Using Technology to Improve Transportation:
All Electronic-Tolling and Beyond Transcript

Introduction

STEVE POFTAK: Thanks to all of you for coming today and joining us. I'd also like to thank our partners who have put this together: Joseph Giglio from the Center for Strategic Studies at the D'Amore-McKim School of Business at Northeastern University and Greg Massing at the Rappaport Center for Law and Public Service at Suffolk University.

Here in Massachusetts, we've just gone through another round of legislative and executive branch discussions, debates, and votes on transportation funding; surely, this won't be the last. Funding is a means to an end. But we'd like to pivot that conversation today to talk about technology. How do we define customer service? How do we improve our service for people who use and depend on our transportation system? Today, we'll about funding, but we'll also talk about how we can use technology to improve customer service.

Keynote Address: Technology and Transforming the Customer Experience

RICH DAVEY, Secretary and Chief Executive Officer, Massachusetts DoT

Why is technology important? First, transportation is the broadest form of government service: it is the most customer-facing and most customer-focused of all government services. Trust in government is another aspect of transportation. And technology is a way for us to show our customers that we can improve their experience.

I think the gold standard in our business is giving more time back to people. Whether it's standing on a platform at Alewife or standing in line at the Registry of Motor Vehicles, it is giving people more time back. Technology holds tremendous promise to accomplish these goals that we have in transportation.

The Registry of Motor Vehicles is, after the Department of Revenue, the Commonwealth's second-largest revenue generator, through registry fees and/or taxes. We serve just about everybody in the Commonwealth. We have been improving our online transactions over the last several years. The online wait time is zero minutes. One in three of our customers in Massachusetts who is at a branch can conduct his or her transactions online instead.

Massachusetts will be the first in the nation to roll out a "My RMV," like an Internet banking account. You will be able to see all of your transactions and how you've been interacting with government. The goal is to make it easier to interact with the department.

Underinvestment has put pressure on transportation providers to improve service. Fiscal pressures have limited the resources available to make those improvements. Technology offers the opportunity to leverage smaller investments by improving customer services, enhancing operating efficiencies, and increasing revenue.

To explore the potential of new technologies to make transportation work more efficiently, faster, and safer, the conference "Using Technology to Improve Transportation: All-Electronic Tolling and Beyond" was held on May 7, 2013 at the Suffolk University Law School.

The Conference was co-sponsored by The Rappaport Institute for Greater Boston, The Center for Strategic Studies at the D'Amore-McKim School of Business at Northeastern University, and The Rappaport Center for Law and Public Service at Suffolk University Law School. B

It featured a keynote address from MassDOT Secretary Rich Davey and two panel discussions. Biographies of the presenters and panelists are located at the end of the transcript.

Technology is being deployed to improve services and create efficiencies. We are very excited to be the first transit agency in the United States to roll out mobile ticketing, which has been introduced on our commuter rail system. In the last four months, we've already had $5 million in sales.

Also, we are giving people information that they can use to make their commute decisions. We are moving to real time traffic information in the Commonwealth. For example, we use signs to convey real time information such as "5 miles, 6 minutes." The applications for this information are endless. You will be able to download an application on your iPhone to see what traffic looks like, including the traffic's actual speed and how long it will take to go from point A to point B. We are also working with the developer community on the transit side to create an app that will tell you the best route to downtown Boston, given current conditions.

We are rethinking how we are going to deploy this technology across the state. Having toll booths at interchanges is crazy: that's where you want the least bottlenecks.

We are putting up static signs along the routes to Cape Cod. The signs give people specific, real time information about travel times from point A to point B. This is part of a statewide project that we're rolling on our most used arterials: the Cape, Route 6, Route 3, and the Massachusetts Turnpike between Exit 9 and downtown Boston.

The Fast Lane is finally here. The legal speed limit through the Fast Lane is fifteen miles an hour: that is not fast. We are moving to all-electronic tolling, piloting it on the Tobin

Bridge by the end of 2013, and then rolling it out statewide over the next couple of years. In the process of this transition, labor has certainly been a challenge for us. We've been working very closely with our partners in labor. Unfortunately in Massachusetts, the toll collector has been held up unfairly as a wasteful government position. The challenge is in actually saying, "We're going to have a meaningful transition for our employees to either work in government or outside of government." That would open the door to rolling out a significant customer improvement.

Policymakers of the future know that electronic tolling can allow for things like congestion pricing, which seems to be a no-brainer. If we decide to toll other roads, we will be able to deploy the technology very quickly and easily. By the way, it also gives traffic information and can provide us with a wealth of other data.

We are rethinking how we are going to deploy this technology across the state. Having toll booths at interchanges is crazy: that's where you want the least bottleneck. In Massachusetts, you will likely see a tolling scheme that tolls per mile. Vehicles will go under a gantry every 10 or 15 miles and not pay at an interchange.

After Boston, our two largest cities, Springfield and Worcester, have had economic challenges. However, if you are in Worcester and you want to stay in Worcester but you want to use the Massachusetts Turnpike, you have to pay. The same is true for Springfield. Juxtapose that with some other cities and towns in the eastern part of state, where the economy is a little better and we are not charging. We are going to even that out and make it a little fairer for commerce across the state.

I would like to take some time to discuss safety and security and the role technology can play. Obviously, everybody is doing cameras. But there are things the MBTA is doing that I want

to mention. The MBTA is considered a Tier 1 target by Homeland Security. Not only have we been in a heightened state of vigilance, we have also been a laboratory for security improvements in and around the system. We move 1.4 million people a day on our transit system, the fifth largest in the country. We have some old tunnels, obviously. The Blue Line tunnel was built in the 1920s, for example. Air flow analysis determined that it's possible that chemical or biological weapons could be used in a subway system, such as happened in Japan with the sarin attack.

We've been working with the Department of Homeland Security for the last nineteen months to understand the airflows in our tunnels. We will be better prepared to know how we can

It is often said in transportation that we are "information-rich, but data-poor." We need to use the information that we have to come up with actionable data, and the information is there, whether it is electronic tolling, looking at how people travel, or simply understanding our customers' travel patterns so we can resoond to our customers.

evacuate people efficiently, as opposed to putting people into harm's way. This has been a great partnership with Lincoln Labs, MIT, and the Department of Homeland Security. We are trying to bring more technology to bear in terms of how we protect our people.

Another technological development supporting safety is the "crime tip" app recently rolled out by the T police. We've been able to solve a number of crimes on our system, as a result of people reporting suspicious activities. This is

more evidence of how we are using technology to improve the system.

I would like to discuss a couple of technological areas that, as an industry, we should be thinking about. The first is how people pay for services. With due respect to the Charlie Card system we have here, which is, in its own right, fairly forward thinking: it is already or almost obsolete. What you see in WMATA and other transit agencies are obsolete systems. We can't be building proprietary systems that our customers can't use easily. Whether it's near-field technology, Q-codes, or barcodes, we need to be thinking about how people are going to pay in the future and make it easy for our customers to pay. The T spends 75 cents per Charlie Card — and about $3 million a year or every other year — buying Charlie Cards. We are looking for a way to "tap and go" with a credit card. Google wallet has some interesting applications that are coming out in the near future.

The second key technological area is how we use the information available to us. It is often said in transportation that we are "information-rich, but data-poor." We need to use the information that we have to come up with actionable data, and the information is there, whether it is electronic tolling, looking at how people travel, or simply understanding our customers' travel patterns so we can respond to our customers.

