U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON RESEARCH & TECHNOLOGY
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
HEARING CHARTER

Smart Mobility: It's a Community Issue

Friday, October 25, 2019
10:00 a.m. – 12:00 p.m. EST
Livonia City Council Chambers
33000 Civic Center Drive
Livonia, Michigan

PURPOSE

On Friday, October 25, 2019, the Subcommittee on Research and Technology of the U.S. House of Representatives Committee on Science, Space, and Technology will hold a field hearing titled, *"Smart Mobility: It's a Community Issue."* The purpose of this hearing is to explore the use of smart technology to improve the ability of small cities and suburban communities to provide safe and efficient mobility solutions, to examine the research and development needs to ensure this technology is accessible to diverse communities, and to consider best practices for integration of community input and consideration of unique community needs, as well as collaboration between public, private, and academic stakeholders.

WITNESSES

- **The Honorable David Coulter,** Oakland County Executive
- **Mr. Mark Dowd**, Executive Director, Smart Cities Lab
- **Dr. Raj Rajkumar**, Director of Mobility21 and George Westinghouse Professor of Electrical and Computer Engineering, Carnegie Mellon University
- **Dr. Tierra Bills**, Assistant Professor, Civil and Environmental Engineering, College of Engineering, Wayne State University
- **Mr. Scott Averitt**, Technical Expert and Manager of Public/Private Partnerships, Robert Bosch LLC

OVERARCHING QUESTIONS

- What are the benefits of smart mobility solutions? How can technologies be developed and deployed to effectively serve the needs of diverse communities?
- To what extent are smart mobility solutions applicable to small cities and suburban communities? What are the current and long-term challenges to deployment of smart mobility solutions in such communities?

- What additional research and development is needed to advance smart mobility solutions, in particular in less densely populated areas, including areas without a history of public transit?
- What is the role of federal science agencies in supporting research and development in smart mobility? How can federal agencies best partner with State and local governments, researchers, citizen groups, and the private sector to advance smart mobility innovations and deployment?

Background

The 2016 President's Council of Advisors on Science and Technology report, "Technology and the Future of Cities," envisioned smart cities as providing "opportunities to improve people's lives both by modernizing key infrastructures (such as energy, water, or transportation) and by using information technology (often with open data) to enhance city operations and services." The report described several key smart cities technologies and concepts for improving transportation and mobility that could help achieve safety, efficiency, accessibility, and environmental objectives for how we move people and goods across the nation.

Smart mobility is not only about building advanced infrastructure; it is also a people-centric concept that seeks to address social aspects of transportation. These include equity issues for economically challenged communities and helping seniors age in place. For example, testing and deployment of seamless payment systems for access to different mobility options should also consider how people without banking accounts or credit cards (the "unbanked" and "underbanked") and without smartphones will access the system.

Demographic shifts, social trends, and technological advancements are leading communities, city transit agencies, and businesses towards Mobility as a Service (MaaS) using multimodal, on-demand services.[1] Transit agencies are exploring adding more mobility-on-demand (MOD) service to their traditional fixed-routes public transportation services.[2] The U.S. Department of Transportation (USDOT) describes MOD as "an innovative, user-focused approach which leverages emerging mobility services, integrated transit networks and operations, real-time data, connected travelers, and cooperative Intelligent Transportation Systems (ITS) to allow for a more traveler-centric transportation system-of-systems approach, providing improved mobility options to all travelers and users of the system in an efficient and safe manner."[3]

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[1] National Academies of Sciences, Engineering, and Medicine Transportation Research Board, Transportation Research Circular Number E-C244, May 2019, "Mobility On Demand – A Smart, Sustainable, and Equitable Future."
[2] Id.
[3] https://www.its.dot.gov/factsheets/pdf/MobilityonDemand.pdf

MOD may include various modes such as "carsharing, bikesharing, carpooling/vanpooling, ridesourcing, scooter sharing, microtransit, shuttle services, public transportation, and other innovative and emerging transportation solutions."[4] In 2018, thirty-six percent of adults in the U.S. said they had used a ride-hailing service, double that of 2015.[5] Forty-five percent of urban residents and 40% of suburban residents report having used a ride-hailing app.[6] A number of communities and city transit agencies are partnering with rail-hailing services or transportation network companies (TNCs), such as Uber, Lyft and Via, to provide more mobility options for their communities. These microtransit options often offer on-demand, door-to-door shuttle service at a subsidized, flat rate through a smart phone app. These kinds of partnerships are relatively new, and the Transportation Research Board recently issued a "Partnership Playbook" for cities contemplating this approach. The Playbook is based on lessons learned by early adopters, and key findings show that the biggest barrier to these partnerships is TNCs' hesitancy to share data with transit agencies based on privacy, public records requests, and competition concerns.[7]

On a smaller scale, micromobility options, such as human-powered and electric bikes and scooters, also provide access to transit for people that live beyond bus or other transit stops or who want to take a different route than available on transit. In the U.S., people have taken 207 million bike share and shared mobility trips since 2010. Eighty-four million of those trips were taken in 2018, double the number of trips taken in 2017.[8] However, these options may be less viable in less densely populated areas such as suburban communities.

