

# **IBTTA 2014 Summit on All- Electronic Tolling, Managed Lanes & Interoperability**

## **Thematic Report**



**San Diego, CA  
July 20-22, 2014**

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## **Executive Summary**

When IBTTA convened its largest-ever Summit on All-Electronic Tolling, Managed Lanes and Interoperability in San Diego July 20-22, 2014, panelists and participants stressed the huge advances that have shifted their focus from technology development to implementation.

In each of the Summit's three areas of focus, several years of intensive effort have delivered innovative technologies that largely meet the need for tolling agencies to deploy effective, reliable electronic tolling systems. The result is a growing variety of often very large projects designed to meet the toughest local and regional mobility challenges.

The next generation of technology promises even better operational results, including integration with a menu of other transportation modes and options. Still, much of the discussion at this Summit had to do with the business rules and back office operations on which successful all-electronic tolling projects depend.

With their state hosting the Summit, California tolling agencies traced lessons learned from recent projects and discussed a cascade of new systems and infrastructure that will come online in the next three to 20 years. "The rate at which California has come up to speed on tolling is just incredible," a session moderator said.

Underlying the whole discussion was an intense focus on customers and customer service. IBTTA President **Mike Heiligenstein** stressed the tolling industry's commitment to "safe, seamless mobility for the millions of customers we serve," from freight haulers to vacationers to commuters, whether the distances they travel are short or long. A state official added that "people don't have to pay a quarter to be deemed a customer. They're a customer because they benefit from the mobility service we provide."

Keynote speaker **Joseph Kopser** urged participants to think of tolling as part of a continuum of seamless, door-to-door mobility options for users of all ages. He urged the industry to focus customers' minds on the "fully-burdened cost of mobility," beginning with the cost of the time they lose on congested highways – whether its value to them is \$20, \$40, or \$300 per hour.

Several industry panelists agreed that the era of "owning" customer accounts is coming to an end. One industry veteran said customers are looking for integrated systems that give them access to a host of services – from parking, to transit, to car washes, to state park access, to gas purchases. Panelists also discussed the challenge of earning and retaining customer confidence in an era of routine electronic data breaches and rising mistrust of governments and other institutions.

With electronic tolling technology well established, much of the discussion in San Diego focused on the systems and strategies that would enable even more agencies to convert to all-electronic tolling. With orders of magnitude more license plate images to process, a panelist said agencies were going through "a ton of system changes, tightening the bolts and making sure nothing is slipping through the gaps." While violation enforcement is a

critical part of the system, she said a successful AET system begins with high image quality and a smooth, streamlined image review process.

A panelist from one of the first U.S. agencies to introduce AET said the keys to success were to observe what worked, recognize mistakes, document the experience, and share lessons learned. "It took time and effort to make it right," she said. Most important, the agency shifted its business philosophy from "customer included" to customer-centered.

Several panelists touched on a new generation of toll collection technologies that could soon be available to augment traditional AET systems, allowing customers to combine their tolls with a wider range of transportation transactions. A couple of panelists pointed to mobile phone systems as a complement or replacement for AET, with one speaker contrasting the steady but slow adoption of toll tags with the meteoric rise of smart phones.

Panelists described managed lane projects of growing complexity, from a single jurisdiction with three new roads worth more than \$1 billion each, to projects on established, heavily-built corridors that required careful synchronization of construction activities. Participants also heard about the longer-term capacity issues that could arise as managed lane projects become more commonplace and managed lane networks begin to take shape. A panelist said agencies must ensure that downstream lanes have enough capacity to accept additional traffic before new ones are built.

A couple of panelists pointed to the growing convergence of intelligent transportation systems (ITS) with electronic toll collection on managed lanes. "We used to talk about toll operations and traffic operations," said one panelist. "Now, it's just roadway operations," pointing to a degree of integration that extends to roadside technology, back office operations, maintenance, and customer service.

This year's Summit marked the midpoint in the drive to achieve national interoperability in the United States by 2016, and panelists reported progress on several key technical issues, including transponder selection and business rules. "The most difficult thing about implementing interoperability is the time and effort to put together the agreements and the rules," a session moderator said. Panelists traced significant progress on major state and regional interoperability projects, and speakers from the European Union and Mexico reported on developments in their own jurisdictions.

