

Vehicle Infrastructure Integration: VII for Safety and Mobility

M-CASTL

*First Annual Transportation Research
and Education Conference*

May 6, 2008

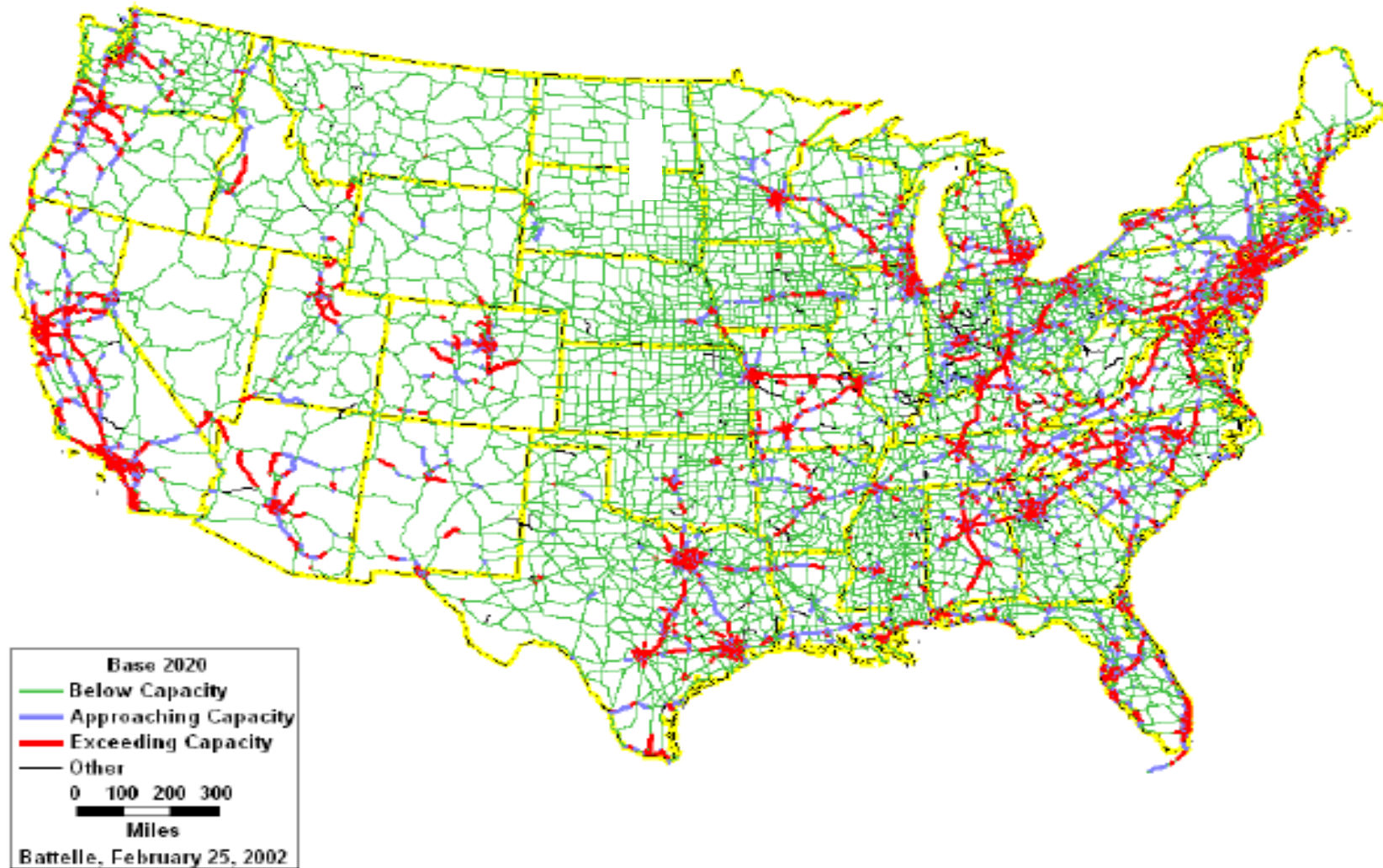
Ralph Robinson

ITS Integration Office
University of Michigan
Transportation Research Institute

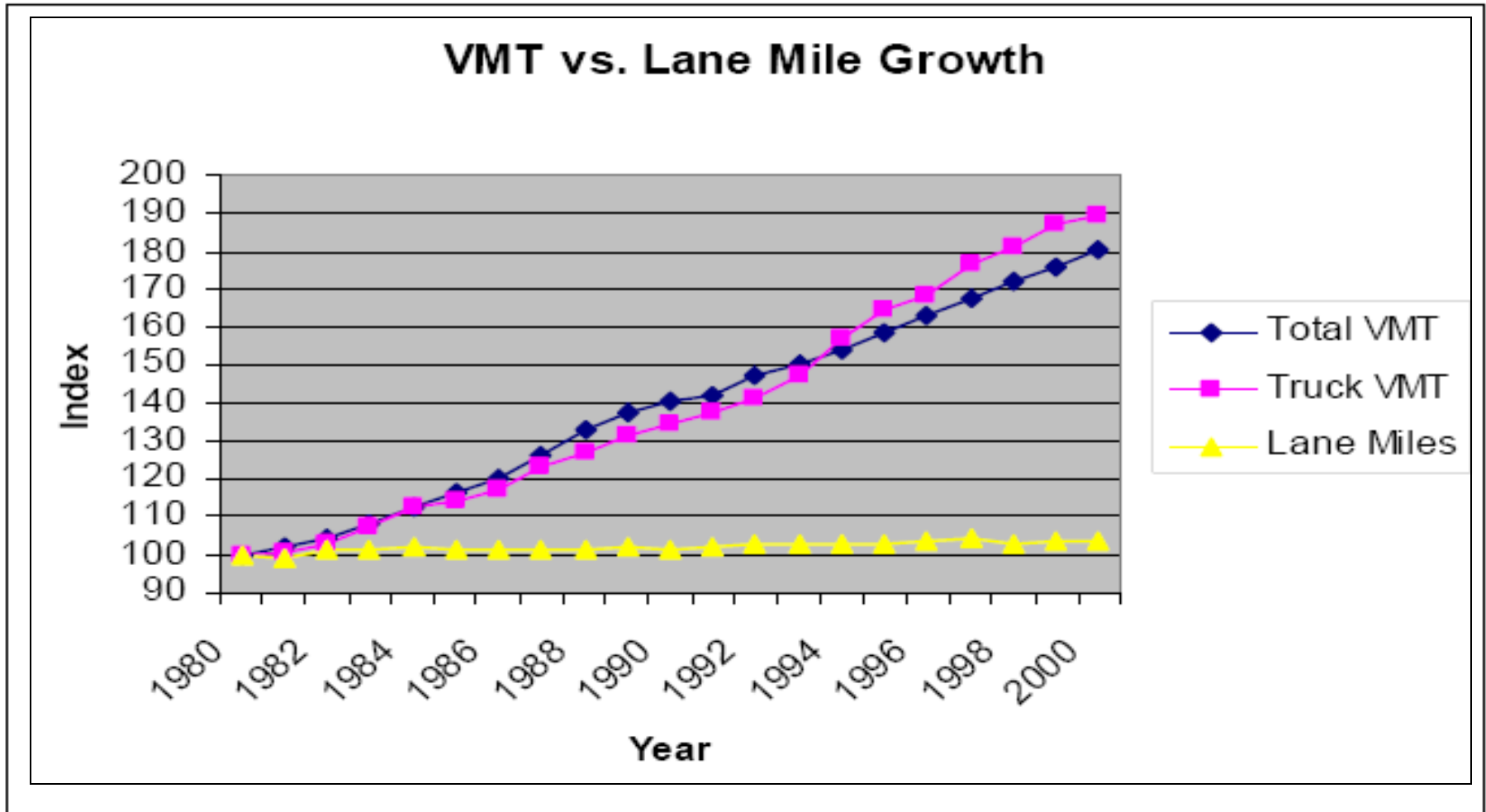
