Vehicle Infrastructure Integration (VII)
05 October 2006
Why VII?
Vehicle Safety & Mobility

Safety

Mobility

Source: ITS Joint Program Office, US Department of Transportation
VII Applications Fall Into Three Categories

• **Highway Safety - Reduce Fatalities**
  – Cooperative vehicle-roadway effort to mitigate deaths, injuries & property damage
  – **Primary Approach**
    » Intersection cooperation
    » Lane / road departure
    » Vehicle-vehicle cooperation

• **Vehicle Mobility – Improved Traffic Flow**
  – Cooperative information sharing to improve traffic flow and enhance driving experience
    » Aggregate real-time probe data into map database
    » Driver advisories, incident detection, optimized signal phasing
  – City, County and States can track service trucks and emergency vehicles

• **Consumer and Commercial Services**
  – Media downloads
  – Information services
  – Fleet management
  – Etc.
How Does VII Work?

Satellite to Vehicle (GPS)

Communication Hot Spot (DSRC)

Private Sector Uses

Traffic Management Center (TMC)

Data Base

Vehicle-to-Vehicle (DSRC)

Vehicle-to-Roadside (DSRC)
Program Timing

• Phase One – Field Operational Testing (FOT), 2006 to 2008
  – OEM’s are in the process of setting up test regions around their facilities
    » DCX, GM, Ford, Nissan, VW
  – State DOT’s are setting up test sites
    » Michigan, Florida, California, Minnesota
  – Suppliers setting up test sites
    » Delphi, Motorola
  – Funding coming from the FHWA and state DOT’s
  – A Proof of Concept is being set up in the Southeast Michigan area

• Decision to Deploy Nationwide expected late 2008

• Phase Two – Deployment, 2009 to 2016+
  – FHWA, DOT’s will start installing access points in 2009
  – OEM production estimated start 2011 ramp to all vehicles by 2016+
VII-Consortium (VII-C)

- VII-C is a group of OEM’s working together to coordinate the Proof of Concept test activity

- Working with the Government (Federal, State and Local) and suppliers
  - Vehicle Hardware
  - Data available from the vehicle
  - Radio signal interface to the roadside units

- VII-C Current Membership
  - Ford
  - Nissan
  - DaimlerChrysler
  - BMW
  - Honda
  - VW
  - Toyota
  - GM
Delphi’s Involvement

• The VIIC has organized the tasks in groups
  – System
  – On Board Equipment (OBE)
  – Radio (DSRC)
  – Applications
  – Security
  – …

• Delphi is currently working in two of these areas
  – On Board Equipment
  – Applications
On Board Equipment

- Responsible for defining and selecting the vehicle equipment to be used for the Proof of Concept
- The team has been working for several months on the selection process
Applications

• In Vehicle Messaging
• Navigation
• Delphi has a test/demonstration area in Kokomo for probe data and pothole detection
Improving Mobility: Using Vehicles as Data Probes

- Transit authorities want data from vehicles in order to better manage traffic flow and resource utilization

- Existing infrastructure is inadequate
  - Too few locations monitored
  - Equipment is unreliable
  - Can’t detect critical parameters
  - No nation-wide solution

- Information of interest from vehicles includes
  - Travel velocity
  - ABS activation
  - Wiper activation
  - Outside temperature
  - Pothole detection

[Map of Oakland County with various symbols indicating road conditions and incidents.]

Click here for the full Oakland County map

http://www2.rcocweb.org/
## Sample Applications

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<th>#</th>
<th>Name</th>
<th>Lead</th>
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<tbody>
<tr>
<td>1</td>
<td>Emergency Brake Warning</td>
<td>CAMP</td>
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<tr>
<td>2</td>
<td>Traffic Signal Violation Warning</td>
<td>CAMP</td>
</tr>
<tr>
<td>3</td>
<td>Stop Sign Violation Warning</td>
<td>CAMP</td>
</tr>
<tr>
<td>4</td>
<td>Curve Speed Warning</td>
<td>VIIC</td>
</tr>
<tr>
<td>5</td>
<td>Display Local Signage</td>
<td>VIIC</td>
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<tr>
<td>6</td>
<td>Present OEM Off-Board Navigation</td>
<td>VIIC</td>
</tr>
<tr>
<td>7</td>
<td>Present OEM Reroute Information</td>
<td>VIIC</td>
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<tr>
<td>8</td>
<td>Present Spontaneous Traffic Information</td>
<td>VIIC</td>
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<tr>
<td>9</td>
<td>Electronic Payments: Parking / General</td>
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<tr>
<td>10</td>
<td>Electronic Payments: Gasoline</td>
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<tr>
<td>11</td>
<td>Electronic Payment: Toll Roads</td>
<td>USDOT</td>
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<tr>
<td>12</td>
<td>Traveler Information</td>
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<tr>
<td>13</td>
<td>Ramp Metering</td>
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<td>14</td>
<td>Signal Timing Optimization</td>
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<td>15</td>
<td>Pothole Detection</td>
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<td>16</td>
<td>Winter Maintenance</td>
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<td>17</td>
<td>Corridor Management Planning Assistance</td>
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<td>18</td>
<td>Corridor Management Load Balancing</td>
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<td>Weather Information Traveler Notification</td>
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<tr>
<td>20</td>
<td>Weather Information Improved Weather Observing</td>
<td>USDOT</td>
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Additional Activity

• ITS America with supporting OEM’s and Suppliers is Demonstrating the Technology
  – Convergence, October 2006
  – ITS World Congress in London 8-12 Oct 2006
  – CES 2007
  – Several State locations throughout 2007 to be determined
  – CES 2008
  – ITS World Congress in New York  Nov 2008
Questions?