Center for Advanced Multimodal Mobility Solutions and Education

USDOT Tier 1 University Transportation Center
Program Progress Performance Report #1

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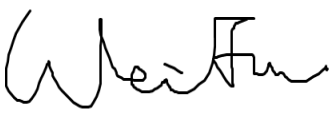
Signature of Submitting Official:	

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1. ACCOMPLISHMENTS

1.1. What are the major goals and objectives of the program?

The major goals and objectives of the program as outlined in the proposal include the following categories.

Research

CAMMSE will address the FAST Act research priority area of “Improving Mobility of People and Goods” by conducting multi-disciplinary, multi-modal research, education and workforce development, and technology transfer. CAMMSE is motivated by the recent advances in computing, smartphones and communication technologies, and ubiquitous data to create sustainable, efficient, and growth-enabling multimodal transportation systems. Cutting edge analytical methods and models will enhance the effectiveness, efficiency, and reliability of these systems accordingly. Recent technological advancements enable new perspectives and holistic approaches to address the well-known challenges in multimodal transportation systems planning, design, operations, and maintenance. In particular, the following research topic areas will be established to maximize synergy and adaptability across multiple modes and jurisdictions:

- Increase access to opportunities that promote equity in connecting regions and communities, including urban and rural communities;
- Generate innovations in multi-modal planning and modeling for high-growth regions;
- Develop data modeling and analytical tools to optimize passenger and freight movements;
- Innovations to improve multi-modal connections, system integration and security; and
- Smart Cities.

Leadership

The CAMMSE team is nationally and internationally recognized for its contributions to the field of transportation research, and for its deployment of successful solutions to critical, real-world transportation challenges. In addition, team members are committed advocates and longstanding leaders within the multimodal transportation community and the UTC system itself. Through this UTC grant, the Consortium plans to build on its demonstrated experience to mentor future leaders in the field of transportation. CAMMSE plans to nurture students through skill building and professional development

activities that promote notable research scholarship and successful transportation careers.

Education and Workforce Development

With years of collective education, research, and UTC experience, CAMMSE will provide a transportation education program through its partner universities. The program will promote creative and multidisciplinary problem-solving and exposure to a myriad of educational and workforce development experiences. The program will serve to attract, educate, and train future and existing transportation professionals with the know-how to undertake and implement innovative projects being or to be conducted.

The workforce development program will leverage the existing training skills and delivery resources available within partner universities. On-line webinars will be designed and delivered using available technical resources, which could provide Continuing Education Credits (CEUs) to interested course participants. In addition, UTC funds will be used to support and host the monthly transportation seminar series, particularly while classes are in session. Target audience is current students and the local university community. UTC funds will also enhance our ability to host nationally and internationally recognized speakers. The target audience is local and regional (onsite), and national when recording and posting talks online.

CAMMSE will support career-building activities that facilitate student transition from school to the workplace by offering enhanced student research opportunities, research seminars, guest speakers, professional conference travel and other professional networking opportunities. In addition, outreach programs at the pre-collegiate level (elementary to high school) will be designed to spark interest in transportation issues and to encourage youth to consider transportation academic programs and careers. The outreach initiatives will particularly focus on recruiting underrepresented minorities into transportation and other STEM fields.

Technology Transfer

The technology transfer program at CAMMSE is designed to support the USDOT in their objective of “expanding technology transfer to partners and stakeholders” by sharing research results quickly and to the widest possible audience. CAMMSE has demonstrated ability to disseminate research results, spur implementation, and conduct continuing education programs. The technology transfer program is a direct extension of the Center’s research and education programs; in other words, these activities are designed to increase the scope and effectiveness of research accomplishments and education initiatives. General objectives within the technology transfer area in CAMMSE will be to:

- Increase the national visibility of CAMMSE research and education activities.
- Increase the availability and speed at which CAMMSE research results are disseminated.
- Provide technical assistance based on CAMMSE research and development.