ralphrob@umich.edu



Potential Congestion in 2020



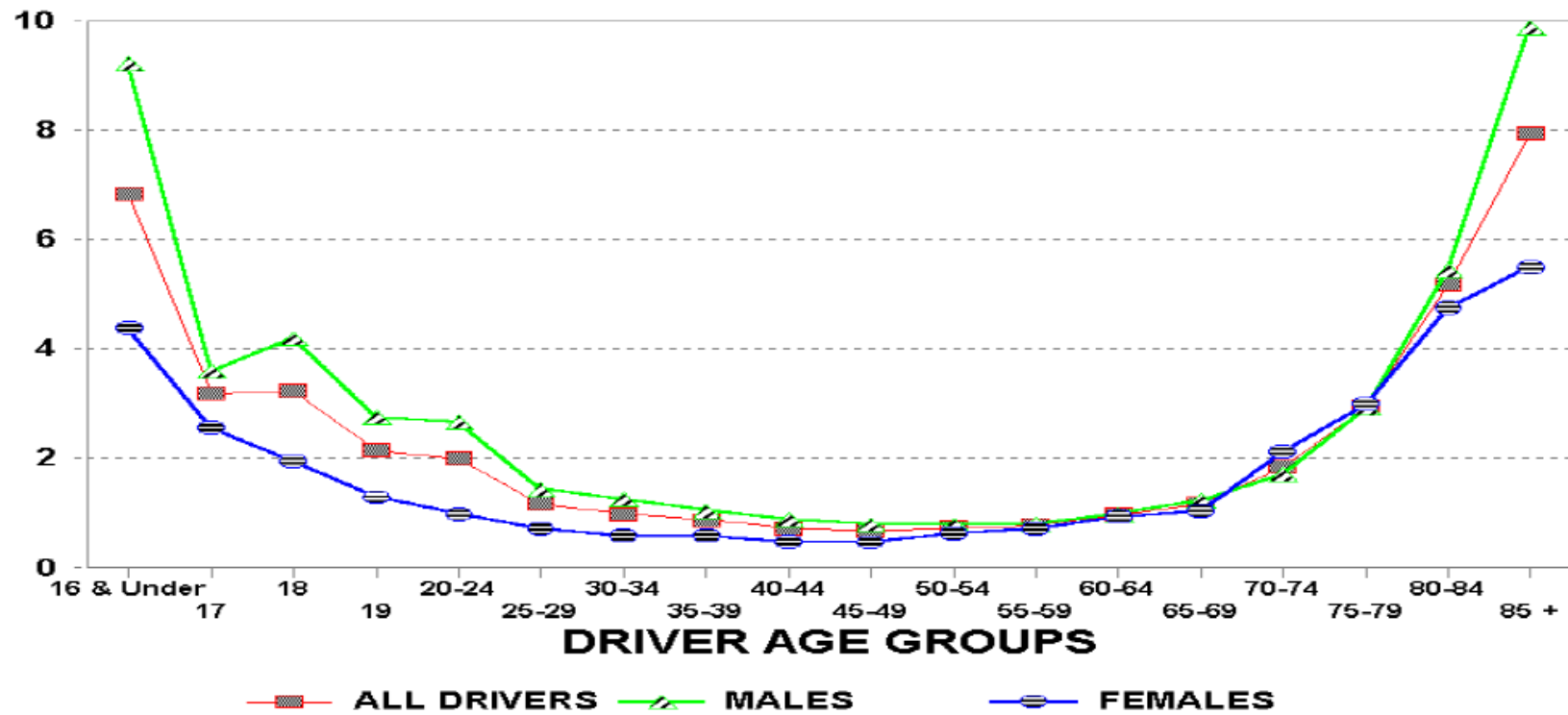
Vehicle Miles Driven Exceeding Capacity



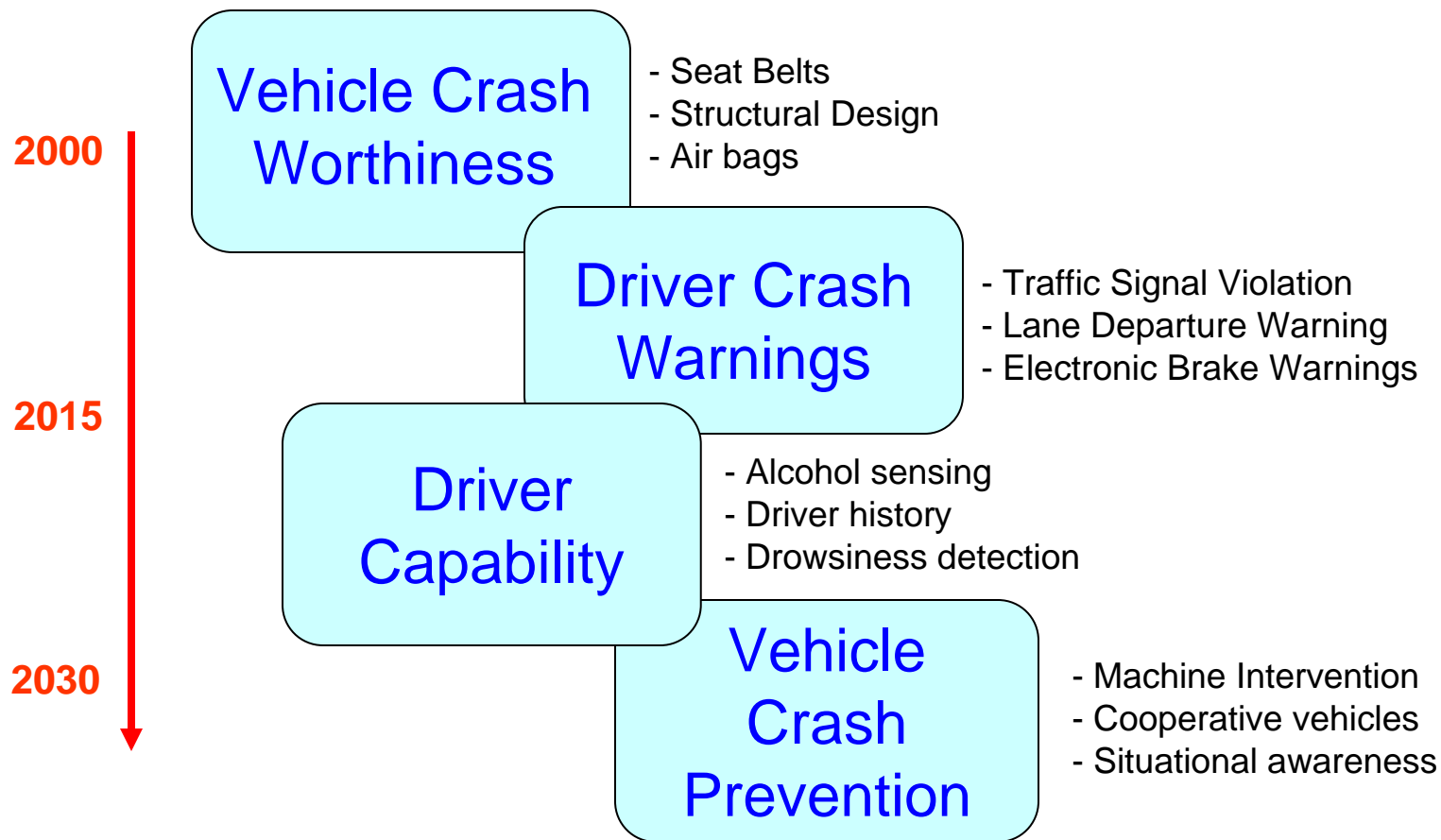
Safety and Congestion are Motivating Factors

- **Traffic Congestion Costs Americans \$63B/Yr**
 - **Congestion Wastes Billions of Gallons of Fuel**
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- **42,000 People Die Every Year on Our Roadways**
 - *Leading Cause of Death Between Ages 4 – 33*
 - *50% of the Deaths Occur from Intersection Collision and Roadway Departure*
 - **Traffic Crashes Cost the Economy \$230B/Yr**