In the EU, toll concessionaires are participating in a Regional European Electronic Toll Service (REETs) that will bring together seven member nations plus Switzerland with a combined 38,100 kilometres of tolled roadway, 20.7 million heavy vehicles, and €22.77 billion in annual toll revenue. In the U.S., a panelist estimated that the market for national interoperability will consist of about four million Class 8 trucks and fewer than four million automobiles. Interoperability options include multi-protocol readers, eventual adoption of the 5.9 GHz protocol, mobile technologies, or augmenting license plate readers with bar codes or other secondary technologies to boost accuracy and allow greater automation.

### Introduction: A Moment of Opportunity

IBTTA Executive Director and CEO **Patrick Jones** welcomed participants to IBTTA's largest all-electronic tolling (AET) summit ever, with more than 500 participants from 16 countries, including representation from the association's newest member from Zambia. He acknowledged the member support that makes all of IBTTA's successes possible, from its annual workshop series to the *Moving America Forward* public affairs campaign. "You are the ones who support everything we do."

IBTTA President **Mike Heiligenstein**, Executive Director of the Central Texas Regional Mobility Authority, said *Moving America Forward* was an important member initiative that had delivered big dividends. "When we increased our dues, there was a lot of discussion and debate," he said, and "our members stepped forward and said this was worth it." Less than two years later, the Obama Administration proposed a highway program measure that would lift the ban on tolling existing interstate highways to fund their reconstruction. Tolling "has finally hit the screen," Heiligenstein said. "It's on the radar," and IBTTA's message is beginning to get through.

**Jack Dale**, Chair of the Board of Directors of the San Diego Association of Governments (SANDAG), affirmed that "a big part of the future of transportation is going to be toll roads. We've got two, and we'll build some other ones, but we're dependent on you" to make it happen. **Mike Kraman**, Acting CEO of the Transportation Corridor Agencies, noted that "there's so much happening in our industry, but we can never forget to consider our customers as we move these ideas forward."

**Joseph Kopser**, CEO & Co-Founder of Austin, TX-based RideScout, reinforced Heiligenstein's advocacy message by encouraging participants to tweet Summit highlights to their online networks.

Early in the Summit, **Trey Baker** of the Texas Transportation Institute set the stage for much of the discussion to follow by laying out the common characteristics of the transportation megaprojects that are rolling out across the industry. They're costly, all over \$1 billion in construction costs. They're colossal in size. They're complex to design, procure, operate, finance, and govern. They tend to "activate groups that wouldn't normally pay attention" to a smaller tolling project. They're controversial from the moment the public hears the word *megaproject*. But given the political gridlock around the U.S. highway reauthorization bill, "these types of projects are one of the best options for getting big, massive infrastructure done."

### California: Where Mobility Dreams Are Coming True

Session moderator **Greg Hulsizer** led off the discussion of the California tolling experience with a video tour of the state's express lanes and iconic bridges, set to the tune of the equally iconic *California Dreamin'*. "The rate at which California has come up to speed on tolling is just incredible," he said. Panelists traced lessons learned from recent projects and discussed a cascade of new systems and infrastructure that will come online in California in the next three to 20 years, including:

- Improved business rules for customer service, and a new philosophy of customer interaction, that followed the introduction of all-electronic tolling on the Golden Gate Bridge
- Reliance on regional partnerships to reduce traffic demand and control the degradation of HOV traffic? on other Bay Area bridges
- Completion of a successful HOT lane/managed lane pilot program in Los Angeles County that produced 30 million trips, sold 260,000 transponders against an original goal of 100,000, and saved commuters an average of 12 to 17 minutes during peak hours
- Development of new express lane projects in Riverside County, 11 years after a public agency successfully took over operation of a private toll road
- Growth of the 51-mile Transportation Corridor Agencies system into a “regional lifeline” that generates more than \$260 million in annual revenue from its strategic express lane network and is now introducing AET
- The evolution of public support and intermodal collaboration in San Diego since the region opened America’s first managed lane project along Interstate 15 in the late 1990s, soon to include a border crossing with Mexico that could mitigate congestion costs that exceed \$7 billion per day
- A commitment among all the states’ agencies to deliver seamless traffic flow across multiple projects and integrate tolled highways with rapid transit.

