Vehicle to Infrastructure Deployment Coalition
V2I DC

Final Phase 1 Webinar
3:30 – 4:30 PM (Eastern) | February 13, 2017
Webinar Logistics

• All lines are muted

• Webinar will be recorded

• Submit questions and comments in chat or Q&A section of webinar window

• Questions will be answered at webinar conclusion
Agenda

• Introduction

• Welcome and V2I DC Milestones
  ▪ Shailen Bhatt, Colorado DOT

• Key Outcomes from V2I DC
  ▪ Greg Larson, Caltrans
  ▪ Matt Smith, Michigan DOT
  ▪ Ed Seymour, TTI

• Future V2I DC Work
  ▪ Dean Deeter, Athey Creek Consultants

• Q&A
Welcome and V2I DC Milestones

Shailen Bhatt, Colorado DOT
Chair of V2I DC Executive Committee
Initial Goal of V2I DC

To help accelerate V2I deployments that support passenger vehicles, freight and transit in both urban and rural areas, with initial focus on:

1. Intersections (signalized/unsignalized)
2. Queue warnings
3. Work zone management
4. Curve warning systems
V2I DC Structure

Connected Automated Vehicle Executive Leadership Team

V2IDC Executive Committee

V2I Deployment Coalition

US DOT - ITS JPO - FHWA - FTA - NHTSA

TWG 1: Deployment Initiatives

TWG 2: Deployment Research

TWG 3: Infrastructure Operator, OEM, and Supplier Partnerships

TWG 4: Deployment Guidance

TWG 5: Deployment Standards
### V2I DC Work on Deployment Issues

<table>
<thead>
<tr>
<th>Issue</th>
<th>TWG 1 Initiatives</th>
<th>TWG 2 Research</th>
<th>TWG 3 Partners</th>
<th>TWG 4 Guidance</th>
<th>TWG 5 Standards</th>
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<tr>
<td>Issue 1: V2X Applications</td>
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<td>Coalition Webinar 1</td>
<td>May 7, 2015</td>
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<td>Coalition Workshop 1 (Pittsburg, PA)</td>
<td>Jun 4-5, 2015</td>
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<td>Executive Committee Standup &amp; Meeting 1</td>
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<td>Executive Committee Meeting 3</td>
<td>Dec 6, 2016</td>
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<td><strong>Final Phase 1 Webinar</strong></td>
<td><strong>Feb 13, 2017</strong></td>
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V2I DC Deliverables

Tech Memo 1: V2I Deployment Issues       Jun 18, 2015
Tech Memo 4: Phase 1 Final Report         Jan 31, 2017

www.transportationops.org/V2I/V2I-overview
Key Outcomes from V2I DC

V2I DC TWG Chairs
  Greg Larson, Caltrans
  Matt Smith, Michigan DOT
  Ed Seymour, TTI
Key Outcome:
SPaT Challenge
Greg Larson, Caltrans
SPaT Challenge

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

What is the Challenge?
To challenge state and local public sector transportation IOOs 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 state by January 2020.
SPaT Challenge

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

- Lay ground work for more advanced V2I deployments
- Show a commitment to OEMs and applications developers
- Analogous to early fiber deployments – most benefits came later
SPaT Challenge

What are the benefits?

- Be more prepared for DSRC-equipped vehicles and on-board V2I applications
- Useful as testing site for future applications
- Other V2I applications that build on SPaT at intersections:
  - Smart Transit Signal Priority
  - Red Light Violation Warning
  - Intelligent Signal Systems
  - Eco-Driver
SPaT Challenge

What resources will be available?

RESOURCES

The following resources have been compiled or created by members of the V2I Deployment Coalition and are available or will soon be available.

