

V2I Deployment Coalition Executive Committee Meeting
Colorado Department of Transportation – Headquarters Office
4201 E Arkansas Ave, Denver, CO 80222

September 9-10, 2015
Meeting Summary

Executive Summary:

The inaugural V2I Deployment Coalition (V2I DC) Executive Committee meeting was hosted by the Colorado Department of Transportation (CDOT) in Denver, Colorado on September 9-10, 2015. The meeting included a working session on September 9 consisting of the Project Team, and Technical Working Group (TWG) Chairs and Co-Chairs, and the full Executive Committee meeting was held on September 10.

The Executive Committee meeting was led by Executive Committee Chair, Shailen Bhatt from CDOT. The Executive Committee reached consensus on ***the role of the Executive Committee which shall be:***

- Define the primary focus areas for the entire V2I DC;
- Identify goals that the V2I DC can use to measure progress towards accomplishing the focus areas;
- Support the work of the TWGs by offering input to the processes and review of work completed; and
- Elevate the results of technical work to the Connected Vehicle Executive Leadership Team (ELT) for policy level considerations.

The Executive Committee was updated on the work plans of each TWG. The five TWGs have each created work plans to address the key V2I issues identified by the member agencies of AASHTO, ITE, and ITS America. After briefings on planned activities, issues to be addressed, and challenges facing the coalition, Shailen Bhatt led a discussion of the role, goals, and focus areas of the coalition. It was agreed by members of the Executive Committee that ***the role of the V2I DC is to help accelerate consistent and effective deployments of Connected Vehicle technologies that address passenger vehicles, freight, and transit operations in both urban and rural areas.***

To accomplish this role, the V2I DC has established initial goals to be:

Goal #1: Help to accelerate the deployment of V2I technologies at *intersections* where the majority of crashes and/or congestion occur;

Goal #2: Help to accelerate the deployment of V2I technologies to support *end of queue warnings* in locations with high rates of rear-end collisions;

Goal #3: Help to accelerate the deployment of V2I technologies for *work zone management*; and

Goal #4: Help to accelerate the deployment of V2I technologies for *curve warning systems*.

The V2I DC will work towards the initial goals by performing the following activities during the initial 18 months:

- Informing and educating Connected Vehicle stakeholders on available tools to assist them in deploying V2I technologies (e.g. deployment guidance and supporting USDOT developed tools).
- Researching and defining a set of V2I issues and identifying needed actions to address the issues, as they relate to the initial four goals.
- Facilitating discussions between OEMs and infrastructure owners and operators to enable all parties to understand each other's goals and objectives.

The V2I DC will evaluate the focus areas and goals after 18 months to determine additional actions and work plans.

Finally, the draft V2I DC Business Plan was presented by Gummada Murthy and discussed by the Executive Committee members. The group agreed that efforts should continue towards finalizing the Business Plan for 2016-2021, revisiting the overall needed budget and the portion of the budget that will be achieved through volunteer efforts of the coalition members.

The Executive Committee will meet again one more time before the next full coalition-workshop planned for spring 2016.

Action Items Identified in the Meeting:

1. Project Team: Schedule and facilitate meeting(s) among TWG Chairs to review and coordinate work planned for Issues 1, 3, 6 and 7.
2. Project Team: Share concerns with and request further guidance from USDOT regarding the scope of Issue 5 and related work that may already be underway outside of the coalition.
3. TWG 4: Distribute to the Executive Committee the draft summary document of work related to Issue 6 for further review and input.
4. TWG 4: Distribute webinar material prepared that relates to Issue 11 (V2I consumer messaging) to the EC.
5. Project Team: Prepare general overview document and presentation about the coalition for use when discussing V2I DC work with other groups.

6. Project Team: Complete development of public web site and private Sharepoint to facilitate the sharing of coalition work.
7. TWG Chairs, Co-Chairs and Liaisons: Review TWG work plans to determine if further modifications are needed to address the four priority application areas identified for the coalition.
8. Project Team: Revise Business Plan to focus on the initial and short-term (through 2021) periods and add further details on anticipated coalition activities based on the four priority application areas that were identified.
9. TWG 1: Follow up with Randy Iwasaki to request the survey results of the CCTA survey of end users.
10. JUSDOT: Explore whether any 'mining' of information in the pilot proposals could be done to summarize the applications proposed, communications approaches, and other insight into the stakeholders' approaches.
11. Project Team: Review the Connected Vehicle Footprint Analysis and other documents to identify quantifiable benefits that are anticipated with incremental levels of V2I deployment.
12. Project Team: Identify a date and location for the next Executive Committee meeting.
13. Project Team: Inform Executive Committee members about progress with scheduling a meeting of the CV ELT.

