AASHTO's National Infrastructure Analysis

"Preparing for Implementation"

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FOT-NET
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Background

- In late 2011 AASHTO was asked by NHTSA what our implementation plans were for the Connected Vehicle infrastructure?
  - Don’t know what it is
  - Don’t understand the performance/operational requirements
  - Don’t have any money
- Conclusion: we had better find answers to these questions fast!

Background

- In early 2013 AASHTO with support from the USDOT and Transport Canada formed a team to conduct a national connected vehicle field infrastructure footprint analysis
  - Consider broad range of applications in safety, mobility
  - Describe deployment concepts that could be used for implementation approaches and costing
  - Define a “national launch footprint” in time for a NHTSA implementation decision

National Footprint Objectives

- Describe the justification for and value of a connected vehicle infrastructure
- Assess the infrastructure, communication and data needs of priority applications
- Generate a set of generic (high-level) design concepts
- Identify deployment scenarios leading to a preliminary national connected vehicle field infrastructure footprint
- Provide Cost estimates and Funding Options
- Identify workforce, training, policy and guidance needs
- Identify implementation/institutional challenges and timing

Footprint Development Process

- Develop a **Tech Memo** to initiate engagement with State and local agencies (Task 3)
- Assess the range of **applications** and their **enabling requirements** such as data & communication needs (Task 4)
- Develop **design concepts** (Task 5)
- Develop **deployment scenarios**, a preliminary **national footprint**, and **cost estimates** (Task 6)

Tech Memo

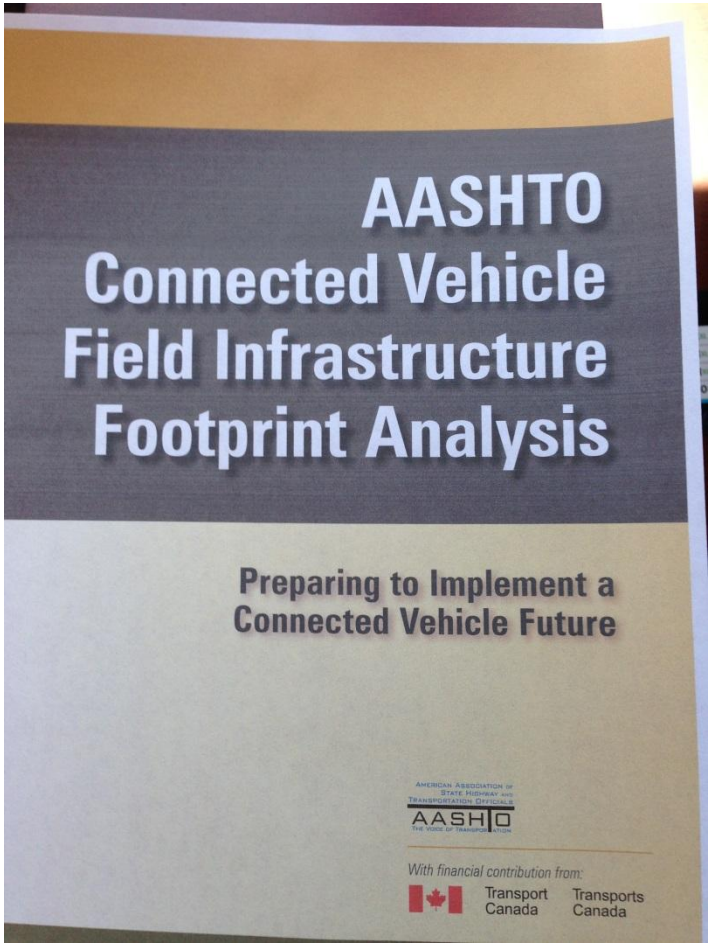
Completed

"This is a major undertaking for AASHTO, Transport Canada, and the United States as we prepare for a safer and more productive transportation environment."

Mike Lewis, AASHTO President and Director, Rhode Island DOT

"We are proud to invest in innovation and new opportunities to improve transportation safety and efficiency. By working together now we can lay the groundwork to align standards and regulations in North America and prevent barriers to cross-border travel and trade."

Susan Spencer, Director of ITS Programs, Transport Canada



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Footprint Applications Assessment

Completed

Application Packages

- V2I Safety
- Mobility/Environment
- Road Weather
- Smart Roadside
- Int. Border Crossings
- Fee Payments
- Agency Operations

Application Requirements

- Data Needs
  - Basic Safety Message 1
  - Probe message
  - SPaT
- Communication spectrum
  - DSRC, Cellular
- Backhaul Options
- Road Side Units siting

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Design Concepts

Completed*

- Selected to represent settings into which an agency might want to deploy CV applications
- Documented with conceptual plan sheets and supporting descriptions
- Include variations and alternatives to enable broader range of applications
- Identify example applications appropriate to that setting and concept