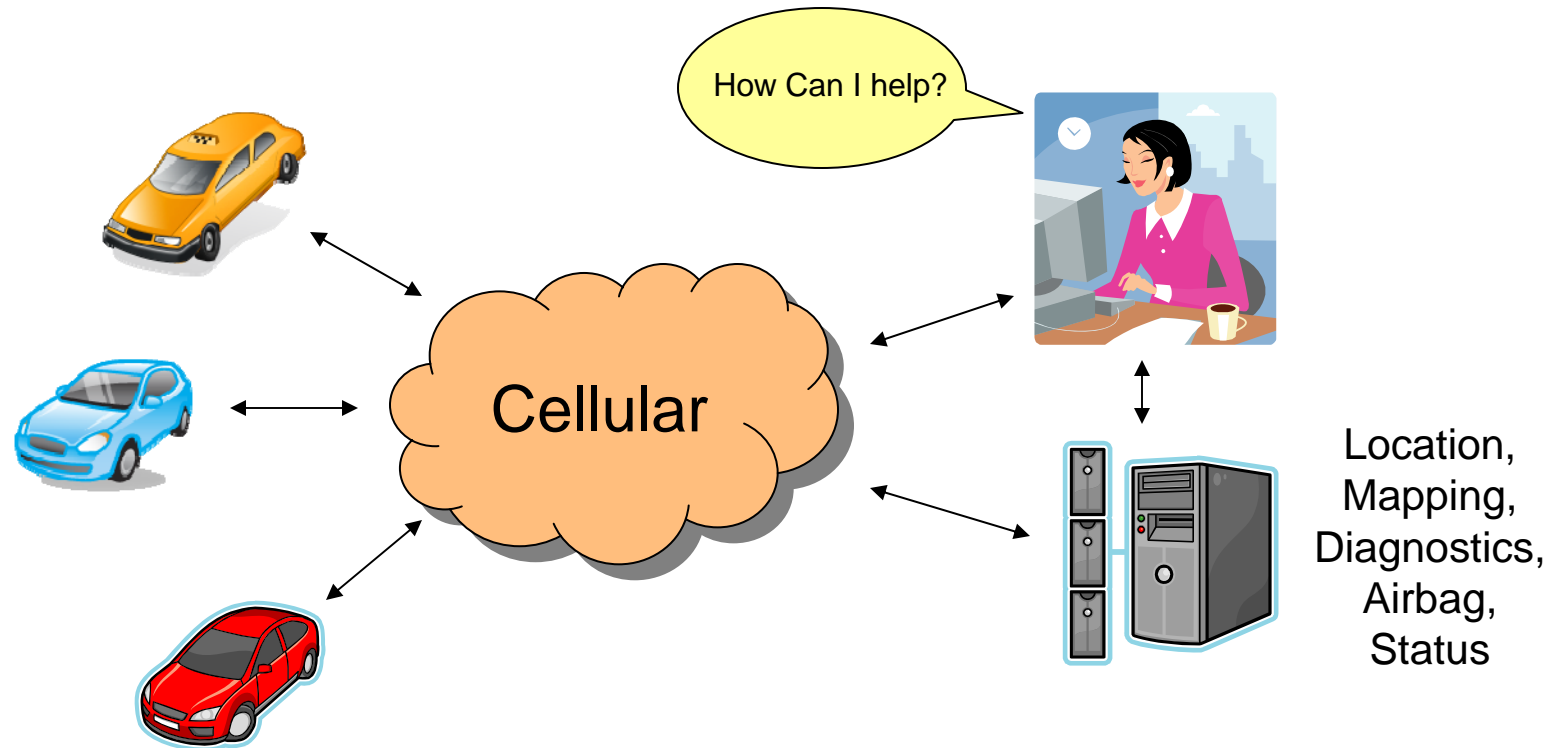
Impact of Driver Age on Safety



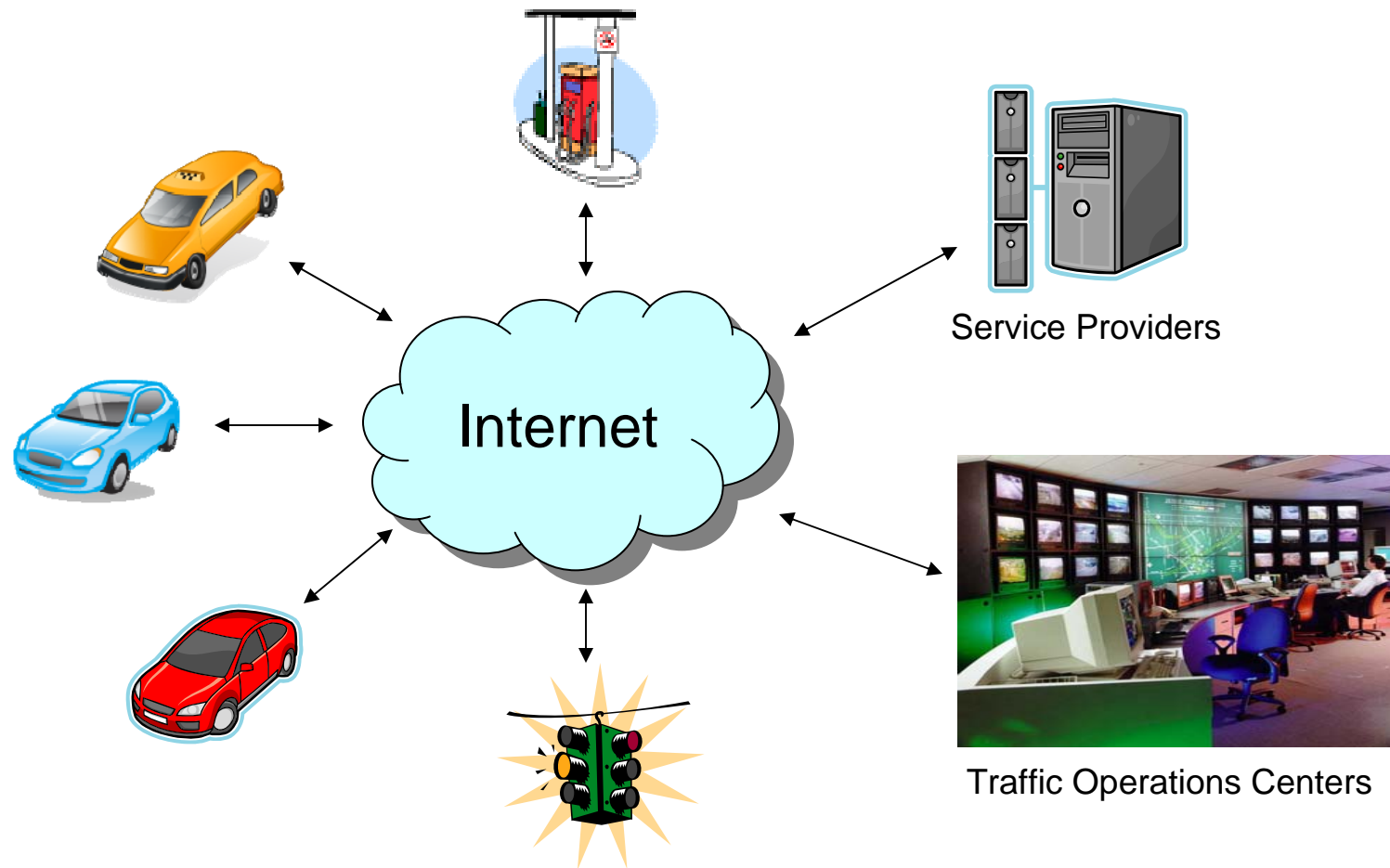