Meeting Summary:

Introduction

The V2I Deployment Coalition (V2I DC) Executive Committee meeting was hosted by the Colorado Department of Transportation (CDOT) in Denver, Colorado on September 9-10, 2015. The meeting was structured into a 1.5 day format. The first half-day consisted of a working meeting for the five Technical Working Group (TWG) Chairs and Co-Chairs. The goals for the TWG working meeting were to review work that has been planned and accomplished to-date, and to allow for discussion of the overall coalition work and focus in preparation for the full Executive Committee meeting the next day. The second full-day included all members of the Executive Committee and served as the inaugural meeting for the group.

In the opening remarks for the meeting, Executive Committee Chair, Shailen Bhatt from CDOT, commented on the significant changes in transportation from 1970s to today. He further noted that the transportation experience will be dramatically different going forward and the V2I DC will be part of shaping it.

Randy Iwaszki from CCTA, explained that he is representing the local perspective on V2I deployment and hopes to share coalition info with local agencies in return.

Carlos Braceras from Utah DOT observed that transportation is on the threshold of something as significant as the interstate system with even greater potential to improve quality of life. He added that departments of transportation serving as focal points for transportation is also changing – expanding to include locals and private industry.

There has been a high degree of interest and enthusiasm to participate in the V2I DC as evidenced by the 150 participants who attended the initial coalition workshop in June following the ITS America Annual Meeting in Pittsburgh. The Executive Committee will evaluate the sum of coalition work to determine if group has achieved what is needed and to determine what else may yet need to be done. USDOT hopes the coalition will provide stakeholder input and support for outreach – particularly to those who do not yet know what Connected Vehicle is or how it will impact them.

V2I DC Executive Committee Roles

Shailen Bhatt invited attendees to offer input on the role of the Executive Committee and the needs of the TWGs. TWG Chairs, and other meeting attendees, identified a number of needs that the V2I DC has for high level input from the Executive Committee, summarized as follows:

- Matt Smith commented that there is a need for facilitation among TWGs, and the Executive Committee could assist in ensuring this happens.
- Bill Legg noted that he believes the evolution of Connected Vehicle deployments will be similar to traveler information technologies, where ownership will not reside entirely in the DOTs and believes the Executive Committee could assist this, similar to how the 511 Coalition supported DOTs. Randy Iwasaki agreed with this and noted that private sector partners are already leading many aspects of deployment.
- Faisal Saleem noted that the Connected Vehicle issues regarding technology, partnerships, and institutional perspectives are so broad that coalition members will benefit from insight from the Executive Committee.
- Joe Averkamp expressed a need for the Executive Committee to help execute communications on key messages on issues such as spectrum sharing – especially when other industries potentially competing for the spectrum already are conducting outreach.
- Shailen Bhatt reiterated that he believes there is a need for coordinated communication about the need to maintain FCC allocations of DSRC for CV use.
- Rob Kreeb noted the questions about federal commitment to DSRC still keep coming up.
- Shailen Bhatt agreed that a consistent message about the need for and planned use of the spectrum allocated to DSRC is needed and does not exist. He expressed that he feels the focus of the coalition should be to support deployment, and this is a key aspect.

- Ryan Rice commented on the overwhelming nature of the topic and not knowing where to start. There are so many technology categories that represent smaller mountains to scale and that might be more productive than trying to climb the whole mountain.
- Bob Kreeb shared that he believes the coalition needs a handful of deliverables/wins to provide momentum for longer term work.

Shailen Bhatt concluded the discussion by summarizing the role of the Executive Committee, as described in Figure 1 below.

