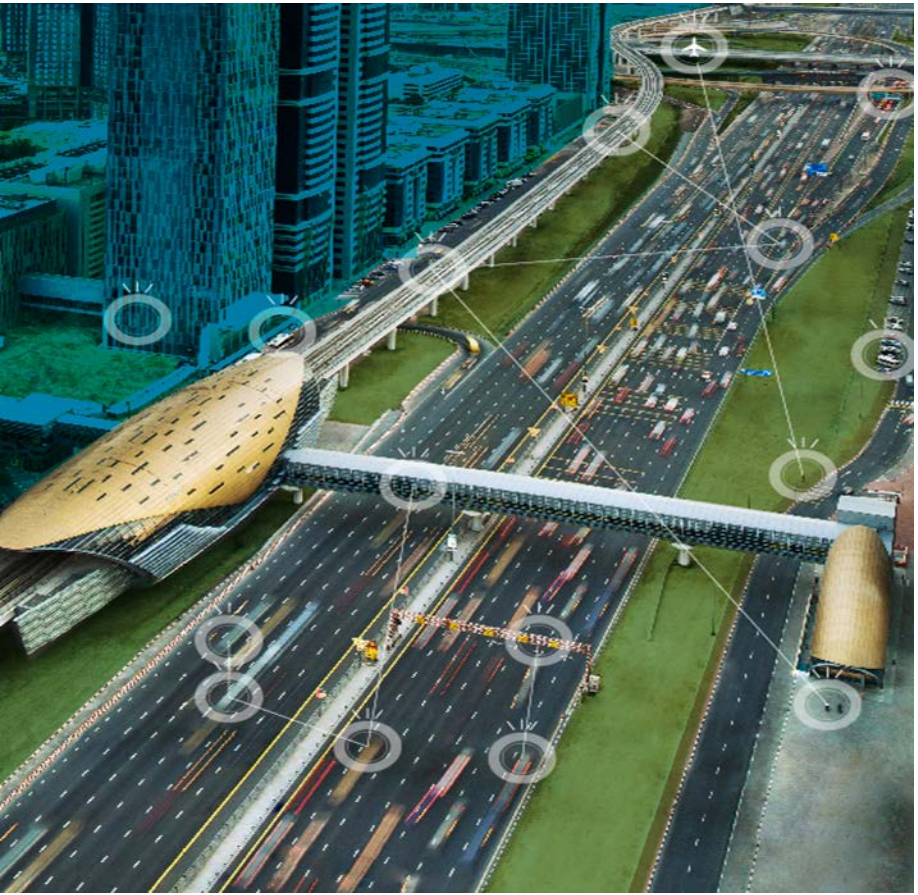


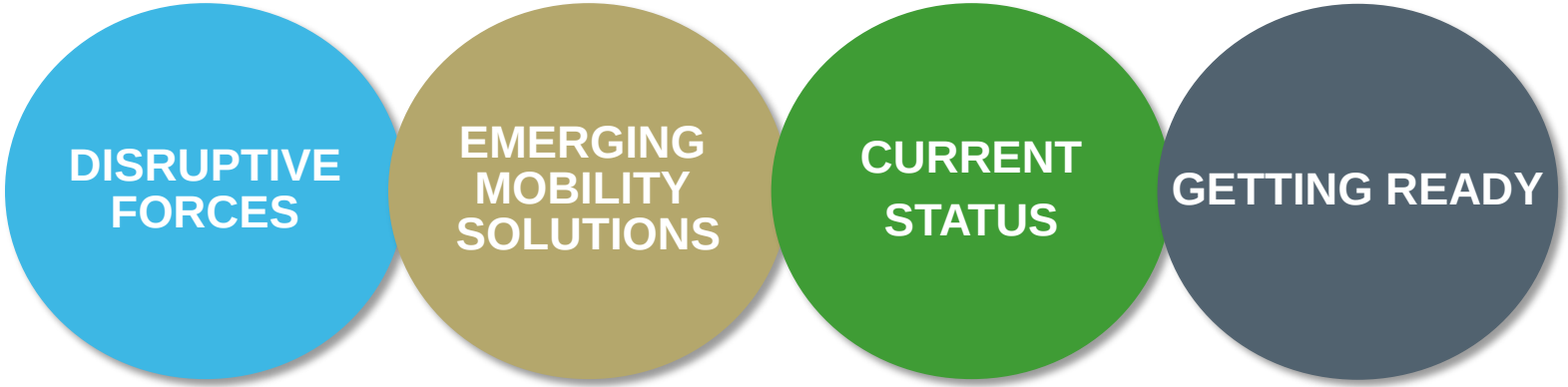
Connected Vehicle Infrastructure Deployment Considerations