### **Customer Expectations: The Next Generation**

IBTTA President **Mike Heiligenstein** set the tone for the Summit by bringing the discussion of technologies and infrastructure back to the association’s 2014 theme, *Customers and Collaboration*. The tolling industry is committed to “safe, seamless mobility for the millions of customers we serve,” from freight haulers to vacationers to commuters, whether the distances they travel are short or long. “They’re all our customers,” he said, and “there’s nothing more important than making sure they understand why we do the things we do.”

Panelists repeatedly pointed to technology and back office procedures as the tools that make toll payments more seamless for users, and effective listening and communicating as the keys to customer good will. “Our feeling is that people don’t have to pay a quarter to be deemed a customer,” noted one state official. “They’re a customer because they benefit from the mobility service we provide.”

By delivering successful projects on time and on budget, and sticking to a consistent brand promise, she said agencies earn good will that stands them in good stead when short-term problems arise.

Modern, responsive customer service also means integrating tolling with a variety of available transportation options, including emerging business and service models like Uber and Zipcar – particularly for customers in younger demographics who are concerned about convenient mobility, but not terribly interested in owning their own vehicles. In jurisdictions with high volumes of tourist traffic, the relationship with rental car companies is still an urgent issue.

Several panelists said excellent customer service is particularly important for managed lanes that run right beside general purpose lanes. “The trick is finding out what customers want and whether you can do it,” a panelist said. Loyalty programs, low costs for starter toll tags, and unconventional account formats for unbanked customers all emerged as innovative options for connecting more customers with all-electronic tolling.

Keynote speaker **Joseph Kopser** reinforced the idea that tolling is about seamless, door-to-door mobility for users of all ages. He urged the industry to focus customers’ minds on the “fully-burdened cost of mobility,” beginning with the cost of the time they lose on congested highways – whether its value to them is \$20, \$40, or \$300 per hour.

Kopser, who served with the U.S. military in Iraq, contrasted true customer service with the U.S. Department of Veterans’ Affairs’ self-described mission to “move inventory” – an attitude that created problems for the VA when it turned out the “inventory” consisted of returning servicemen and women. Kopser added that, based on his experience overseas, his “fully-burdened cost of mobility” includes the effort that went into protecting fuel convoys in hostile territory, while fuel worth billions of dollars is wasted back home due to highway congestion.

As the developer of a mobile app that combines all surface transportation options (personal driving, transit, biking, car pooling, etc.) on a single platform, he said there’s no longer any need for tolling agencies to invest in one-off apps for their individual services. “You’re sitting on what we call excess capacity,” he said. We usually talk to people about empty seats in vehicles. But think about all of those open miles on some of your tollways. We think we can fill them.”

Several industry panelists reinforced Kopser’s argument, suggesting that the era of “owning” a customer account is coming to an end. But despite the huge progress the industry has made with tolling and payment technologies, one industry veteran stressed that there’s no time for agencies to rest on their laurels.

“We’ve slowed down over time, and the customers have caught up and in some cases surpassed us with innovation,” he said. “We still think we’re doing a great job looking to the future,” but customers are looking for integrated systems that give them access to a host of services – from parking, to transit, to car washes, to state park access, to gas purchases.

### *Keeping Customer Data Secure*

Customers also expect their electronic transactions to be safe and secure. But at a time of heightened attention to online privacy, participants heard that data departments are “outmanned and outgunned” against Chinese hackers, Russian mobsters, and a roster of other adversaries. A panelist said 25% of the tolling systems represented at the Summit could expect to experience a data breach in the next two years, and while 44% of incidents are malicious, the rest are caused by software glitches and other forms of carelessness.

