CONNECTED AUTOMATION: Disruptive Transformation

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We’re on the cusp of a transformation in transportation, driven by advances in vehicle connectivity and automation. The changes will be disruptive.
EXAMPLES OF DISRUPTIONS IN TRANSPORTATION

Toll booth personnel displaced by ETC

Government financed 511 traveler information systems versus private traveler information services
CONNECTED VEHICLES: CURRENT STATE

- Advance notice of proposed rulemaking on August 18, 2014
- Final rule on V2V held up
  - Spectrum challenge
  - Privacy and security challenges
- GM will offer connected vehicles in the 2017 model year (this year)
- AASHTO “Footprint Analysis” for infrastructure applications
- USDOT Guidance Documents
- Connected Vehicle Pilot Deployment program
AUTOMATED VEHICLES

- USDOT Policy released on September 20, 2016
- Industry introducing automated features on vehicles
  - Lane tracking
  - Adaptive cruise control
  - Automated braking
  - Park assist & automated valet
  - Platooning technology
- Dynamic mobility ecosystem
Mobility as a Service

- Phenomenal growth in TNCs, sharing economy, app development
- Auto companies getting into the game
  - GM/Lyft partnering
  - Ford Smart Mobility
  - Maven
- Partnerships for automation
  - FCA/Google
  - GM/Cruise Automation
  - Ford/Veladyne
SMART CITY CHALLENGE

- Competitive challenge among mid-size cities
  - Connected
  - Automated
  - Electric

- Single award of $40 million (DOT) – private partners offering millions more

- 78 cities submitted proposals

- 1 city selected

Improving safety, enhancing mobility, creating ladders of opportunity, and addressing climate change
Columbus was the single winner out of 78 applicants for the Smart City Challenge.

- Framework for connecting people with opportunities:
  - 4 systems
  - 4 districts
  - 4 outcomes
SMART PRACTICES

- Leveraging All Your Tools with TSM&O – Solutions for Improved Performance across All Modes and All Roads
- Interjurisdictional Coordination and Partnerships for Mobility & Safety
- Intermodal Coordination for Greater Efficiency & Seamless Transportation of People and Goods
- Open Data to Spur Innovation and Partnerships
- Asset Management to Support System Availability, Maintenance and Planning
- People and Processes – Focus on Training, Organization, & Work Environment
TECHNICAL CHALLENGES FOR PUBLIC AGENCIES

- Interoperability and standards
- Implementation and support of specific applications & technologies
- Data management
- Data privacy
- Communications and network management
- Security management
- Local network security
INSTITUTIONAL CHALLENGES

1. Funding – Shortfalls impact the ability to deploy
2. Education & Workforce Considerations – Lack of staff with necessary technical skills
3. Business Case – Lack of benefit and cost information to support investment decisions
4. Data Ownership – How to access it, who owns it, how do they support it?
5. Liability – What’s the risk and how does it get allocated?
6. Forces Outside Their Control – Local agencies have no control over auto manufacturers
Significant Federal Investment in ITS

- Sec. 6002 and 6003: Technology and Innovation Deployment Program - $335 million
- Sec. 6004: Advanced Transportation & Congestion Management Technologies Deployment (ATCMTD) program - $300 million
- Sec. 1105: Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) - $4.5 billion
- Section 6020 on user-fee based alternative revenue
Purpose-Built Automation

- Intermodal facilities – first and last mile opportunities
- Residential and campus applications
- Urban applications – shared use vehicles
- Highway maintenance operations
TRANSITIONING ON OUR HIGHWAYS

• Think about “managed lanes” in a new context

• Should we separate automated vehicles from others to generate the most benefits?

• If penetration reaches 20-25% of the fleet, should we dedicate a lane?

• Incrementally increase the number of special lanes as the fleet turns over
if

CARS

don’t

CRASH
EMPOWERING THE MACHINE

- Traffic signalization impacts
- Signage
- Seamless travel between roads and modes

NO TRAFFIC SIGNS
GETTING READY

- Be systematic in your approach
  - Pilot projects
  - Employ needs-based, systems engineering principles
  - Apply for grants

- Ready your resources
  - Improve signs and markings
  - Robust communications and electrification infrastructure
  - Strengthen data management capabilities (collect, transmit, store, aggregate, analyze, disseminate, report)
  - Strengthen technical capabilities of staff

- Evaluate planning, policies and organizational impacts

- Work with industry to understand or even influence direction of change

- Create partnerships and educate your stakeholders
REMAINING QUESTIONS

- How to assess investment decisions regarding these emerging technologies and applications without experiential data?
- At what point should public agencies begin to invest in infrastructure changes?
- How do we amend traffic models and forecasting tools for an uncertain future?
- What are the unaddressed data needs of public agencies?
- What new highway design standards will be required and when?
- What new, disruptive technologies will emerge in the future to render current thinking obsolete?
EMERGING MOBILITY SOLUTIONS

- This will be a game-changer
- Integration of connected and automated vehicle technologies into the existing operations environment will be challenging and disruptive to current paradigms
- Engineering and operational concepts, performance measures, algorithms, the transportation workforce, design standards, traffic control systems, and policies will be transformed

The book must be rewritten.
Connected Automation – Disruptive Transformation

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