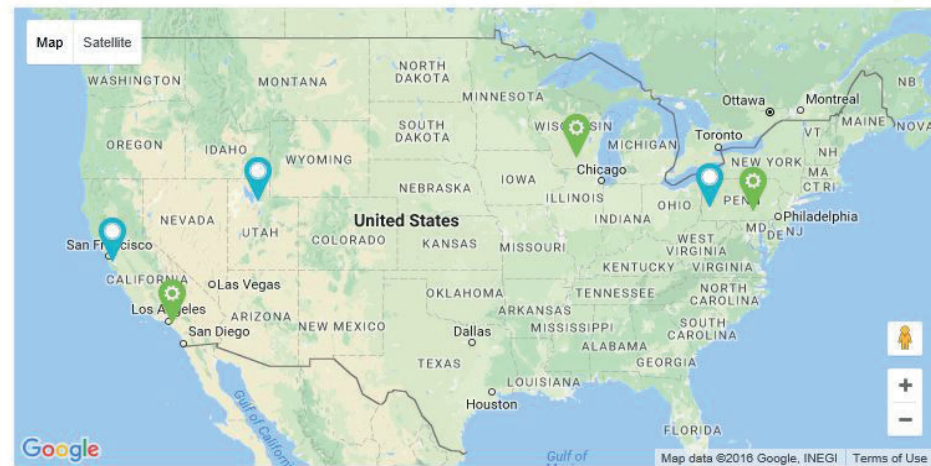


### Where has SPaT already been deployed?

The NOCOE has a map to track progress of the Challenge. Check the website for frequent map updates and new resources as they become available!



-  SPaT deployment underway
-  SPaT deployment operational

If you have deployed SPaT or are planning on doing so let people know by posting your information on the website. Go to <http://www.transportationops.org/spatchallenge> for more information.



### Get Involved with Connected Vehicles – Take the Challenge!

More information is available at the National Operations Center of Excellence:

<http://www.transportationops.org/spatchallenge>

Infrastructure Owners & Operators wishing to join the challenge, or others wishing to participate in the effort, may contact Patrick Son the Managing Director of the National Operations Center of Excellence at [pson@transportationops.org](mailto:pson@transportationops.org)

**20/50/20 – 20 intersections in each of the 50 states by 2020**

The AASHTO Connected Vehicle SPaT Deployment Challenge is being led by the V2I Deployment Coalition which is led by AASHTO, ITE, and ITS America, with support from the AASHTO Connected and Automated Vehicle Working Group.



You can get a copy of this folio at <http://transportationops.org/spatchallenge>

Jan 2017

# The National Connected Vehicle SPaT Deployment Challenge



## A Challenge...

To state and local public sector transportation infrastructure owners and operators to achieve deployment of DSRC 5.9 GHz infrastructure with SPaT broadcasts in at least one corridor or network (approximately 20 signalized intersections) in each of the 50 states by January 2020 through cooperation and coordination.

## What is SPaT?

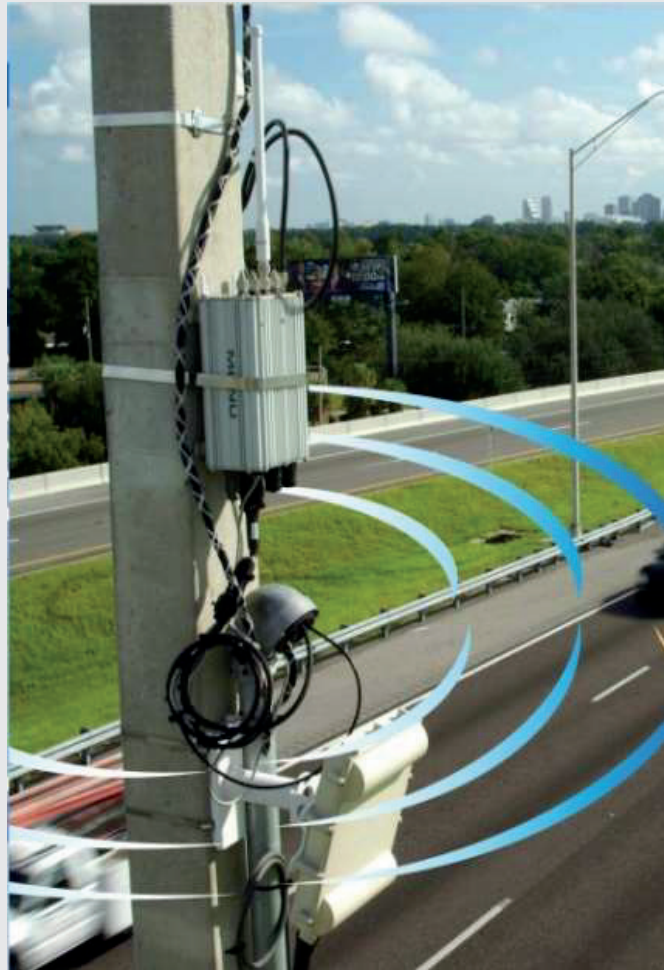
A Signal Phase and Timing (SPaT) message defines the current intersection signal light phases. The current state of all lanes at the intersection are provided, as well as any active pre-emption or priority.

