



U.S. Department of Transportation  
**Federal Highway Administration**

# FHWA Office of Operations Getting Ready for Connected and Automated Vehicles





## **Outline of Discussion**

- ✓ Setting the Stage – FHWA’s Connected/Automated Vehicle Activities
- ✓ What Public Agencies Should be Doing or Thinking About
- ✓ Questions



## **FWHA Connected Vehicle Vision Statement**

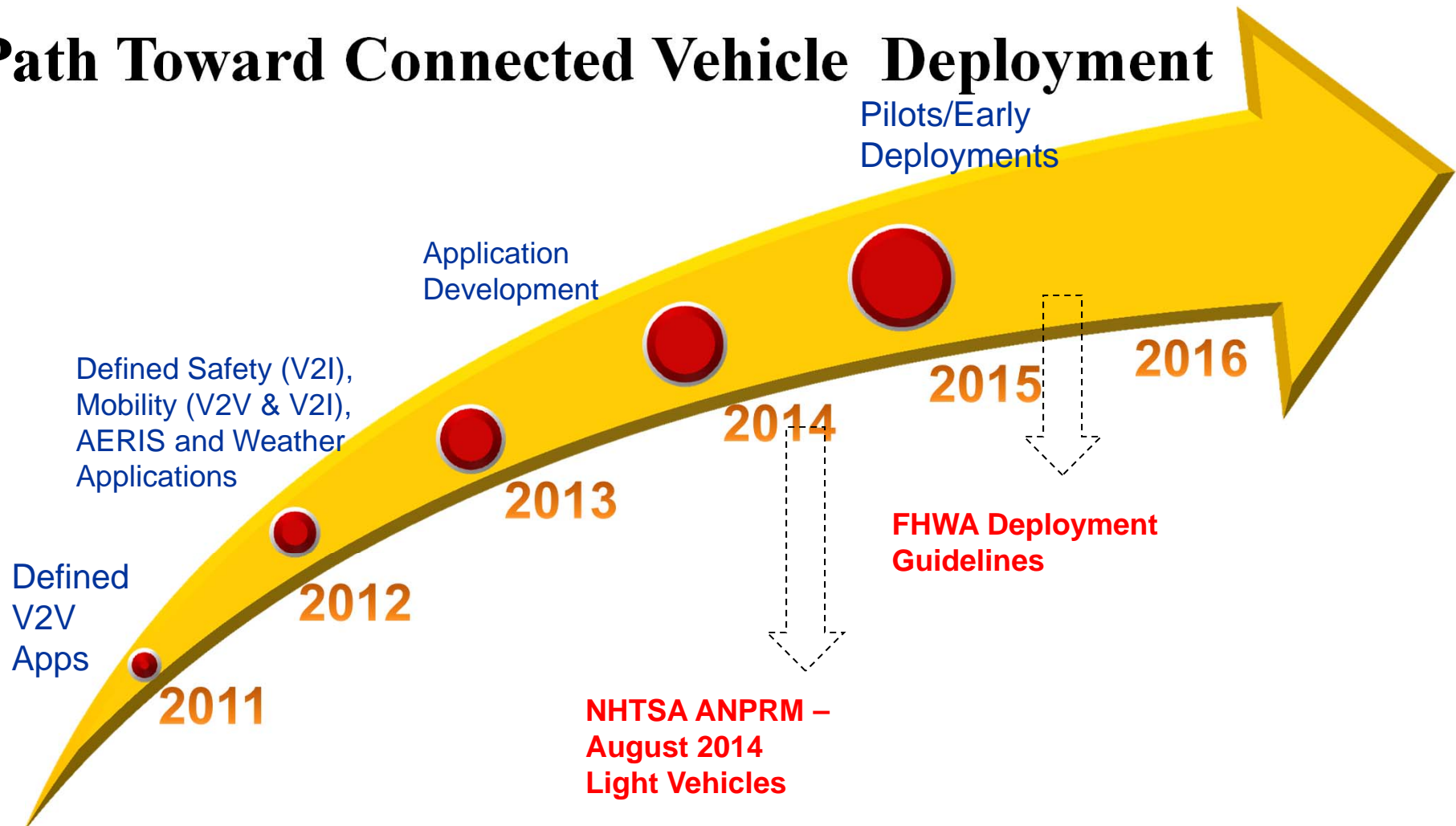
Provide national leadership and facilitate a smooth and effective deployment path for transportation facility owners/operators interested in implementing infrastructure enabled connected vehicle (CV) applications.



