TESTIMONY SUBMITTED FOR THE RECORD

OVERSIGHT AND GOVERNMENT REFORM COMMITTEE

SUBCOMMITTEE ON TRANSPORTATION AND PUBLIC ASSETS

UNITED STATES HOUSE OF REPRESENTATIVES

STATUS OF TOLL INTEROPERABILITY

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WASHINGTON, D.C.

Introduction

Chairman Mica, Ranking Member Duckworth, members of the subcommittee and guests: Good afternoon, my name is Tom Knuckey. I am providing this testimony to you today as a volunteer member of the International Bridge Tunnel and Turnpike Association's (IBTTA) Interoperability (IOP) Steering Committee; and as Chair of the IBTTA Roadside Operations Subcommittee (ROSC).

I am humbled by this opportunity to share more details of the hard work that has been conducted by approximately 100 volunteers, representing toll agencies and the toll industry from all regions of our nation and Canada, collectively working together to implement tolling interoperability. These volunteers have served on various IBTTA committees addressing the complexities of toll interoperability as it relates to the governance, customer service, businesses rules and technology of interoperability. With that said, it is my hope today to represent the voices of these volunteers so as to provide more detail on the process and status the industry association's committees have undertaken. As an IBTTA volunteer, my statements and views represent my own opinions, and are not necessarily the opinion of my employer, Atkins North America.

Goal of the Committee

IBTTA's IOP committee and IOP subcommittees have worked diligently to meet the requirements of MAP 21 by planning for technologies and business practices leading to electronic toll collection (ETC) interoperability within North America in a manner that;

(1) allows ETC customers with valid accounts to be able to pay for travel on toll facilities across the continent with a single account and a choice of payment methods,
(2) takes into account the large investment in roadside, vehicle and back office technology already undertaken by US and Canadian public agencies and private toll operators and;

(3) fosters open competition and minimizes legal and financial barriers to anyone wishing to provide products and services to toll agencies, operators and customers.

Definition of Nationwide Electronic Tolling Interoperability

IBTTA has adopted a definition of an interoperable toll system as one that allows customers to establish a single toll account that would allow for payments on all US toll facilities. We envision that a driver who has a valid registered account with any participating toll agency (e.g. E-ZPass, SunPass, TxTag, Fastrak) can use electronic toll lanes of any other participating interoperable toll agency nationwide. The customer would not need to take any action, and the tolls would be deducted from their account. This would be accomplished by having the agency's toll system read the national IOP transponder (tag).

The Interoperability Complexity Challenge

There are various complexities to nationwide interoperability, one of these relates to the interoperability flexibility of toll transponders and reader technology used to make ETC payments. In the absence of a prior national standard, toll agencies have made major financial investments in the last 20 years in various proven radio frequency identification (RFID) protocols. These protocols are considered as unique "languages" the electronic devices "speak" that allow the toll transponders in the vehicle to communicate to the roadside reader, thereby linking a vehicle to an account in milliseconds as a vehicle passes non stop through a toll site. Today, eight unique protocols are currently used to collectively process over 5 billion transactions annually. To accelerate IOP, IBTTA's process has been to only consider these existing protocols as candidates for the proposed toll tag **National Toll Protocol** (NTP).

Beyond the RFID protocol challenges, there are complex issues that had to be addressed related to the business rules of how transactions would be exchanged securely and efficiently between agencies, how customers would know a toll road was interoperable during the transition period, and the need for creation of rules of governance for the IOP process to live on in an environment of public and private toll operators across the nation. Cleary the challenge of IOP requires multiple levels of approach.

IBTTA Process Calls on Industry Expertise

IBTTA began the IOP process in 2010. Shortly after the passage of MAP 21, IBTTA defined a process to address the various challenges associated with implementing IOP. To meet the MAP 21 IOP goal, IBTTA created an Interoperability (IOP) Steering Committee of 25 members from across the nation, initially led by Martin Stone, from the Tampa Hillsborough Expressway in Florida, and currently led by David Kristick of the E-470 Public Highway Authority in Colorado. This IOP Steering Committee reports to the IBTTA Board of Directors. The Steering Committee then formed four subcommittees which address specific areas necessary to support national interoperability. All subcommittees are made of up toll agency and industry member **volunteers** from throughout the nation and Canada. Each committee holds regular meetings to execute their respective areas supporting interoperability. These four subcommittees and their primary areas of responsibility are:

1. **Governance Subcommittee** – Samuel Johnson, Chair, Transportation Corridor Agencies, CA Responsible for developing the plan for ongoing management of interoperability to include:
    a. Governance organizational structure and participation
    b. Oversight and modifications to the technology standards, file exchange specifications, and business rules
    c. Applicable mandates for fees and cost allocations
2. **Branding Subcommittee** -Rosa Rountree, Egis Projects Corporation, Chair, FL; the subcommittee has 9 members, and has met 17 times since 2013.
    a. Development of a North American interoperability brand and a national and local communication plan.
    b. Creation of branding identifiers – has developed multiple potential symbols and text to represent national IOP which could be displayed on signs or promotional materials
    c. Deployment approaches for interoperability branding symbols and text.
    d. Coordination with the USDOT FHWA for IOP symbol inclusion in the Manual for Uniform Traffic Devices
    e. FHWA Pooled Fund Study is underway. The study is a human factor study utilizing the 10 potential symbols. (5 international and 5 developed symbols) Study estimated completion is April 2016
    f. Communication plan development is underway. Estimated completion January 2016.
    g. Communication implementation tentative rollout May 2016.
3. **Back Office Operations Subcommittee –** Tim Reilly, Chair, Central Texas Regional Mobility Authority, TX; the subcommittee has 25 Members, and has met over 20 times since 2013.
    a. Identification of the general business processes to exchange and settle interoperable toll transactions between participating agencies, operators and providers
    b. Development of draft uniform business rules for the exchange and settlement of interoperable transactions between participating agencies, operators and providers which have been published in 2014 to the IBTTA website
4. **Roadside Operations Subcommittee** – Chaired by myself, Tom Knuckey, Atkins North America, FL; the subcommittee and its Special Panel, and Legal Group have a total of 31 members, and have met over 40 times since 2013.
    a. Conducted the 2013 “IBTTA Survey on Tolling Interoperability” to asses the existing status and needs related to Interoperability.
    b. Developed a document titled “National Interoperability Requirements” for a electronic toll collection protocol requirements
        i. The document contains agencies consensus performance requirements which were developed by the subcommittee, reviewed by suppliers (vendors), and published in 2014 to the IBTTA website.
    c. Developed a process for identification of a single national toll protocol (NTP) for North America RFID toll technologies, including a requirement for testing to evaluate candidate protocols.
        i. Eight existing RFID protocols in the 915-928 MHZ spectrum where analyzed in relation to the “National Interoperability Requirements”

ii. Three of the eight protocols were short listed for further consideration. These short listed protocols are commonly referred to as: SEGO (or 6B+); ISO 18,000 6C (63); and TDM/E-ZPASS.
    1. Agencies were asked to nominate one of the three NTP short listed protocols, and also indicate existing local protocols to work in conjunction with the NTP. All of the previous three short-listed NTP protocols received nominations and advanced to the next step.
    2. Suppliers (vendors) were asked to sponsor one or more of the three short-listed NTP protocols. This effort was to validate industry support of the short listed NTP protocols. All of the previous three short-listed NTP protocols received supplier sponsors from industry and advanced to the next step.
    3. The subcommittee commissioned a Special Panel which included independent technical and legal experts in the industry to evaluate the supplier responses. As a result, two protocols (ISO 18,000 6C (63), and TDM/E-ZPASS) of the three short-listed protocols have been approved by the IOP Steering Committee in July 2015 to begin the testing phases, with discussions on-going with the third protocol (SEGO) sponsor.

d. Testing of the NTP candidate protocols to validate conformance to "open" and adherence to the "National Interoperability Requirements" document performance levels.
    i. In April 2015 the subcommittee publicly procured the services of an independent testing entity. The contract was awarded to OMNIAIR Certification Services, a leading entity for certification of RFID devices in the tolling and intelligent transportation industry.
    ii. Testing phases
        1. Conformance testing - is now under development to ensure the specifications used to make the candidate NTP technology are in fact able to be built and operated as specified by others. This is critical to protect the goal of adoption of open technology that can be supplied by multiple suppliers to the industry. This phase should be complete by January 2016 and is completely funded by IBTTA cash reserves of up to $250,000.
        2. Performance testing – this will be used to ensure that the NTP protocol devices meet the performance criteria of the "National Interoperability Requirements" Document. Testing will include lab and field testing of up to 6 months, and could be complete by July 2016. This testing phase is currently **unfunded** and requires approximately $ $3,000,000 in unidentified funding.
        3. At the completion of testing the IBTTA Committees will review test results and other pertinent information and make a recommendation to the IBTTA Board for selection of a single NTP protocol for IOP.