Panelists said hackers could have any number of reasons for targeting a tolling agency – from a desire to avoid paying tolls, to an interest in harming the agency’s public image,

to the thrill of the chase. Given the impact of a security breach – from the cost of remedial action, to the reputational damage that results – panelists agreed that overstretched IT departments must ensure secure exchange of back office data, minimize the exposure of tag protocols to possible breaches, build authentication of encrypted tags into their systems, introduce incident response plans before problems arise, and ensure that all staff are trained to keep security front and center.

### *Customer Confidence in an Era of Limited Trust*

While the cost of a toll will factor into a driver's decision on whether to participate in an electronic tolling system, a couple of participants pointed to public mistrust of governments and other institutions as a challenge for any business – including tolling – that depends on customer confidence. A panelist agreed that this issue is becoming more pronounced around the world and pointed to toll enforcement as an important part of the solution. "Customers need to believe that the rules apply to everyone, that there's fair play in the system and the process," she said. An effective enforcement system "goes a long way toward building trust, which in turn fills that bucket of good will."

The other way to build good will is to meet and exceed customer expectations. Several panelists talked about projects that cut billions in operating costs while guaranteeing minimum driving speeds, reducing commute times, dramatically increasing the use of free carpools, and earning public support in the range of 75% or higher.

Customer relationships are just as important when a road is under construction. A new managed lane project in Texas is relying on extensive community outreach to build public support, while managing project schedules to minimize noise and inconvenience for nearby households. The agency built seven miles of sound walls in 19 locations, hosts community events to share project updates and thank neighbors, and set up a 24/7 project hotline to field complaints.

### **Putting AET to Work**

With electronic tolling technology well established, much of the discussion at this year's AET Summit focused on the systems and strategies that would enable even more agencies to convert from traditional electronic toll collection (ETC) to all-electronic tolling. With orders of magnitude more licence plate images to process, a panelist said agencies were going through "a ton of system changes, tightening the bolts and making sure nothing is slipping through the gaps."

While violation enforcement is a critical part of the system, a successful AET system begins with high image quality and a smooth, streamlined image review process. "You don't want to start with garbage," the panelist said. She described an image processing strategy that combines three data sources – violation enforcement and optical character reader (OCR) results, back office image review, and independent image review – to verify roadside results, track system performance issues that may be contributing to errors, and connect those anomalies to revenue sources and maintenance needs.

Summit participants heard about several major projects in the works, including:

- Introduction of AET to reduce congestion, increase available revenue, and

- control collection costs on the Bay Area bridges in California
- A new effort to fund the Louisville-Southern Indiana Ohio River Bridges project, a \$2.6-billion effort that has been 40 years in the making, by relying on AET
- A statewide project to convert the Massachusetts Turnpike and three Boston-area toll facilities from cash and ETC to full AET in 2016
- A system expansion/reconstruction and AET conversion along the Elgin-O'Hare Expressway in Illinois.

A panelist from one of the first U.S. agencies to introduce AET said the keys to success were to observe what worked, recognize mistakes, document the experience, and share lessons learned. When the system was first introduced, the agency made several assumptions: that it understood its cash customers, that the state Department of Motor Vehicles would supply reliable data, that all transactions would be billable, that customers would pay after the first bill, and that the agency knew how to assign staff in a new business environment. "It took time and effort to make it right," the panelist said. Most important of all, the agency shifted its business philosophy from "customer included" to customer-centered, and resolved to never stop listening.

"Don't get mad," the panelist urged. "Get better."

Another panelist said AET systems generate aggregate data that can be combined with survey data to help agencies understand their customers' needs, wants, and behaviors. Through trip clustering, the panelist's agency segmented its user base and concluded that 19% of customers accounted for 63% of all trips. "Our higher-frequency users were most likely to change their travel plans when our prices doubled," so the agency pays close attention to the behaviors of different customer segments by time of day.

#### *The Next Generation of Toll Collection Technology*

Several panelists touched on a new generation of toll collection technologies that could soon be available to augment traditional AET systems, allowing customers to combine their tolls with a menu of other transportation transactions. By contrast, one speaker compared the current system to a grocery store where shoppers buy individual products using a variety of separate payment methods.