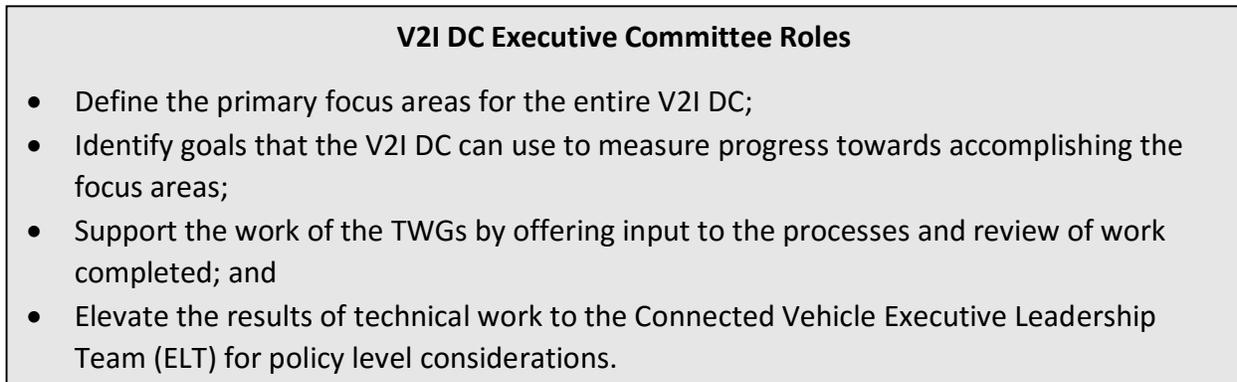


Figure 1 – V2I DC Executive Committee Roles

V2I DC TWG Work Plan Review

Each TWG Chair presented their work plan and highlighted work completed to-date. This allowed other members of the Executive Committee to ask questions to clarify the scope of each group’s tasks, to identify areas of potential concern, and to discuss how the TWGs will coordinate on issues that multiple groups will be working on.

It was observed that TWG 1: Initiatives and TWG 3: Partners have the greatest likelihood and opportunities to collaborate on their work. TWG 1 also tends to be more owner/operator focused among its membership, while TWG 3 membership tends to be more focused on the OEM/supplier. This more distinct member dynamics of each group should allow for a broader, more inclusive perspective on the issues that both groups will work on together.

There was an in-depth discussion of Issue 1: V2I Applications and each TWG’s intended work related to the issue. A preliminary fishbone diagram was used to illustrate what each TWG will do, approximately when the work will be done, and what the targeted outcome will be. This allowed the groups to clarify and confirm their work, as well as begin determining when the groups will need to work together to share information, review work and offer input.

The TWG Chairs and Co-Chairs also requested that a similar coordination exercise be completed for the following issues which, like Issue 1, have been targeted for work by multiple TWGs:

- Issue 3: V2I Data
- Issue 6: V2I Outreach

- Issue 7: Benefits and Costs of V2I Deployment

Related to the matter to coordinating with other agencies and industry representatives outside of the V2I DC, the TWG Chairs requested a general overview presentation that may be used to explain the coalition and its scope of work. It was also noted that the Project Team is developing a public website to share coalition news and a private Sharepoint to allow the exchange of materials among the TWGs.

The TWG Chairs and Co-Chairs also noted that further direction is needed for Issue 5: Security. As the issue is currently defined, it is very broad and it is unclear what other work may already be underway outside of the coalition. It was noted that there have been separate conversations with USDOT about security and the need for an overarching group to address the issue. Such a group will need to expand technical expertise to include security experts from other governmental agencies (e.g. DHS, FBI) and from other private industries related to security.

During the TWG 1 presentation, Randy Iwasaki noted that CCTA has survey results on travelers' perceptions of V2I technologies that can be shared with TWG 1. Jeff Lindley commented that FHWA would be willing to participate in discussions regarding the Federal level policy statement.

During the TWG 2 presentation, Randy Iwasaki asked whether the issue of business models for Connected Vehicles was being addressed. It was clarified that Issue 7: Understanding Benefits and Costs was originally titled V2I Business Models, but was renamed to reflect that infrastructure owners and operators primarily need to understand the benefits and costs. Randy emphasized the need to continue to consider the full spectrum of business model needs when defining Issue #7.

As TWG 4: Guidance shared their work completed to-date on Issue 6: V2I Outreach, it was noted that this issue is so pervasive that the full Executive Committee will likely have input to offer. It was also noted that USDOT is about to begin a focused Knowledge and Technology Transfer (KTT) effort, in addition to developing Professional Capacity Building (PCB) efforts. Furthermore, NCHRP Project 20-102(05) is also expected to soon begin developing a strategic communications plan for efforts that, to the extent practical, complements communications efforts underway for other significant public and private Connected Vehicle and Autonomous Vehicle efforts. It was requested that TWG 4 circulate to the Executive Committee the draft summary document of their work on Issue 6 to allow for further coalition input before submitting the document to USDOT.

