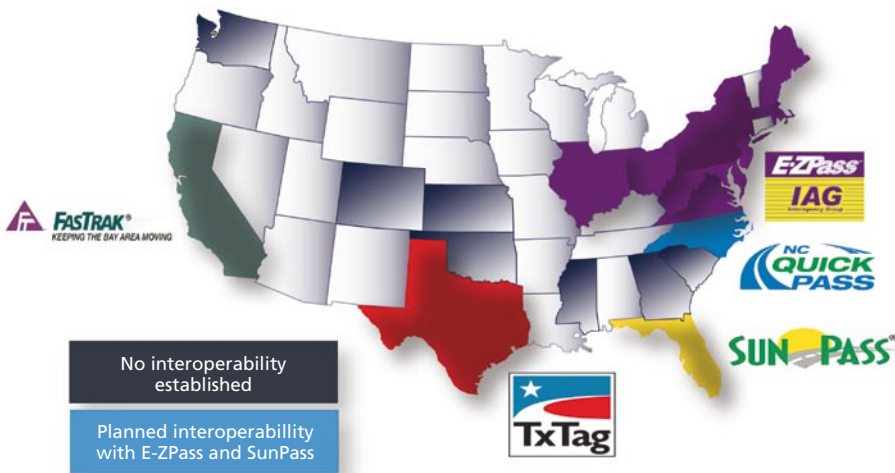
I'm not sure the market's ready for any new emerging technology," he says.

"The one thing I am sure about is the ongoing demand for increasingly lower tag prices – anyone that comes to market with a US\$25-US\$30 tag has an uphill

battle on their hands, particularly if it offers no real operational enhancement. With the economic demands of the transportation industry – whether you're an independent toll agency or a state DOT – 'bang for your buck' is key."

But 6C comes with a much lower price tag, surely offering what Mike refers to as bang for your buck? In response, he points to





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

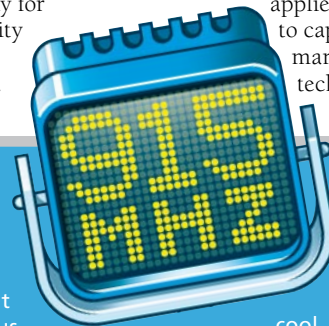
operation that will initially establish toll interoperability for any customer having an account with a participating toll agency. The concept is to attempt to read the transponder and, failing that, to capture the license plate number of the vehicle. These transactions would be sent to the central clearinghouse 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 time 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 typically for a year, toll transponder ubiquity would be accomplished after just a single 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 by 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



Security, he goes on to say, is another big consideration. "In an increasingly cashless and complicated world, the threat of intervention from nefarious folks is pretty big and I think that security and data encryption are going to play a major part," he predicts. "Once you go to encrypt 6C, well, it can't be open architecture because everyone will know how to un-encrypt it!"

But doesn't this hotly contested issue merely serve to stifle progression? With so many misconceptions – not least relating to technology – US nationwide interoperability probably won't even make it to first base. "I think the industry holding off for the panacea of the next-big technology is a myth, perpetuated by the thrill of the unknown and the up and

coming," he says. "A lot of people are seduced by the appeal of new technology – it's the whizbang factor. It's cool, it's interesting, but is there a business case?"

And we're back to the business case, which coincidentally is at the heart of discussions in Europe about EETS. "The trucking market is driving country-to-country interoperability in Europe, but in North America we don't have that same dynamic," Mike says. "The love-hate relationship between the truckers and the toll industry here is a topic on its own. I think they would like to have a single OBU, but with multi-protocol tag technology – which is available right now – that desire is increasingly being fulfilled."

< "misconceptions" abound regarding the whole tag debate. "A shallow dive into the world of 6C makes you realize that it's a cobweb of intellectual property where the industry presumes it's an open architecture; the fundamental layers might be but the application layers are still proprietary with IP wrapped around a dozen or so different companies. This is one of the huge misconceptions!"





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

## “THE FUTURE OF US INTEROPERABILITY REMAINS UNPREDICTABLE BUT IT DOES APPEAR THAT SEVERAL FACTORS ARE LEADING TO A GREATER PROBABILITY OF NATIONAL TOLL INTEROPERABILITY”



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 will be switching from 6B transponders. 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.

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.

