AASHTO SPaT Challenge Webinar

September 15, 2016
Welcome & Introductions
Pat Zelinski, AASHTO
Mike Holder,
NCDOT Chief Engineer & AASHTO SCOTE Chair
Shailen Bhatt
Executive Director, CDOT & AASHTO STSMO Chair
History and Definition of the SPaT Challenge

Blaine Leonard, UDOT
AASHTO CAV WG Chair
V2I Deployment Background

“Chicken and Egg” problem:
How do we encourage / initiate broad V2I deployment?

How do we demonstrate commitment to the OEM and private industry?

What is a reasonable, early expectation?

Signalized Intersections (low-hanging fruit)
The SPaT Challenge

So, what is SPaT?

A Signal Phase and Timing (SPaT) message defines the current intersection signal light phases. The current state of all lanes at the intersection are provided, as well as any active pre-emption or priority.

The SPaT message can be obtained from a traffic signal controller via a standard query protocol and is broadcast by most DSRC roadside devices as a standardized data message.
The SPaT Challenge

Challenge state and local public sector transportation Infrastructure Owners & Operators (IO&Os) to deploy DSRC infrastructure with SPaT broadcasts in at least one coordinated corridor or network (approximately 20 signalized intersections) in each state by January 2020.

Additional V2I Applications that build on SPaT are also encouraged!

20 Intersections in 50 states by 2020!
The SPaT Challenge

SPaT broadcasts are typically accompanied by:

• Broadcasts of MAP/GID data (a detailed data file that describes the physical intersection); and

• A GPS Real-time Correction Message (RTCM)

However, not all SPaT broadcasts include these. We see the SPaT Challenge as Phase 1 of a deployment. MAP, RTCM, and additional V2I Applications would supplement SPaT as future phases.
The SPaT Challenge

Why this Challenge?
To provide IOOs with an entry into DSRC-based V2I deployment allowing them to gain valuable procurement, licensing, installation, and operation experience, which in turn will:

• Lay the ground work for more advanced V2I deployments
• Show a commitment to OEMs and applications developers
The SPaT Challenge – Short-term Benefits

• Largely internal to the agencies
  • lessons learned,
  • overall knowledge gained,
  • basic infrastructure for future applications
• Will better prepare each IOO for future, more complex V2I deployments
• A message of commitment to the OEMs
• Analogous to early fiber backbone deployments (benefits came after additional technologies and applications were deployed on both ends)
The SPaT Challenge – Long-term Benefits

• Tied to the V2I Applications deployed & number of vehicles equipped
• Transit Signal Priority
  • Could be a near-term application with an equipped transit fleet
• Other V2I Applications that build on SPaT at intersections:
  • Red Light Violation Warning
  • Intelligent Signal Systems
  • Eco-Driver
The SPaT Challenge

AASHTO STSMO CAV WG / AASHTO SCOTE
- Promoting, supporting, discussing within AASHTO
- Input to the SPaT Challenge Resolution documents

V2I Deployment Coalition TWG1
- Leading the Resource Development

National Operations Center of Excellence (NOCoE)
- Map of deployments
- Repository of supporting documents and resources
AASHTO SCOTE Perspective on the SPaT Challenge

Mark Luszcz, Delaware DOT &
AASHTO SCOTE Traffic Signal / Lighting Technical Team
Automobile Manufacturers
Perspective on the SPaT Challenge

Ed Bradley, Program Manager, Toyota – Product Regulatory Affairs, Safety
SPaT Challenge: Supporting Resources for Agencies

Bill Legg, WSDOT & V2I DC TWG 1 Chair
Resources are Needed to Support the Challenge

• Recognition that agencies accepting the challenge and considering the deployment SPaT may need additional information
• Goal is to assemble resources and make them available on the NOCoE Website
The SPaT Resources Team

- Small Group of TWG 1 members & other volunteers have been meeting since July
- Monthly webinars
- Anyone is welcome to participate
- Next meeting is this afternoon (Sep. 15th 4:00PM Eastern)
Identifying the Resources

Resources Currently Under Development:

• DSRC licensing information
• Implementation guidance
• Estimated costs (install & maintenance)
• Sample SPaT/DSRC related ConOps, Requirements, & Other Documents
• Guidelines for selecting corridors
• Procurement guidance
• Identification of existing funding sources that agencies may consider
Resource Availability

Existing Resources

• Use the documents; describe the value to agencies participating in the SPaT Challenge
• Summarize the content of these (documents, interviews, etc.) for use in the SPaT Challenge