"In the current [transportation payment] system, each individual component is priced, collected, and reported on separately," he said. In an integrated approach, customers would benefit from a single, easy-to-use system, while participating agencies would gain valuable insights on the other systems their customers use and the mobility benefits they value most.

A couple of panelists pointed to mobile phone systems as a complement or replacement for AET, with one speaker contrasting the steady but slow adoption of toll tags with the meteoric rise of smart phones: While the tolling market benefits from financial independence, a strong focus on the customer, low cost of capital (for the moment), and the ability to present an alternative to funding limits and congestion, it suffers from obsolete rules, market boundaries, and political interference. He urged agencies to "seize the day" by adding mobile to their toll collection strategies.

Another panelist said AET adoption will be difficult for the 17 million Americans who are unable or unwilling to open direct deposit bank accounts. “It doesn’t mean they’re not financially responsible,” he said. “They’re just out of our system,” largely because license plate billing for an unbanked customer travelling across the country would lead to a \$10 service charge on each transaction.

### **Managed Lanes Hit Critical Mass**

Managed lanes are among the hottest transportation trends in the United States, with more and more jurisdictions seizing the opportunity to reduce traffic congestion—particularly in corridors with little or no space to expand the footprint of existing highways. One session moderator referred to a recent managed lane project that “transformed what was once a parking lot several hours a day into a swift-moving corridor for those willing to pay.”

The panelist representing that project said the private operator learned over the first 18 months of operation that users placed an even higher premium on safety than on the time they saved on a managed lane: Particularly for younger and female drivers, it was worth the cost of a toll to drive on a road with no trucks, minimal weaving, 24/7 monitoring and incident detection, and an average incident response time of five to six minutes. Early in the project, the operator implemented better lane markings and signage and a high-profile media campaign to reduce customer confusion at the decision point between the general purpose and express lanes.

Another speaker described a cluster of three managed lane projects in Dallas-Forth Worth, each worth more than \$1 billion, that “push the limits on revenue collection, safety, reliability, and customer convenience.” Two segments went into service almost nine months early, and a third is expected to open ahead of schedule later this year.

Operating on a dense, established freeway corridor in a heavily-built environment, the projects have required careful synchronization of construction activities that often take place at night. With multiple stakeholders involved in setting dynamic tolling rates, the projects also required a consistent set of rules to maximize the use of available capacity, keep speeds at 50 miles per hour, and ensure consistent toll charges for individual users.

Participants also heard about the introduction of multi-mode, declarable carpool transponders on the I-405 HOT lanes that are scheduled to go into service in Washington State in autumn, 2015. With three existing facilities, and two new projects coming online in the next couple of years, the state Department of Transportation will have to determine how customers declare occupancy (for HOV purposes the toll is waiver or reduced) on the three legacy systems, and what to do with existing switchable tags that won’t work on the new roads. By changing the programming of the transponders, WSDOT was better able to specify HOV status, and to allow for future additions like E-ZPass classification codes.

Panelists and participants discussed the longer-term capacity issues that could arise as managed lane projects become more commonplace and managed lane networks begin to take shape. When new managed lanes feed excess traffic into existing facilities, agencies

will have to think ahead to the possibility that congestion on the old road will drive up tolls on the new one. “You end up with prices that are off the chart, and talk about losing good will,” a participant said.

A panelist said agencies must ensure that downstream lanes have enough capacity before new ones are built. “We need to think that far ahead,” she said. “We talk about managed lanes being a sustainable type of mobility infrastructure? Well, it had better darn well be sustainable” and meet customer needs over a reasonable period of time. “Otherwise, you might not get to build that third or fourth managed lane project.”

Several panelists also pointed to issues with signage—having the right number of signs on the road, providing enough information but not too much, and delivering messages that inform rather than confuse drivers operating at high speed.

### *Managed Lanes Meet ITS*

A couple of panelists pointed to the growing convergence of intelligent transportation systems (ITS) with electronic toll collection on managed lanes, with one speaker pointing out that the two applications once co-existed in the U.S. Federal Highway Administration’s National ITS Infrastructure. They diverged in the early 1990s, with commercial ETC products entering the market and beginning to standardize while ITS programs were still searching for research funds.

