

## **V2I Deployment Coalition Executive Committee Meeting**

Sheraton Detroit Metro Airport

8000 Merriman Road, Romulus, MI, 48174

**April 21, 2016**

### **Meeting Summary**

#### Opening Remarks

Shailen Bhatt, Colorado DOT, joined the meeting by telephone and expressed his appreciation for all that the Technical Working Groups have accomplished since last June. Shailen turned the meeting over to Carlos Braceras, Utah DOT, to manage the remainder of the meeting. Carlos welcomed the group and invited Jeff Lindley and Ken Leonard from USDOT, and King Gee from AASHTO, to share any opening comments with the group. Jeff noted that Coalition has made great progress and expects work to continue into a second phase. Ken added that he appreciates the TWG work and as next steps for the Coalition are determined he would like to identify a role for JPO as they would like to accelerate deployment. King Gee further acknowledged progress of the TWG and added that Coalition needs to continue broadening its membership to include stakeholders such as the commercial vehicle industry.

#### Recap of Previous Meeting

Rob Bertini, Cal Poly, provided a recap of the previous Executive Committee meeting that was held in September 2015 in Colorado. Key outcomes from the meeting included: a clarified the role of the Executive Committee, a defined set of initial focus areas for the V2I DC, a defined set of initial goals for the V2I DC, and discussion about a preliminary Business Plan for ongoing V2I DC efforts beyond June 2016. Rob reviewed the role of the Executive committee.

- 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.
- Elevate the results of coalition technical work to the Connected and Automated Vehicle Executive Leadership Team (ELT) for policy level considerations.

Rob then explained the Executive Committee's relationship with the Connected and Autonomous Vehicle Executive Leadership Team (CAV ELT). While the V2I DC and Executive Committee will primarily focus on the technical and institutional aspects of V2I deployment, as policy issues arise they will be elevated to the CAV ELT for guidance and further action.

Rob then shared that the role of the V2I DC has been summarized as, "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." It was asked if autonomous should be included with the connected vehicle focus for the Coalition. It was also observed that "accelerate" puts another twist on adding autonomous. It was suggested that perhaps the focus should be on V2I – disregarding reference to connected or autonomous more specifically. Rob concluded the recap by noting the four priority applications that have been identified by the Executive Committee – Intersections, Work Zone

Management, Intersections, and Queue Warning. He added that the TWGs have spent the initial 18 months of effort:

- Informing and educating Connected Vehicle stakeholders on available tools to assist them in deploying V2I technologies.
- Researching and defining a set of V2I issues and identifying needed action plans to address the issues, as they relate to the initial four goals/focus areas.
- Facilitating discussions between OEMs and infrastructure owners and operators to enable both parties to understand the goals and objectives of the other party.

### V2I DC TWGs Summarize Results and Efforts

Each of the TWG chairs were asked to present a high level summary of the results and findings of their respective groups over the past year, including the issues addressed, emphasis on the four priority applications, deliverables prepared, issues for CAV ELT consideration and next steps before June 2016.

#### *TWG 1: Deployment Initiatives*

Bill Legg, Washington DOT, explained that TWG 1 has focused on the following issues:

- Issue 1: V2X Applications
- Issue 7: Understanding the Benefits and Costs of V2I Deployment and Operation
- Issue 13: Infrastructure Processes as V2I Obstacles
- Issue 14: Federal V2I Policy Statement
- Issue 15: Maintaining V2I Infrastructure

The group initially focused on wanting to understand what was being deployed and a desire to support the overall Coalition. This led to a desire to explore costs, obstacles and a strong federal policy. Bill noted the need to more closely coordinate work across the TWGs. In line with the Coalition's desire to accelerate deployment, TWG 1 would like to build or gather a set of tools to support quick deployment. This will require more coordination among TWGs and stronger, closer work with OEMs to better understand each sides' business models. Regarding future potential work for the Coalition, Bill described the concept of deploying SPaT as a simple application that will allow practice with using new tools and provide a framework for deploying – one that reduces fear and increases learning to set the stage for other app deployment. The group supported the concept and suggested development of "how-to" guidelines. It was also noted that the deployment concept sends a stronger but still not mandated message to the agencies. It was observed that OEMs really want to focus on a small number of apps and do them well. The group discussed how to strengthen relationships with OEMs and it was noted that the open group discussions in TWG 3 have been useful. Additional opportunities to interact with OEMs are needed. The group recommended an action to arrange a workshop between OEMs and owners/operators to further discuss the SPaT deployment concept and other issues related to V2I deployment. AASHTO agreed to take the lead on the action. This concept will also be shared with the CAV ELT for further input.