Also during the TWG 4 presentation, the topic of the FHWA Deployment Guidance was discussed. Jeff Lindley shared with the group that a review is underway, but a specific date for the next release is not available. Jeff also commented that the technical aspects of the deployment guidance should be very applicable to city and county infrastructure owners and operators. The group discussed how outreach will be conducted once the deployment guidance is completed. Jeff indicated he would like to work with TWG 4 to discuss this further, and Rob Bertini mentioned that the TRB operations committee might be good channel for distribution of the guidance. TWG

4 members agreed to take an action to distribute the summary document of work related to Issue 6: V2I Outreach, and webinar material prepared that relates to Issue 11: V2I Consumer Messaging for further review and input.

During the TWG 5 presentation, Ed Seymour commented that he believes the efforts invested by Connected Vehicles stakeholders in thinking about and preparing the Pilot Deployment proposals represents a valuable collection of insight into the priorities regarding V2I deployments and approaches towards deployment. The group recognizes the limitations that USDOT has on circulating proposals, but requested that USDOT consider 'mining' the proposals for data and information that could be presented to summarize the submittals (e.g. XX% of proposals were to use DSRC for communications, YY% of the proposals involved application ZZZ). Even high level summary information could provide insight into the approaches that stakeholders may follow over the coming year. Jeff Lindley agreed to explore if USDOT could perform some level of 'mining' of the submittals.

V2I DC Focus Areas and Goals

Shailen Bhatt facilitated a discussion about the overall focus areas of the V2I DC and specific goals that will enable the coalition (and the Executive Committee) to measure progress.

The group discussed opportunities for the V2I DC to help accelerate deployment of V2I technologies. Bob Kreeb (NHTSA) described that the Vehicle to Vehicle (V2V) stakeholders have benefitted from understanding the anticipated benefits that will be achieved when V2V technologies are operational. Bob suggested that if the V2I DC could identify anticipated quantified benefits of V2I technologies (perhaps from the Footprint Analysis) this would help explain the anticipated impacts of V2I and help encourage deployments. The Project Team took the action to review the Footprint Analysis documents and other resources to identify examples of benefits.

The Executive Committee discussed the benefits that V2I technologies can offer to intersections (both signalized and non-signalized) that encounter congestion and/or safety hazards. Similarly, the group discussed that a large percentage of freeway crashes occur from vehicles approaching the end of a queue, and therefore V2I technologies to address queue warnings is another area with likely near-term benefits. Work zone management (in both rural and urban areas) is another areas members agreed would see early benefits of V2I technologies. Finally, the group discussed V2I technologies related to curve warnings as an area likely to see early V2I benefits. Through all these V2I focus areas, the group agreed that the V2I DC should focus on expediting V2I deployments to support passenger vehicles, freight carriers, and transit operations in both urban and rural areas.

A major decision reached by the Executive Committee was determining the preliminary focus for the V2I DC. Executive Committee members agreed to four initial focus areas summarized in Figure 2 below.

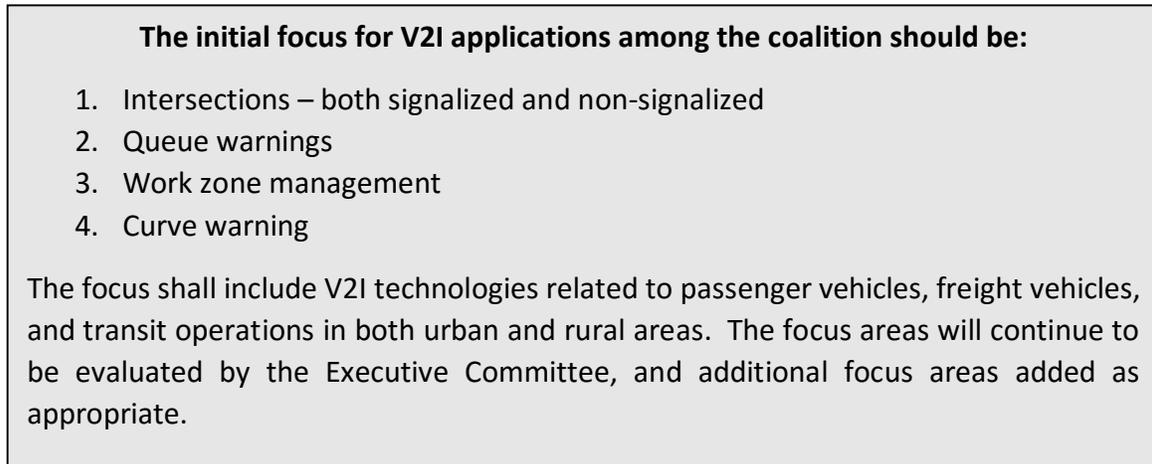


Figure 2 – V2I Deployment Coalition Initial Focus Areas

To further define the goals of the V2I DC, the group reached agreement on the following:

The role of the V2I DC is to help accelerate consistent and effective deployments of Connected Vehicle technologies that address passenger vehicles, freight, and transit operations in both urban and rural areas.

