VII Michigan Program
Concept of Operations

Stakeholder Presentation
October 7, 2005
Metro Region Office
Southfield, MI
Agenda

• Background
• What VII Means to Michigan
• VII Michigan Program
• Concept of Operations Process
• Closing Remarks
What is VII?

- An “Enabling Communication Infrastructure” to support Vehicle-to-Vehicle and Vehicle-to-Infrastructure Communications

- National consortium
  - Automotive Industry
  - AASHTO / DOTs
  - USDOT / FHWA
  - Technology Vendors

- Address emphasis on:
  - Crash / fatality avoidance
  - Roadway operations
  - Intelligent Vehicles
  - Evolution of communications

Source: FHWA
Vast Potential of VII

- Improved traffic safety
- Enhanced mobility
- Increased traveler information
- Improved transportation planning
- Road condition monitoring
- Advance interface between auto industry and customers
- Telematics
- Commercial services
- Many others . . .
VII is **Safer Roads**

- Vehicle / infrastructure cooperation is a critical element for preventing:
  - Intersection collisions
  - Road departure collisions

- These two factors account for 50% of the crashes and fatalities on our roads

Source: FHWA

**Background**

- What VII Means to Michigan
- VII Michigan Program
- Concept of Operations
- Closing Remarks
VII Means Saving Lives

- VII has the potential to reduce the worst kind of crashes: intersection collisions
- Safer roads for Michigan residents and visitors
- Improved safety and security of freight movement
- Improved emergency response
VII is More Efficient Roads

- Reducing the effects of events (e.g., traffic incidents, work zones, weather)
  - Provides “double” congestion relief:
    - More Predictable
    - Lower overall delay
  - Improves safety
    - Reduce motorist exposure to unsafe conditions
  - Saves fuel
  - Reduces emissions

Source: FHWA
VII Means a Stronger Economy

- Follows MDOT goal to invest in growing economy
  “…providing the highest quality integrated transportation services for economic benefit and improved quality of life…”
- Bring the right type of jobs to MI – combines technology and automotive industry
- Strengthen existing automotive industry
- Increase mobility throughout the region – work force and freight
Purpose of VII Michigan

- Test feasibility of concept
- Identify institutional and technical applications and issues
- Develop stakeholder partnerships and roles
- Compliment other national test efforts
- Develop framework for testing a wide variety of communications technologies
Michigan’s Investment in VII

- The State of Michigan is committed to being at the forefront of VII:
  - Investment of dollars and staff efforts
  - Development of enabling infrastructure within public right-of-way
  - Coordination of multiple stakeholders in the automotive and telecom industries

- *Concept of Operations* is a means to ensure that the investment is spent effectively
Concept of Operations

- COO process from American National Standards Institute and American Institute of Aeronautics and Astronautics (ANSI / AIAA)
Who are VII Michigan Partners?

• Public-Sector Stakeholders:
  – Michigan Department of Transportation (MDOT)
  – Federal Highway Administration (FHWA)
  – Road Commission for Oakland County (RCOC)
  – Road Commission of Macomb County (RCMC)
  – City of Detroit
Who are VII Michigan Partners?

- Original Equipment Manufacturers (OEMs):
  - General Motors
  - DaimlerChrysler Corporation
  - Ford Motor Company
  - Nissan Motors North America

- Communications Carriers:
  - Motorola
  - Azulstar Networks (i.e. Ottawa Wireless)
Who are VII Michigan Partners?

- Automotive Equipment Suppliers
  - Motorola
- Traffic Control Equipment Suppliers
- Research Institutions:
  - University of Michigan Transportation Research Institute (UMTRI)
What is the VII Michigan Test Bed?

Elements:

– Vehicles/On-Board Equipment
– Roadside Equipment
– Communications Infrastructure
– Private-Sector Test Bed Facilities
– MDOT / Public-Sector Centers
– Data Processing and Archiving Facilities
VII Michigan Test Bed Concept Diagram
What is the VII Michigan Test Bed?

- VII Michigan will enable open testing:
  - Wired / wireless
  - DSRC/802.11 Standards
  - Leased / agency-owned

- Between:
  - Vehicles and Infrastructure (V2I)
  - Vehicles to Vehicles (V2V)
  - Roadside to Centers
  - Center to Center
When?

- VII Michigan Test Bed Program is multi-phased approach
- Goal: Region-wide test bed facilities to feed into FHWA FOT planning efforts (lessons learned)
Phased Approach

Phase 1:

- Localized and autonomous private-sector test beds
- Private-sector technology concept testing
  - V2V
  - V2R
  - Roadside to servers
- Developing interfaces between private and public-sectors.
- MDOT / public-sector testing of data usage
Phased Approach

Phase 2:
- Expanded RSU coverage
- Additional technology updating and testing
- Increased stakeholder interfaces
- Stakeholder coordination in identifying and solving technical and institutional issues
Phased Approach

Phase 3:
- Region-wide interoperable RSU coverage
- Integration of test bed facilities, vehicles, and RSUs – non-localized
- Coordination between stakeholders to determine best-practices and protocol for interoperability
- Consolidating communications where possible
VII Michigan Test Bed
Phased Approach
Why VII Michigan Test Bed?

• Incubate VII technologies and protocol
• Answer:
  – How to collect data?
  – Who/how to process data?
  – How to distribute data, and to whom?
  – Who/how to use data?
• Identify and solve institutional issues:
  – Responsibilities
  – Data access rights
  – Data security
  – Inter-agency/company agreements
  – Competitive market issues
Where will the Test Bed be?

• Field test locations:
  – Auburn Hills (DaimlerChrysler)
  – Southfield (DaimlerChrysler)
  – Dearborn (Ford)
  – Farmington Hills (Nissan, Motorola and CAMP)
  – Warren (General Motors)

• Data processing locations:
  – Auburn Hills (DaimlerChrysler)
  – Dearborn (Ford)
  – Detroit (General Motors, MDOT-MITSC)
  – Farmington Hills (Nissan, Motorola and CAMP)
  – Pontiac (RCOC)
How?

Need for Clearly Defined Roles:

- Public Sector
- OEMs
- Suppliers
- Telecom Industry
- Research Partners
How? Private-Sector Roles

- Planning, design, implementation, integration, testing, operation and maintenance of test beds, including:
  - Vehicle fleet and on-board equipment
  - Cellular, or other non-roadside based, communications systems
  - Private-Sector Test Bed Facilities/Server
  - Private-sector Internet connection and security systems

- Anonymizing and disseminating data collected to MDOT / public-sector via Internet
VII Michigan Test Bed
Private-Sector Responsibilities
How? Public-Sector Roles

- Design, deployment and integration of roadside-based communications networks
- Establishment of field Internet connections
- MITSC Internet connection and security systems
- Design, deployment, integration and maintenance of inter-agency communications linkages via the MITS communications system
How? Public-Sector Roles

• Development of a requirements document that sets forth public-sector stakeholder requirements. Will need private-sector input.

• Archiving anonymized data provided by the OEM’s

• Development of a Michigan VII web site to post information regarding VII activities in Michigan
VII is Michigan’s Future

- VII means saving lives, safer roads
- VII means improved mobility and productivity
- VII means Michigan jobs and economic development

The VII Michigan Test Bed Program is an investment in the future of our State and the safety of our citizens