Bill concluded his remarks for TWG 1 by noting the group's remaining work through June will consist of wrapping up discussion on maintaining V2I infrastructure, finalizing action items related to infrastructure processes as barriers, and coordinating with other TWGs on issues of mutual interest.

#### *TWG 2: Deployment Research*

Greg Larson explained that TWG 2 has been working on the following issues:

- Issue 1: V2X Applications

- Issue 3: V2I Data
- Issue 6: V2I Outreach
- Issue 7: Understanding the Benefits and Costs of V2I Deployment and Operation

Greg explained that although Issue 4: Patents-Intellectual Property and Issue 9: Understanding V2I Liability Assignment were also originally assigned to TWG 2 the group did not address them due to a lack of legal knowledge. TWG 2 has focused more on Issues 1 and 3. Regarding Issue 1, Greg noted that applications have been identified in many places – CVRIA has a list of over 70 applications, FHWA has a list of more than 50 applications. This has caused some confusion and TWG 2 suggests that one definitive list be established to focus deployment and other efforts. This challenge is evident with trying to mesh the lists for various activities like development of the benefit/cost tools. Greg added there could be some filtering around app readiness. Regarding Issue 3, the identification of clear data needs from the OEMs should be further researched. TWG 2 will develop a problem statement to research and resolve as many of the prioritized data issues as possible over the coming 2-5 years.

Greg noted that the one-stop-shop for research in relation to Issue 6: V2I Outreach will continue to be an important area for TWG 2 going forward. TWG 2 will describe the one-stop-shop to the point where entities could estimate the costs and resources required to create and operate it. Regarding Issue 7: Understanding the Benefits and Costs of V2I Deployment and Operation, TWG 2 members reviewed webinar summaries from TWG 1 and the case studies developed by TWG 3 to identify gaps that may require additional research. A problem statement will be created defining additional research needed to supplement both the current and completed benefit/cost studies.

Greg concluded his remarks for TWG 2 by outlining topics to further discuss with the CAV ELT. He reemphasized the need for better mechanisms for OEMs and owners/operators to work together. He reiterated the need to develop a more streamlined V2I application list. He also requested that the CAV ELT consider supplemental approaches for developing and providing deployment guidance outside of formal V2I Deployment Guidance development process that USDOT must follow. It was noted that one such supplemental approach could involve an association issuing interim guidance. This could allow another level of detail and faster release to the agencies.

### *TWG 3: Partners*

Matt Smith, Michigan DOT, provided an overview of the progress from TWG 3 in the following issues:

- Issue 1: V2X Applications
- Issue 3: V2I Data
- Issue 7: Understanding the Benefits and Costs of V2I Deployment and Operation
- Issue 16: Operator and OEM Goals for V2I

Matt noted that primary issues for them were Issue 3: V2I Data and Issue 7: Understanding the Benefits and Costs of V2I Deployment and Operations. Regarding Issue 3, the group has noted that owner/operators need data from vehicles just as OEMs may need data from the infrastructure for certain applications. TWG 3 would like to further explore data needs with OEMs and owners/operators by identifying what data is needed for each application, what may be common across applications and what could potentially be low-hanging fruit for continued deployment. Matt further explained that as TWG 3 has addressed Issue 7, they could only make assumptions based on research in many cases. Having results from the CV Pilots will be important for improving benefit and cost information, particularly for application

development, maintenance and security. He also noted that benefit/cost information will need to be consistently updated to be useful to agencies.

Matt shared that in discussing Issue 16: Operator and OEM Goals for V2I it was clear that safety is a common goal for all partners. Private industry is providing solutions and services that are in line with agencies' overall mission and goals, and they are providing new technological solutions for owners/operators that will lead to new business opportunities. He reiterated the value of hosting a workshop for OEMs and owners/operators to further discuss goals overall.