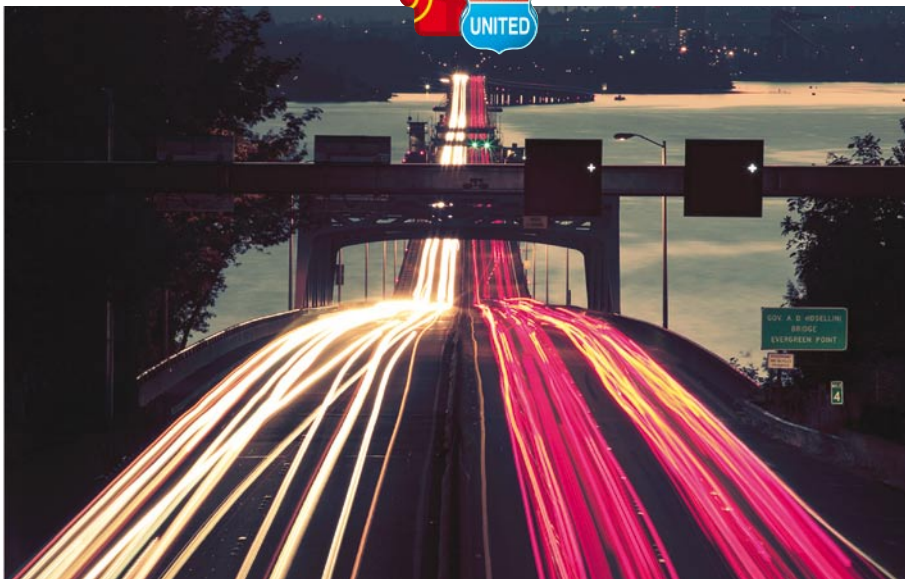
Some interoperability does exist through the InterAgency Group (E-ZPass), as well as within the states of Florida, Texas and California. These interoperable environments are depicted in the figure on the page opposite. However, it’s taken these organizations two decades and significant investment to develop back-office systems, business rules and procedures to provide interoperability for their customer base. However, the capability to establish

market share. Attempts were made to 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, the predominant ETC deployment is in the 915MHz range. The US toll industry is gradually adopting standard non-proprietary RFID or multi-protocol detecting devices.



### WHAT'S THE US STATUS?

Currently, near-term national interoperability in the USA remains unlikely. Tolling is a patchwork of various technologies heretofore incapable of creating an interoperable



⬆ 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

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interoperability between them all has remained elusive.

**THE CUSTOMER**

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.

It is worth noting that customers have unique needs for ETC payment. Frequent interstate travelers are unique and different from infrequent interstate travelers, just as 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 and the payment method used.

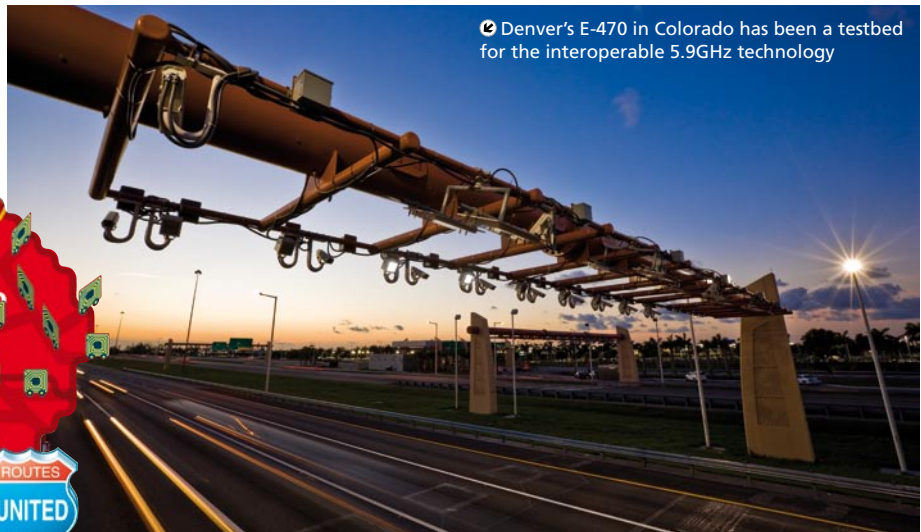
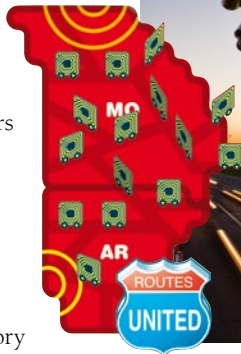
**FUTURE INTEROPERABILITY**

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.

But many sections of the interstate highway system are reaching the end of their design life and will require major reconstruction to service the continued growth of interstate travel. moreover, 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.

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. Such departments are intimately familiar with transportation regulation and liaise with their federal counterparts on a daily basis. The involvement of these agencies in national toll interoperability



Photograph courtesy of E-470

**“...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”**

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 transponder maintenance is reduced due to the absence of a battery. 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 the potential for AETC. 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 but the propensity to debate, political uncertainty and the potential for jurisdictional conflict could delay development. ❌

*An industry veteran and globally respected authority on tollways, Dr Harold Worrall is the founder and president of Transportation Innovations, Inc – a consortium of toll and ITS professionals dedicated to stimulating innovation in the transportation community. To contact him, please telephone +1 407 366 1096, or alternatively email trans.innov@gmail.com*