To accomplish this, the V2I DC has established initial goals to be:

Goal #1: Help to accelerate the deployment of V2I at *intersections* where the majority of crashes and/or congestion occur;

Goal #2: Help to accelerate the deployment of V2I technologies for *end of queue warnings* in locations with high rates of rear-end collisions;

Goal #3: Help to accelerate the deployment of V2I technologies for *work zone management*; and

Goal #4: Help to accelerate the deployment of V2I technologies for *curve warning systems*.

The V2I DC is trying to accomplish the initial goals by focusing on the following during the initial 18 months:

- Informing and educating Connected Vehicle stakeholders on available tools to assist them in deploying V2I technologies (e.g. deployment guidance and supporting USDOT developed tools).
- Researching and defining a set of V2I issues and identifying needed action plans to resolve the issues over the coming years in order to support V2I deployment.
- Facilitating discussions between OEMs and infrastructure owners & operators to enable both parties to understand the goals and objectives of the other party.

The TWG work plans should be reviewed and adjusted if needed with these initial priority application areas in mind.

V2I DC Business Plan

Matt Smith explained that the intent of the business plan is to be used as a tool for the associations to share with their members what the coalition is doing/will be doing to get their support. The TWG work plans can be folded into the business plans to better describe what's happening in the next year.

Gummada Murthy led a presentation of the draft business plan that described the activities to be performed in the initial 18 months (current period) and over a period of time from 2016 – 2021. The Project Team explained the purpose of the Business Plan is to help shape where the coalition may go after the initial 18 months of work. The concept has been presented to USDOT to explain the need for the V2I DC, accomplishments to-date and the role of the coalition going forward.

The draft plan outlines the roles and activities for the initial term (first 18 months of the coalition) and the short-term (June 2016 – June 2021). While it is likely the V2I DC will continue operations beyond 2021, it is too difficult to describe specific and meaningful activities for the long-term as deployment is expected to evolve significantly during that time which will in turn impact the focus of coalition work. The initial period of the V2I DC is intended to identify issues, but not necessarily solve them, and to identify who and how well stakeholders are involved in V2I deployment. During the short-term period of the coalition (2016-2021), there will be new initiatives underway, including the upcoming Connected Vehicle deployment pilots. It was noted that the coalition could serve as a peer-to-peer forum and continue with issue resolution during that period.

The Executive Committee reached consensus that efforts to develop the Business Plan should continue. That budgets should be reviewed to ensure enough funds are available to accomplish the goals of the coalition and to possibly consider increasing the budget to ensure sufficient funds are available, and that the estimated level of voluntary contributions should be reviewed, as the

estimate appears too low. A revised Business Plan will be prepared in the coming months for review of all participating agencies and the Executive Committee.

Special Topic: V2I Deployment Support Tools

During the working meeting on the afternoon of the first day, Dominie Garcia (BAH) presented work underway for the AASHTO Connected Vehicle/Autonomous Vehicle Working Group. The AASHTO CV/AV Working Group recently produced the Footprint Analysis and they are currently working on a series of tools designed to support agency decisions regarding near-term V2I deployment. The effort started about a year ago there are three fundamental tools under development:

- *Application Prioritization Tool:* This tool is intended to be used at an individual agency level to support application selection. All applications from the CVRIA have been included in the tool, as well as those from the co-pilot costing tool and other lists identified by USDOT. The initial version of the tool has been completed and is being modified based on beta testing at this point. The final tool is expected to reside online.
- *Life-Cycle Cost Modeling Tool:* This tool takes the same applications from the prioritization tool to provide estimates on deployment costs associated with infrastructure. It is intended to cover all associated costs (e.g. field, communication, backhaul, training, etc.). The tool provides baseline costs but allows those to be adjusted based on agency experience when it is available. The tool focuses on costs that will be carried by the agencies and include those associated with capital, operations and maintenance needs. The tool is in testing at this time.
- *Infrastructure Planning and Phasing Tool:* This tool aims to help agencies understand what the likely sequence of activities for deployment may be. The team is still trying to further define the scope of this tool.