Jim Barbaresso
National ITS Practice Leader
HNTB Corporation

IBTTA Annual Meeting
September 1, 2015

HNTB

REINVENTING TRANSPORTATION



EVERY BUSINESS OR TECHNOLOGICAL DISRUPTION CREATES OPPORTUNITY

- Performance driven – operations focus
- Demographic changes
  - Aging population
  - Millennials
  - Rapid urbanization
- Technology
  - Connectivity
  - Automation

EXAMPLES OF DISRUPTIONS IN TRANSPORTATION

Toll booth personnel displaced by ETC

Government financed 511 traveler information systems displaced by private traveler information services

POSSIBLE FUTURE DISRUPTIONS

Integrated, interoperable electronic payment systems will be integrated across modes and facilities

Smart phones will become the toll tag of the future (CTRMA's PToll)

Wireless induction will replace plug-in power transfer for electric vehicles

Car sharing will diminish need for auto ownership

Vehicle automation (platooning) will increase maximum lane capacity by up to 300%

Traffic signal equipment and timing algorithms will change dramatically to accommodate V2I connectivity

"Mobility as a Service" will give travelers end-to-end mode choices for fastest, cheapest travel

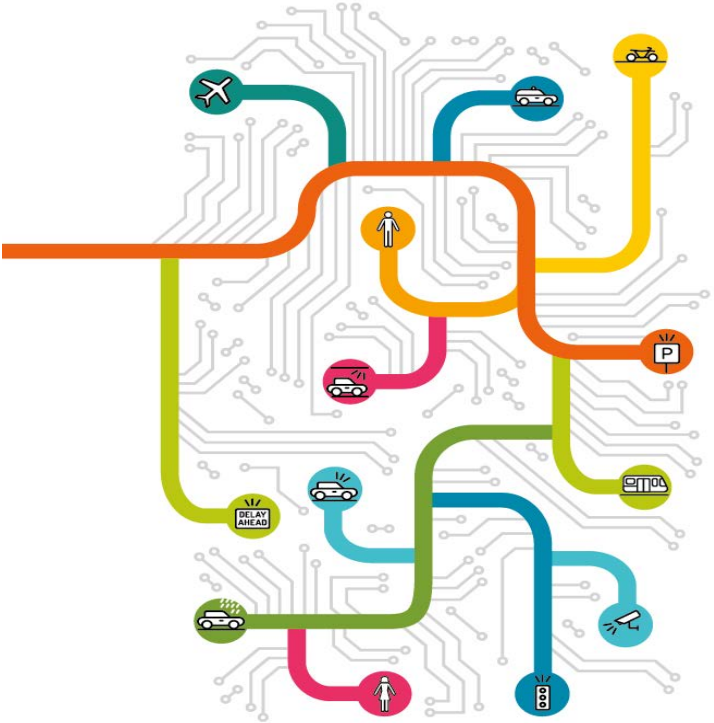
VMT pricing will replace the fuel tax

Dynamic wireless electric vehicle charging will allow vehicles to draw power from the roadway

