



Vehicle Infrastructure Integration Program Status

Ray Resendes

National Highway Traffic Safety Administration

US Department of Transportation

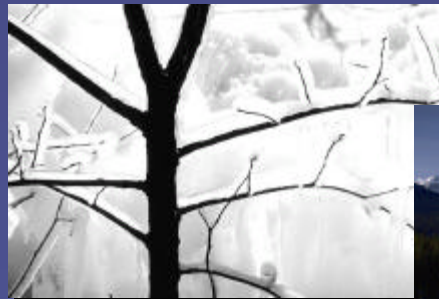
Vehicle Infrastructure Integration

Vehicle
Infrastructure
Integration

Connecting Vehicles and Infrastructure



*Creating a
“nationwide enabling
communication
infrastructure”*



Vehicle
Infrastructure
Integration

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?**

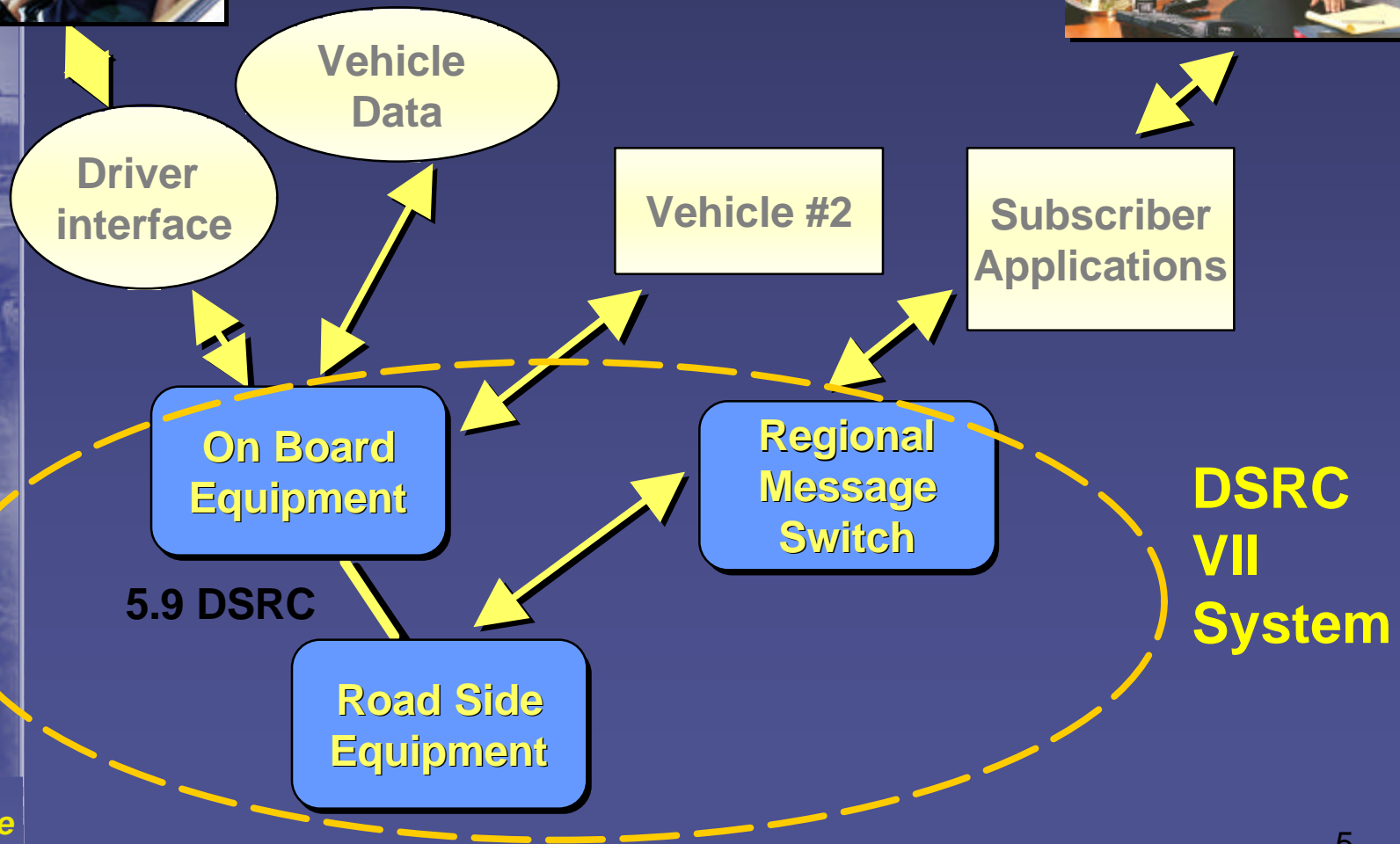
Connects Vehicles and Infrastructure



Driver



End User



“Day 1” Applications

Signal Violation Warning

Corridor Mgmt

Stop Sign Violation Warning

Traveler Info

Curve Speed Warning

Electronic Pay

Electronic Brake Lights

Local Weather

Advance Warning Info

Winter Maint

In Vehicle Signing

Probe Mapping

Ramp Metering

Signal Timing & Adjust

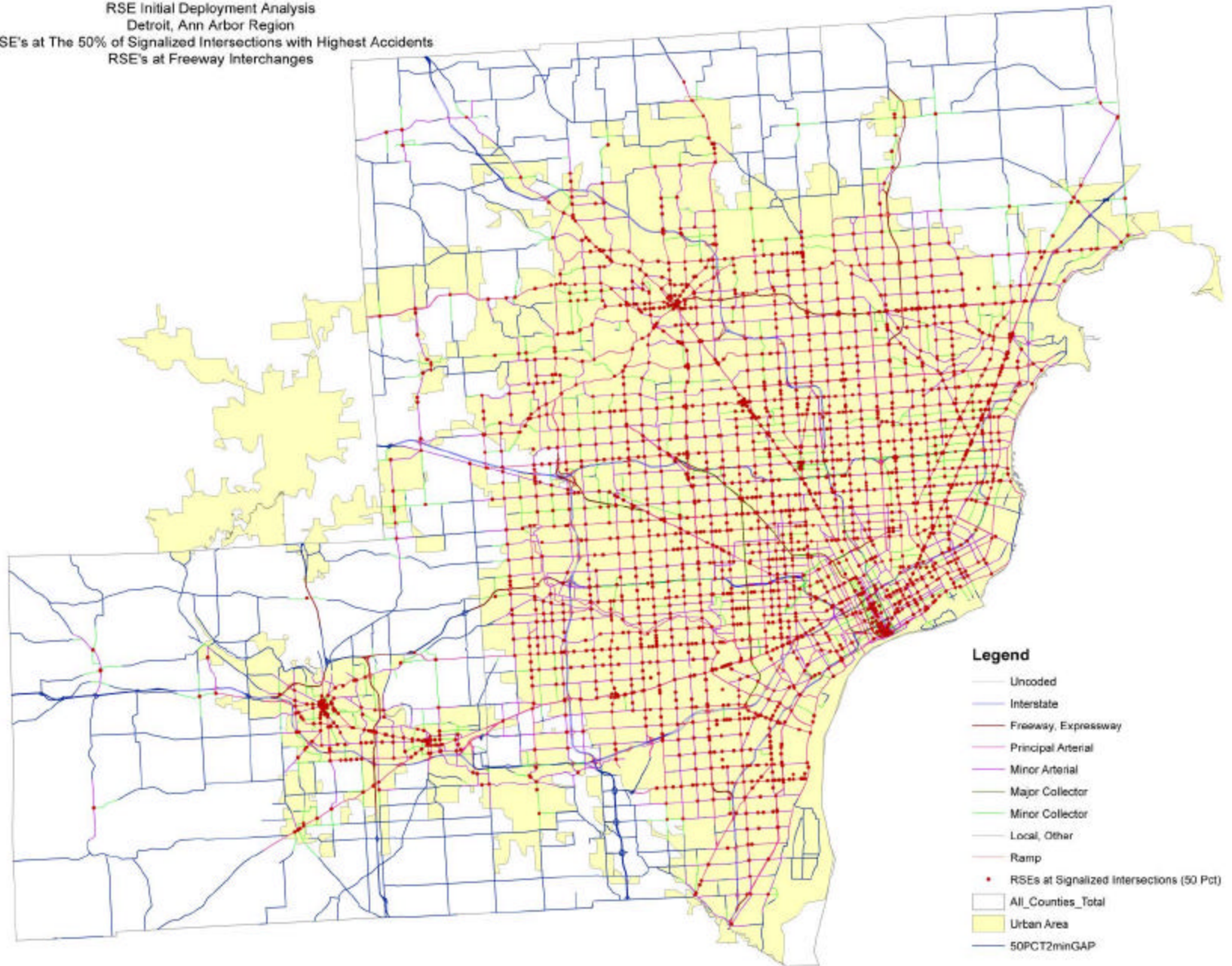
What Does Nationwide Mean?

