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SYMPOSIUM ON MILEAGE-BASED USER FEES: TECHNOLOGY WORKSHOP

Session 3: Nexus of Road User Fees and In-Vehicle Technologies

Speaker 4: Chris Hill, Booz Allen Hamilton

“Connected Vehicles”

Chris Hill leads the highways and ITS business line for Booz Allen Hamilton, but his entire career has been in the transportation technology field. He has been involved in the research and early implementation phases of systems from electronic tolling collection to heavy vehicle pre-clearance systems, and has worked with Minnesota on mileage-based user fees. He is now involved in connected vehicle (CV) systems and spoke from that perspective.

Slide 2 – Connected Vehicles Background

Connected vehicle systems represent a national collaborative effort among auto makers, the federal government, and state and local transportation agencies. CV systems facilitate wireless communications between vehicles or between a vehicle and roadside infrastructure to support a variety of safety, mobility and environmental applications that are important to the public and private sectors and consumers.

CV applications should be adaptable for use in all kinds of vehicles, including light (passenger), heavy and transit vehicles. CV approaches may include devices that have been installed by the car maker or devices installed as aftermarket equipment. Including applications for mobile phones and other carried devices would allow connections with pedestrians or cyclists.

Slide 3 – Core Technologies

It is useful to reflect on the core technologies that support the connected vehicle environment when considering the nexus of CV and MBUF technologies. CV systems involve communication between two different components: something in the vehicle communicates with something in another vehicle or with some sort of roadside infrastructure. Dedicated short range communications (DSRC) is a piece of the radio frequency that has been set aside specifically for transportation safety applications. The use of DSRC is fundamental to the safety component of a CV system. However, other non-safety applications – including MBUF and technologies from the private sector such as consumer entertainment – could be supported by cellular and wireless technologies.

Slide 4 – Current Activities

The CV program is different from established programs such as tolling because it does not have existing infrastructure on which to build; still in the nascent stages of development, the CV environment is not ready to support implementation of MBUF.

Developmental work in CV systems, like that of MBUF, is aimed at defining types of applications, defining technology and how it needs to perform, determining the various technology, policy, and

institutional issues, defining the potential benefits, and learning how the driver will accept those types of systems and technologies.

A key milestone for CV system development will come late in 2013 when the National Highway Transportation Safety Administrations (NHTSA) will decide whether to mandate the inclusion of DSRC radios in new light vehicles. NHTSA's decision on this mandate will depend heavily on solid empirical data on the benefits for developing and deploying these technologies.

Ongoing technical and policy related research efforts are aimed at creating a large security management system so that CV applications can operate in a trusted environment. It is fundamental that messages being transmitted between vehicles and between a vehicle and the surrounding infrastructure are trustworthy, particularly for safety-related applications.

Slide 5 – Convergence Opportunities

What are the potential convergence opportunities for CV systems and MBUF? If you build out a CV system in the way that we envision with DSRC devices in vehicles and DSRC roadside infrastructure, is it possible to leverage that infrastructure for MBUF applications? For example can RSE locations support a boundary-crossing type of MBUF collection system, triggering the collection of different fees at points where you have this RSE infrastructure? Or perhaps the infrastructure can act as a vehicle data collection node that connects to some back office MBUF processing service.

There are a number of efforts underway that are looking at what the roadside equipment (RSE) infrastructure might look like for a CV system, and some work that USDOT is doing may lend insight into the suitability of MBUF on a CV system. AASHTO is currently doing a footprint analysis to determine where to place RSEs if a state or local agency is interested only in supporting their own interests, such as safety or mobility applications. That sort of network is physically quite different from a network developed from a national security planning perspective. It is uncertain whether a locally implemented network would be suitable for MBUF data collection.

Slide 6 – Potential Challenges

An infrastructure designed for connected vehicles is something that could be leveraged for MBUF, but the RSE locations, distribution and density must be planned carefully to accommodate MBUF.

There is a fundamental conflict between the very clear principles of connected vehicle data collection and possible MBUF data collection. For example, with a CV system it is important that no personally identifiable information is collected and that there is no potential for tracking individual vehicles. This is quite different than the information that could be collected for MBUF.

If MBUF implementation cannot take advantage of the RSE network for a CV system, or some other existing system, there would be significant cost implications for implementing an analogous network for MBUF.