New Resources – May need to develop resources or portions of resources if none exist
Sample Resource Progress

An existing resource:

• DSRC Licensing Information

Where no existing resource exists:

• Guidelines for Selecting Corridors
DSRC Licensing Information

• This is an important report prepared by ITS America, USDOT, FHWA

• The resource Team has developed a 2 page summary and has identified the link to the document

Recommended Practices for DSRC Licensing and Spectrum Management

A Guide for Management, Regulation, Deployment, and Administration for a Connected Vehicle Environment

www.its.dot.gov/index.htm
Final Report — December 2015
FHWA-JPO-16-267
Recommended Practices for DSRC Licensing and Spectrum Management

A Guide for Management, Regulation, Deployment, and Administration for a Connected Vehicle Environment


Direct link to the document: http://op.to/5600/5600/5600/5600/5600/5600/JPO-16-267.pdf

The goal of this document is to make DSRC licensing requirements transparent and best practices accessible to any organization seeking to deploy Connected Vehicle Dedicated Short Range Communications (DSRC) Roadside Units (RSU) that support vehicle-to-infrastructure (V2I) communications. The document covers the following issues in-depth:

Understanding DSRC: For DSRC-based Connected Vehicle applications, the mobile service allocation is limited to Dedicated Short Range Communications Service (DSRCS) systems operating in the Intelligent Transportation System (ITS) radio service communications frequency band as defined by the Federal Communications Commission (FCC) in CH Part 2.1. In the United States, the DSRC service operates in the SSB = 5925 MHz band (the 5.9 GHz band), and coexists as a primary use along with other Federal users authorized by the National Telecommunications and Information Administration (NTIA), as well as with a number of commercial satellite operators.

Use of the spectrum: Other 5.9 GHz DSRC users have transmitters deployed in relatively distant and isolated areas with respect to the most trafficked roadway networks. In some cases, however, deployments may be near outer suburban and rural corridors. This document recommends a process for coordinating with these users to reduce interference.

Spectrum coordination: Coordinating with DSRC roadside units is an important ongoing management task for any agency using DSRC. In field deployments, adapting the design, siting, placement, location, power, antenna, and other elements that maximize performance and avoid interference of DSRC roadside units will be necessary.

Responsibilities: Responsibilities for agency's which plan to deploy RSUs include reviewing FCC service rules, regulations, and technical requirements; field deployment and planning; licensing administration and ongoing management activities. See the chart below which outlines responsibilities for the deployment, commissioning and monitoring of DSRC systems.

<table>
<thead>
<tr>
<th>High Level Management Responsibilities for DSRC</th>
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<tbody>
<tr>
<td><strong>Deployment &amp; Commissioning Tasks</strong></td>
</tr>
<tr>
<td>Site Selection, Deployment Design, and Service Planning</td>
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<tr>
<td>Procurement and Equipment</td>
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<tr>
<td>FCC Licensing and Site Registration</td>
</tr>
<tr>
<td>Coordination with Existing Federal and Non-Federal Co-Primary Users (e.g. Fixed Satellite)</td>
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<tr>
<td>Radio Frequency Analysis and Survey of “Unlicensed” Systems (e.g. Wi-Fi)</td>
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<tr>
<td>Revisions to Design and Service Planning</td>
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<tr>
<td>RSU Site Installation</td>
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<td>Security Credentialing and Service/Application Commissioning</td>
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**Monitoring/Remediation & Optimization Tasks** |

| Site Channel/ Application Configuration Updates and Optimization |
| Security Credential Updates |
| Ongoing Coordination with New Primary Users |
| Ongoing Coordination with New DSRC RSU Sites/Service Providers |
| Updates to Radio Frequency Analysis (Addressing New |

Additional Resources:
AASHTO supports the Special Committee on Wireless Technology which provides information and frequency coordination to AASHTO members. Contact AASHTO at jpo@aashto.org for more information.

FCC has ongoing work related to the 5.9GHz spectrum that is posted to their website. Go to https://www.fcc.gov/ and search for 5.9GHz.
Guidelines for Selecting Corridors

1. Introduction

The goal of the SPaT Challenge is to encourage state or local agencies throughout the United States to deploy Dedicated Short Range Communications (DSRC) broadcasts of Signal Phase and Timing (SPaT) at approximately 20 intersection locations, typically in a corridor or network setting.

