Assessment of Information & Communication Technologies in Transportation (DOT Goal: Livable Communities; Topic: Development of Livability Performance Measures)

Introduction of advanced control and communication technologies on US roadways and vehicles is likely to have a variety of impacts to be considered. Congestion, emissions, and accident rates could all be affected. Any reduced congestion in the system will alter travel demand decisions, often reducing the net effect of the new technologies. Moreover, combinations of new technologies may have synergies that affect assessments. We will estimate the collective impact of different technologies in a traffic simulation model to help the design and implementation of the new technologies. Improving the design and implementation of the new advanced control and communication technologies will improve their safety and efficiency impacts. We will review and assess the costs and benefits, including accident costs, congestion and environmental costs and benefits (measured by air pollution and greenhouse gas emissions) of a range of new information and communications technologies, using a consistent set of emission factors and analysis boundaries. We will identify potential technologies and combinations of technologies, and develop a region-specific tool to aid local decision-makers in assessing benefits and costs and in choosing between and designing technologies. Our tools will be available for widespread use, and will contribute to the growing interest in ‘smart growth’ guidelines and standards (Figure 13).

Desired Outcomes and Metrics

**Year 1:** (a) Calibrated traffic simulation model. (b) Assessment of an initial set of information and communications technology and rebound effects. **Year 2:** (a) Documentation of results in professional journal publications. (b) Creation of spreadsheet analysis aid. (c) Extension to additional technologies.

Capabilities and Experience

**Lead:** Prof. Chris Hendrickson (CMU). He is a member of the Transportation Research Board (TRB) Executive Committee and a member of the National Academy of Engineering. He brings over 30 years of experience in research. He was Chair of the TRB committee on Applications of Advanced Technology to Design & Construction and Chief Editor, ASCE Journal of Transportation Engineering.

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