e. Certification process - IBTTA expects to create a certification process to validate that suppliers seeking to sell IOP functional devices have in fact met requirements of IOP. Once the certification process is available, it is expected to attract current and perhaps yet unknown suppliers to the market place to have new devices certified to meet IOP requirements. We believe that once a standard NTP protocol is selected that is open, and a certification process is in place, then this will increase adoption rates of the technology by agencies and increase the market opportunities for suppliers. The development of the certification test process is unfunded and requires up to $ 150,000 – $250,000.

Missing Piece

Much progress has been made in the IBTTA approach for IOP, almost completely through volunteer industry efforts. The process is now at a critical point, funding is required to perform professional testing services and preparation of a certification process. Without such funding for IBTTA to complete the test process, it will make it challenging for the IOP committee and Board to make a selection of a NTP protocol.

Beyond Certification - Implementation

Once funded, we expect the testing and certification process to be complete within nine months. After which suppliers will submit devices for certification, some initially, others over time. Agencies will then have to secure funding for the implementation costs NTP protocol devices and changes to the back office systems. Toll Agencies will then be able to procure and implement IOP NTP certified devices.

We anticipate that all agencies will have to make some changes to their current tolling systems to support the implementation of IOP. For some Agencies they will have significant efforts and costs to adopt new IOP certified lane readers and NTP protocol transponders. For others already using the selected NTP protocol, they will likely have to make modifications to implement back office processes and make minor change to their ETC lanes to support the IOP transponders.

We expect that once the IOP NTP standard protocol is in place, the industry will offer innovative solutions that ease the transition to nation-wide IOP adoption through the use of multi-protocol transponders and multi-protocol readers that would both have the NTP and local protocols. Once in place the NTP standard and certification process may create the market place environment for innovative industry approaches such as integration of the NTP into new intelligent vehicles, or potential integration into consumer electronics like smart phones.

We are close

MAP 21 has provided the impetus for real IOP progress. Through IBTTA leadership, and the committees of volunteers have diligently worked through complex issues and developed a process for national interoperability. The process has been defined, and the industry is preparing for IOP. Yet we need more time, and funding to complete the process. In the mean time regional interoperability is expanding and serving as an initial step providing examples of interoperability for the industry.

BIOGRAPHICAL DATA

Thomas S. Knuckey

Vice President / National Tolls Technology Group Director - Atkins North America, Inc.

Interoperability Steering Committee Member – International Bridge Tunnel and Turnpike Association (IBTTA)

Roadside Operations Subcommittee - International Bridge Tunnel and Turnpike Association (IBTTA)

Tom has over 25 years of toll technology and engineering experience and currently volunteers service to the IBTTA Interoperability steering Committee and serves as the Chair of the IBTTA Interoperability Roadside Operations Subcommittee which is supporting the process for the determination of a national transponder protocol for interoperability. He has been actively involved in leadership roles on the IBTTA Interoperability process since 2010. Tom is also Group Vice President / National Tolls Technology Group Director - Atkins North America, Inc

Tom, a Professional Engineer (FL 44019), is Atkins' practice area leader for the firm's national tolls technology group, which provides support for toll and transport agencies making technology procurements, planning for technology enhancements, facility modifications, implementing tolling infrastructure projects, and supporting toll operations for toll operator across North America.

Previously, Tom was the consultant project manager for the Florida Department of Transportation as was responsible for the implementation of SunPass throughout the state of Florida, and helped with implementation of interoperability in the state of Florida. He is a frequent author and presenter to the toll industry, and a co-author of one of the early electronic toll resource guides, "An ETTM Primer for Transportation and Toll Officials," ITS America 1996.

He has B.S. in Civil Engineering from the University of Florida. Tom and his wife, have two children and live in Longwood, Florida.