The intent of this resource document is to provide guidelines to assist agencies accepting the SPaT Challenge in selecting their corridor or network. The selection of a corridor/network for an initial SPaT deployment involves at least two high level types of decisions:

- **Need for V2I Applications.** Selecting a corridor with an understood current or impending need for eventual Vehicle to Infrastructure (V2I) Applications that will be deployed and make use of the SPaT broadcast; and

- **Infrastructure Compatibility.** Selecting a corridor with infrastructure that is ready and compatible for SPaT deployment, either now or prior to 2020.

The remainder of this document is structured around these two high level decision factors.

2. Needs Based Selection of a SPaT Deployment Corridor

While the goal of the SPaT Challenge is to encourage near-term deployment of a limited number of SPaT broadcasts, agencies accepting the SPaT Challenge are encouraged to select corridors or networks where there is a high probability that the SPaT broadcasts will be used in the future to support one or more V2I Applications. The Connected Vehicle Field Infrastructure Footprint Analysis Deployment Scenarios document describes deployment concepts for Connected Vehicles and overall selection guides, including suggestions on value proposition. Depending upon the agency, a formal user needs assessment accompanied by a system engineering analysis or a higher level preliminary sketch planning assessment of needs may be used in the corridor selection.

This section identifies questions for agencies to consider when identifying the corridor(s), and offers lessons learned and/or suggestions based on other Connected Vehicle deployments.
SPaT Resource Information Sharing

- Work with NOCoE to launch a website
- Include Background Material / Progress to Date / Map of Deployments etc.
- Provide contacts to experts
- Provide links to available resources and provide resource summaries where helpful
- Recognize the Need for Paper/PDF Documents
Sharable Resources

The National Connected Vehicle Deployment Challenge
20 SPaT Intersections in 50 States by 2020

Why is This Challenge Necessary?

- To provide State and Local DOTs with an entry into DSRC based V2I Deployment (allow them to gain valuable procurement, licensing, installation, and operation experience)
- To promote future (more advanced) V2I deployments
- To show a commitment to automobile manufacturers and applications developers

Do you have a candidate corridor for the challenge? Ideally the corridor will have:

- 20 signals but 10 will also work
- Modern controllers with in-cabinet equipment to support the DSRC radio (the RSU)
- Backhaul communications with sufficient bandwidth from the corridor either from each signal or from a master.
- MAP/GID* data for each intersection

“What is MAP/GID data?
MAP/GID (Geographic Intersection Description) data is a detailed data file that describes the physical intersection

Fortunately, there is one fairly basic connected vehicle element which is relatively simple to deploy and fundamental to a number of applications, the “signal phase and timing” (SPaT) message. SPaT defines the actions of a traffic signal. It is obtained from a traffic signal controller via a standard query protocol and is broadcast by most DSRC roadside devices as a standardized data message.”

Blaine Leonard, Utah DOT ITS Program Manager

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What is SPaT? A Signal Phase and Timing (SPaT) message defines the current intersection signal light phases. The current state of all lanes at the intersection are provided, as well as any active pre-emption or priority. Want to know more about SPaT? Go to this FHWA website: http://www.fhwa.dot.gov/index.php/community/explore-applications/all/9076

What is DSRC? Dedicated short range radio (DSRC) refers to two-way radio communication operating on the 5.9-GHz band for the purpose of supporting traffic operations. FCC has set aside this band for this purpose. The National Highway Safety Traffic Administration (NHTSA) is in the process of requiring all new light vehicles sold in the US to be equipped with DSRC and for those radios to transmit basic information about the performance and location of the vehicle. This will enable agencies to collect data using roadside installed DSRC radios and to transmit data back into the vehicle with the intent to support safer more efficient operations:

http://www.fhwa.dot.gov/fhwhowto/dsrc_factsheet.htm
Available Challenge Resources
The following resources are available to help get started with the Challenge:

  Final Report — December 2015 FHWA-JPO-16-267
  The goal of this document is to make DSRC licensing requirements transparent and best practices accessible to any organization seeking to deploy Connected Vehicle Dedicated Short Range Communications (DSRC) Roadside Units (RSU) that support vehicle-to-infrastructure (V2I) communications.