At the January 2019 USDOT and Transportation Research Board workshop, "Mobility on Demand – A Smart, Sustainable, and Equitable Future," participants identified a number of research and policy needs. Among them are infrastructure-related research for automation and public-transportation, shared automated vehicles (SAVs), rights-of-way management and pricing to optimize sustainability, and accessible and equitable outcomes.[9] Outstanding research for SAVs includes understanding the potential impacts of SAVs on land use; understanding the social and behavioral impacts of vehicle automation; continuing research on cellular and dedicated short-range communications opportunities, challenges, and best practices; methods for

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[4] National Academies of Sciences, Engineering, and Medicine Transportation Research Board, Transportation Research Circular Number E-C244, May 2019, "Mobility On Demand – A Smart, Sustainable, and Equitable Future."

[5] https://www.pewresearch.org/fact-tank/2019/01/04/more-americans-are-using-ride-hailing-apps/

[6] Id.

[7] National Academies of Sciences, Engineering, and Medicine 2019. *Partnerships Between Transit Agencies and Transportation Network Companies*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25425

[8] National Association of City Transportation Officials - https://nacto.org/shared-micromobility-2018/.

[9] National Academies of Sciences, Engineering, and Medicine Transportation Research Board, Transportation Research Circular Number E-C244, May 2019, "Mobility On Demand – A Smart, Sustainable, and Equitable Future."

incorporating SAVs into land use and transportation modeling and long-range planning; and best practices to prepare public agencies for SAVs.[10]

Research Funded by the Department of Transportation

USDOT initiated its Smart City Challenge in December 2015 to incentivize mid-size cities to propose innovative solutions to create an integrated smart transportation system that would use data, applications, and technology to help people and goods move faster, cheaper, and more efficiently.[11] USDOT provided $40 million in federal funding and the cities leveraged an additional $500 million in public and private funding. Out of 78 applications, the winner of the Challenge was announced in 2016 as Columbus, Ohio. Columbus's proposal included an integrated plan that would use several enabling technologies including a connected transportation network, integrated data exchange, and electric vehicle infrastructure. The other finalists were Austin, Denver, Kansas City, Pittsburgh, Portland, and San Francisco.

Congress also considered the need to invest in smart mobility in the most recent highway bill. The 2015 *Fixing America's Surface Transportation* (FAST) *Act* authorizes $77.5 million in FY 2020 for 35 University Transportation Centers. Improving mobility of people and goods is the focus of two of the five national UTCs, two of the 10 regional UTCs, and 10 of the 20 Tier 1 UTCs.

The FAST Act also provides $60 million per year from the Federal Highway Administration's (FHWA) Technology and Innovation Deployment Program for USDOT to establish the new Advanced Transportation and Congestion Mitigation Deployment (ATCMTD) Program (23 U.S.C. 503(c)(4)). The program awards five to 10 grants per year to fund the deployment of technologies that will, among other purposes, collect, disseminate, and use real-time traffic, transit, parking, and other transportation-related information to improve mobility, reduce congestion, and provide for more efficient and accessible transportation.[12]

The Intelligent Transportation Systems Joint Program Office (ITS JPO) and Federal Transit Administration (FTA) lead the department's Mobility-on-Demand (MOD) Sandbox through the Public Transportation Innovation account (49 U.S.C. 5312). Under this program, FTA provides funding to transit agencies to carry out innovative pilots and demonstrations of integrated MOD solutions, explore partnerships, develop new business models, and to investigate new, enabling technical capabilities such as integrated payment systems, decision support, and incentives for traveler choices.

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[10] Id.

[11] U.S. Department of Transportation "Smart City Challenge: Lessons for Building Cities of the Future," https://www.transportation.gov/sites/dot.gov/files/docs/Smart%20City%20Challenge%20Lessons%20Learned.pdf.

[12] Fixing America's Surface Transportation Act [P.L. 114-94] Section 6004.

Research Funded the National Institute of Standards and Technology

The National Institute of Standards and Technology (NIST) Global City Teams Challenge is an initiative to help communities in the U.S. and around the world leverage networked technologies to better manage resources and improve quality of life.[13] NIST and its partners created the International Technical Working Group in Internet-of-Things-Enabled Smart City Framework (IES-City Framework) to reduce barriers to adoption of smart city solutions. Two key barriers are lack of interoperability between systems and multiple competing architectures from which to choose.

Research Funded by the National Science Foundation

US Ignite, a national effort that originated out of the Office of Science and Technology Policy (OSTP) and funded by the National Science Foundation (NFS), partnered with NIST in the GCTC initiative. In addition, US Ignite and ATIS are developing a secure and interoperable Smart Cities Data Exchange framework. One of the major barriers to adopting smart mobility solutions is access to data, such as real-time data and results of mobility-focused smart city pilots in other communities. The framework would create interoperable data management platforms, data exchanges, and data marketplaces for cities, states, local and federal governments, citizens and others.

NSF also maintains the Smart and Connected Communities program, which "supports integrative research that addresses fundamental technological and social science dimensions of smart and connected communities and pilots solutions together with communities".[14] This program operates across several directorates, including Computing and Information Science and Engineering, Education and Human Resources, and Social, Behavioral, and Economic Sciences.

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[13] https://www.nist.gov/news-events/news/2014/08/nist-global-city-teams-challenge-create-smart-cities
[14] https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505364