

Incorporating Connected/Automated Vehicles into the Transportation Planning Process

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Purpose of the Study

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

- Impacts on planning activities
- Impacts on roles and responsibilities of existing and new stakeholders
- Impacts on tools, techniques and data
- Impact on organizational skills and expertise



Project Focus

- Automated Vehicles (AV)
- Vehicle to Vehicle Communication (V2V)
- **Vehicle to Infrastructure Communication (V2I)**
- **Connected Vehicles (CV)**
- **Connected Automated Vehicles (C/AV)**



Task 2 - Impacts on Planning Processes and Products

This task is completed



A Summary of Some of the Outcomes

Impact on products

- Long-Range plans
- Corridor plans
- ITS/operational plans

Impact on processes

- Data collection methods (using DSRC technology as probes for travel time data and for arterial operations)
- Incorporation of DSRC into arterial and intersection improvement projects
- Tools - Potential long term change in analytical tools
- Impact to transportation, land use, and economy in the long term



A Summary of Some of the Outcomes

Skills needed

- Data analyst and data “scientist” to manage a significant amount of data
- Hardware, software and communications technology specialists
- Potential shift of analytical responsibilities from the public sector to the private sector

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.



Task 3 - Impacts on Tools, Techniques and Data

This task is completed



Task 3 Approach

1

Identified existing tools and models



2

Evaluated and compared existing tools



3

Conducted gap analysis for existing tools & data



4

Developed a roadmap for addressing gaps



Comparison of Tool Capabilities

- * Comparison of geographic scale by tool category
 - Generally a criteria used for initial tool selection
 - Ranges from small, isolated locations to large, regional models.

Geographic Scope	Sketch Planning Tools	Travel Demand Models	Highway Capacity Manual	Simulation Models
Isolated location	○	○	●	●
Segment	◐	○	●	●
Corridor or small network	◐	◐	◐	●
Regional model	◐	●	○	◐

● *Highly relevant*

◐ *Limited applicability*

○ *Poorly suited*

Detailed results for other comparison categories are provided in the Task 3 report.



Research Roadmap for Addressing Gaps



- Identified short and long term research needs
 - Levels of effort
 - Time frame,
 - Potential lead agency
 - Possible data sources
- Need for empirical data
- Long term need for enhancing analytical tools
- Considered five levels of automation associated with each task



Task 4 - Case Studies

This task is currently underway



Case Studies Based on Planning Products

1. Long-Range Metropolitan Transportation Plan

2. Transportation Improvement Plan
3. Transportation Asset Management Plan
4. Regional ITS Architecture/Operations Plan
5. Strategic Highway Safety Plan
6. State Implementation Plan
7. Transit Development Plan
8. Bicycle and Pedestrian Plan
9. Public Involvement Plan
10. State Freight Plan
11. Financial Plan



Long Range Metropolitan Transportation Plan

Basic Steps

Step 1:	Gather System Baseline Information
Step 2:	Establish Goals and Objectives
Step 3:	Develop Performance Measures and Targets
Step 4:	Alternatives Analysis
Step 5:	Financial Plan and Investment Priorities
Step 6:	Transportation Plan and Programming
Step 7:	Implement and Monitor the Plan



Factors to Be Considered in Developing LRTP

- Identify emerging technologies
- Estimate market penetration of C/AV technology
- Engage all stakeholders in development of visions for the region
- Revisit performance targets by considering the impact of C/AV technology on safety, mobility and the environment
- Establish a regular process for review of C/AV technology and applications
- Identify and analyze the potential adverse impact to vulnerable road users
- Monitor and document the effectiveness of C/AV deployment



Task 5 – Workforce Skills and Training

This task is currently underway



Topics covered

- Training needs and costs
- Timeline estimates for training/development programs
- Capability to take advantage of existing resources (ITS Professional Capacity Building Program)
- Options for acquiring skills
 - On-the-Job Training/Continuous learning opportunities
 - Part time employees (Obtaining “niche” technological expertise that may not be needed full-time)
 - Peer-to-peer networks
 - Educational partnerships
 - Closer ties to operations training



Task 7 – Desk Reference and Outreach Materials

This task is currently underway



Outreach Materials

Outreach

- Highway Capacity Manual Community
- Modeling community outreach
- Planning community outreach
- Desk Reference/Guidance Document



Schedule

Task 2 – Impact on planning processes and products – complete
(Technical Memorandum #2: Connected Vehicle Planning Processes and Products and Stakeholder Roles and Responsibilities.

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

Task 3 - Impact on tools, techniques and data - complete

(Analysis of the Need for New and Enhanced Analysis Tools, Techniques and Data.

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

Task 4 - 11 illustrative case studies – complete

Task 5 - Workforce training and skills – underway, TBC by 12/2015

Task 6 – Final Report - To be completed by 3/2016

Task 7 – Outreach materials

- Highway Capacity Manual Tech Memo – complete
- Modeling Tech Memo – To be completed by 3/2016
- Planning Community Outreach Packet - To be completed by 3/2016
- Desk Reference - To be completed by 3/2016