- **Implementation and Procurement Guidance, ConOps, and Requirements**
  In a connected vehicle environment, signal priority for multiple vehicles with different modes (transit, freight and emergency) can be managed within an integrated framework. Vehicles that are eligible for signal priority communicate their desired level of priority information to the roadside infrastructure. The allocation of priority levels is determined by involved Stakeholders (e.g., local agencies, transit operators, and freight operators) enabling the effective management of signal priority control through inputs to MMITSS. More about MMITSS apps here: http://www.tsforge.net/index.php/mmitss

- **Standards Information**
  Connected Vehicle Standards
  Standards are essential in a connected vehicle environment. Standards support interoperability, which will allow vehicles and the roadside infrastructure to exchange information and use the information that has been exchanged in a consistent manner, regardless of the manufacturer of the vehicle or the roadside equipment.
  USDOT Professional Capacity Building Program - ITS Standards Training Module, Vehicle-to-Infrastructure (V2I) ITS Standards for Project Managers
  This P&I module provides an introduction to the connected vehicle environment and a description of the potential benefits and capabilities of a Vehicle-to-Infrastructure (V2I) environment. The module then presents the ITS Standards that help support the deployment of a V2I application and a V2I infrastructure.

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Success in Meeting the Challenge Will Be Measured
The V2I Deployment Coalition will work with the National Operations Center of Excellence (NOCoE) to maintain a website to track progress using a national map to depict locations where:

- There is a commitment to deploy.
- DSRC SPaT broadcast is operational.

Where has DSRC already been deployed?

Green: Deployed  Orange: In Planning for Deployment  White: To Be Confirmed

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How Much Will This Cost?
AASHTO cost estimates based on the Footprint Analysis of early deployments estimates costs to be around:

- Deployment costs: $15-$20K/intersection
- Backhaul communication installation will cost between $4-$40K for the corridor depending on what existing services exist.
- And expect ongoing operations and maintenance costs for the corridor to be around $2-$3K/yr. per intersection depending on communications costs.

You can find the Footprint Analysis here:
http://itasco.transportation.org/Documents/Analysis%203%20July%202013.pdf

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Get Involved with Connected Vehicles – Take the Challenge!
More information is available at the National Operations Center of Excellence:
http://www.transportationsops.org

Infrastructure Owners & Operators wishing to join the challenge, or others wishing to participate in the effort, may contact: Dean Deeter (AASHTO support liaison to both groups) at deeter@acconsultants.org

The Connected Vehicle SPaT Deployment Challenge is being led by the V2I Deployment Coalition and the AASHTO Connected and Autonomous Working Group.
Examples of Completed / Ongoing SPaT Deployments

Mark Kopko, Pennsylvania DOT
Pennsylvania DOT
SPaT Deployments

September 15, 2016
Purpose and Objectives

- Provide a successful demonstration of autonomous vehicle technology to Pennsylvania Legislators corresponding to pending legislation in the 2015-16 session
- Equip a test bed corridor to be used for future testing and demonstrations
  - Improve experience with connected and autonomous vehicle technology application
  - Provide opportunities for testing by the following stakeholders:
    - Vehicle manufacturers
    - Supporting technology manufacturers
    - Regulatory agencies
Timeline

August 4, 2016

Week 1
- Conception

Week 2
- Consultant Support
- Basic Con Ops
- Field View
- RSU quotes

Week 3
- Kickoff Meeting
- 2nd Field View

Week 4
- Purchased RSUs

Week 6
- RSUs arrived

Week 7
- Updated Firmware
- Deployed RSUs
- Mapping

September 12, 2016

Week 8
- Field Testing

September 28, 2016

Week 9
- Demonstration
Each traffic signal along the demo route will need to be identified by the vehicle.

Visual (video) sensors within the vehicle will be used as the primary source. SPaT messages transmitted via DSRC radios at each intersection will supplement the video sensors to prevent occlusion and other issues.
1. Forster Street (SR 3016) / 3rd Street (City)
2. Forster Street (SR 3016) / Commonwealth Ave (SR 3031) / Commonwealth Ave (DGS)
3. Walnut Street (SR 3014) / 5th Street (City)
4. Walnut Street (SR 3014) / Commonwealth Ave (DGS) / Aberdeen Street (City)
5. Walnut Street (SR 3014) / Fourth Street (SR 3014) / Walnut Street (City)
6. Walnut Street (City) / Third Street (City)
7. Third Street (City) / Locust Street (City)
8. Third Street (City) / North Street (City) / North Street (DGS)

Roadway Ownership Key:

PennDOT
City of Harrisburg
DGS
• Ownership: Harrisburg
• Controllers: McCain ATC eX
  – Updated Firmware
• RSU: Arada Locomate
• OBU: Arada
• Backhaul: twisted pair
• Future Backhaul: Fiber
  – Remote communications connections to traffic signals via the Commonwealth VPN
• Worked with CMU on RSU placement
• Contractor had RF expertise/experience
• RSUs configured prior to installation
• No MAP message for initial deployment
  – CMU vehicle handling the information/IDs internally
Next Steps

