Multi-Mode Transportation:
Modeling Commuter Choice and Policy Options

- Richard Gonzalez, University of Michigan Institute for Social Research
- David Chock, University of Michigan Transportation Research Institute

A Roadmap for Sustainable Transportation:
Connected, Automated, and Electric Vehicle Systems

- Steve Underwood, Electrical and Computer Engineering Department and Connected Vehicle Proving Center, University of Michigan-Dearborn

ADVANCING LIVABLE COMMUNITIES THROUGH SUSTAINABLE TRANSPORTATION

Livable communities—sometimes referred to as "sustainable communities"—are places that seek to balance economic and natural assets to meet the diverse needs of present and future residents by offering a variety of housing choices, healthy lifestyle options, reduced air and water pollution, and protection of natural landscapes. Another important element of these communities is sustainable transportation: transportation that meets individuals' and business' needs safely, equitably, and efficiently, while minimizing impacts on human health and the environment.

With a focus on the role of transportation, the **Advancing Livable Communities through Sustainable Transportation Integrated Assessment** (IA) asked:

"What policies, interventions, innovations, and partnerships best enable urban areas to create more livable communities?"

To answer this question, the Graham Sustainability Institute provided support for two separate research teams each working collaboratively with stakeholders and decision makers around this common theme. The teams focused on two areas:

- innovative and disruptive applications of technology for transportation including connected, autonomous, and electric vehicles, and
- multi-modal mobility—that is, transit that involves more than one mode of transportation.

Their collective efforts resulted in the development of analytical approaches, data sets, tools, and policies for sustainable transportation and livable community interventions.
See the back for project details.

SUSTAINABLE TRANSPORTATION...

- Allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations.

- Is affordable, operates fairly and efficiently, offers a choice of transport mode, and supports a competitive economy, as well as balanced regional development.

- Limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below their rates of generation, and uses non-renewable resources at or below the rates of development of renewable substitutes, while minimizing the impact on the use of land and the generation of noise.

  - The European Union Council of Ministers of Transport

"This collaboration will provide us with needed policy and implementation tools for addressing livability challenges in Portland, Oregon in a crucial but to-date under-researched area of sustainable transportation knowledge and action."

- Oregon Transportation Research and Education Consortium

MULTI-MODE TRANSPORTATION:
MODELING COMMUTER CHOICE FOR POLICY OPTIONS

Richard Gonzalez, University of Michigan Institute for Social Research
David Chock, University of Michigan Transportation Research Institute

Key partner: Metro

Working with the Portland, Oregon metropolitan area urban planning agency, Metro, the team collected survey data and developed a new modeling framework to improve understanding of commuters' attitudes that affect transportation choices and the ability to evaluate the effects of different transportation policies. Unlike traditional models that consider choices among only single modes of transportation, the new model focused on trips that use more than one mode of transportation, and the results supported the viability of an integrated transportation system as a way to address interconnected issues including poor air quality, congestion, and lack of parking.

Key aspects of the project included:

- Development of a model framework that considers multi-modal mobility decisions, thereby filling an important gap in existing modeling approaches and helping to identify potentially more successful strategies for encouraging car commuters to utilize public transit
- Inclusion of measures of attitudes in the survey and model, which allows agencies to evaluate a broader array of policy approaches to promote sustainable transportation
- Expansion of the model to enable scenario planning to improve the ability to examine intended and unintended consequences of different transportation policies
- Additional collaboration with transportation authorities in California and the Oregon Department of Transportation, among others, to explore opportunities to scale the model or integrate multi-modal choice into other models of GHG emissions of different transportation scenarios
- Continued opportunities to expand upon the work with a focus on mobility in mega-cities in China

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Back Left Photo Credit: Metro Bus

A ROADMAP FOR SUSTAINABLE TRANSPORTATION:
CONNECTED, AUTOMATED, AND ELECTRIC VEHICLE SYSTEMS

Steve Underwood, Electrical and Computer Engineering Department, University of Michigan-Dearborn

Key partner: Center for Advanced Transportation and Energy Solutions

This project brought together experts from the public, business, and nonprofit sectors and academia in a year-long collaboration to develop a roadmap of short, medium, and long-term technical and policy solutions to advance sustainable transportation based on innovations in connected, automated, and electric vehicle technologies. Planners from the Seattle-Tacoma region of Washington State provided additional input on local planning considerations for testing these technologies in a comprehensive real-time community pilot demonstration project at Joint Base Lewis-McChord, one of the largest military bases in the U.S.

In addition to identifying key near-and long-term science and technology milestones, the project considered a range of public policy approaches for accelerating emerging technologies including, but not limited to:

- Large-scale autonomous vehicle testing and demonstration projects
- Government fleet buying programs
- Electric power utility regulatory reforms
- Zero emission vehicle legislation
- Charging at work and at public locations
- Public education and peer pressure
- Tax credits and other temporary incentives
- Options to address connected vehicles and incentivize adoption of increasingly autonomous cars
- Integration of advanced technologies to improve public transit

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Project Reports: http://graham.umich.edu/knowledge/ia/livable-communities