The group's future work will continue to focus on these issues as well as security and international harmonization. Security is relevant at multiple levels in V2I. Matt suggested that a likely first step could include a survey of what is being done and by whom. It was noted that the Connected Vehicle pooled fund has been struggling to figure out security, too. It was asked if there are principles established around security for V2I similar to those developed for transponders, and it was suggested that establishing higher level principles may also be a good starting point. Matt explained that international harmonization will involve exploring a common concept for V2I development. He also asked for flexibility with focus on four priority applications identified by the V2I DC because some are very broad. For example, intersections could involve several applications. It was suggested that a roadmap be developed for the four priority apps to explain the finer details of each. It was also suggested that developing more specific guidance for the four priority apps would be helpful but there must also be caution against developing guidance that is so restrictive it inhibit deployment. Deployment experiences should be used to inform guidance.

#### *TWG 4: Deployment Guidance*

Faisal Saleem provided an overview of the issues that TWG 4 has been working on:

- Issue 1: V2X Applications
- Issue 6: V2I Outreach
- Issue 7: Understanding the Benefits and Costs of V2I Deployment and Operation
- Issue 9: Understanding V2I Liability Assignment
- Issue 11: V2I Consumer Messaging
- Issue 13: Infrastructure Processes as V2I Obstacles
- Issue 14: Federal V2I Policy Statement

In relation to the issues that had already been discussed by the other group, Faisal explained that TWG 4 is gathering TWG feedback on the other issues to review in relation to the new V2I Deployment Guidance once it is issued. He noted that TWG 4 has continued to provide input to USDOT by reviewing the Guidance products that are being developed. He also shared the process for further developing Issue 14: Federal V2I Policy with TWG 1. Faisal explained that the groups have agreed to wait until the new Guidance is issued to determine what specifically an additional Federal policy statement could address. He explained that the policy statement would be presented to the Executive Committee for review and feedback, and then it would be further presented to the CAV ELT to determine if what should be presented to USDOT. It was noted that although the Coalition cannot make formal recommendations, the resulting discussion of this issue can still be provided as feedback to USDOT regarding the current policy position. Faisal reiterated the need to find a supplemental path for issuing guidance to the agencies in a timelier fashion. He added the need to continuously support outreach on V2I especially since it involves so many audiences, messages, etc. and TWG 4 would like to see outreach be sustained and continuous – especially as information changes. It was also noted that outreach should include a scenario describing how local agencies in particular can fit CAV in with all the other transportation priorities (e.g. walkable communities, increased transit, etc.).

### *TWG 5: Deployment Standards*

Ed Seymour, TTI, provided an update on the progress that TWG 5 has made with the following issues:

- Issue 1: V2X Applications
- Issue 3: V2I Data
- Issue 6: V2I Outreach
- Issue 8: V2I Standards

Ed noted that broader input goes beyond OEMs to include standards development organizations, other associations, freight, transit, vulnerable road users, etc. TWG 5 would also like to have input on standards from the deployment sites – both those selected and those proposed. Ed added that waiting for deployment findings to be published is not an efficient model to encourage further deployment. Finding a way to get interim feedback is needed. He suggested reviewing applications that were submitted to extract information related to standards and other deployments proposed. USDOT explained that although the Smart Cities applications may be available eventually this won't likely be the case with the CV Pilot application. It was suggested that the group contact those who submitted CV Pilot applications to request from their proposals. USDOT noted that they could potentially issue a request to the submitters to voluntarily share their information with the V2I DC. Ed further explained that TWG 5 is now identifying standards gaps as part of their work to address Issue 8: V2I Standards and they will suggest potential actions for filling the gaps. For potential future work of the Coalition, TWG 3 suggested several items for further CAV ELT consideration, including:

- Maintain the standards context drawing
- Engaging Smart Cities and Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grant applicants in standards discussions
- Engaging telecommunications providers
- Conformance with appropriate standards
- Monitor certification – currently limited to and focused on CV Pilots
- Monitor security needs and engage experts as the issue comes forward
- Consider standard specification for an after-market system design, subject to the contents of the NPRM
- Focus on and look for gaps in fleet-related standards if an NPRM for heavy vehicles is released
- Perhaps broader engagement with commercial vehicle fleets
- Stay involved with the SAE I2V/V2I Task Force and other standards development organizations

### *V2I DC Group Discussion and Reaction to TWG Reports*

Following updates from each of the five TWGs, the Executive Committee discussed actionable outcomes, the final technical memorandum to be prepared following the workshop, future scope of the Coalition and topics that should be raised to the CAV ELT.