All the major work for this effort, including scenarios illustrating how the tools can be applied, will be complete by the end of 2015.

USDOT Final Comments

Bob Kreeb (NHTSA) commented that clarifying the coalition deliverables and the audience for them is essential for the V2I DC Business Plan. NHTSA also appreciates the coalition and noted that it will be useful for the upcoming NPRM process.

Jeff Lindley (FHWA) commented that he felt the discussions were good. He added that the content discussed was substantial and succeeded at surfacing issues that needed to be addressed. He believes that USDOT will get a lot of benefit from the coalition and would like USDOT to remain active in the TWG meetings. He asked that USDOT members be encouraged to join TWG activities whenever possible.

Next Steps

The Executive Committee discussed the plans for a full coalition webinar this fall and the need for Executive Committee representation on the webinar.

The Executive Committee agreed to meet again (preferably in-person) before the full coalition workshop targeted for spring 2016, possibly as part of the TRB annual meeting.

The Executive Committee agreed to support the reinstatement of the CV Executive Leadership Team (ELT). The ELT Roster will be finalized after the World Congress annual meeting, and a kickoff meeting of the ELT will likely occur in November or December.

Appendix A: V2I DC Executive Committee Meeting Attendees

Day 1 – TWG Working Meeting – September 9, 2015 Attendees

1. Bill Legg, WSDOT, Initiatives Chair
2. Joe Averkamp, Xerox, Initiatives Co-Chair
3. Greg Larson, Caltrans, Research Chair
4. Rob Bertini, Cal Poly, Research Co-Chair
5. Matt Smith, MDOT, Partners Chair
6. Roger Berg, DENSO, Partners Co-Chair
7. Faisal Saleem, Maricopa County, Guidance Chair
8. Navin Katta, Savari Inc., Guidance Co-Chair
9. Ed Seymour, TTI, Standards Chair
10. Gary Duncan, Econolite, Standards Co-Chair
11. Blaine Leonard, UDOT, AASHTO STSMO CVWG
12. Gummada Murthy, AASHTO, Project Team
13. Siva Narla, ITE, Project Team
14. Jennifer Carter, ITS America, Project Team
15. Pat Zelinski, AASHTO, Project Team
16. Dean Deeter, Athey Creek, Project Team
17. Ginny Crowson, Athey Creek, Project Team
18. Adrian Guan, ITS America
19. King Gee, AASHTO
20. John Conrad, AASHTO
21. Jeff Lindley, FHWA
22. Bob Kreeb, NHTSA
23. Michael Lewis, CDOT
24. Amy Ford, CDOT
25. Joshua Laipply, CDOT
26. Peter Kozinski, CDOT
27. Dominie Garcia, Booz Allen Hamilton

Day 2 – Executive Committee Meeting – September 10, 2015 Attendees

1. Shailen Bhatt, CDOT, AASHTO Public Sector
2. Randy Iwasaki, CCTA, ITE Public Sector
3. Carlos Braceras, UDOT, ITS America Public Sector (via telephone)
4. Blaine Leonard, UDOT, AASHTO STSMO CVWG
5. Bill Legg, WSDOT, Initiatives Chair
6. Joe Averkamp, Xerox, Initiatives Co-Chair

7. Greg Larson, Caltrans, Research Chair
8. Rob Bertini, Cal Poly, Research Co-Chair
9. Matt Smith, MDOT, Partners Chair
10. Roger Berg, DENSO, Partners Co-Chair
11. Faisal Saleem, Maricopa County, Guidance Chair
12. Navin Katta, Savari Inc., Guidance Co-Chair
13. Ed Seymour, TTI, Standards Chair
14. Gary Duncan, Econolite, Standards Co-Chair
15. Gummada Murthy, AASHTO, Project Team
16. Siva Narla, ITE, Project Team
17. Jennifer Carter, ITS America, Project Team
18. Pat Zelinski, AASHTO, Project Team
19. Dean Deeter, Athey Creek, Project Team
20. Ginny Crowson, Athey Creek, Project Team
21. King Gee, AASHTO
22. John Conrad, AASHTO
23. Adrian Guan, ITS America
24. Jeff Lindley, FHWA
25. Bob Sheehan, FHWA (via telephone)
26. Bob Kreeb, NHTSA
27. Peter Kozinski, CDOT
28. Ryan Rice, CDOT