

## **0-6848: Transportation Planning Implications of Automated/Connected Vehicles on Texas Highways**

### **Background**

Automated vehicles (AVs) and connected vehicles (CVs) are potentially transformative technologies although impacts, costs, and benefits to the transportation system are highly uncertain. Transportation planning is the process of collaboratively preparing for future events regarding the usage, location, design, impact analysis, mitigation of negative effects, and investment in transportation facilities. The magnitude of potential impacts of AV/CVs to the transportation system is clear; the technology could be transformational and require significant changes to transportation plans and investment. Simultaneously, there is a lack of data-supported predictability of the impacts at this time. Although AV/CVs are expected to have significant impacts, there are no instances where the technology can be measured as part of the existing transportation system.

### **What the Researchers Did**

Researchers conducted seven tasks to complete the project. First, the research team briefly defined existing AV/CV technologies and explored future technologies by conducting a literature review and drawing upon previous research. Next, the research team summarized potential changes that AV/CVs may have to travel behavior, urban form, and other aspects of the transportation system. The research team also studied the potential effects of automation on commercial vehicle transportation and freight. The research study included an analysis

of how travel modeling could be affected by AV/CVs and conducted some experimental models runs using a trip-based model from the Austin, Texas, region. The project also included a statewide web-based behavioral preferences survey and a series of three stakeholder workshops held in spring 2016.

The concluding chapter presents the potential changes to the transportation planning process needed to address AV/CV technology and inform the decision-making process, although there remain many uncertainties about how AV/CVs will impact the transportation system.

### **What They Found**

Through outreach to stakeholders during the workshops, researchers found that there is a need to be able to explain AV/CV technology and its impacts on long-range transportation plans. Given that the future is uncertain, planners either choose to ignore the technology until it has a present impact, or it is discussed only briefly as a potential concern for the future.

#### **Research Performed by:**

Texas A&M Transportation Institute

#### **Research Supervisor:**

Thomas Williams, TTI

#### **Researchers:**

Jason Wagner, TTI

Curtis Morgan, TTI

Kevin Hall, TTI

Ipek Sener, TTI

Gretchen Stoeltje, TTI

Hao Pang, TTI

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Researchers identified the need to use exploratory scenario planning as a technique to address the uncertainty of AV/CVs. More education and guidance are needed, both in AV/CV technology and in the techniques of scenario planning.

### What This Means

Researchers found three fundamental steps planners can take to address AV/CVs in long-range transportation plans:

1. Research and monitor behavioral changes and AV/CV data.
2. Forecast AV/CV impacts.
3. Scenario planning for an uncertain future.

As an alternative to a separation of scenario planning and the standard performance-based

planning process, Figure 1 shows an integrated scenario-performance based planning process (S-PBPP). The integrated process essentially replaces the steps within the planning box of the S-PBPP with the steps for scenario planning. The steps include:

1. Scenario development—Scenarios should be developed that generally address goals.
2. Multiple scenario analysis—All scenarios should be evaluated for their impacts.
3. Scenario consolidation—Impacts from scenarios should be consolidated into common themes.
4. Assess magnitude—Both magnitude and likelihood should be assessed.
5. Prioritize actions—Actions should be prioritized according to the likelihood and magnitude of scenario impacts.

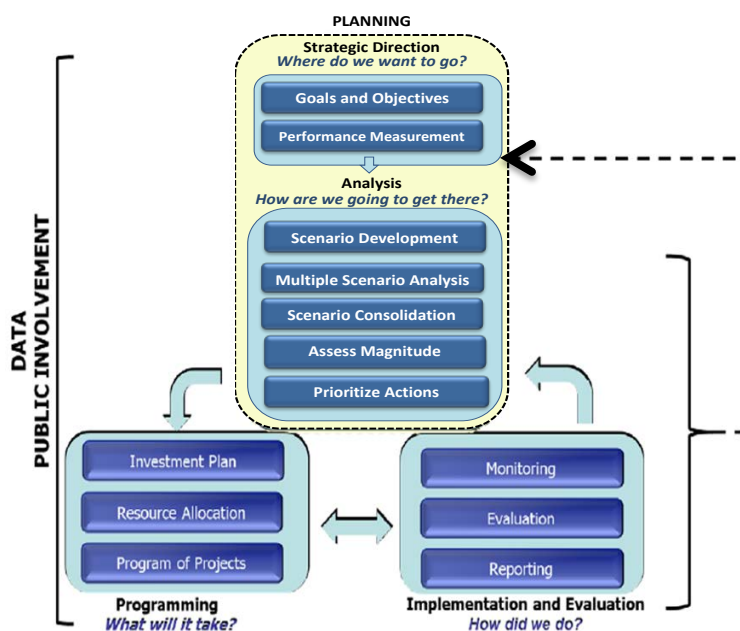


Figure 1. An Integrated Scenario Planning Performance-Based Process.

### For More Information

#### Project Manager:

Wade Odell, TxDOT, (512) 416-4737

#### Research Supervisor:

Thomas Williams, TTI, (512) 467-0952

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Research and Technology Implementation Office

Texas Department of Transportation

125 E. 11th Street

Austin, TX 78701-2483

[www.txdot.gov](http://www.txdot.gov)

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