Semi-Annual Progress Report for University Transportation Centers:
Center for Multimodal Mobility in Urban, Rural and Tribal Areas (CMMM)

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1. Accomplishments

What are the major goals and objectives of the program?

1. Developing more refined models of travel behavior and the factors that influence travel demand;
2. Assessing the potential for unmanned and autonomous vehicles (both ground and air) to streamline the delivery of goods and facilitate the movement of people;
3. Investigating a wide array of congestion-reduction strategies, including incentivization of public transit, and the use of toll and HOV lanes;
4. Identifying the key contributors to transportation-related accessibility and presenting solutions that support mobility, as well as better understanding the accessibility implications of travel barriers, including constrained access to food, healthcare, and employment;
5. Evaluating the potential of modalities such as rideshare, vanpool and microtransit to improve mobility while meeting the ever-evolving demand for efficient, reliable transportation;
6. Exploring the feasibility and impact of infrastructure-based solutions such as "multimodal streets" in reducing congestion and addressing access;
7. Exploring innovative approaches to project finance and delivery and providing technical assistance to stakeholders.

What was accomplished under these goals?

1. Currently, CMMM is leading three competitive projects, which must be collaborative across departments, along with twelve Year 2 core projects. Additionally, twelve Year 3 core project proposals are in and are undergoing the review process.
   In total so far**, CMMM has funded 30 projects adding up to more than $3 million.** These projects range across transportation goals including improving the mobility of people and goods, promoting safety, reducing congestion, and more. Each project reflects the values of the CMMM as well as the USDOT UTCs.

2. **STEM Workforce Development and Outreach**
   CMMM advanced its workforce development goals through two transportation-focused STEM summer camps held in collaboration with White Earth Tribal & Community College (WETCC) in Mahnomen, MN. Designed for middle and high school students, these programs engaged participants in hands-on learning activities connecting core STEM concepts to real-world transportation challenges.

   The middle school camp introduced students aged 10–14 to topics such as energy systems, impacts of transportation, and community-based problem solving. Activities were developed by University of Maryland (UMD) faculty and graduate students, with a focus on rural transportation efforts.

   The high school camp expanded on these themes by introducing robotics and programming applications through a build-and-code activity featuring autonomous model cars. Led jointly by UMD, WETCC, and North Dakota State University faculty, the program provided students with early exposure to transportation technology and systems engineering.

These camps strengthen the transportation workforce pipeline by encouraging young learners to explore STEM fields early, emphasizing how transportation research and innovation directly support community well-being and mobility. Through these outreach efforts, CMMM continues to promote interest in transportation careers and prepare the next generation of skilled professionals to improve the mobility of people and goods.

3. To further expand our outreach and engagement, we are posting regularly on LinkedIn, where our presence continues to grow. Follow us at: **www.linkedin.com/company/umd-cmmm** for updates on CMMM's activities, events, and opportunities for collaboration. These updates represent our ongoing efforts to strengthen CMMM's visibility and communicate our values as a research and education-focused center under UMD and the USDOT.

4. Our advisory board meets twice a year and will have its next meeting on **December 5, 2025**. This interdisciplinary board represents a wide-ranging and engaged team that embodies CMMM's mission and values. During this meeting, CMMM and the advisory board identify pressing transportation challenges within the community and explore opportunities to apply innovative, research-driven solutions. These discussions help ensure that CMMM's research activities remain responsive to real-world mobility needs and effectively advance the movement of people and goods across urban, rural, and tribal areas.
   Advisory Board Meeting Dates: December 13, 2023, May 3, 2024, December 5, 2024, and May 29, 2025, December 5, 2025

   See the list of members below:
   1. Samantha Biddle
   2. Marcia Argust
   3. Elisabetta Cherchi
   4. Christopher Conklin
   5. Christian Dorsey
   6. Dan Goldfarb
   7. Robbyn Lewis
   8. Arben Shasho
   9. Neil Pedersen
   10. Jason Wang
   11. Richard Wu
   12. Hua Xiang

What opportunities for training and professional development has the program provided?
In total, CMMM has hosted 12 educational seminars for students, faculty, and staff at the University of Maryland. Each seminar has had a Zoom link included so that consortium members as well as members of the advisory board are able to participate. The seminars within this reporting period can be seen below:

1. Sisinnio Concas, University of South Florida - April 24, 2025
Performance Measurement Evaluation of Connected Vehicle Deployments: Putting Research into Practice

2. Frank Zou, University of Queensland - October 16, 2025
If you reduce fare, they will ride? Distributional outcomes and accessibility lessons from Queensland's 50-cent public transport fare policy

In our previous performance period, CMMM co-hosted the Generative AI in Transportation Workshop on March 13–14, 2025, at UMD in partnership with the ASCE T&DI AI in Transportation Committee. The event brought together more than 120 participants, including transportation engineers, AI researchers, public officials, students, and industry professionals—with major leaders such as Ford, GM, and Meta joining the discussions. Through expert-led sessions, hands-on demonstrations, and panel discussions, participants explored topics such as predictive traffic modeling, AI-driven infrastructure monitoring, pedestrian safety, and autonomous systems. The workshop's success underscores CMMM's leadership in advancing AI-driven innovation.

How have the results been disseminated? If so, in what way/s?
Online presence:
The results have been disseminated on the government website RIP, on CMMM's website, and via LinkedIn. The core projects, the competitive projects, the educational seminars, semester events, and more have been reflected on this page: www.mti.umd.edu/cmmm

Newsletter:
CMMM sends out a bi-annual newsletter to all of the consortium members, their students, faculty, staff, and to members of the advisory board. These are also linked on the website.