The actions identified for the Coalition based on the TWG reports are summarized as follows (numbered here for reference only):

1. Workshop to discuss OEM and owner/operator goals and needs for V2I deployment.
2. Supplemental guidance documents with more frequent updates and accessibility. It was noted that MUTCD and Green Book development could be potential models to follow. It was also

suggested waiting for latest V2I Deployment Guidance before articulating a proposal to develop supplemental guidance.

3. SPaT national rollout concept should be further developed. It was noted that the concept should not imply a national overhaul of signals but rather focus on the limited deployment that was discussed.
4. V2I security activities need to be better understood and it was suggested that a survey be conducted to determine what is being done and what is known so the Coalition can better understand the scope of security.
5. Framework should be developed for the four priority application area.
6. V2I outreach needs priority, direction and support. It was added that terminology should also be clarified for both outreach and technical perspectives.
7. Mining data from completed and underway projects and proposals could provide further insight on deployment issues.

### V2I DC Future Plans and Activities

Gummada explained that a final technical memorandum will be prepared following the workshop to summarize the results of the TWG work for the V2I DC since June 2015. There are limitations to the V2I DC scope (e.g. the coalition is not performing any deployments, the coalition is not developing scopes for project efforts, and the coalition is not making recommendations). However, the V2I DC is tasked with identifying top issues to address and defining action plans where appropriate. The final technical memorandum will identify what could not be accomplished by June 2016, as well as potential work that should continue after that date. This memo will also support USDOT's consideration of the business plan submitted to continue the V2I DC after June 2016.

### Closing

Gummada asked Ed Bradley, Toyota, to share his impressions of V2I DC as a representative of the OEMs. Ed is an engineering manager in the safety and regulatory group for Toyota, and he is president of the VIIC which includes numerous OEMs. Ed explained that the VIIC has focused on policy issues related to connected vehicles. For example, turning over fleets takes about a decade and the industry is extremely competitive. OEMs are working collaboratively on safety, mobility and environmental applications and they have been working together on anticipated V2V regulations. The V2V work is being done with an eye toward infrastructure but the OEMs are mostly familiar with NHTSA from the regulatory angle. Working with FHWA is a new and welcome thing for most of them. OEMs are primarily worried about customers rejecting new technology so they have a pressing need to have applications work all the time and in all environments. Ed offered to encourage greater OEM participation in the V2I DC. He saw great value in TWG 3 discussion over the last couple days and would like to propose more frequent meetings to further the discussions. It was asked what the Coalition could provide the OEMs in return. Ed answered that simply holding the meetings in Michigan is very helpful as it makes participation easier. He also noted that OEMs are very concerned about the CV Pilots and wanting the deployments to be successful. It was asked how the OEMs feel about the potential for retrofitting vehicles or aftermarket products that may develop in between manufacturing cycles. Ed agreed that this is likely to happen and the OEMs are expecting it. It was also noted that the Special Equipment Manufacturers Association (SEMA) members are developing aftermarket products and training to install it. OEMs have traditionally not been as supportive of aftermarket but there is still a recognition that it will happen. Ed was asked to share the status of the VIIC and he explained that the group began in 2004 and their contract with USDOT ends this year. Tom Schafnit

retired earlier this year and Ed was appointed as interim president. It is not certain what will happen when the contract ends, however Ed has made a recommendation to the VIIC board.

Gummada thanks Ed for sharing his perspective as an OEM. He noted that V2I DC business plan will be finalized based on feedback from USDOT in the coming weeks and then the Coalition will proceed with more detailed scoping for the second phase of work. The plan is to submit the final technical memorandum to USDOT this August. A full V2I DC will be arranged to review next steps. The meeting concluded with a final note that there will be a V2I DC session at ITS America for the TWG chairs to share information about the Coalition. The session is scheduled for June 14 from 3:30-4:30.