Vehicle Safety Technology Progression



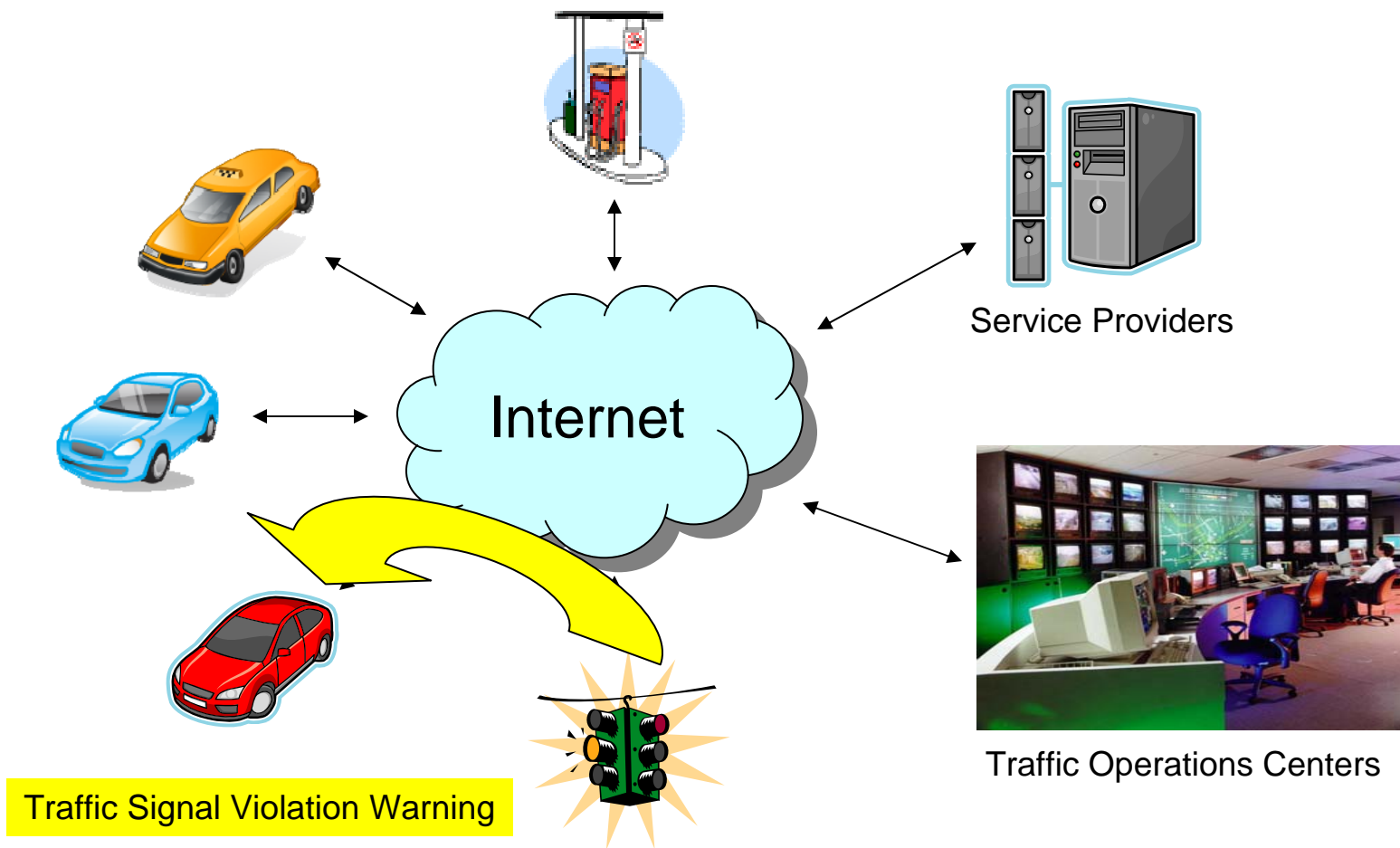
Telematics Connectivity