On-board signage will replace roadside signs

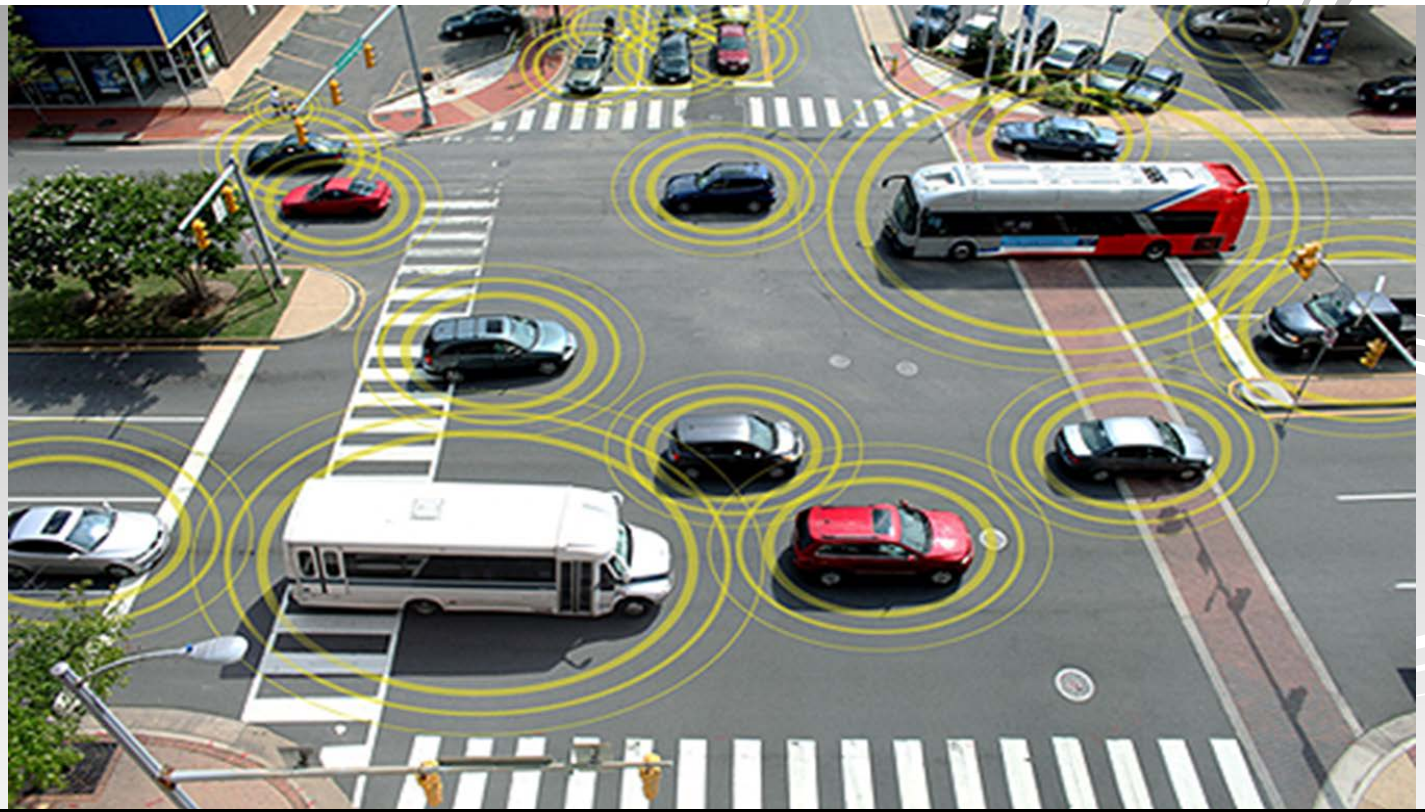
Virtual toll gantries and zones will replace current toll infrastructure

“NOW” TECHNOLOGIES



- Coordination through connectivity
  - Intermodal integration
  - Integrated corridor management
  - Active traffic & demand management
- Mobility applications on smartphones
- Parking applications
- Managed lanes
- Electronic tolling solutions

