Planning for Vehicle Automation

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Overview

- Automation is a Disruptive Technology
- Performance-Based Planning to the Rescue
- New Roles for Scenarios and Models
Disruptive Technology

• “Disruptive” = threat to “business as usual”
  – Automation could upend how transportation works

• Most disruptive elements:
  – How or when will it happen?
  – What will the net effects be?
  – What to do now (or next)?
What makes Automation Disruptive?

• Behavior
  – Drive farther, buy fewer cars, use more taxis

• Infrastructure
  – Better/different markings, less new road capacity, fewer parking spaces, “internet of cars”

• Agency roles
  – Transit vs. shared mobility, “hands on” system management & operations
What Else is Disruptive?

• Self-driving cars are not the only thing
  – Shared Mobility (Uber/Lyft)
  – Freight Management (self-driving trucks, drones, 3D printing)
  – Bicycle and pedestrian travel (“Return to the City”)
  – Generational shifts (“Millennials hate driving”)
  – Externalities (new energy sources, climate change)
Potential Implications on Roadway Infrastructure and Related Policies and Programs

- Physical Infrastructure
- Roadway Operations
- Digital Infrastructure
- Programs and Practices
Potential Implications on Roadway Infrastructure and Related Policies and Programs

Physical Infrastructure

- Unclear infrastructure requirements for AVs (signs, signals, markings)
- Possible need for adaptations to design standards, greater consistency
- Implications for maintenance and investment
Potential Implications on Roadway Infrastructure and Related Policies and Programs

- Short-term challenges of managing a mixed traffic environment (AVs, CVs, non-AVs, C/AVs)
- New challenges in harmonizing traffic flow
- Potential travel demand changes
- Potential long-term efficiency, congestion benefits
Potential Implications on Roadway Infrastructure and Related Policies and Programs

- AVs as new sources of roadway data
- Data updates on construction and road closures
- Maintenance of digital infrastructure

Digital Infrastructure
Potential Implications on Roadway Infrastructure and Related Policies and Programs

- Accounting for AVs and potential land use impacts and uncertainty in long range planning process
- Implications of shared vehicle fleets and new mobility models on travel demand modeling/forecasting
- Revenue and budget implications
The Future...

- **... is Wide Open**
  - More opportunity than ever to improve
- **... is Radically Uncertain**
  - Know less than ever about what will happen
- **... calls for New Planning Strategies**
  - Extrapolate less, experiment more, get more data
Performance-Based Planning to the Rescue
Performance-Based Planning and Scenario Planning

Supporting Performance-Based Planning and Programming through Scenario Planning

June 2016
Handling the Unknown with Performance-Based Planning

- Scenario Development and Visioning
- Performance Measure Development
  - Performance Targets
  - Data Collection
- Try Things and Evaluate Them
- Revisit Assumptions Regularly
Where do we want to go?

• Exit the era of “Manifest Destiny”
  – Certainty about interventions and outcomes
  – Consensus vision of what matters

• Enter the era of “New Horizons”
  – Uncertainty about interventions and outcomes
  – Diverse visions of what might be possible
From Chaos to Confidence

How Much Future is Like Past

How We Respond

Data Gathering More Helpful
Models More Helpful

Try Something Out
Controlled Experiment
Analyze Alternatives
Apply the Warrants
From Chaos to Confidence

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Controlled Experiment
Analyze Alternatives
Apply the Warrants

How Much Future is Like Past

Develop New Knowledge
Data Gathering More Helpful
Models More Helpful
Explore New Phenomena

How We Respond

How Much Future is Like Past

0 10 20 30 40 50 60 70 80 90 100

Try Something Out
Controlled Experiment
Analyze Alternatives
Apply the Warrants

Models More Helpful
Data Gathering More Helpful
Develop New Knowledge
Explore New Phenomena
Rethinking the Role of Scenarios

• Old: Scenarios help decide what will happen
  – Identify factors everyone can agree on
  – Compute outcomes based on known relationships

• New: Scenarios help decide what we want
  – Identify outcomes we hope for (or fear)
  – Identify indicators of where we’re headed
Rethinking the Role of Models

• Old: Models are predictive
  – Visualize outcome of well-understood interventions

• New: Models are exploratory
  – Explore possibilities of hypothetical scenarios
Imagine the Possibilities

• **Use planning cycles (TIP / LRP) to review**
  – Scenario Planning, early and often
  – Focus on “where do we want to go?”
  – Use models sparingly to explore alternatives

• **Prioritize Data Collection and Interpretation**
  – What is happening and what does it mean?

• **Hold onto the Vision**
  – Now more than ever, the future is ours to define