Collaboration

CAMMSE has an extensive history of forming collaborative relationships at a variety of technical, fiscal and administrative levels. Across all its activities, from conducting pooled fund studies to hosting tech transfer events, CAMMSE will seek to work with collaborators from all sectors.

Diversity

In order for the transportation workforce to reflect the diversity of the national workforce pool, CAMMSE will continue to pursue the development of innovative programs to encourage new entrants, particularly those from groups currently underrepresented in the field. CAMMSE will actively participate in a number of committed activities through which the CAMMSE will increase interest in STEM disciplines and raise awareness of transportation-related careers amongst underrepresented groups.

1.2. What was accomplished under these goals?

Research

Based on the list of “early-winner” projects as identified and outlined in the proposal, the CAMMSE Project Information Forms were developed and sent out to Associate Directors at all member universities for input in February, 2017. The forms were collected with suggestion for changes in the middle of February, 2017, including project title, university, principal investigator, PI contact information, funding source(s) and amounts provided (by each agency or organization), total project cost, agency ID or contract number, start and end dates, brief description of research project, implementation of research outcomes, and impacts/benefits of implementation. The project information was posted on the CAMMSE website as required by OST-R. All funded projects in the first round (i.e., in the year of 2016-2017) will be completed within one year and the Final Reports will be submitted within two months after the completion of each project (i.e., by January 30, 2018). The appendix contains the list of the funded projects with respect to each member university.

In the first round of project awards, the center is sponsoring 5 PhD students, 5 master students and 4 undergraduate students. In addition to 7 principal investigators, 7 faculty/staff members/technical consultants (not including P.I.) are involved in the CAMMSE projects.

Leadership

Two Kick-off meetings were conducted during this period. The first meeting was unofficially held at the Transportation Research Board 96th Annual Meeting. Dr. Wei Fan, the center director, met with several Associate Directors from the consortium

institutions. The topics discussed in this meeting included the grant requirements; immediate tasks; establishment of the technical advisory committee; contracts and cost share; research proposals; and education, outreach, and technology transfer. Dr. Wei Fan also attended two UTC Grantees' Meetings at the Transportation Research Board Annual Meeting. The second USDOT Kick-off meeting took place March 29, 2017 at the University of North Carolina at Charlotte (UNCC) campus. This meeting was attended by OST-R staff and several UNCC administrators at different levels, key faculty and staff. The meeting included welcome remarks from UNCC, introductions to the UTC program and opening remarks from OST-R, an overview of grant requirements, open discussions about CAMMSE's plans, and a tour of facilities at UNCC.

Education and Workforce Development

CAMMSE has been working with Institute of Transportation Engineers (ITE) Student Chapter at UNCC in supporting and hosting the bi-weekly transportation seminar series in which guest speakers are invited to UNCC to present their current project activities while classes are in session. The target audience is current students and the local university community. Dr. Fan's transportation research group has also been working in conducting seminars on a bi-weekly basis, in which and graduate students present their current research activities. TSU hosted the Summer Maritime Academy (SMA) during June 20-June 23, a four-day non-residential program designed to introduce high school students to the maritime transportation management and the multimodal connections at US ports.

Technology Transfer

Developed a website (http://cammse.uncc.edu/) and provided information on Center activities.

Collaboration

CAMMSE created a diverse collaboration network with different state and local government agencies, and educational and professional organizations, as well as community practitioners. CAMMSE also worked to build collaborative relations with international transportation centers and universities.

Diversity

Nothing to report.

1.3. What opportunities for training and professional development has the program provided?

The bi-weekly seminars are open to the general public, particularly to the local and state transportation agencies, as well as the industry practitioners.

1.4. How have the results been disseminated?

Dr. Fan has given two invited research seminars relevant to CAMMSE on improving mobility of people and goods (one related to carsharing and the other related to connected & autonomous vehicles) at Tongji University in Shanghai, China in April 2017. Dr. Fan and his students also made three research presentations related to multimodal transportation, two in Charlotte Research Institute (CRI) at Charlotte in April and one in SDITE at Columbia, SC in March 2017.