- **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**

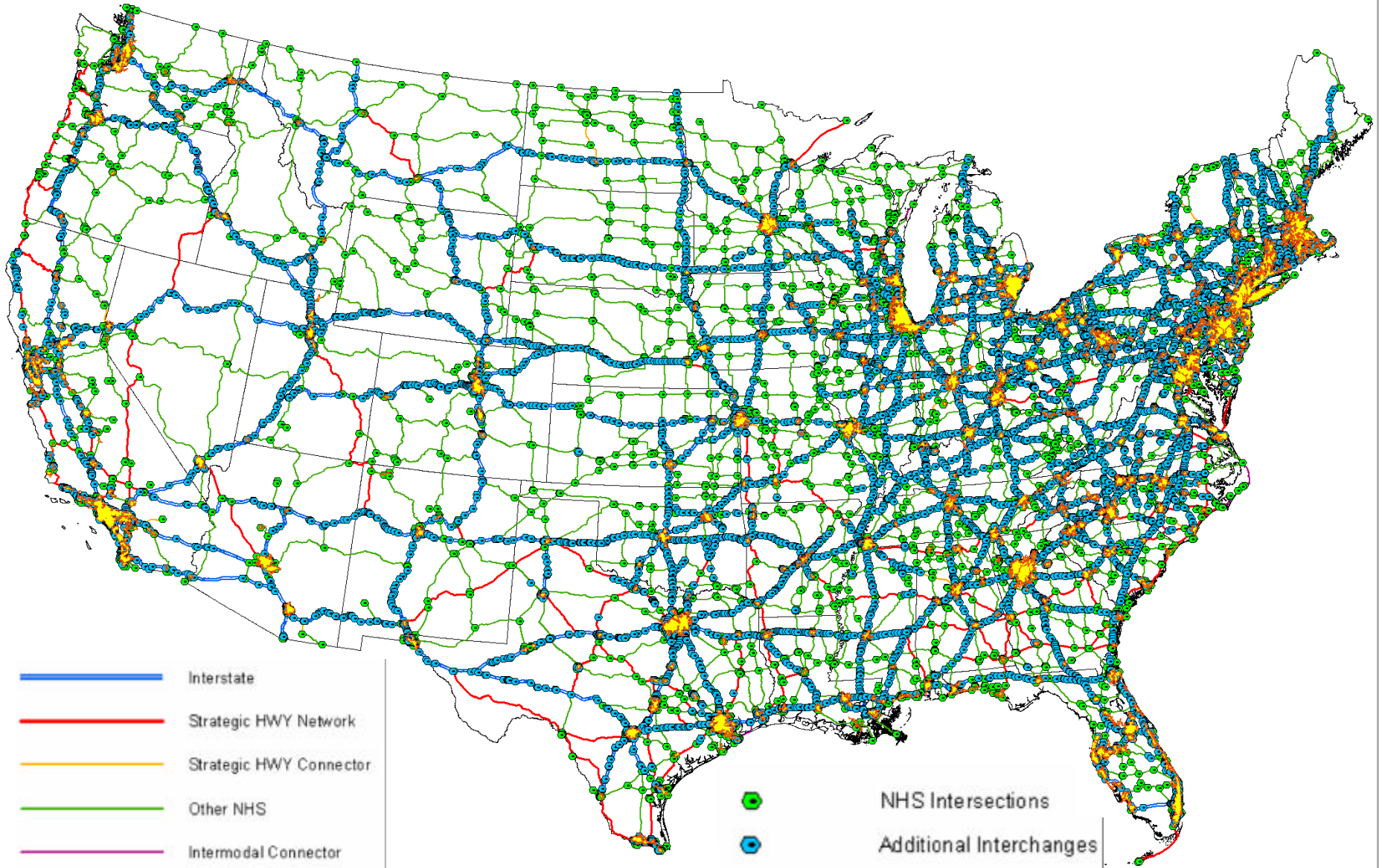
RSE Initial Deployment Analysis
Detroit, Ann Arbor Region
RSE's at The 50% of Signalized Intersections with Highest Accidents
RSE's at Freeway Interchanges



Rural Infrastructure

- **Interstate & Freeway Interchanges**
 - *33,150 miles Rural Interstate*
- **Intersections of NHS Routes & NHS/Interstate Interchanges**

Potential Rural RSE Deployment



DSRC Status

- **1st 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**