Image Source: [http://www.its.dot.gov/press/its\\_images.htm](http://www.its.dot.gov/press/its_images.htm)



# Path Toward Connected Vehicle Deployment



Vehicle-to-Vehicle = V2V; Vehicle-to-Infrastructure = V2I; Applications for the Environment  
Real-Time Information Synthesis = AERIS



## **FHWA Activities**

- ✓ Conducting Research/Developing Applications
- ✓ Providing Awareness and Education
- ✓ Supporting V2I Deployment



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# FHWA V2I Deployment Guidance

- ✓ Policy Guidance
- ✓ Products and Tools
  - Systems Engineering Guide
  - Connected Vehicles and the Planning Process
  - Guide to Licensing
  - V2I Message Lexicon
  - Pre-Deployment Guidance for V2I Safety Applications
  - Estimating Benefits and Economic Impacts
  - Near Term Transition and Phasing
  - Connected Vehicle Training Resources





## **V2I Deployment Coalition (V2I DC)**

AASHTO in collaboration with ITE, and ITSA are establishing a coalition to foster broader stakeholder participation from system owners/operators, public safety groups, professional associations, equipment manufacturers, and academia.

- ✓ Provide input on technical and policy issues related to V2I deployment
- ✓ Carry out strategic outreach to public sector
- ✓ **June 4 and 5 Open Workshop**



# Connected Vehicle Pilot Deployment Program - Goals







## What Should You Be Doing Now?

- ✓ Start to incorporate the concept of Connected Vehicles in your Planning Processes. What problem are you trying to solve?
- ✓ Update your Regional ITS Architecture
- ✓ Upgrade Systems, consider making them Connected Vehicle Ready (include communications as appropriate), & buy certified equipment
- ✓ Consider how automated vehicles may enter your system (platoons, low speed urban, etc.)
- ✓ Participate in the V2I Deployment Coalition, Connected Vehicle pooled fund study, and other ways to influence connected vehicle deployment path



## Performance Based Planning

### ✓ Strategic Direction and Analysis

- Determine your goals and objectives for safety, mobility, environment, etc.
- How do Connected Vehicle Applications Match?
- How can Connected Vehicle technology be used to provide data and measure progress?
- What are specific options?

### ✓ Programming

- How does CV compare to or support other investment options?
- How to pay for CV infrastructure and applications?

### ✓ Implementation and Evaluation

- Can CV data replace existing sources?
- Determining cost effectiveness



## Update Regional ITS Architecture

- ✓ Connected Vehicle Reference Implementation Architecture (CVRIA)
- ✓ Architecture site
  - <http://standards.its.dot.gov/DevelopmentActivities/CVReference>
- ✓ SET-IT Tool Site
  - Version 1.0
  - Sample project
  - <http://www.iteris.com/cvria/html/resources/tools.html>

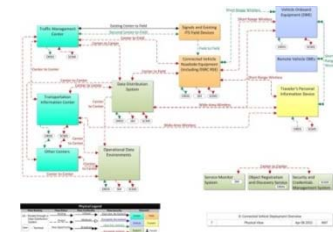


Image Source: <http://www.iteris.com/cvria>



## Certification Expectations for Early Adopters

- ✓ Three independent testing entities are developing certification processes for key information flows in the system architecture that we will be used to assure basic interoperability in CV Pilot installations.
- ✓ Candidate processes will be identified and defined in Q3/2015.
- ✓ Will work with all CV Pilot site operators during their Design Phase. By the end of the Design Phase, all of the CV Pilots implementation teams should be aware of what specific certification services will be available, and be encouraged to use them in their Build Phase.
- ✓ Certification processes will be available for self-application, and testing services will be available during the CV Pilots Build Phase and Operation Phase from the three testing entities on a fee-for-service basis.



# The Evolution of Connected to Automated Vehicles

The path toward connected vehicles will ultimately lead to automated vehicles.

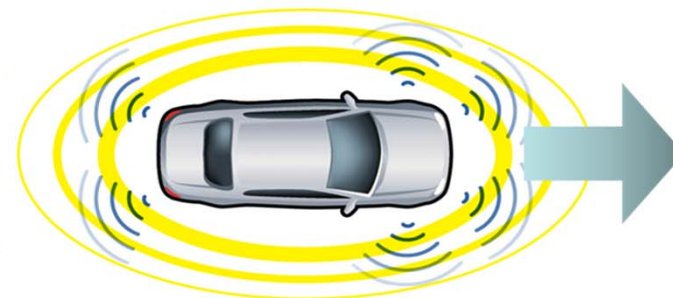
## Connected Vehicle

Communicates with nearby vehicles and infrastructure; Not automated



## Connected Automated Vehicle

Leverages autonomous automated and connected vehicles



## Autonomous Vehicle

Operates in isolation from other vehicles using internal sensors





## Questions

### V2I Deployment Guidance/Products Website

<http://www.its.dot.gov/V2I>

### Contact us

Jeffrey Lindley

Associate Administrator, Office of Operations

[Jeffrey.Lindley@dot.gov](mailto:Jeffrey.Lindley@dot.gov)

202-366-8753