In the Spring, we had a public debate about how we pay for transportation services in the Commonwealth. I expect that this discussion will help us as we roll out other technologies.

It is a great time to be in transportation, because there is so much focus on it. We are getting back to the basics. We can't avoid improving transportation services. We need to move. We need to improve our economy. It is the lifeblood of the Commonwealth and certainly

of the rest of the country.

Q&A

PARTICIPANT: What is the administration's position on usage-based, pay-as-you-drive pricing?

RICH DAVEY: In January, the administration proposed our Way Forward Plan, after months of listening to our customers across the state. And one of the items that we mentioned that we should think about is a VMT tax, with a commission to oversee it and a voluntary pilot program where folks could opt in. On the flip

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side, there are opportunities in the pricing of car insurance: beyond the past practice of basing the price on the kind of vehicle you owned, your zip code, and your driving record.

We're going to have to find a way to raise additional revenues to invest in our system, as the federal government continues to suggest it is stepping away from its past practice of contributing to transportation in the states.

VMT is another equalizer in that regard. Privacy is a concern for a lot of folks. So a pilot to introduce it and see if it works is the way to go. Over the next couple of years I wouldn't be surprised if you saw it emerge here.

TOM FINNERAN: It seems to me, Mr. Secretary, that you had some impressive success with the Fast 14 Project on Route 93.

What did you learn from that project?

RICH DAVEY: The Fast 14 project was our effort to change out fourteen bridge decks over I-93, the most heavily traveled section of any roadway in Massachusetts. Conventional procurement techniques and construction technique would have taken us five years. We did it over 12 weekends in the summer of 2011.

We were able to do it quickly for several reasons. One was the material improvements and the construction improvements that have been made. Two was just how we procured it. We put a lot more risk onto the contractor. But at the same time, we provided incentive payments, and we ended up paying the contractor $5 million in incentive payments. However, there were "sticks" in that as well. If the contractor didn't open up the road by 5:00 a.m. on Monday morning for rush hour traffic, we fined the contractor a huge amount for every five minutes they were late.

Rather than having the traditional design – bid – build, this one was a design – build. Third, the real time traffic information really worked. This has created an impetus for us to scale it across the state as well, to give people a choice.

PARTICIPANT: Setting the gas tax to increase based on an index is a good strategy. Right now, the large, occasional increases get the public all wound up, but regular incremental increases would be easier to bear.

RICH DAVEY: We gave a lot of thought to that. Our plan was to raise MBTA fares five percent every two years. Why five percent? On average, the consumer price index inflation on an annual basis is about two and a half percent.

And to your point, it really gives the public an expectation. I think the challenge with the MBTA over the last twelve years, since forward funding: the T has had all this pent up demand and the T goes for a big fare increase every several years, like last year.

And folks — we had 6,000 people show up at public hearings last year and another 6,000 write us — tell us that they didn't like our ideas about cutting service or raising fares.

Building that in is something that we proposed. We also did it on tolling and on Registry fees as well. Our proposal was to raise tolls and MBTA fares by 5 percent every two years, and Registry fees by 10 percent every five years. Why those time increments? Because you go to the Registry to get your license renewed every five years.

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> **With indexed increases, we are trying to take some of the politics out of this. For students of politics in Massachusetts, you know that transportation costs are always a flash point for someone running for office.**

some of the politics out of this. For students of politics in Massachusetts, you know that transportation costs are always a flash point for someone running for office. In the 1996 Senate race, toll booths came down. Fare increases were a big talking point in the governor's race in 2006, as were tolls in 2008. Rather than actually looking at what an appropriate pricing scheme and cost modeling should be, politics gets in the way.

MARY JANE O'MEARA: Are you looking at managed lanes, which are quite successful in Florida, California and other states around the country?

RICH DAVEY: For a lot of our roads, there is not a lot of room to add another lane. That's the real challenge in Massachusetts. The right of way is, in many ways, maxed out. In the case

of 128, for example, we're widening but that is only because we've been using the breakdown lane for the last fifteen years. The capacity is actually not going to improve; the safety will improve.

With that said, the 2009 Transportation Reform Law created a public- private partnership commission. I expect to ask them to do three things. One is to look at opportunities for private/public partnerships for our rest areas and our service plazas. Two is to look at South Station, which is ripe for a potential private/ public partnership. The project starts with an expansion of South Station, but has the potential to utilize air rights for additional development. Finally, we'll consider managed lanes. We have received an unsolicited proposal to add a managed lane on Route 3. That's something I'll ask the Commission to look at.

Thank you all very much. Congratulations on the event. I look forward to hearing lots of good ideas that my team, who are peppered throughout this room, will employ.

Improving the Customer Experience with Technology

Moderator: David St. Amant

Participants: David St. Amant, president of Econolite Group, Inc.; Kirk Steudle, State Transportation Director for Michigan, Jon Davis, CFO for the MBTA; Mary Jane O'Meara, associate vice president of HNTB Corporation..

DAVID ST. AMANT: I'm happy to have the conversation today to bring new information with us into Massachusetts and Boston and keep the conversation going so that we can get a better deployment of ITS and technology on our roadways.

KIRK STEUDLE: I'm going to focus specifically on the customer experience. In Michigan, we've had a long history of
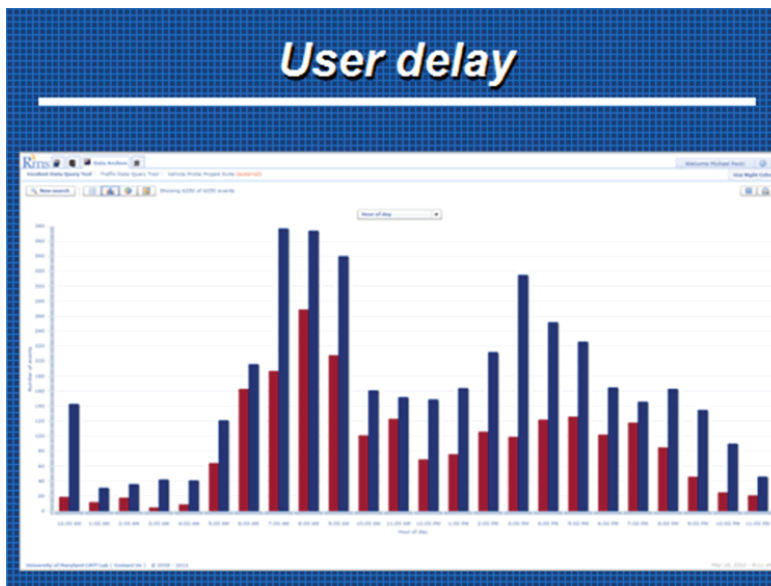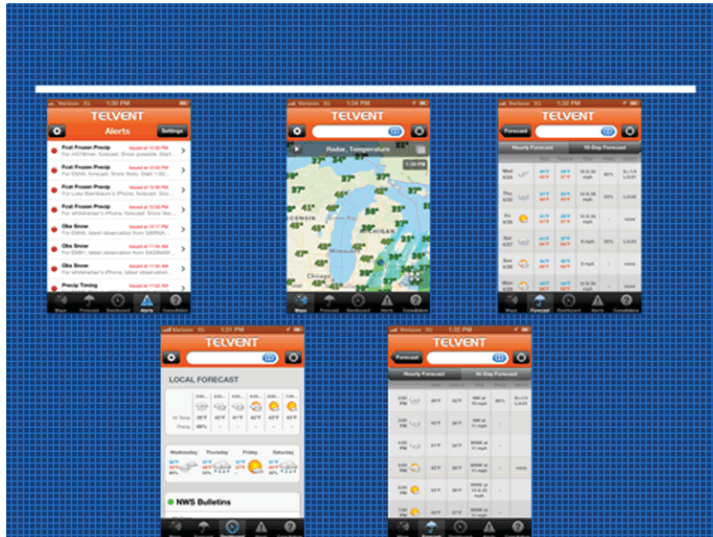
technology and ITS. We are the center of automotive research and development, with a lot of research and development going into connected vehicles and driverless vehicles. Driverless vehicles are the future. We are in a twenty-year transition phase of moving from solo driving to connected and ultimately to autonomous. Mass movement of people on surface transportation is largely going to be automated.