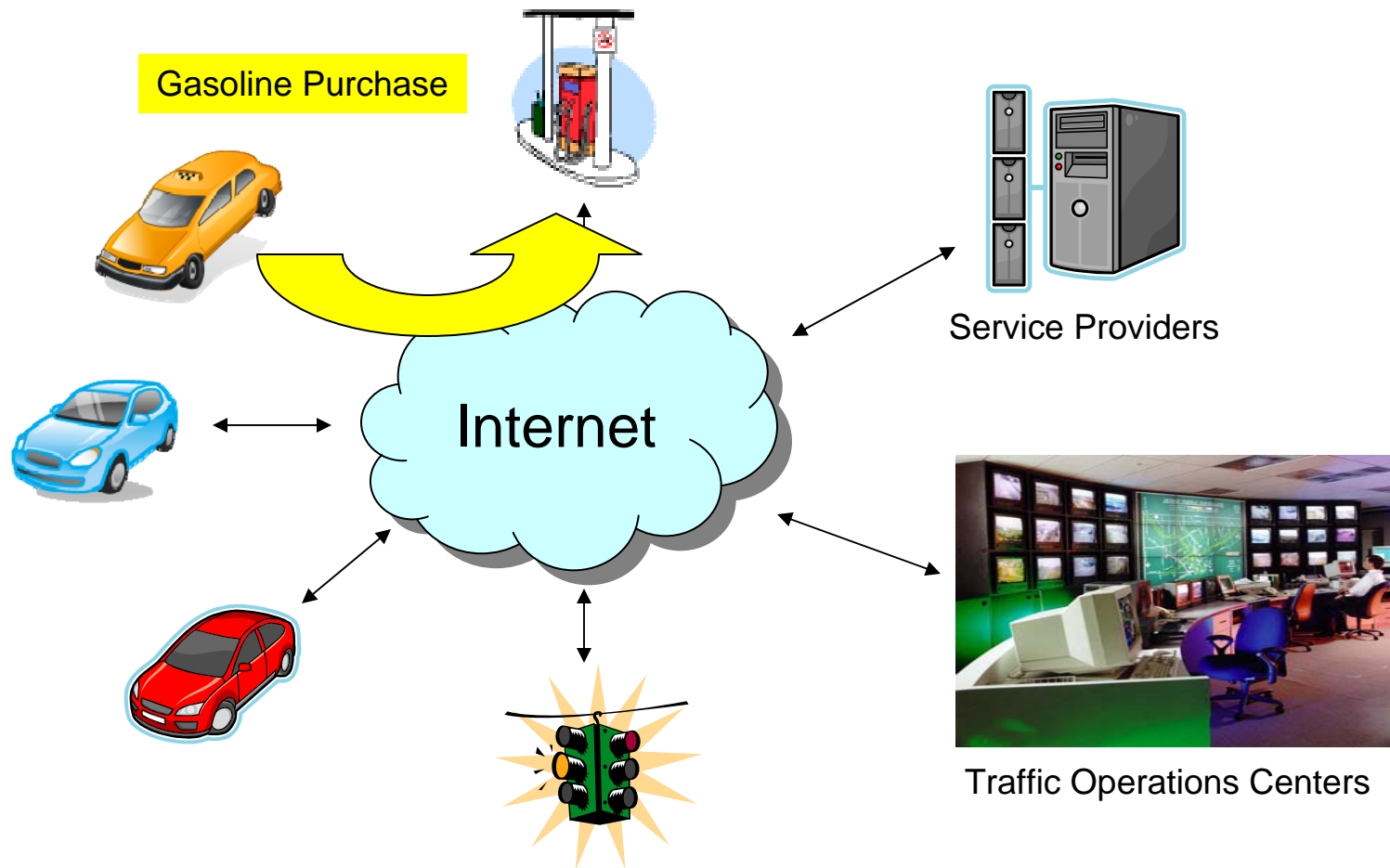
Wireless Connectivity with Vehicle Infrastructure Integration (VII)