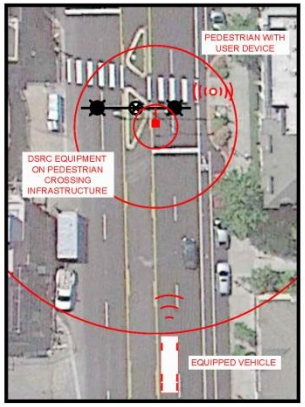
Completed*

Urban Intersection Example

N

NOT TO SCALE

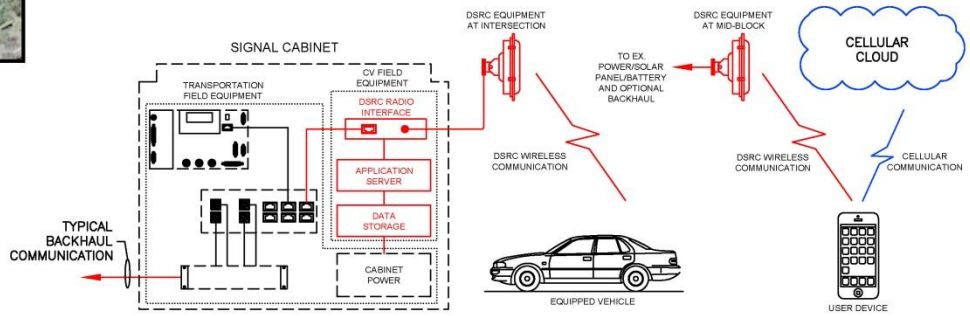
1 - INTERSECTION



2 - MID-BLOCK (OPTIONAL)

1 - INTERSECTION INSTALLATION

2 - OPTIONAL MID-BLOCK PEDESTRIAN CROSSING



3 - COMMUNICATION AND POWER SCHEMATIC

LEGEND

- Existing Mast Arm
- Existing Cabinets
- DSRC Radio
- DSRC Comm.

TYPICAL SETTING FEATURES

urban intersections are junctions of two or more roads within a city setting which typically includes curbing, designated lane markings, and pedestrian crossings.

CONCEPT EXAMPLE

DSRC antennas communicate towards all approaches of the intersection and at a mid-block location to communicate with vehicles on the roadway.

OTHER EXAMPLE APPLICATIONS

- Red Light Violation Warning and Stop Sign Violation
- Driver Gap Assist at Signalized Intersections and Stop Signs
- Multimodal Intelligent Traffic Signal Systems
- Advanced Arterial Management and Operations
- Advanced Signal Operations

Urban Intersection Deployment Concept

NATIONAL CONNECTED VEHICLE FIELD INFRASTRUCTURE FOOTPRINT ANALYSIS

M:\12\12131.00 – Connected Vehicle General Concept for Deployment\Engineering\CAD\Sheets\Concept 3 – Urban Intersection.dwg<Concept 3>Karl Typolt 8/16/2013 4:05 PM

NOT FOR CONSTRUCTION

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CONCEPT 3

Completed*

Ten Sample Design Concepts

- Urban Intersection
- Urban Highway
- Urban Corridor
- Rural Roadway
- International Border Crossings
  - Canada & Mexico
- Smart Roadside
- DOT Operations
- Fee Payments
- Freight Facility
- Cellular Concept

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Deployment Scenarios

In Process

- Discussions underway with selected agencies using application assessment and design concepts
- Ask how they would proceed with implementation and acquire funding
- Results will be used to prepare:
  1. National launch footprint for infrastructure ~ 2020?
  2. Extrapolate the launch footprint into a nationwide rollout ~ 2030?

Remaining Tasks

- Describe implementation Scenarios
  - Identify “seed sites”
  - Describe possible expansion approaches
    - ❖State, region, national corridors, etc
  - Describe deployment timelines
- Develop estimates of capital investment and O&M costs
- Prepare and deliver final report early in 2014

AASHTO Institutional[3]

- Create small executive group within AASHTO to develop BOD resolution
- Have implementation discussion within the ELT on cooperation
- Formalize AASHTO Deployment Coalition
  - ~ 511 Deployment Coalition
  - Peer Exchanges
  - Forum for Public & Private engagements
- AASHTO Television (a consideration)
  - AASHTO has a media center for broadcasting importat topics to all the states
  - Opportunity to create a education video for agency education
  - This could be a panel of a state DOT CEO, an auto industry representative and a USDOT participant

3. NHTSA Makes Clear Implementation Decision

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Summary

- Preparing for Clear NHTSA decision in 2013
- However, still many uncertainties:
  1. DSRC spectrum and FCC ruling?
  2. Security System complexity?
  3. State of development of RSU's
  4. Will probe data be available to DOT's?
  5. State DOT path to Connected Vehicle world?
  6. How will applications be developed and managed in public arena?
  7. Unknowns?

Website for Documents

- Location of National Footprint Documents on AASHTO Site: Task 3, 4 & 5 draft
- http://ssom.transportation.org/Pages/Connected-Vehicles.aspx
- Jwright@aashto.org
- Ben.Mckeever@dot.gov