Real time travel information is a key trend. We have 110 real time travel signs scattered across the state of Michigan. We looked at these signs and said, "What does the driver need?" This is about customer service. For example,

if Interstate I-196 is 13 miles and 14 minutes away, the driver can tell it is pretty much free flow. These message boards and signs are fed with 165 cameras all over the state. On Friday nights, we have travel patterns similar to those of Cape Cod; our drivers are going north on Interstate 75, US 127, and US 31. And on Sundays, it's the reverse coming back. On those days, the signs become very valuable.

The Regional Integrated Transportation Information System is a software program that helps document our historic delays. With the system, we can see the peaks for a particular roadway segment. This is used for setting road construction projects or maintenance. Instead

of guessing by the seat of our pants that rush hour starts "about 6:30," we know it starts at 6:45. We use this technology to design projects that least impact the customer and to set up agreements with contractors governing delays and penalties. There is a mobile phone version of our Website that can be downloaded to a smartphone that provides access to some of this information. Commuters can take a last look at rush hour traffic before heading out on the roads. Information is also available for any of the five border crossings with Canada, providing border wait times.

We also use a significant amount of technology and data for maintenance. This information comes from our eighty road and weather information systems across the state. Michigan has a diverse climate because of Lake Michigan and Lake Superior. Conditions can change significantly from one county to the next. We use the information to make sure that we're sending out the appropriate maintenance response, as opposed to having all our crews jump into the trucks and start spreading salt. We use it to make sure we are being as cost-effective as possible. The information is available in the cabs of the trucks, providing real time information, such as what bridges may be freezing and need attention.

We are designing an information system to support truck drivers; this system provides real time truck driver information on the heavily traveled corridor from I-94, to Interstate 69, down to the Indiana border. One of the problems for us is truck parking. Drivers need to get off the road and get their proper rest. And it's not just in Michigan; this is an issue across the country. One of the difficult parts for drivers is that they may plan to stop at the next truck stop, but when they arrive, it's full. This system tells a driver: "If you plan on going to the rest area — it's full. But if you continue to exit 1, there are seven spots. At exit 12, there are more than fifteen." And they've got in-cab capability of reserving a rest spot so that when they get there they know they have got a spot. This pilot circuit is going to roll out this summer and the fall.

The last piece on the technology front concerns communication with customers. We're using all the social media that's available. Obviously, we have the website, with mobile access to the site. We use Facebook, Twitter, and YouTube. We actually have over 500,000 YouTube views on videos that we put up that are related to safety, transportation-related projects, or new technology. Sometimes we will develop a video: we get a frequent question about a road project, and in response, we develop a one- or two-minute video where we might, for example, talk to two engineers about the project.

Our customer satisfaction rating last year was 73 percent. We have a major push to increase that number to 80 percent this year. Improving how we communicate to the public is a key part of that initiative. Every one of our employees is directing people, after an interaction with a resident, to say, "Here is our public survey. How did we do? Were we professional and appropriate? And did you get the answer that was presented in a way that was respectful and that you understood?"

JON DAVIS: Boston has the oldest subway and the fifth-largest transit system in the United States. We started service in 1897. That comes with its challenges, because how do you maintain and modernize a 115-year old transit system? We have several top priorities that we focus on. Safety is the number one priority throughout the system, and this includes improving maintenance and service delivery. In addition, we continually seek to create efficiencies and improve customer experiences. This is done in part by replacing obsolete rolling stock, modernizing an aging infrastructure, and upgrading technology applications.

First, I would like to discuss our automated fare collection (AFC) system. The backbone of our system is the Charlie Card, a smart card that allows convenient access to bus and subway customers. Originally, we intended, in AFC Phase 2, to migrate it to commuter rail and the other modes of transportation. However, it was deemed to be too expensive — somewhere between $50 and $75 million to deploy — and less convenient to our customers and our conductors. So, we took a different path for commuter rail. We deployed a mobile phone ticketing system developed by a company called Masabi (www.masabi.com), which we have migrated across all our commuter rail lines. We also have a mobile application for parking. About 40 percent of our commuter rail parkers are currently using this mobile application.

For the subway system, we have introduced a real time countdown service that notifies people waiting on the platform when the next subway car will be approaching. Our customers are very pleased with that application. It cost us about $750,000 to deploy this throughout three heavy subway lines.

Additionally, we have rider tools on our website that enable people to plan their trips. We have automated stop announcements to comply

Real-Time countdown information

Mobile Ticketing Service

with Americans with Disability Act (ADA) regulations. We have computer-aided dispatch and automated vehicle location. Wi-Fi is being introduced across the entire commuter rail system. Currently, it is only on a few commuter rail coaches, but we're about to put it on all of our coaches.

We are moving towards broader deployment of variable message signs. We have one up on Route 128 at our Anderson Regional Transportation Center, a commuter rail stop. It tells commuters how many minutes until the next train.

As it relates to operational efficiency and system reliability, we're looking at positive train control and collision avoidance, which is mandated on commuter rail. This will cost $300-$500 million, and it is legally mandated to have this functionality on the commuter rail system. We are exploring implementing it on our heavily used Green Line subway. We don't know exactly what technology we are going to employ, but we need some type of positive train control to ensure safety and preserve capacity on this system.

To enhance security, we have implemented portal protection. We've hardened our asset with limited access. We have a chemical

protection system within our overall system. The MBTA police have an application that any of our customers can download called "See Something, Say Something."™ A customer can take a picture and get it to the police right away to be investigated.

We struggled with measuring service delivery from customer's viewpoint. We are very good at the more traditional type of reliability measures: mean miles between failures, on-time performance, end-to-end. We didn't think those measures gave a good perspective of what the customer experiences on the system every day. We wanted to see a more even service delivery during most or all periods of time. We developed a report with students and faculty at MIT; it looks at service from the standpoint of the customer. It talks first about long waits, passenger travel times, and passenger wait times; it's a report that we get every day. This now provides us with empirical data that shows, on a daily basis, what the customer experiences on the system. In one instance, by gathering this information, we were able to reduce the number of delays on the Red Line between two particular stations from 43 percent to 32 percent of trips.

We have been looking into and developing advances in maintenance for vehicles. The

main maintenance tool for our new commuter rail coaches will be laptops that will enable us to do diagnostic testing to determine quickly what's wrong with respect to any type of maintenance concerns.