- Resource #1: DSRC licensing information
- Resource #2: Implementation guidance
- Resource #3: Estimated costs (install & maintenance) - Coming Soon
- Resource #4: Sample SPaT documentation - Coming Soon
- Resource #5: Guidelines for selecting corridors
- Resource #6: Procurement Guidance - Coming Soon
- Resource #7: Identifying existing funding sources to consider - Coming Soon
- Resource #8: Frequently Asked Questions (FAQs)
- Webinar Schedule and Recordings – Coming Soon
- Additional Links
Key Outcome: V2I Research Definitions

Greg Larson, Caltrans
V2I Research Definitions

1. Research Definition for Cooperative Vehicle-Infrastructure Situational Awareness System
2. Research Definition for Readiness Assessment of Connected Vehicle (CV) Applications in the OSADP
3. Research Definition for How to Prepare TIM Responders for a Connected Vehicle / Automated Vehicle World
V2I Research Definitions

4. Research Definition for I2V for Automated Vehicle Navigation
5. V2I Outreach (One-Stop Shop for Research)
6. Research Definition for Cost-Effectiveness Assessment of Vehicle to Infrastructure Applications
7. Research Definition for Planning Analysis Methods for Assessing the Mobility and Reliability Impacts of Connected and Autonomous Vehicles
Key Outcome: Engaged a Unified Coalition

Matt Smith, Michigan DOT
Engaged a Unified Coalition

• V2I DC has grown to over 250 members with transportation and technical professionals from public and private sectors
  ▪ Organized a unified message regarding DSRC bandwidth needs and issues
  ▪ Reviewed and commented on V2I Deployment Guidance and products for USDOT
  ▪ Learned about outcomes and findings of V2I research and demonstrations
Key Outcome:
IOO/OEM Workshop
Matt Smith, Michigan DOT
IOO/OEM Workshop

- Initial two-day workshop held Sep 22-23
- Long-term collaboration framework established
- Technical needs identified
- General consensus to:
  - Proceed with a “forum for collaboration”
  - Forum will function within V2IDC structure
IOO/OEM Workshop

• IOO Representatives
  ▪ Matt Smith, MDOT – Overall IOO State Lead
  ▪ Faisal Saleem, MCDOT – Overall IOO Local Co-Lead
  ▪ Ahmad Jawad, RCOC – Arterial Apps
  ▪ Blaine Leonard, UDOT – AASHTO STSMO CAV TWG Chair
  ▪ Melissa Lance, VDOT – CV PFS Lead
  ▪ Greg Larson – Caltrans
  ▪ Ed Seymour, TTI and Standards
IOO/OEM Workshop

- OEM/CAMP Representatives
  - Mike Shulman, Ford (CAMP) – Overall OEM Lead
    - Jay Parikh, CAMP
    - Others as appointed by CAMP (including Nissan, Volvo, etc.)
  - Ed Bradley, Toyota (Outside CAMP)
  - Other OEM participation with USDOT support

- USDOT
  - FHWA – Bob Arnold, Bob Rupert
  - ITS JPO – Bob Sheehan, Jonathan Walker
  - TFB FHWA – Brian Cronin, Carl Andersen, Gene McHale
IOO/OEM Workshop

Approach for initial 90 days

- IOO and OEM individual participation
  - Invitation only – not open to entire V2I DC
- Ad-hoc focus area groups
  - SPaT Challenge / RLVW
  - Data Exchange
  - Cooperative Automation (e.g. Eco-Drive, MMITSS)
- Ad-hoc groups report back to full forum
IOO/OEM Workshop

Progress during initial 90 days

SPaT / RLVW Group
IOO members:
• Blaine Leonard
• Bill Legg
• Matt Smith
• Faisal Saleem
Webinars:
• Oct 26
• Dec 15

Data Exchange Group
IOO members:
• Matt Smith
• Greg Larson
• Melissa Lance
• Bill Legg
Webinars:
• Dec 12

Cooperative Automation / Eco-Drive
IOO members:
• Ahmad Jawad
• Matt Smith
• Faisal Saleem
• Greg Larson
• Bill Legg
Webinars:
• Dec 16
IOO/OEM Workshop