What do you plan to do during the next reporting period to accomplish the goals and objectives?
CMMM plans to move forward with innovative transportation research via twelve new core projects, to be funded soon. Additionally, CMMM will continue hosting their seminar series, putting out a newsletter twice a semester, and updating the website and LinkedIn page. The Center will continue to work with our collaborators to turn research into real-world solutions to improve the mobility of people and goods.

2. Participants and Collaborating Organizations

What organizations have been involved as partners?
CMMM collaborates directly with the University of Maryland, Morgan State University, San Jose University, North Dakota State University, and White Earth Tribal and Community College

Have other collaborators or contacts been involved?
CMMM collaborates across academia, government, and industry to conduct research, further education, and lead career development. Specific cross-collaboration examples include our thirty research projects and our recurring seminar series. CMMM's collaborators are listed below.
Universities:
University of Maryland, Morgan State University, San Jose University, North Dakota State University, and White Earth Tribal and Community College, University of Michigan, University of South Florida, University of Queensland, National University of Singapore, and University of Virginia

Academic Partners: Ali Haghani, Gang Len Chang, Paul Schonfeld, Xianfeng (Terry) Yang, Mehdi Shokouhian, Celeste Chavis, Young-Jae Lee, Ahoura Zandiatashbar, Susan Shaheen, Adam Cohen, Ying Huang, Ilya Ryzhov, Anna Alberini, Di Yang, Muhid Kabir, Mansha Swami, Jean Daniels Saphores, Yaobang Gong, Kofi Nyarco, Sisinnio Concas, Frank Zou
Agencies: MDOT, USDOT, the Federal Highway Administration, the State Highway Administration
Industries: Transurban, Rekor-AI, and EurekaFacts, GM, Ford, Meta

3. Outputs

CMMM currently leads **12 core** and **3 competitive projects**, all focused on enhancing the mobility of people and goods. Beyond advancing research, these projects also provide hands-on learning and mentorship opportunities for students—several of whom will graduate as newly trained engineers in May 2025 (see KPIs for details). Through its **seminar series**, **Transportation Research Summer Camps**, and an **active online presence**, CMMM continues to strengthen education, research, and collaboration in support of applied innovations that improve transportation systems.

4. Outcomes

The outcomes for this reporting period include a notable increase in understanding and awareness of transportation challenges and opportunities across the CMMM network. This progress was achieved through CMMM's educational seminar series, which provided participants with exposure to current research and emerging technologies in mobility and infrastructure.

The call for proposals and review of twelve new core projects expanded the Center's research portfolio and strengthened collaboration among faculty, students, and partner institutions. In addition, advisory board meetings fostered discussion on real-world transportation needs and strategies for translating research into practical solutions.

5. Impacts

<u>What is the impact on the effectiveness of the transportation system?</u>
The research conducted by our students and faculty directly enhances transportation system effectiveness, addressing challenges like traffic flow, safety, and ease of access. These projects generate data-driven solutions that improve efficiency, reduce congestion, and support resilient mobility across communities.

<u>What is the impact of technology transfer on industry and government entities, on the adoption of new practices, or on research outcomes which have led to initiating a start-up company?</u>
CMMM has continued to advance technology transfer through collaborative research, applied innovation, and workforce development initiatives that connect academic research with real-world implementation.

1. **Autonomous Vehicles** – CMMM is advancing efficient connected and automated vehicle (CAV) technologies through a multi-objective ecological driving system that optimizes

trajectories to reduce travel time, fuel use, and improve safety. Using its in-house CAV platform, the center is testing this innovative framework in real-world conditions, highlighting CMMM's leadership in autonomous vehicle research and collaboration.
2. **Partnership with Transurban** – Conducted research to improve tolling operations and enhance system efficiency through innovative, data-driven strategies.
3. **Collaboration with Rekor-AI** – Advanced pedestrian safety using AI-based tools and analytics to inform safer roadway and urban design practices.
4. **Work with EurekaFacts** – Supported studies on e-bike adoption and safety standards, providing applied research to guide emerging micromobility policies and practices.
5. **Career Development and Workforce Growth** – Through seminars, our Generative AI in Transportation conference, summer camps, student research projects, and mentorship, CMMM fosters professional development and increases interest in transportation research and technology fields. Many participating students go on to pursue advanced degrees or careers in industry, government, and academia, directly supporting the growth of a skilled transportation workforce.

Together, these efforts demonstrate how CMMM bridges research and practice—translating new knowledge into tools, partnerships, and trained professionals that strengthen both industry and government capabilities in transportation innovation.

What is the impact on the body of scientific knowledge?
CMMM's students and researchers are at the forefront of transportation innovation, actively contributing to solutions for complex mobility challenges through an impressive portfolio of 30 supported research projects. Their work spans critical areas such as urban mobility, autonomous vehicle integration, and commute efficiency, producing valuable insights that are not only advancing academic understanding but also influencing real-world transportation systems.

This research is fueling numerous journal publications and supporting our students in achieving advanced degrees, all while equipping them with hands-on expertise that prepares them for impactful careers in the field. These works are also being published in final reports, journal papers, and conference presentations (see KPIs).

What is the impact on transportation workforce development?
CMMM strengthened the transportation workforce pipeline through two STEM-focused summer camps held in partnership with White Earth Tribal and Community College. The camps engaged middle and high school students in hands-on activities exploring transportation, environmental systems, and robotics, fostering early interest in engineering and mobility research. By introducing young learners to real-world transportation challenges, these programs help build the next generation of professionals dedicated to improving the movement of people and goods.

6. Changes/Problems
Nothing to report

7. Special Reporting Requirements
Nothing to report