For the future, we are looking at several improvements. Since we have real time information on our three heavy-rail lines, our customers would like to see it migrated to the Green Line. We also want to look at Green Line boarding. How can we more quickly get our customers on board? Currently, we are not opening all the doors because we want to preserve revenue collection. We want to integrate mobile ticketing to the bus and subway. I think the main payment methodology is going to be mobile ticketing, as well as smart credit cards. We need to make sure that we link

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MARY JANE O'MEARA: I'm going to go in a little different direction and talk about my experience as director of the Tobin Bridge and customer service and technology. With the changes of technology, we don't always keep the customer in mind. The majority of people will be able to use new technology, but in a city like Boston, like many other cities, we deal with a large immigrant population.

I will discuss the experience of installing electronic tolls, called AVI or Automatic Vehicle Identification, on the Tobin Bridge. Originally, tolls on the Tobin Bridge were collected in cash. We sold commercial books of script to the trucking industry, and they used those as vouchers. All of these things were costly to administer and costly to manage. Commuters could buy a discount sticker for two dollars for two years that gave them a 30 percent discount on the toll. Residents bought a residence sticker for two years that gave them a 70 percent discount. Resident discounts are mandated by law for the cities or towns in which a bridge is constructed. The two cities covered were Chelsea on one side, and the Charlestown community in Boston, on the other.

When we moved to the AVI system, the decision was made to eliminate the books of script. The issue arose of how to get the folks in these two communities into the system, because in order to receive the discount, according to our mandate, they had to be part of the system. They had to get a transponder; they had to come in; they had to register. We had interpreters who worked on the bridge whom we could bring to the city of Chelsea, where we really needed them. People were required to bring a proof of residency in the form of a tax bill or a phone bill along with their registration and licenses. But we realized quickly that when you're dealing with an immigrant population, you have a lot of people who don't have credit cards, who do not have checking accounts, and who come with cash. At that time, $20 was required to start the account. After that, people would be required to go to the Fast Lane Center and pay cash. I was talking earlier today to my friend, Ron Rahn, with whom I worked on that project. He told me that they are still accepting a lot of cash at that center.

So this is something we really have to think about, because as you know, public

transportation is for the masses. It's not just for people from my town who love that ferryboat and people who ride the commuter rail and have iPhones or smartphones. We have to think about another group of people who can't get to work, who can't move, who can't get to the hospital, who can't get their groceries, unless they have a way to do it. We have to figure these people in. These people are a big part of our community.

Q&A

CELIA BLUE: In Massachusetts, we have an overall blueprint, a statewide plan for our major roadways. We are trying to come up with some congestion goals. How does real time traffic information help with congestion? Do you have a congestion goal?

KIRK STEUDLE: When everything crashed in 2009, our congestion was gone. When there are no trucks moving, there are no factories working. When there are no factories working, there is nobody driving to get to a factory. Our congestion problem is in the suburbs. We're working our way towards a congestion goal, but we don't have one yet. Frankly, we're looking to all of you — in big, heavily congested urban areas like Boston, Chicago, New York — to say how best to handle congestion and figure out what makes sense for us.

DAVID ST. AMANT: We've talked a lot about a technology in terms of improving customer efficiencies and providing back office efficiencies. Could the panel talk about using technology as a tool to potentially redistribute demand across both transit and roadways?

JON DAVIS: I think the information that's provided to the customer allows them to make intelligent choices. I find, in my travels around the town, that with the mobile applications we offer, people are looking at them and saying, "Oh, yes, the bus or the subway car is three minutes away. Let's take that." Or they

will say, "It's ten minutes away. Let's make a different decision to access some other form of transportation to get to where we're going."

KIRK STEUDLE: There is a significant development that's happening in downtown Detroit. There are two groups of people who are moving back into the downtown area: young adults, the twenty-somethings who don't have any children in school, and retirees who are buying condos in old, converted warehouses in downtown Detroit. They want the transit system. So last year, after forty years and twenty-six attempts, we finally got a Regional Transit Authority set up, and we signed in legislation for southeast Michigan. There had been one, and it got disbanded in the 1950s because General Motors wanted to sell buses.

JON DAVIS: We tackled the whole notion of big data at the ITS America Leadership Circle in Nashville in April. In that group, we discussed the ability to take data and turn it into usable information that can inform decisions before people leave the house. The information comes over on your smartphone or some other device, and you can look road conditions, find out if the trains are on time, or the availability of parking. The availability of usable information provides options for the driving public, or for the customer, I should say.

JOHN COLLURA (University of Massachusetts/Amherst): Could you elaborate on the view out in Michigan, within the transportation industry and in the government, with respect to the vehicle mile travel (VMT) fee and how in-vehicle devices may, in fact, make that a more reasonable financing alternative in the future?

KIRK STEUDLE: The biggest issue with VMT is the privacy piece. You need to think about a connected vehicle or an autonomous vehicle — those are two different scenarios. First, there is a device that you buy, privately. It goes wherever you want it to go, and it will still have a bunch of identifiable information that

is connected directly to you. However, if you happen to use an autonomous vehicle, a fleet car like a Zipcar, the device creates information that you need to track back and determine who was renting it at the time and where it was. We need to recognize that while it becomes a little more anonymous, you can still track it.

I think that we are going to have to struggle with that concept from a privacy standpoint. While we can put up lots of screens to protect people's personal information, I think the careful discussion revolves around police agencies. When there is a crime or there is something going on, at what point can a police agency retrieve that data? Is it through a subpoena? Is it through a court order? Those are the conversations I think that we, as a society, must have. I think that is the big issue is really privacy, and whether we are willing to give that up. Technology-wise, it's there; it will work.

The biggest challenge that we face is not financing, but core capacity. How are we going to be able to provide the service and the capacity for those people who will come to the transit system for those mobility options?

JOHN WALKER (Transportation for America): I appreciate you talking a bit about the demographic changes. You touched briefly on the demographic bulge, which is the aging population. Here in Massachusetts, it is a large concern. We did have increases in fares but ridership in general stayed the same with the exception of The Ride, which is our para-transit service. I'm curious if any of you can speak to some of the technology that is available or on the horizon to address this issue of the aging population. How can we meet these transportation needs in the next 20 or 30 years?

JON DAVIS: I think it is providing them the mobility options they are going to need. One of them is para-transit services for those people who are disabled. There are technologies out there that are available to maximize the usage of those vehicles, some of which were actually installed on our system and some that we are looking at. There definitely are technologies available to be able to effectively deploy that type of mobility option. But I think you're right. We need to be prepared for the people who are going to come to transit, and that would include para-transit. I think the biggest challenge that we face is not financing, but core capacity. How are we going to be able to provide the service and the capacity for those people who will come to the transit system for those mobility options?

DAVID ST. AMANT: We know that there is a safety pilot going on now in the state of Michigan, and it's wrapped around the Dedicated Short Range Communication (DSRC) concept. And they've got thousands of cars. What effect, if any will that have on customer service?

KIRK STEUDLE: That pilot is looking at the connection. It really is about providing information to the customer. This one is real time information that says, "You are ready to collide with somebody." It's less about, "It is fourteen miles and fifteen minutes to get there." It's about the car that is coming in the other direction that is going to run the red light that's going to T-bone you. So it really is about customer information for a safety component that basically is the first step toward cars that refuse to crash.