The two paths began to converge again in the mid-2000s because “the systems started to need each other,” as ITS came into its own and gained public profile. Today, the speaker said, AET and ITS providers “are really on the cusp of developing these integrated systems, and one of the primary drivers for that has been the rise of managed lanes,” with second-generation systems relying on ITS to support real-time dynamic pricing.

“We used to talk about toll operations and traffic operations,” he said. “Now, it’s just roadway operations. The same people are managing both the revenue on the toll side and the traffic on the operations side,” leading to a degree of integration that extends to roadside technology, back office operations, maintenance, and customer service.

A key challenge is that ITS and ETC apply different key performance indicators to the same sensor technology, with revenue collection demanding a higher level of performance, the speaker noted. The higher performance standards “are probably achievable today, but it’s a paradigm shift from the traditional ITS side in how you maintain your system and your hardware.”

He added that the dawn of connected vehicles “will just broaden the sphere of things” to include safety and emission reduction features that are not available on today’s vehicles.

Another panelist contrasted the first generation of managed lane retrofits and conversions with a second generation that emphasizes new capacity and regional networks. She said the projects in the new wave are larger and more complex, involve multiple operators, and point toward a future in which many states will set out to build networks of managed lanes.

### **Pathways to Interoperability**

The Summit marked the midpoint in the drive to achieve national interoperability in the United States by 2016, in accordance with federal transportation reauthorization legislation adopted in 2012 (MAP-21). Many participants had been involved in a series of pre-Summit committee meetings that reached unanimous agreement on several key technical issues, including transponder selection and business rules.

“The most difficult thing about implementing interoperability is the time and effort to put together the agreements and the rules,” a session moderator said. Although much of the discussion focused on the broad transition to national interoperability, participants also heard about an interoperability megaproject that is well under way in Florida. The five components of the state’s interoperability agenda are:

- Establishing a single, state-wide transponder protocol
- Expanding the ability to read protocols from other jurisdictions
- Delivering a common experience for Florida residents through a consolidated back office
- Establishing interoperability with bordering states
- Achieving regional interoperability, as a springboard to a single, national system.

“It’s been a long process” since Florida began its interoperability efforts in spring 2012, involving 14 multi-agency workshops, 569 common business rules, 2,350 requirements, more than 50 staff from different agencies, and more than 10,000 hours of staff time, the panelist said. The project has involved “lots of moving parts, and lots of different folks working on the various elements,” but Florida is now in active discussions with several other states and well positioned to deliver added service to its customers.

Participants also heard updates on regional interoperability initiatives in Texas, California, and the northeastern United States. And a panelist who completed a 30-day, 13,000-mile trek through 38 states, 28 tolling systems, and 133 tolling points reported that it’s technically possible to drive across the United States with a toll tag that corresponds to every regional system. But the regions of interoperability are still inconsistent and confusing, and there are still a number of back office and customer service issues to be worked out.

**David Kristick**, Chair of IBTTA’s Interoperability Committee and Deputy Executive Director of the E-470 Public Highway Authority, reported on a coordinated plan of action that emphasizes open technical and design standards and calls for performance-based evaluation of potential interoperability protocols. “This whole process is envisioned to provide freedom of choice to all agencies,” while maximizing the economies of scale in a national system.

A recent assessment of North American tolling systems identified widespread use of electronic toll collection (ETC) and the availability of “very capable, strong, agency-based back offices” as key strengths, Kristick said. The disconnects among protocols represent the biggest weakness, though several states are involved in large-scale projects to address the problem. Managed lane projects are becoming a catalyst for interagency collaboration that could lead to wider cooperation on interoperability. And Kristick

pointed to a new “warmth” toward tolling in national policy discussions that could reinforce the drive toward national interoperability.

Panelists representing the Alliance for Toll Interoperability delivered an update on ATI’s Interoperability Hub, a system that is expected to offer volume pricing for settlement of out-of-state and out-of-region electronic toll transactions, primarily based on video. Hub members will provide lists of approved ETC accounts, then forward their daily video transactions, so that the hub can match the plates with its valid accounts list and report matches back to the agencies. Financial settlements will be provided through a secure commercial banking settlement system.

