ROLE OF CONNECTED AND AUTOMATED VEHICLES IN PLANNING

USDOT 5th ITS PCB University Workshop

November 2017

Role of Connected and Automated Vehicles in Transportation Planning

Recent CV/AV Planning Research Projects

> *Incorporating CV/AV in Transportation Planning Processes and Products*

> *Scenario Planning for Connected and Automated Vehicles*

Incorporating Connected/Automated Vehicles in Transportation Planning

Purpose of the Study

The study aimed to help facilitate the consideration of C/AV in transportation planning processes and products by States, MPOs and local agencies by reviewing:

1) Impacts on planning processes and products
2) Impacts on roles and responsibilities
3) Impacts on tools, techniques and data
4) Impact on organizational skills and expertise

Impacts on Processes

General Considerations

➢ Understand the technology and its dimensions

➢ Track technology advancements

➢ Understand market penetration & efficacy rates for technology and applications

➢ Forge partnership with new stakeholders

➢ Utilize ITS approach as a platform for incorporating C/AV in planning processes

➢ Incorporate Dedicated Short Range Communication (DSRC) into arterial and intersection improvement projects and for data gathering

➢ Consider data collection opportunities that require small smart technology market penetration

➢ Plan to manage "Big Data"

Long Term impacts:

➢ Incorporate potential changes in physical infrastructure requirements

➢ Considerate shortened project life cycles with more focus on communications

➢ Prepare for rapid technology changes

➢ Prepare for change in travel behavior & travel patterns and thereby on transportation planning tools and models

➢ Plan for multifaceted fleet composition

➢ Consider potential impact on transportation, land use, and economy

Impacts on Roles and Responsibilities

Summary of Recommendations

New stakeholders

➢ Communications companies

➢ Vendors of C/AV equipment and systems

➢ Vendors providing data management and analytical services

➢ Companies that will provide security

➢ Educational institutions

➢ New niche organizations that have not yet emerged

New Expertise

➢ Data analyst and data "scientist" to manage "Big Data"

➢ Hardware, software and communications technology specialists

➢ Potential shift of analytical responsibilities from the public sector to the private sector

Impacts on Tools, Techniques and Data

Factors to consider in evaluating the effectiveness of tools

➢ Levels of automation

➢ Market penetration

➢ Efficacy rates

➢ Impact on fleet composition

➢ Availability of empirical data representing gains in capacity, delay, travel time, speed, and emissions under different market penetration rates

Tools must be revisited and revised to account for

➢ Changes in infrastructure criteria

➢ Changes in driver behavior

➢ New capabilities

Deliverables

Impact on planning processes and products

http://ntl.bts.gov/lib/55000/55700/55711/FHWA-JPO-16-246.pdf

Impact on tools, techniques and data

http://ntl.bts.gov/lib/55000/55700/55712/FHWA-JPO-16-247.pdf

11 illustrative case studies

Workforce skills and Training

http://ntl.bts.gov/lib/59000/59100/59173/FHWA-JPO-16-364.pdf

Primer

Outreach materials

- *Highway Capacity Manual Tech Memo*

http://ntl.bts.gov/lib/59000/59300/59316/FHWA-JPO-16-365.pdf

- *Modeling Tech Memo*

http://ntl.bts.gov/lib/59000/59200/59249/FHWA-JPO-16-412.pdf

- *Planning Community Outreach Tech Memo*
- *Desk Reference*

Scenario Planning for Connected and Automated Vehicles

Background

➢ Scenario planning is a tool used by planner to develop plausible futures and highlights major forces that can shape the future

➢ Helps decision makers to prepare for tomorrow

Purpose of the Study

➢ Develop several futures

➢ Document and describe the process for conducting CV / AV scenario planning

Scenario Planning for Connected and Automated Vehicles

Scope

➢ Technology scan

➢ Scenario planning workshops

  ➢ *Workshop #1 on technology*

  ➢ *Workshop #2 - Testing Scenario Implications*

➢ Policy implications

➢ Outreach materials

Schedule

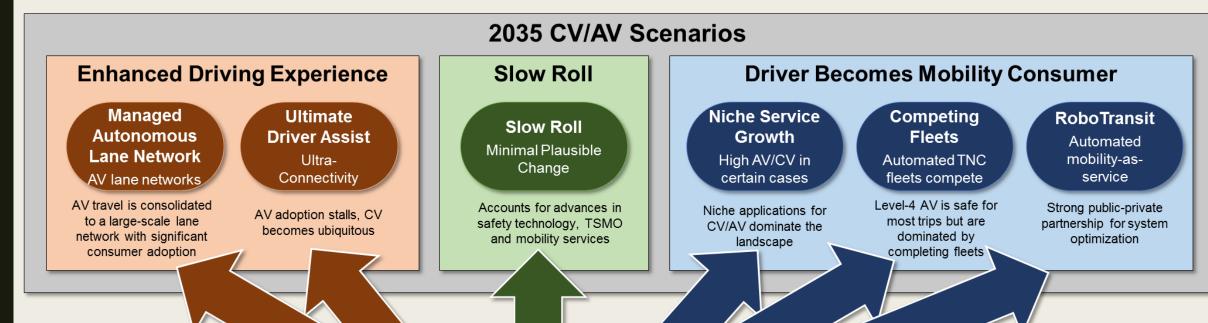➢ This study was initiated in December 2016 and will be completed in spring 2018.

Scenario Planning for Connected and Automated Vehicles

Workshops 1

➤ Conduct in August 2017

➤ Panel of Experts

➤ Target Year 2035

➤ Focused on Emerging Technology

  ➤ *Automation*

  ➤ *Connectivity*

  ➤ *Cooperation*

➤ Developed 6 Scenarios

  ➤ *Drivers – External Forces (Market Actions, Consumer Preferences, Innovation)*

  ➤ *Levers - Internal Actions (Public policies, Infrastructure Investment, Subsidies, Restrictions)*

Six Potential CV/AV Scenarios Developed in Workshop #1