It's a car-to-car information piece. What they are trying to prove is, will it have a safety component? Will it actually save lives and reduce fatalities. I think what comes out of the study will largely shape the future of connected vehicles and what NHTSA requires on all new vehicles that are produced. It is also being

tested in the bus fleet and in commercial trucks, for the same approach. I think commercial trucks will be the first one that adapt it.

"Perils, Pitfalls, and Payoffs from All-Electronic Tolling"

Panel members: George Campbell, moderator; Pat Jones, executive director and CEO of the International Bridge, Tunnel and Turnpike Association (IBTTA); Mike Heiligenstein, executive director, Central Texas Regional Mobility Authority; Butch Eley, CEO and founder, Infrastructure Corporation of America

GEORGE CAMPBELL: The theme of the panel is perils, pitfalls, and payoffs. But there is a sub-context here that came out in the last panel. Technology advances in collection allow us to pursue a more robust usage fee system. The system is built on a vehicle miles travel

system and reduces collection costs while making many more millions of dollars available for the capital needs of the traveling public on our systems.

Hampton, NH opened its electronic tolling system a little over two-and-a-half years ago. The benefits are fairly obvious to the traveling public. What's not so obvious is that our collection costs in Hampton dropped 35 percent since we opened that facility.

We collect overall in our system about $124 million a year. It has cost us over $20 million to collect that, so when you start having that kind of drop, it makes a big difference.

PAT JONES: If you remember nothing else about what I say today, I'd like you to remember that electronic tolling has revolutionized mobility in ways never imagined

Need for Improved Toll Technology

- Hampton Mainline Plaza (Pre-ORT)
  - Pre-ORT 16-Lane Plaza
  - Limited Capacity – Congestion during Peak Periods
    - Plaza Directional Capacity
      - 8-Lanes – approximately 4,400 vehicles per hour (VPH)
      - 9-Lanes – approximately 4,800 vph
      - 10-Lanes - approximately 5,150 vph
    - High Traffic Volumes – Summer Weekends (August Peak Month)
    - Peak Hour Volumes (2008)
      - Friday NB Traffic   4,880
      - Saturday NB Traffic   5,200
      - Sunday SB Traffic   5,650
    - Projected 2010 & 2020 Volumes *(actual 2010 – italics)*
      - Friday NB   5010 (2010)   *4968 (8/6/10)*   5960 (2020)
      - Saturday NB   5330 (2010)   *5278 (8/7/10)*   6340 (2020)
      - Sunday SB   5800 (2010)   *5630 (8/8/10)*   7077 (2020)

Hampton ORT Impacts & Results

TRAFFIC OPERATIONS (after 2 yrs)
- Improved traffic efficiency
  - Delays reduced 17.5% on summer weekends
  - Delays reduced 180,000 hours or 8.1% annually
- Improved Plaza Operation
  - Last second lane switching eliminated
  - Reduction in undefined transactions: 3.48% (FY10) to 2.77% (FY12)
- Increased E-ZPass Utilization
  - E-ZPass usage up 15% over the last four years
  - New accounts & transponders up 20% in June-August over same period previous year

Hampton ORT Impacts & Results

- Operational Cost Savings
  - Coupled w/ Lean Staffing Initiative - savings of 35% in staffing costs
  - Projected annual toll collection savings of $725,000 in FY 13

before. As your vehicle passes under a gantry, you pay your toll without stopping, often at highway speeds, using a transponder associated with your account. Here's a slide of all-electronic tolling outside Denver, the E-470 Public Highway Authority. You see a gantry with the electronics outfitted there. This is the way tolling is meant to be.

Here's a picture of Washington, DC's Interstate-495 Capital Beltway. There is a new, high occupancy toll or express lane that occupies 14 miles of interstate highway between the Springfield interchange in the south and the Dulles toll road in the north. There are four general-purpose lanes and two express lanes in each direction. The express lanes require the use of a transponder and are tolled electronically. They are dynamically priced so that as the congestion increases, the toll goes up and we use a market-clearing function to provide mobility to everybody who is in the system. This is really the future of all-electronic tolling, and it exists today.

The funding crisis issue tries to answer the

question of why tolling and why all-electronic toll collection. We begin with a general premise that the gas tax is unsustainable. We had two congressional commissions look at how we fund transportation in this country. They came to similar conclusions: We ought to increase the gas tax in the short term. For the long term, we are going to have to go to something that's quite a bit more robust. And that would be charging vehicles for system usage.

The American Society of Civil Engineers periodically produces a report that provides a letter grade for the state of America's infrastructure. They gave a grade of D+ overall to infrastructure, D to roads, and C+ to bridges. Each year, Texas A&M publishes an urban mobility report. In the most recent report, they found that in traffic congestion, we consume, or waste, 2.9 billion gallons of fuel every year. The financial impact on the country is about $121 billion annually. Since the federal gas tax has not been increased since 1993, Congress has had to transfer more than $50 billion into the highway trust fund. The gas tax is not sustainable. We need another method to fund transportation.

I would like to make a few points about tolling in the United States. We have 5,300 miles of tolled motor ways in 35 states and territories. We collect about $12 billion a year in toll revenues annually. Eighty-four percent of Americans feel that tolls should be considered — project by project or as a primary source of transportation revenue. So there is broad support for tolling. Across the country, each agency has had its own organic growth in electronic toll collection. Most agencies in the country have 70 percent to 80 percent of customers paying by electronic tolling.

There are many examples of all-electronic tolling systems around the world. In Toronto, the 407 ETR, highway 407, opened with electronic tolling, as did a new highway in

Melbourne, Australia. In the US, we've seen the migration to all-electronic tolling in Dallas, Denver, Houston, and Austin. Additionally, there are many examples of priced managed lanes. The Capital Beltway in Washington D.C., noted earlier, is one example of about 300 corridor miles in this country that are actually priced managed lanes, congestion charging, or express lanes. There is another 700 miles of high-occupancy vehicle lanes in this country. If you look at what is under development today, there are about 2,500 miles of express lanes in some level of development.

The payoff for all-electronic tolling is a more sustainable source of funding. The fact that we are transferring huge quantities of money from the general fund into the highway trust

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fund suggests that the gas tax is unsustainable. Continuing to rely on the federal gas tax inhibits us from raising money in more productive ways. Tolls provide a sustainable source of funding and a clear, direct link between payment for the facility and use of the facility. They make congestion charging possible.

Finally, I want to discuss perils and pitfalls. The issue of uncollected tolls is a challenge to moving to all-electronic tolling. The reciprocity agreement among New Hampshire, Maine, and Massachusetts is an attempt to provide

for the collection of tolls from people who may be violating their respective states. Accommodating members of the customer base without bank accounts or without credit cards is a challenge. Additionally, there is the uncertainty that may exist in the collection of tolls. That would be a concern for credit rating agencies.

That is a brief overview of all-electronic tolling. In closing, I would like to note that the Golden Gate Bridge went to all-electronic tolling in March, 2013. The transition to all-electronic tolling occurred without any hazard of incident. I believe that next spring we will see the Tobin Bridge going to all-electronic tolling, as well.

MIKE HEILIGENSTEIN: I'm executive director of the Central Texas Regional Mobility Authority (RMA), which includes Austin. Austin is a dynamic, growing, prosperous area of 1.6 million people. The RMA model has only been around since 2002. We represent two counties, a red county and a blue county. You couldn't have two more different counties anywhere in Texas than Williamson and Travis Counties. I now live in the Republic of Austin, a city that is very different from most of the state.