“NEXT” TECHNOLOGIES



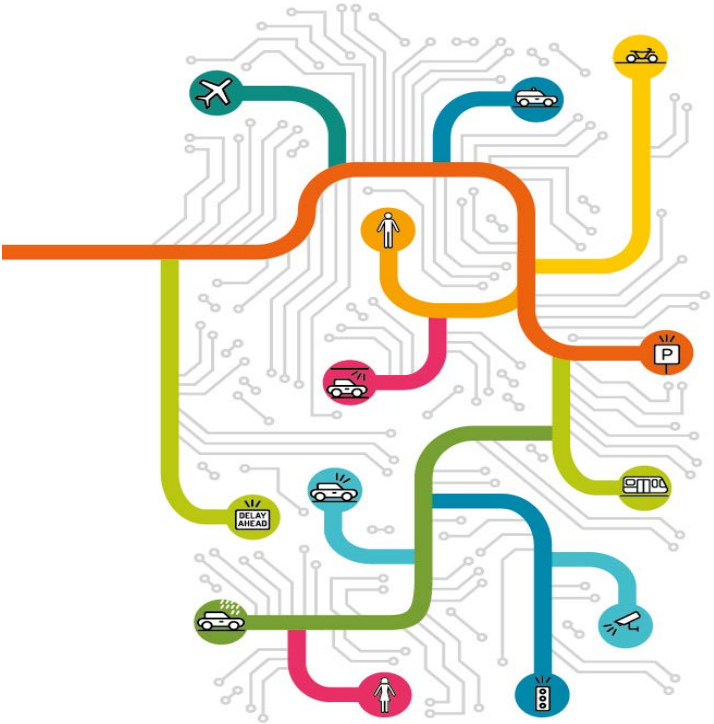
CONNECTED VEHICLES: CURRENT STATE

- Advance notice of proposed rulemaking on August 18, 2014
- Final rule on V2V expected in 2016
- AASHTO “Footprint Analysis” for infrastructure applications
- Connected Vehicle Pilot Deployment Program
- GM announced they would offer connected vehicles in the 2017 model year

BENEFITS OF CONNECTED VEHICLE TECHNOLOGY

- Connected vehicle technology could address **more than 80% of vehicular crash scenarios** involving unimpaired drivers
- However, many challenges must be overcome to realize the benefits of this promising technology

SYSTEM PERFORMANCE DATA



Most public agencies want basic vehicle probe information for improved system performance

- Real-time data for:
  - Traffic signal control strategies
  - Corridor management
  - Active traffic management
  - Weather and event management

TECHNICAL CHALLENGES

TECHNICAL CHALLENGES

- Interoperability and standards
- Implementation of specific applications
- Applications support
- Data management
- Data privacy
- Communications and network management
- Security management
- Local network security

INSTITUTIONAL CHALLENGES

1. Funding shortfalls that impact their ability to deploy
2. Lack of staff with new technology skills needed
3. Lack of benefit and cost information to support deployment decisions
4. Data – how to access it, who owns it, how do they support it
5. Agencies have no control over what auto manufacturers do
6. Not enough information to build a business model for deployment

THE BIG ISSUES

- Recent hacking events
- Threat to dedicated spectrum
- Alternate technologies

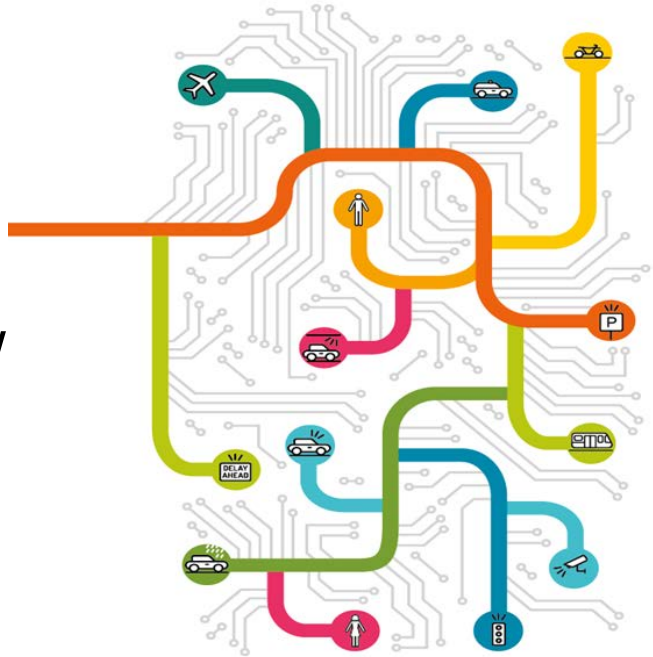
WHAT'S NEXT?

Uncertainties prevail at this time:

- Rapidly advancing technologies
- Difficulty in choosing the right path
- Lack of clarity from a policy perspective
- Implementation will lag without guidance on data management/ownership, standards, business models and funding

GETTING READY

- Plan where you need infrastructure to support needs
- Ready your network and back office to support Big Data
- Work with industry to adapt or develop new standards
- Conduct pilot projects to evaluate application of new technologies
- If you have a solution that works, then stay the course until disruption is apparent



CONNECTED VEHICLE TECHNOLOGY

- Ultimately, connected vehicle technology could be the game-changer envisioned by U.S. DOT and the automakers more than a decade ago
- Integration of connected vehicle technology into the existing operations environment will be challenging
- Engineering and operational concepts, performance measures, algorithms, the transportation workforce, and traffic control systems will be transformed

The book is being rewritten.

GAME CHANGER