Approach for next 12 months

• Continue the Key Focus Areas:
  ▪ SPaT/RLVW
  ▪ Reduced Speed Zone Warning (RSZW)
  ▪ Eco-Drive
  ▪ Data Exchanges
Key Outcome: Standards Context and Recommendations

Ed Seymour, TTI
Standards Context and Recommendations
Standards Context and Recommendations

- Context diagram illustrates various standards that exist to support vehicle, infrastructure, and roadside units.
- Diagram has been critical towards understanding spectrum of V2I standards.
- Serves as a framework to show relationships among V2I standards – both current and needed.
Standards Context and Recommendations

• Recommendations included additional actions to address needs and gaps related to V2I standards
  1. Maintain Standards Context Diagram
  2. Representatives from V2I DC should interact with SAE DSRC Technical Committee
  3. Once DSRC RSU specification is stabilized it should be transferred to an appropriate SDO and updated to a consensus driven standard
  4. Explore development of automated testing tools for RSUs
  5. Support standardization and expansion of SCMS
Standards Context and Recommendations

6. Monitor RSU certification activities as actual deployments occur and develop comprehensive certification process

7. Explore move from best practices to “enforceable” or “gradable” performance

8. Encourage and work among associations to support efforts to update MUTCD and other guidance documents

9. Conduct webinar to review the USDOT Data Capture Management document with V2I DC

10. Engage with Smart City and ATCMTD projects to identify lessons learned

11. Engage telecommunications and IT industries to ensure that standards and guidelines are robust and reflect current technologies

12. Look for gaps in fleet-related standards
Future V2I DC Work
Dean Deeter, Athey Creek Consultants
Current V2I DC Structure – Phase 1

CAV-ELT

V2IDC Executive Committee

USDOT
- ITS JPO
- FHWA
- FTA
- NHTSA

V2I Deployment Coalition

TWG 1: Deployment Initiatives

TWG 2: Deployment Research

TWG 3: Infrastructure Operator, OEM, and Supplier Partnerships

TWG 4: Deployment Guidance

TWG 5: Deployment Standards
Proposed V2I DC Structure – Phase 2

CAV-ELT

V2IDC Executive Committee

- V2I DC Strategic Initiatives TWG
- V2I DC Guidance TWG
- V2I DC Peer Exchange / Outreach TWG

USDOT
- ITS JPO
- FHWA
- FTA
- NHTSA

AASHTO ITS AMERICA
Proposed V2I DC Structure – Phase 2

Will carry on activities previously performed by TWG 1 Initiatives
For example:
• Continue SPaT Challenge
• Look for new initiatives similar to SPaT Challenge

CAV-ELT

V2IDC Executive Committee

V2I DC Strategic Initiatives TWG

V2I DC Guidance TWG

USDOT - ITS JPO - FHWA

Resource development;
Proposed V2I DC Structure – Phase 2

Will carry on activities previously performed by TWG 4 Guidance For example:
• Review and provide feedback to USDOT on V2I Deployment Guidance and supporting products
Large working group, meeting approximately quarterly, with well constructed agendas and invited speakers to allow peer exchange on key V2I topics, including:

- Pilot Deployment / Smart City Updates
- Connected Vehicle Standards
- Connected Vehicle Research
- Deployment Status
- AV Policy Updates
- Outcomes of IOO/OEM Forum Discussions

All members of V2I DC would be encouraged to participate in this TWG; group will carry on many functions of current TWG 2, 3, and 5
V2I DC Phase 1 Transition to Phase 2

- New structure will be activated once Phase 2 begins
- TWG meetings will be supported as needed during transition
- Coalition wide webinars every other month
  - April 12, 11:00-12:30 (Eastern)
Q&A
Submit questions and comments in chat or Q&A section of webinar window

V2I Deployment Coalition Website
www.transportationops.org/V2I/V2I-overview