I believe we have perhaps the most powerful mobility model in the country. The revenues we generate stay inside the boundaries of the region. They do not have to stay in a corridor. In fact, most will not stay in the corridor. They will stay in the region. We are building a system in central Texas, not a single road. We are building a system of mobility. To build a single road and then say that all the revenue has to stay there, no matter what county, would be disingenuous, and I think, not productive for the region.

Our first facility is actually back-stopping our second facility, which is in a different county. These two counties came together and agreed that this was a good model. The two

counties appoint my board, establishing local governance. The governor of the state appoints the chairman. The statute that formed this arrangement stated that no elected official can serve on my board.

I appreciate the ability to remove politics from the things that we have to do, particularly as it relates to tolling. Tie that in with the regional decision-making culture, and we have an immediate connection to the entities that we serve, particularly our metropolitan planning organization. This is critical.

We include all forms of mobility. Our agency can do everything from airports to trails, from rail to transit to highways. In fact, with every

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road we build, we build a bike and pedestrian facility. We have primacy and CDA authority. With primacy, we have right of first refusal to develop a toll facility over any other agency in the State of Texas, including the Department of Transportation.

In Austin, we started with electronic and cash. The credit agencies and the rating agencies wouldn't allow us to start up a facility that did not include cash, because seven years ago they didn't believe in all-electronic. They thought there would be too much leakage. We transferred over to all-electronic; we are the first to actually convert over to all-electronic.

We decided that the leakage would be worth it. People who violate the system one or two times aren't that important to our revenue stream.
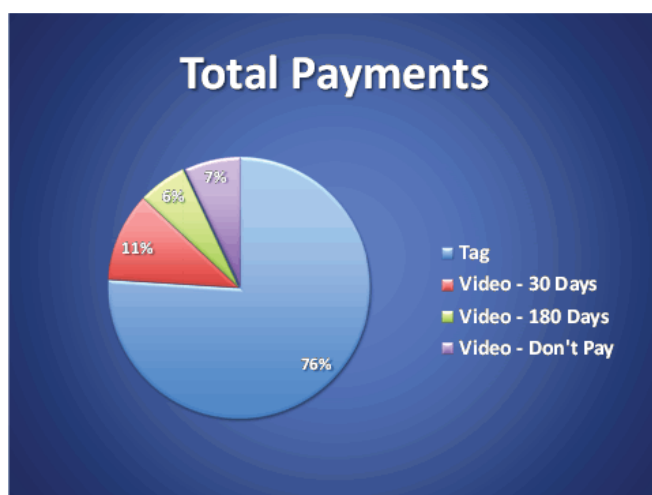
There are issues, not so much pitfalls, to consider in all-electronic tolling. The first is, "Who owns the customer base?" or in our case, "Who owns the data behind the customer base?" Our solution is to filter though the department. The state transportation department has an electronic tag that we buy into. The tag is inter-operable throughout the entire state of Texas. That was a huge consideration for us. We didn't want to have Houston people needing to get a different tag to go to Austin, a different tag to go to Dallas, San Antonio, or Tyler.

The issue of availability to all populations and all economic populations is important. You have to have a companion program where you enable a person who wants to do a cash-based tag to do so. Another thing on all-electronic is: "Who gets exemptions?" In our case, the only exemptions are transit buses and registered van pools. We have been discussing disabled veterans, but the concern is you can go on down the line and get to a tremendous number of exemptions.

In our system, 76 percent of total payments are electronic. 76-80 percent is probably going to be about the top end. On the video side, a picture of your license plate is taken, and then we bill you. 11 percent pay within 30 days; most people pay within 180 days. We don't get collection from about 6-7 percent of users.

We see some environmental benefits. When you don't have vehicles sitting in queues waiting to get through a gantry, you are saving a lot of fuel. In a study we commissioned, we found that for tolling in general travel time savings were up to 75 percent. Additionally, comparing an older road (with 16 lights) to the toll road running parallel, fuel savings were about 26 percent per year using the toll road. The CO_2, the CO, and the NOX reductions have been significant.

Total Payments

- Tag — 76%
- Video - 30 Days — 11%
- Video - 180 Days — 5%
- Video - Don't Pay — 7%

In addition, we have reduced capital expenditures. There is no additional real estate to be acquired, no need for multiple toll booths, no money counting equipment. We realized reduced operational costs from labor to equipment, plaza, roadway width, and utility costs.

The biggest thing with technology is allowing us to do is dynamic pricing. For example, Minneapolis has made the decision to no longer build traditional toll or non-toll roads. They going to create managed express lanes. Tolling will be set to algorithms in the back office based on the level of congestion and designed to provide a reliable, timed trip from point A to point B at, say, 50 or 60 miles per hour.

We have a project underway now that is adding a lane to three existing non-toll lanes. We could have gone the other route and simply added another lane to that corridor without tolling. However, that would draw demand and the road would be as congested within six months, if not earlier than it is now. In this case, you provide an opportunity for transit to get in that lane with their express buses and get from point A to point B reliably. In the Austin region, 94 percent of the population travels in a single-occupant vehicle. We are focusing our planning on that customer base. If we can get public ridership to 10-15 percent, that would be amazing. But we need to focus on the 90 percent who use cars to get to work. Transit and registered van pools get in this lane at no cost and we're hoping to bleed five to six percent of those single-occupant vehicles.

We really want to get people out of single-occupancy cars, and we are trying to figure out ways to do it. One program encourages ride sharing with smartphones. We're going to pilot that for the FHWA, where folks can get together at any time, either before or at the commencement of a trip and connect with other people and ride together downtown. And

we think that Austin will be a good market for these electronic smartphone applications, which will start soon.

I would be remiss not to say it's been a difficult journey at times but the electronic portion of this has made it a much better and easier journey than it would have been otherwise. We live by: seamless, reliable, safe, green.
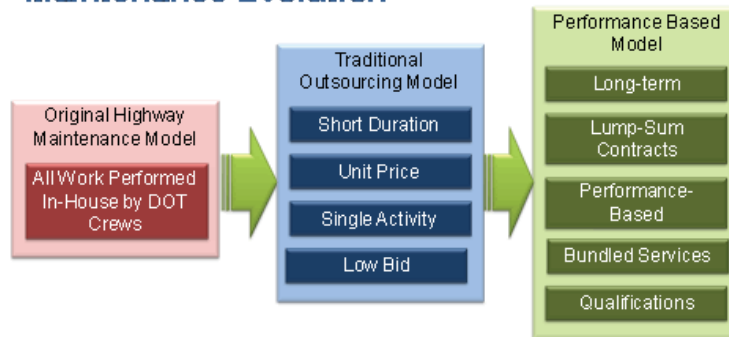
BUTCH ELEY: I want to discuss the back end of delivery model operations and maintenance. We know that every state has experienced tremendous difficulties with deficits and budget cuts over the last few years. At the same time that we've been dealing with those cuts, the condition of our asset all over the country continues to deteriorate. We've got roughly 40 percent of our roads in poor-to-mediocre condition throughout the country.

We've tried to nudge our agencies and our governmental entities toward more of an asset management approach. We're trying to move away from old school, reactive operations and maintenance and move toward a model that considers the total life cycle cost on the front end.
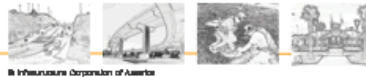
So, what can we do about it? The simple message that I would put forth today is to try to begin with the end in mind rather than just getting something moving. We spend so much energy and time on the process, planning, implementation, approval, design, and build that we don't tend to focus on what is it going to take to operate this facility. How do we operate that facility most efficiently?