ATI is also negotiating with the American Association of Motor Vehicle Administrators (AAMVA) to set up a central, national database of U.S. vehicle owners, to help members track license plates that don’t match the accounts list.

In the European Union, panelists said work is well under way on a Regional European Electronic Toll Service (REETS) that will bring together seven member nations plus Switzerland with a combined 38,100 kilometres of tolled roadway, 20.7 million heavy vehicles, and €22.77 billion in annual toll revenue. After missing an ambitious deadline for full continental interoperability, the EU turned its attention to regional schemes, and the continent’s toll concessionaires have been working toward an integrated system involving one onboard unit, one contract, and three groups of key players: toll chargers, toll integrators, and road users. The last year has seen the development of cross-border interoperability projects involving France and Spain, Spain and Portugal, the Nordic countries, the Nordics and Austria, and Austria and Germany.

A panelist from Mexico agreed with others who said technology is not the main obstacle to interoperability. The challenge is to reconcile business models and balance a variety of political and commercial interests. “The choice is clear if all factors are considered,” he said. “It’s a priority when the user is the main focus of highway operations.”

Another panelist discussed international efforts to standardize payments for tolls and transit, accelerate the deployment of open payment systems for transportation, and encourage consolidation of back office operations. For customers, access to a single account would reduce barriers to use and offer more choices for trip modes and payments. For agencies, a consolidated system would reduce the cost of operations and maintenance, while making it easier to introduce loyalty programs and discounts.

#### ***Who Gains From Interoperability?***

Different panelists described interoperability as a springboard for agencies to embrace all-electronic tolling, and AET as an innovation that “really drives a greater need for interoperability among agencies.” The U.S. users with the most compelling interest in the MAP-21 deadline are mostly commercial vehicle operators, and one panelist stressed that with four or five tags on their windshields, “their need for nation-wide interoperability is now.”

Another panelist said the total market for national interoperability in the U.S. is about four million Class 8 trucks (over 33,000 lbs.) and fewer than four million automobiles,

and “the size of the market should be proportional to the investment.” Just as cell phone producers came up with roaming to achieve interoperability across 30 or more frequency bands, he said tolling agencies could “do something similar with a multi-protocol tag” containing all U.S. frequencies and protocols. Panelists and participants explored a variety of other options, from eventual adoption of the 5.9 GHz protocol, to mobile technologies, to augmenting license plate readers with bar codes or other secondary technologies to boost accuracy and allow greater automation.

In back office operations, several panelists said the next round of innovation will involve consolidating operations to provide better customer service and matching the credit card industry’s capacity for real-time transaction processing.

### **Conclusion**

Throughout the Summit, panelists and participants traced the dimensions of a rapidly-changing business and policy environment, in which:

- Technology is no longer the limiting factor for all-electronic tolling and managed lanes. The industry’s biggest task is to understand and communicate with customers, deliver value, and continue earning the public’s confidence and trust. “Whether it’s technology, back office, or policy, it’s the customer,” said one track chair. “We should start every sentence with what the customer expects.”
- Technology has advanced faster than anyone imagined possible. Just five years ago, it seemed risky to predict that national interoperability would become a reality, or that AET would become common enough to make cash toll collection a novelty. But that bright future is now upon us.
- Safe, reliable, convenient mobility is the fundamental service the industry provides its customers, and full interoperability means positioning tolling alongside all the other transportation choices at customers’ disposal. Technology companies are at the center of that effort, and IBTTA has done well to expand its universe of consultants and innovators in recent years.

Panelists agreed that the drive for AET, managed lanes, and interoperability is ultimately about relationships – with customers, among tolling agencies, between tolling and emerging mobile technologies, and among agencies, governments, and private sector partners.

“I still want to interact with my customers, but I want to give them easy access to our facilities and multiple channels, not just for feedback, but to make payments,” said one tolling executive. “If they like using their smart phones and I can get the revenue, I’m listening. We need to be open to all of these things. I’m hoping that whatever is convenient for the customers will be good business for me.”