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VEHICLE-TO-INFRASTRUCTURE DEPLOYMENT

WHAT SHOULD STATES DO NOW?

For more than a decade, the U.S. Department of Transportation (USDOT) has been researching the potential benefits of connected vehicle technology, which allows vehicles to communicate with each other, roadway infrastructure, traffic management centers, and our personal mobile devices. Using advanced wireless communications, cars, trucks, buses, and even motorcycles soon will be able to share real-time information about their speed, position, brake status, and more. Vehicle-to-infrastructure (V2I) communications is the wireless exchange of data between vehicles and roadway infrastructure such as traffic signals, work zones, and toll booths. When leveraged with vehicle-to-vehicle communications technology, a V2I deployment will result in significant safety, mobility, and environmental benefits that will be of significant interest to state, regional, and local transportation agencies.

Photo Source: USDOT

The following are seven basic steps for state departments of transportation (DOTs) and owners/operators that are considering deployments for connected vehicle technology:

1. **Initiate the Planning Process:** Consider how V2I communications and applications could be used to solve your problems. What applications are best suited to address critical safety, mobility, and environmental problems? Would the technology be able to collect helpful data on system operations? Where would you need to implement the equipment?

   The Federal Highway Administration (FHWA) is developing a product that will be available this year to help with these planning questions. In the meantime, the American Association of State Highway and Transportation Officials (AASHTO) *National Connected Vehicle Field Infrastructure Footprint Analysis* report provides information on these topics for agency decision-makers to consider. To view the AASHTO report, please visit: http://ntl.bts.gov/lib/52000/52600/52602/FHWA-JPO-14-125_v2.pdf. The Connected Vehicle Pilot Deployment Program webpage has information on various applications that were recently developed. For more information, please visit: http://www.its.dot.gov/pilots/index.htm.

2. **Update the Regional Intelligent Transportation System (ITS) Architecture:** Regions should start to update their ITS architecture with connected vehicles

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in mind. The first step is to create a connected vehicle architecture component. The Systems Engineering Tool for Intelligent Transportation (SET-IT) was developed to help with this process. For more information on the SET-IT tool, please visit: http://www.iteris.com/cvria/html/resources/tools.html. The USDOT is currently working in Southeast Michigan to develop a comprehensive reference architecture example. Details are available at: http://standards.its.dot.gov/DevelopmentActivities/CVReference.

3. **Consider the Connected Vehicle Pooled Fund:** The Virginia DOT leads the Connected Vehicle Pooled Fund Study (CV PFS). This group provides many states with opportunity to gain hands-on experience dealing with V2I deployment and research issues. A state, regional, or local agency can become an official member for $50,000. Some agencies can obtain an observer status at no cost. For more information, visit CV PFS website at: http://www.cts.virginia.edu/cvpfs/, or contact Melissa Lance at Melissa.Lance@vdot.virginia.gov.

4. **Get Involved in the V2I Deployment Coalition:** AASHTO formed a V2I Deployment Coalition (V2I-DC) that provides a more centralized framework for achieving comprehensive stakeholder input and owner/operator participation in order to accelerate V2I deployment activities. The coalition has become an interface for peer interaction, webinars, research, conferences, and technical working groups. The V2I DC is open to the public and has become an interface for peer interaction, webinars, research, conferences, and technical working groups (TWGs).

   Currently, the V2I-DC has five TWGs, focused on distinct aspects of V2I deployment. Each TWG exchanges information, discusses issues, and recommends actions and next steps. The initial TWGs are listed below.

   - TWG 1: Deployment Initiatives
   - TWG 2: Deployment Research
   - TWG 3: Infrastructure Operator, Original Equipment Manufacturer, and Supplier Partnerships
   - TWG 4: Deployment Guidance
   - TWG 5: Deployment Standards

   To become involved with the V2I-DC, please contact Mr. Gummada Murthy, Ph.D., P.E. of AASHTO at (202) 624-8913.

5. **Join and/or Monitor Affiliated Testbed Activities:** The USDOT's ITS Joint Program Office (JPO) is collaborating with industry on detailed technical issues related to connected vehicle technologies. The ITS JPO has entered into over

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75 Memorandums of Agreement with public, private, and academic organizations involved in the affiliation of test beds. The purpose of the memoranda is to create a non-binding, precompetitive affiliation among those using V2I communications devices and installations. The affiliation facilitates information exchanges, allows organizations to share USDOT tools and resources, and encourages the consistent development and deployment of infrastructure components. States should consider joining the testbed and/or monitoring the work. For more information, visit: http://www.its.dot.gov/testbed/testbed_affiliated.htm.

6. **Purchase Certified Equipment:** Three independent testing entities are developing certification processes for key information flows in the connected vehicle system architecture to ensure basic interoperability in connected vehicle installations. Certification will ensure basic interoperability in connected vehicle installations. Certification processes will be available for self-application, and testing services will be available in 2016 from the three testing entities on a fee-for-service basis. Contact Kevin Gay (Kevin.Gay@dot.gov) for further information.

7. **Participate in Training:** The USDOT's ITS Professional Capacity Building program is developing a comprehensive training program for connected vehicle professionals. A Connected Vehicle 101 (CV101) eLearning course offers an introduction and broad overview of connected vehicle technology. A second connected vehicle workshop (CV102) provides a detailed look at connected vehicle applications and their benefits. A new connected vehicle workshop (CV201) in development will discuss information exchange, ITS standards, and communications security. For more information, visit: http://www.pcb.its.dot.gov. In addition, the Connected Vehicle Reference Implementation Architecture training is available at http://www.iteris.com/cvria/html/resources/cvriatraining.html. This training provides an overview of the implementation architecture, including the SET-IT software tool.

For more information about this initiative, please contact:

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FHWA-JPO-16-414