One of the things that we've tried is to nudge our agencies and our governmental entities toward more of an asset management approach. We're trying to move away from old school, reactive operations and maintenance and move

Performance Based Maintenance Evolution

toward a model that considers the total life cycle cost on the front end. The new model allows us to end up moving with an operations and maintenance approach that is more proactive in the process. We are trying to bring technology and innovation into the thought process of every single asset activity and every feature that we utilize. Our system in Orlando is 100 percent covered with ITS, with cameras. We utilize those cameras in operations and maintenance every day. No longer do you have to depend on guys out there in trucks looking at what needs to be done on the roadway. We've got those camera eyes on the road 24/7, and this speeds up our reaction time to an accident or incident or helps us to uncover activities that need to be tended to.

Certainly, incident response is a major part of operations and maintenance. When you look at tolling and when you look at operations and maintenance for toll facilities, it is about staying focused on the customer. If the facility goes down, that means money. So you've got to get the facility back open as soon as possible.

I recognize that, as it relates to open road tolling, there are a lot of front end considerations like labor and politics. Certainly, a major consideration is safety. Last October, we had a horrible accident involving a tractor trailer at a toll booth at 2:45 a.m. This was not an isolated incident. From the standpoint of open road tolling or all-electronic, there is simply no replacement from the safety standpoint: the lives that can be saved over the years by having free flow through those gantries as opposed to having to stop with tolls. From an operational standpoint, we were able to have a new booth in place and working within 12 hours.

I wanted to also note innovations in contracting. There are tremendous opportunities now for contract models that improve the delivery processes and create greater efficiencies. To illustrate: A fuel spill spread 8,000 gallons on a bridge in Florida. The bridge was re-opened in less than three weeks. Crews worked 24/7 on the roadway. The performance incentives and disincentives built into those contracts had an impact: The bridge opened sixteen days after the incident.

Remote monitoring is an example of innovation and technology that has enhanced our daily operations and maintenance activities. A computer network, utilizing sensors, captures data in the field that, in turn, drives our work plan and our quality. For instance, we no longer need to send somebody out every week to look

at the generators to make sure that they were working properly.

In closing, I would reiterate the fact that if we can create alignment through the entire process, from planning, design, construction, implementation, and on the back end, operations and maintenance, this complete process will make for a much smoother facility.

Q&A

MICHAEL PUTNIK: My question is to Pat Jones. Do you expect to be able to cover the gap for transportation funding, $55 billion, with tolls only, which today account for $12 billion?

PAT JONES: Tolling is one of the tools in the toolbox; that's the main message that I want to convey. It isn't appropriate everywhere. The point I'm trying to highlight is that we need to think about how to fund our surface transportation system because the current reliance on the fuel tax is not sustainable. Tolling is one of the options.

MIKE HEILIGENSTEIN: Administrator Rogoff recently spoke at the Center for

Tolling is one of the tools in the toolbox; that's the main message that I want to convey. It isn't appropriate everywhere.

Transportation research at the University of Texas. Somebody asked him a similar question about funding. He said, "We need everything. I don't think we are going to see a big increase in gas tax. It doesn't look like anybody's got the heart for that right now." Between the tax and P3s and tolling, perhaps some of that gap can be filled. Frankly, I think that it's going to be difficult. I think we are going to see continued cutbacks until new sources of revenue become available.

GEORGE CAMPBELL: I would chime in as

a former commissioner of transportation, with responsibility for a whole state: Public-private funding partnerships can advance projects as much as a decade sooner, and they can save that huge extra cost of capital inflation.

C.T. TANG: My question is to Mike. What approaches does your Authority take to reduce the leakage?

MIKE HEILIGENSTEIN: Primarily we've used the judicial system. Prior to going to court, we go through the 30/60/90-day process of trying to make sure people understand that they owe a bill. If they fail to respond, eventually they are going to go to the Justice of Peace Court. During this session of legislature, we have a bill going through that is going to allow the holding of the registration of the car. But frankly, right now, the judicial system has worked quite well.

CRAIG KELLY: I'm a City Councilor in Cambridge. Our roads were built starting in 1781. I was wondering what sort of retrofitting you have going on in terms of systems for these older, more established, already incredibly congested places.

MIKE HEILIGENSTEIN: In that scenario, you can possibly do cordon pricing. However, cordon pricing is sort of the third rail in a lot of areas right now, because you are pricing everything that comes into your core city at some level. But the technology now will allow cordon pricing and give cities at least the opportunity to consider that option.

GEORGE CAMPBELL: I think that part of the answer for Cambridge is, "What's going on regionally in terms of collection and facilities collection that can be shared?" Second, look at your transportation as a whole, parking included. And think about technology and what it can do in parking. In San Francisco, a simple device on a parking meter can tell when the vehicle leaves the meter and the meter goes back to zero. By deploying this technology, San

Francisco increased its parking collection 40 percent.

Closing Remarks

MARIO MARSANO: This has been a very productive conference. I would say what keeps this country strong and productive is its economy, and our infrastructure is the underpinning of our economy. This conference has demonstrated that by marrying our current infrastructure with technology, we will continue to be able to grow and stay relevant.

I took a trip to Chile earlier this year, and I was extremely impressed to see a blueprint that fifteen years ago they set out to implement and to see it almost fully developed — and how far ahead of the curve they are from where we are. I think it was noted earlier how long it takes to implement things in our country. A vital transportation system is the lifeblood of our economy. And I think that if we are able to get our officials on the same page, we can take our transportation system forward and continue to be the strongest country in the world.

It happens that Chile has an economy the size of Missouri. You look at a country that size being able to implement everything in its plan, and it leaves a little something for us to think about.

I want to thank Steve for the opportunity to speak and for putting this conference together. Before closing, I would also like to acknowledge Joseph Giglio. Joseph has been very provocative and forward-thinking in the transportation sector for many years. About a year ago, New Jersey was talking about integrating its system, and I thought, "You know, I think I have read this before somewhere." I called Joseph and he said, "Yeah. I wrote about that idea twenty years ago." So he is not only ahead of the curve, he is the curve. So, Joseph, thank you very much for all your contributions. We are also very thankful for all of you who participated today.

About the Speakers

Rich Davey

Richard A. Davey was appointed as MassDOT Secretary and Chief Executive Officer by Governor Patrick in September 2011. Prior to his current appointment, Secretary Davey served as MBTA General Manager and MassDOT Rail & Transit Administrator, where he was responsible for managing the MBTA and overseeing the Commonwealth's 15 Regional Transit Authorities and MassDOT's rail program. Prior to joining MassDOT, Secretary Davey served in a variety of capacities, including General Manager, at the Massachusetts Bay Commuter Railroad (MBCR), the company that operates and maintains the MBTA's commuter rail service.