• Map Message
  – 6/8 Intersections LIDAR mapped

• Additional CV applications
  – Additional processor needed

• Equipping Department vehicles with OBUs
McKnight Road

Characteristics

- 30,000 ADT
- 4.6 Mile Corridor
- 3 lanes in each direction with left turn lanes at traffic signals
- Residential and commercial developments

AID Grant
Adaptive Fiber Backhaul TMC Connectivity
Lessons Learned

- Equipment procurement lead time
- Consultant Support
- Vendor sales awareness
- Equipment compatibility & software upgrades
- FCC requirements
- Contractor, vendor, engineer, and DOT coordination is critical
- Radio positioning
- Lack of documentation
SPaT Challenge
The AASHTO Resolution Process
Pat Zelinski, AASHTO
SPaT Challenge Resolution

WHEREAS, The U.S. Department of Transportation’s (DOT) National Highway Traffic Safety Administration (NHTSA) has released an advance notice of proposed rulemaking (ANPRM) to create a new Federal Motor Vehicle Safety Standard (FMVSS) to require vehicle-to-vehicle communication capability for light vehicles, and

WHEREAS, The automobile manufacturers are preparing the hardware and software components that will achieve vehicle-to-vehicle (V2V) communications using Dedicated Short Range Communications (DSRC) in anticipation of the proposed rulemaking, with some deployments as early as the 2017 model year; and

WHEREAS, The DSRC capabilities being developed by the automobile manufacturers for vehicle-to-vehicle communications can also be leveraged and expanded to enable a two-way communication that is capable of delivering data and information from the roadside to the vehicle and from the vehicle to the roadside (commonly referred to as Vehicle to Infrastructure (V2I) Applications); and

WHEREAS, A number of V2I Applications have been identified and defined in detail in the USDOT Connected Vehicle Reference Implementation Architecture (CVRIA) that will provide safety, mobility, and environmental benefits once they are deployed and a network of DSRC-equipped automobiles are operational; and

WHEREAS, The USDOT has asked the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the Intelligent Transportation Society of America (ITS America) to work together to create and manage the Vehicle to Infrastructure Deployment Coalition (V2I DC) as a single point of reference for stakeholders to meet and discuss V2I deployment-related issues, and

WHEREAS, Through various funding sources, including USDOT, state, and local funding, there have been multiple pilot deployment sites that have demonstrated the functionality and benefits of V2I Applications in multiple locations throughout the United States; and

WHEREAS, Beyond the pilot deployments and a limited number of early adopter deployment sites, the majority of state and local infrastructure owners and operators have not yet begun large scale deployment of V2I Applications, however solutions are now available to problems that were hindering deployments.

WHEREAS, The automobile manufacturers are developing at least three V2I applications and are looking for some indications from the infrastructure owners and operators about the timeline for deploying the roadside infrastructure to support V2I applications; and

WHEREAS, Most infrastructure owners and operators have corridors of signalized intersections which are interconnected and use modern controllers to coordinate signal timing along the corridor; and

WHEREAS, The “signal phase and timing” (SPaT) message is relatively simple to deploy and fundamental to a number of V2I applications, and can be obtained from a traffic signal controller via a standard query protocol and can be broadcast by most DSRC roadside devices as a standardized data message; and

WHEREAS, Deploying this SPaT data message in a number of locations around the country will provide state and local transportation agencies with a tangible first step for deploying V2I Applications, promote future more advanced V2I applications, and demonstrate a commitment to the DSRC-based V2I deployments that are needed by automobile manufacturers; and

WHEREAS, The net result of deploying SPaT will be to accelerate V2I application deployment by the automobile manufacturers, the private sector, and the public sector; now therefore be it

RESOLVED, That AASHTO is challenging the state and local public sector transportation infrastructure owners and operators to cooperate together to achieve deployment of DSRC infrastructure with SPaT broadcasts in at least one corridor or network (approximately 20 signalized intersections) in each of the 50 states by January 2020 (referred to as the “AASHTO SPaT Challenge”), and therefore be it
RESOLVED, That AASHTO is challenging the state and local public sector transportation infrastructure owners and operators to cooperate together to achieve deployment of DSRC infrastructure with SPaT broadcasts in at least one corridor or network (approximately 20 signalized intersections) in each of the 50 states by January 2020 (referred to as the “AASHTO SPaT Challenge”); and therefore be it