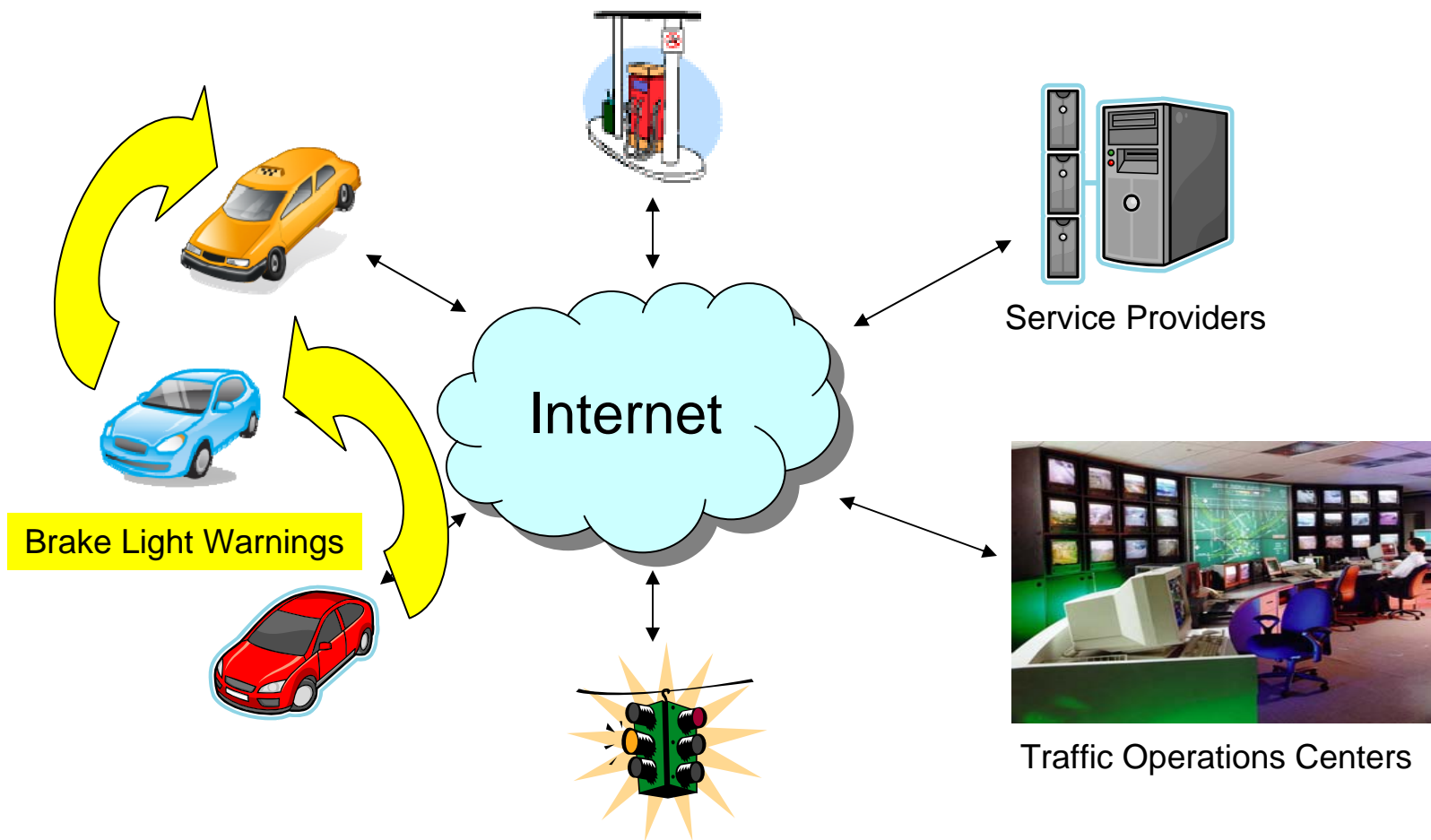
Wireless Connectivity



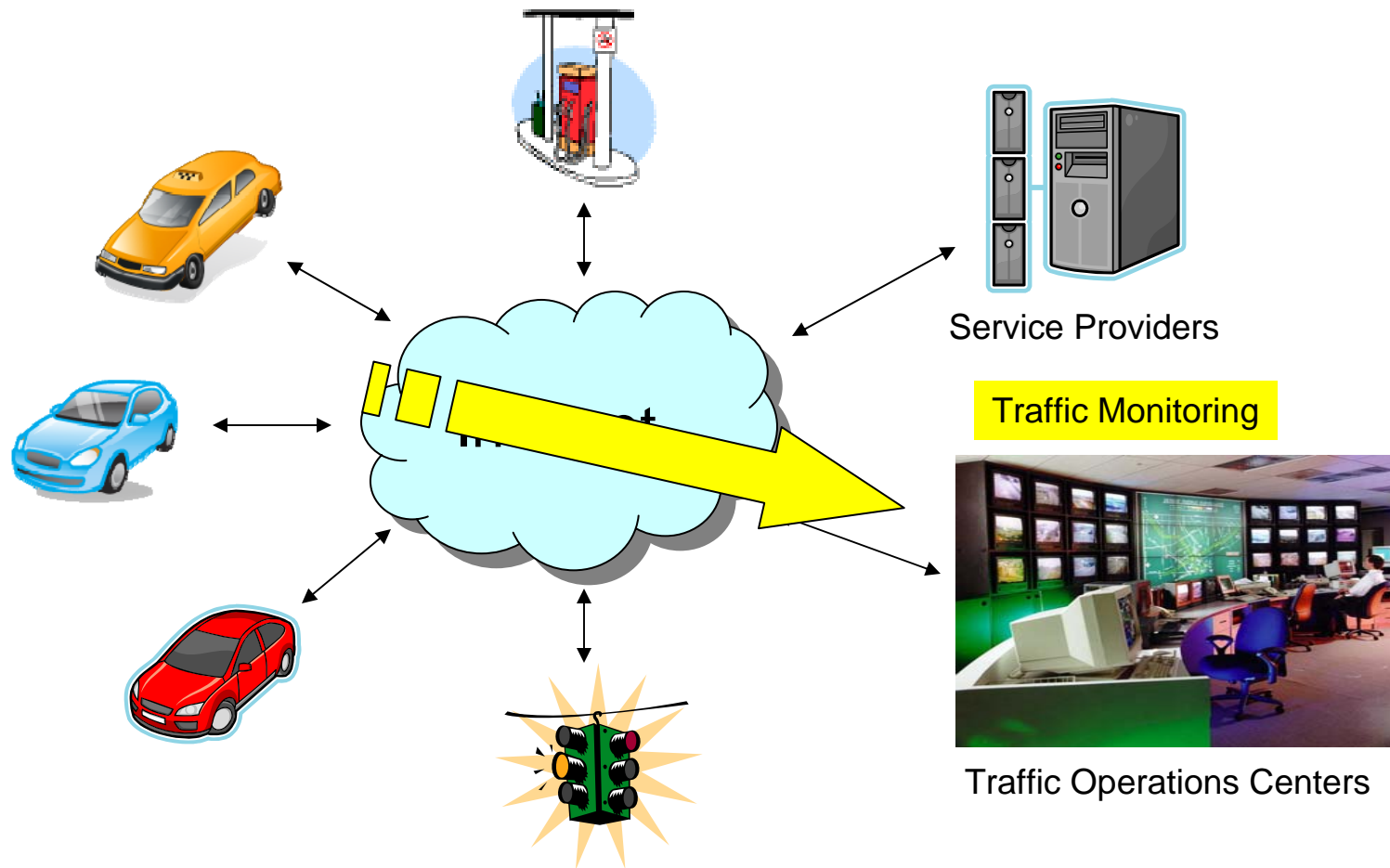
Wireless Connectivity



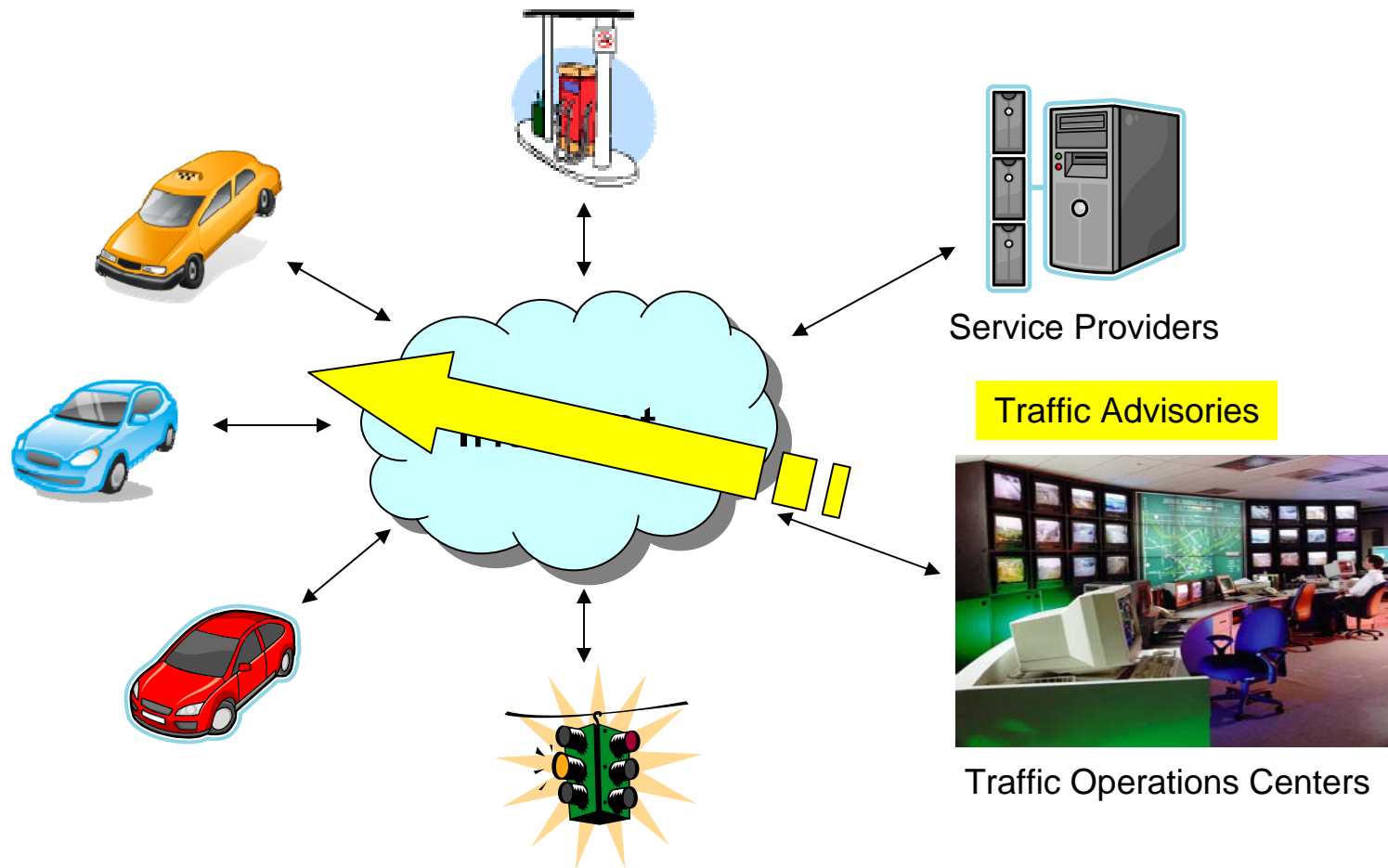
Wireless Connectivity



Wireless Connectivity



Wireless Connectivity



Safety Applications

- Approaching Emergency Vehicle
- Blind Spot Warning
- Forward Collision Warning
- Emergency Electronic Brake Lights
- Highway Merge Assistant
- Highway/Rail Collision Warning
- Lane Change Warning
- Pre-Crash Sensing
- Vehicle-Based Road Condition Warning
- Vehicle-to-Vehicle Road Feature Notification
- Visibility Enhancer
- Wrong Way Driver Warning
- Blind Merge Warning
- Curve Speed (Rollover) Warning
- Emergency Vehicle Signal Preemption
- Intersection Collision Warning
- Left Turn Assistant
- Low Bridge Warning
- Road Condition Warning
- SOS Services
- Stop Sign Movement Assistance
- Stop Sign Violation Warning
- Traffic Signal Violation Warning
- Work Zone Warning

Mobility Applications

- In-Vehicle Signage
- Weather Alert Notifications
- Icy Bridges Warnings
- Signal phasing (traffic flow optimization)
- Incident detection and mitigation
- Traffic Advisories (routing, re-routing assistance)
- Navigation assistance
- Fleet management (logistics control)
- Travel information (available facilities, parking, special events, timing)
- Parking location assistance
- Parking Access (security / payment)
- Food Drive-through payment
- Roadway toll payment
- Concierge assistance
- Appointment confirmation/changes
- Download data files (MP3, games)
- Software/firmware updates
- Remote Diagnostics
- Customer Relations Management
- Dealer service scheduling
- Voice mail

Developmental Test Environment – VII Proof of Concept Facility