Kirk Steudle

Kirk T. Steudle is Michigan's State Transportation Director. He began his career with the Michigan Department of Transportation (MDOT) in 1987 as an engineer trainee. He is a registered professional engineer, and rose through the ranks of the department to his current position. On Jan. 1, 2011, Governor Rick Snyder appointed Kirk T. Steudle as the State Transportation Director. Steudle also served as State Transportation Director from 2006 - 2010. Steudle oversees MDOT's more than three billion dollar budget and is responsible for the construction, maintenance, and operation of nearly 10,000 miles of state highways and more than 4,000 state highway bridges. He also oversees administration of a wide range of multi-modal transportation programs statewide. Steudle is the 2013 vice chair of the Transportation Research Board (TRB) Executive Committee as well as the 2013 vice chair of the Intelligent Transportation Society America (ITSA).

Jon Davis

Jon Davis is the Deputy General Manager

and Chief Financial Officer for the MBTA. Serving for more than ten years, Davis directs the financial management and accounting functions of the Authority, manages the operating and capital budgets, and oversees the collection of all revenue. As the MBTA's senior financial advisor, Davis provides financial counsel to the General Manager and the Board of Directors. Prior to coming to the MBTA in 1995, Jon worked in the private sector for 25 years at H.P. Hood, Inc. At that organization, he held the positions of Vice President and Controller, Vice President Operations Planning, Vice President MIS and Treasurer, and Corporate Controller. He received his MBA at Babson College and his BS at The Defiance College.

Mary Jane O'Meara

Mary Jane O'Meara is an Associate Vice President at HNTB Corporation. Her more than 25 years of experience includes two decades with the Massachusetts Port Authority (Massport), serving as operations manager and then director of the Tobin Memorial Bridge. Additionally, O'Meara has always been a strong advocate for professional development of the industries, of which she is involved, as well as her peers and support staff. She is the past president of the International Bridge, Tunnel and Turnpike Association and the International Women's Transportation Seminar.

David St. Amant

David St. Amant is the president and chief operating officer for Econolite Group, Incorporated, headquartered in Anaheim, California. Econolite Group is the umbrella company of Econolite Control Products, Incorporated and five other subsidiaries serving the transportation industry. Prior to joining Econolite Group, St. Amant spent 14 years serving in senior and executive level sales and marketing positions at Avnet Incorporated, the world's largest distributor of electronic

components. He has previously served as Chair of the National Electrical Manufacturers Association (NEMA), Transportation sector. He has, for many years, served on the Board of Directors for Intelligent Transportation Society of America (ITSA), and has chaired its Policy and Business Council. St. Amant is also the incoming chair of ITS America.

Pat Jones

Patrick D. Jones is executive director and chief executive officer of the International Bridge, Tunnel and Turnpike Association. With headquarters in Washington, D.C., IBTTA is the worldwide association for the owners and operators of toll highways, bridges, and tunnels and the companies that provide products and services to the toll industry. Since assuming this position in 2002, Jones has built IBTTA into the principal advocate for toll financed transportation and the leader in producing high quality educational experiences for toll industry professionals. Under his leadership IBTTA revitalized its premier journal, *Tollways*, created the IBTTA Leadership Academy, and introduced many new programs, including the Transportation Finance Summit, Transportation Improvement Forum, Violation Enforcement Summit and its first workshop in South America. Prior to joining IBTTA in January 2002, Jones was vice president for business programs with the Health Insurance Association of America.

Mike Heiligenstein

Mike Heiligenstein is the Executive Director of the Central Texas Regional Mobility Authority, an independent government agency created in 2002 to design a modern, regional transportation network for Central Texas. The Mobility Authority's current and future projects are key elements in a carefully planned, multi-modal transportation system designed to meet the diverse mobility needs of this fast-growing region. Heiligenstein has been with

the Mobility Authority since its inception and has overseen the development the Mobility Authority's first project, the 183A toll road in Williamson County, one of the first toll roads in the country to convert to all-electronic toll collection. Before taking the helm at the Mobility Authority, he served the citizens of Williamson County and the City of Round Rock as County Commissioner and City Councilman. During his 23 years of public service, he initiated and helped supervise over $500 million in capital improvement projects.

Butch Eley

Butch Eley is the Chief Executive Officer, founder, and a member of the Board of Directors of the Infrastructure Corporation of America. He began his career as a congressional assistant where one of his responsibilities was working with the U.S. House of Representatives Public Works and Transportation Committee. He later served as Chief of Staff in the Metropolitan Nashville Mayor's Office. He left the government sector in 1990 to start his own consulting firm, which specialized in helping communities do business with the government. He later merged his company with The Ingram Group and became President of the Ingram Group in 1993. In that position, he was responsible for assisting clients such as Corrections Corporation of America, Leisure Management International, National Recovery Technology, Chase Manhattan, and Ray Belle Construction. Eley is currently the Chair of AASHTO (American Association of State Highway Transportation Officials) Interstate Anniversary Board of Advisors. Eley earned both his Bachelors of Business Administration and M.B.A. from Belmont University's Massey School.

George Campbell

As Senior Managing Director, George Campbell leads Lexden's Public Private Partnership business. An accomplished strategic thinker, business and community leader, he has a proven record of creating billions in public-private partnerships. With an extensive leadership background in both the private and public sectors, Campbell has been President of four companies, including an inter-modal transportation business and a northern New England commercial real estate business. His public service leadership posts include having been Commissioner of Transportation for two states, Maine and New Hampshire, both which he led from significant deficits to sound financial footing. He was also elected City Councilor and Mayor of Portland, Maine. He served as President of the Maine Municipal Association and leadership of several non-profits including having chaired the Gulf of Maine Research Institute.

Mario Marsano

Mario Marsano is a Managing Director of Ramirez & Co. in charge of the firm's Boston office. He is a veteran of the municipal finance business with over 33 years of experience. Prior to joining the firm, Mr. Marsano spent over 13 years at Raymond James & Associates, and 16 years at Credit Suisse First Boston. During his extensive investment banking career, Marsano has represented many major domestic and international clients including Chubut Province in Argentina, Public Private Partnerships in Chile, as well as major issuers in the United States ranging from health and education institutions to transportation enterprises and state and local governments. He currently serves as lecturer at the D'Amore-McKim School of Business, Northeastern University. He is on the Board of Directors of the Boston Rugby Foundation, and Beth Israel Deaconess Hospital - Milton.

The Center for Strategic Studies

The Center for Strategic Studies, housed at Northeastern University's D'Amore-McKim School of Business, focuses on issues facing public and private sector enterprises including strategic direction, service delivery, and capital financing. The Center works with organizations to identify opportunities for strategic and operational improvements and assistance with implementation. The Center prides itself on its independent, fact-based research model for restructuring organizations for growth and improved financial performance.

The Rappaport Center for Law and Public Service

Established with the generous support of the Phyllis and Jerome Lyle Rappaport Foundation, the Rappaport Center for Law and Public Service at Suffolk University Law School fosters innovative thinking on law and public policy and promotes emerging leaders who are deeply committed to public service and pro bono work. Serving as the home to all public service related activity at the law school, the Rappaport Center sponsors an extensive public policy programming agenda, advises students interested in public service careers, manages the law school's Pro Bono Program, and administers the Rappaport Fellowship Program in Law and Public Policy and other fellowship programs. More information about the Center is available at http://www.rappaportcenter.org/.

The Rappaport Institute for Greater Boston

Harvard University's Rappaport Institute for Greater Boston aims to improve governance of Greater Boston by fostering better connections between scholars, policy makers, and civic leaders. The Institute was founded and funded by the Phyllis and Jerome Lyle Rappaport Foundation, which promotes emerging leaders. More information about the Institute is available at www.hks.harvard.edu/rappaport.