Vehicle Infrastructure Integration Program Status

Ray Resendes
National Highway Traffic Safety Administration
US Department of Transportation
Vehicle Infrastructure Integration

Connecting Vehicles and Infrastructure

Creating a “nationwide enabling communication infrastructure”
VII Coalition

- USDOT
  - FHWA
  - FMCSA
  - NHTSA
  - FTA

- AASHTO
  - 10 State DOTs

- Auto Companies
  - BMW
  - Daimler Chrysler
  - Ford
  - GM
  - Honda
  - Nissan
  - Toyota
  - VW
Focus of the Coalition

- Is the investment necessary to equip new vehicles and the roadway infrastructure with communications warranted?

- Can the investment by the public sector and auto industry be coordinated?
Connects Vehicles and Infrastructure

Driver

Vehicle Data

Driver interface

On Board Equipment

5.9 DSRC

Road Side Equipment

Vehicle #2

Regional Message Switch

Subscriber Applications

End User

DSRC VII System
## “Day 1” Applications

<table>
<thead>
<tr>
<th>Applications</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Violation Warning</td>
<td>Corridor Mgmt</td>
</tr>
<tr>
<td>Stop Sign Violation Warning</td>
<td>Traveler Info</td>
</tr>
<tr>
<td>Curve Speed Warning</td>
<td>Electronic Pay</td>
</tr>
<tr>
<td>Electronic Brake Lights</td>
<td>Local Weather</td>
</tr>
<tr>
<td>Advance Warning Info</td>
<td>Winter Maint</td>
</tr>
<tr>
<td>In Vehicle Signing</td>
<td>Probe Mapping</td>
</tr>
<tr>
<td>Ramp Metering</td>
<td></td>
</tr>
<tr>
<td>Signal Timing &amp; Adjust</td>
<td></td>
</tr>
</tbody>
</table>
What Does Nationwide Mean?

- In our Urbanized Areas
  - Freeways and major arterials
- Rural Areas
  - National Highway System
  - Interstates
  - Major Rural Roads
Urban Deployment

- 400+ Urbanized areas with Pop. > 50,000
  - 70% of Total population

- Signalized Intersections
  - 265,000 Nationwide
  - 90% of Crashes at 50% of Intersections

- Urban freeway Interchanges
Rural Infrastructure

- Interstate & Freeway Interchanges
  - 33,150 miles Rural Interstate
- Intersections of NHS Routes & NHS/Interstate Interchanges
Potential Rural RSE Deployment
DSRC Status

- 1\textsuperscript{st} DSRC radio delivered
- IEEE 1609- 1,2,3, &4 V1 in ballot
  - V 2 Ballot in 06
- Complete Standards testing July 06
VII Vehicle Design Initiated

- VII Consortium (Auto OEMs)
  - Cooperative Agreement in Place
  - Design In-Vehicle Equipment & Applications (non-safety)

- CAMP (Auto OEMs) – Safety Applications
  - Cooperative Agreement in Place
Infrastructure Design Initiated

- Booz Allen Hamilton
- System Integrator & Network Development
- Requirements Definition Underway
- Backhaul Communications Analysis
- RSU Procurement Analysis
System Integration

- Vehicle
- Infrastructure
  - RSUs
  - Network
- Integrated end of ‘06
Proof of Concept Test

• Begins end of 06

• Testing in a controlled Environment

• Integration of applications – vehicle – Infrastructure
  – Location – suburban Detroit

• FOT -- TBD
Benefit – Cost Analysis

• Identification of Applications Initiates B/C Analysis

• Volpe Transportation Center
  – 40 year LCC analysis

• Inputs
  – Deployment Analysis
  – Comm analysis
  – RSU procurement analysis
  – Application Development

• 1st Iteration – Summer ‘06
Privacy

• Focus of VII work on institutional issues to date

• Privacy-Related Policy Assumptions
  – VII must comply with applicable Federal, state, and local laws
  – VII must operate in a manner that adequately preserves personal privacy and civil liberties
  – VII must be secured against unauthorized access / tampering

• Two products developed
  – Privacy Limits Paper
  – Privacy Principles
Privacy Limits Paper

• Goals
  – Establish framework for implementing VII privacy legislation
    • Part of enabling legislation for VII
  – Limits function of VII as system requirements
    • Frames VII context to facilitate technical, business, and policy solutions to privacy-related concerns

• Approach
  – Establish rules for 7 categories of VII data/information
  – Includes supporting rationale
VII Limit Areas

Applications designed into VII

- Public-sector transportation
- Public-sector commerce and toll collection
- Public-sector regulation and commercial vehicle permitting
- Private sector commerce
- Private sector transportation

Applications Designed OUT of VII

- Law enforcement/investigation
- Homeland security surveillance