## What is DSRC?

Dedicated short range communication (DSRC) refers to two-way radio communication operating on the 5.9GHz band for the purpose of supporting vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) traffic applications. The FCC has set aside this band for this purpose. The National Highway Traffic Safety Administration (NHTSA) is in the process of requiring all new light vehicles sold in the U.S. to be equipped with DSRC radios and for those radios to transmit basic information about the location, speed, and critical operations of the vehicle. This will enable agencies to both collect limited anonymous vehicle data using roadside installed DSRC radios and to transmit data, such as SPaT, back into the vehicle with the intent to support safer, more efficient operations.

## Why is this challenge important?

- It provides State and Local DOTs with an entry into DSRC based V2I deployment (allowing them to gain valuable procurement, licensing, installation, and operation experience)
- It promotes future (more advanced) V2I deployments
- It demonstrates 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 fewer is OK
- Modern controllers with in-cabinet equipment to support the interface with a DSRC radio (the “roadside unit” or “RSU”)
- Backhaul communications with sufficient bandwidth from the corridor either from each signal or from a master.

#### What else is needed?

In addition to broadcasting SPaT data, the intersection needs to broadcast MAP/GID (Geographic Intersection Description) data. This is a detailed data file that describes the physical intersection geometry, which must be created using accurate mapping data. For some future applications, a global navigation satellite differential correction, the “RTCM,” must be broadcast to ensure the vehicles’ GPS data is accurate for the intersection. This broadcast can be added later.

*“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**

### Available SPaT Challenge Resources

The following resources are available to help to get started with the Challenge. All of these resources, and others, can be found at the National Operations Center of Excellence (NoCOE) website:

<http://transportationops.org/spatchallenge>

#### ➤ **SPaT Challenge FAQs**

A comprehensive introduction to the challenge to help guide agencies with their participation.

#### ➤ **Guidelines for Selecting Corridors**

Provides guidance to assist agencies accepting the SPaT Challenge in selecting their corridor or network.

#### ➤ **How Much Will This Cost?**

Deployment costs have been estimated to be about \$15K-\$50K per intersection, based on some early deployments. More recent deployments suggest that the cost could be as low as \$5k per intersection. Backhaul communication installation will cost between \$4-\$40K for the corridor depending on existing services. Ongoing operations and maintenance costs for the corridor could be around \$2-\$3K a year per intersection, depending on ongoing backhaul communications costs.

#### ➤ **Recommended Practices for DSRC Licensing and Spectrum Management - A Guide for Management, Regulation, Deployment, and Administration for a Connected Vehicle Environment Final Report —December 2015 FHWA-JPO-16-267**

This document makes DSRC licensing requirements transparent and best practices accessible to any organization seeking to deploy Connected Vehicle DSRC Roadside Units (RSU) that support V2I communications.

#### ➤ **Connected Vehicle Standards**

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, V2I ITS Standards for Project Managers**

This PCB module provides an introduction to the connected vehicle environment and a description of the potential benefits and capabilities of a V2I environment. The module then presents the ITS Standards that help support the deployment of a V2I application and a V2I infrastructure.

#### ➤ **V2I Deployment Checklist and Guidance**

A checklist of common design, approval, and installation activities required to successfully complete deployment of DSRC systems.

#### ➤ **Interface Software**

The V2I Hub is open source software which bridge the gap between infrastructure messages and vehicle messages and allow the two systems to effectively communicate. This software forms and transmits SPaT messages that are key to connected vehicle applications such as red light violation warning.

#### ➤ **FHWA Draft Vehicle to Infrastructure Deployment Guidance and Products**

This guidance is intended to assist transportation owner operators in deploying V2I technology and to help ensure interoperability and effective operations. A revised version of this guided is expected in early 2017.

#### ➤ **Multi-Modal Intelligent Traffic Signal Systems (MMITSS) ConOps Final Report, Version 3.1 12/4/2012:**

This document describes an application that could be added to DSRC-equipped intersections. The Concept of Operations document, or ConOps, captures a vision and a roadmap for the development, deployment, operation and maintenance of future Multi-Modal Intelligent Traffic Signal Systems (MMITSS) based upon stakeholder views and is written so that it can be reviewed and understood by the various stakeholder communities, including users, owners, operators, and benefactors.