RESOLVED, That the AASHTO-led V2I Deployment Coalition and AASHTO Highways Subcommittee on Transportation Systems Management and Operation (STSMO) Connected and Automated Vehicle Working Group will develop resources intended to be used by public sector transportation agencies participating in the AASHTO SPaT Challenge; and therefore be it

RESOLVED, SCOH approves this resolution and forwards it to the AASHTO Board of Directors for final approval and implementation.
Background Information on Proposed Policy Resolution

AASHTO SPaT Challenge

- Circulated with webinar invite
- 5 Page background material
- Majority of the information that was covered today

I. PURPOSE OF RESOLUTION

The purpose of this resolution is to approve an AASHTO nationwide challenge to deploy Dedicated Short Range Communications (DSRC) infrastructure with Signal Phase and Timing (SPaT) broadcast in at least one corridor (approximately 20 signalized intersections) in each of the 50 states by January 2020.

II. INTRODUCTION

Connected and Automated Vehicle technology is advancing rapidly and many state and local agencies are wondering what they can do to support or be part of the deployment of these transformational transportation technologies. While the concept of autonomous vehicles has been around for 50 years, the reality of vehicle automation and fully autonomous driving has only recently emerged. This technology, however, has captured the imagination of the public. Autonomous vehicles are eagerly anticipated and skeptically feared, in about equal proportions. The potential of autonomous driving is in the public forum, but connected vehicle technology is less known or understood. For the most part, these two technologies will roll out in tandem, incrementally, as connected automation.

Anticipating the NHTSA DSRC mandate, automakers are busily preparing the hardware and software components of vehicle to vehicle (V2V) systems. Cadillac will deploy DSRC on at least one model in late 2016, with an estimated production of 40,000 vehicles. Other automakers will likely follow suit in the next year or two.

Pilot Deployment sites, and a few others, are developing Vehicle to Infrastructure (V2I) applications, mostly anticipated for use by fleets of cars which can be outfitted with DSRC devices as part of the deployment. Automakers are also developing V2I applications, funded, at least in part, by the US DOT through the Crash Avoidance Metrics Partnership (CAMP). Without infrastructure, these V2I applications will not function, and it is unlikely that the automakers will deploy them until there is a larger scale deployment of roadside DSRC. Car owners in various parts of the country need to see and appreciate these new features on roads where they live and drive.

In testimony before a Congressional Committee in March, 2016, Delphi Automotive Vice President Glen De Vos stated, “In an automated future, cars will need to be able to communicate not just with their owner but also the surrounding environment, other vehicles and infrastructure. Knowing when traffic signals are going to change and where traffic is heaviest not only adds to the safety of the vehicle but allows cars to be driven, or drive themselves, more efficiently.” His argument for the synergy between connected vehicle infrastructure and the new driverless paradigm is compelling.

While there is a clear interest in these new technologies, and a solid case for the role of connected vehicle infrastructure in both the connected and automated space, agencies are not prepared for deployment. In many cases, in this rapidly evolving and sometimes complex environment, they simply don’t know where or how to start. An additional challenge is the fact that very few, if any, connected vehicle applications are ready for deployment. Today’s emerging deployments involve considerable software engineering effort. Further, many of those who are currently planning to deploy are working on a variety of applications. To incentivize the deployment of V2I applications in new cars, we need a consistent and uniform deployment across the nation, at least at some level and density.
Next Steps with the Resolution Process

• STSMO & SCOTE Members:
  - Requested to submit any comments, feedback, suggested changes by COB Friday, September 23rd.
  - Feedback can be submitted to Pat Zelinski: pzelinski@aashto.org
Next Steps with the Resolution Process

• Final Versions of the Resolution & Background Document will be circulated for balloting approximately October 3rd.

• Goal is to have voting completed and approval by October 24th.

• If approved, the resolution will be presented to SCOH at the AASHTO Annual meeting in Boston (Nov. 12 – 15, 2016)
Question & Answer Session
Questions / Comments

• Please submit questions using the webinar screen
• Any questions not answered today will be responded to in writing
Closing

• Thank you for your time

• SCOTE & STSMO members: please send any remaining comments or questions to Pat Zelinski by COB September 23rd: (pzelinski@aashto.org)

• If you wish to join in developing SPaT Resources, contact Dean Deeter (deeter@acconsultants.org)
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- Mark Kopko, Pennsylvania DOT, markopko@pa.gov