1.5. What do you plan to do during the next reporting period to accomplish the goals and objectives?

The following tasks are planned in order to accomplish the goals and objectives of CAMMSE.

(1) Issue the RFPs for the year of 2017-2018.
(2) Conduct rigorous peer-reviews, select funded projects and issue contracts.
(3) Project summaries will be posted and updated on the CAMMSE website as well as on RiP once all projects have been selected.
(4) Attend NC Section Institute of Transportation Engineers (NCSITE) and Southern District ITE (SDITE) Annual Meetings, as well as the 2018 TRB 97th Annual Meeting to present papers based on research.
(5) Update the website to include the seminar presentations.

2. PRODUCTS

2.1. Publications, conference papers, and presentations

Publications

[1] Yu, M. and Fan, W., Calibration of Microscopic Traffic Simulation Models Using Metaheuristic Algorithms, Accepted for Publication in International Journal of Transportation Science and Technology, May, 2017.

[2] Zhang, H.H., Fan, W., Liao, Z.H. and Yang, L., Impacts of Parallel Runway Operation Modes on Air Traffic Flow Characteristics in Terminal Areas, Accepted for Publication in Journal of Transportation Systems Engineering and Information Technology, April, 2017.

[3] Qi, Y and A. Guo, Pedestrian Safety Under Permissive Left-Turn Signal Control, Accepted for Publication at International Journal of Transportation Science & Technology, 2017.

Presentations

[1] Fan, W. Carsharing: A Dynamic Decision-Making Problem for Vehicle Allocation, Tongji University, Shanghai, P.R.China, April 19, 2017.

[2] Fan, W. Connected & Autonomous Vehicles, Tongji University, Shanghai, P.R.China, April 18, 2017.

[3] Yu, M. and Fan, W. Calibration of Microscopic Traffic Simulation Models Using Metaheuristic Algorithms, Charlotte Research Institute (CRI) Spring Reception in the PORTAL Atrium, Research & Economic Development, UNC Charlotte, April 13, 2017.

2.2. Website(s) or other internet site(s)

The CAMMSE website is located at http://cammse.uncc.edu/. This website will be used to disseminate any information related to the program.

2.3. Technologies or techniques

Nothing to report.

2.4. Inventions, patent applications, and/or licenses

Nothing to report.

2.5. Other products

Nothing to report.

3. PARTICIPANTS AND OTHER COLLABORATING ORGANIZATIONS

3.1. Who has worked on the program?

The members of CAMMSE UTC include the University of North Carolina at Charlotte (UNCC); the University of Texas at Austin (UT Austin); the University of Connecticut (UConn); Washington State University – Pullman (WSU); and Texas Southern University (TSU). Table 1 lists the leadership team members who have worked on the program during this reporting period.

Table 1. CAMMSE Staff Working on the Program

Name	Wei Fan	Randy Machemehl	Nicholas Lownes	Xianming Shi	Yi Qi
Program/Project Role	Center Director	Associate Director at UT Austin	Associate Director at UConn	Associate Director at WSU	Associate Director at TSU
Contribution to Program/Project	Oversees overall operations of the program. Responsible for coordinating with stakeholders and developing and implementing the CAMMSE strategic plan	Serves as liaison between CAMMSE and UT Austin	Serves as liaison between CAMMSE and UConn	Serves as liaison between CAMMSE and WSU	Serves as liaison between CAMMSE and TSU
Funding Support	UNCC	UT Austin	UConn	WSU	TSU
Collaborated with Individual(s) in Foreign Country(ies)	Yes	No	Yes	Yes	Yes
Country(ies) of Foreign Collaborator(s)	P.R.China	No	Australia	P.R.China	P.R.China
Traveled to Foreign Country(ies)	N/A	N/A	N/A	N/A	N/A
If traveled to foreign country(ies), duration of stay	N/A	N/A	N/A	N/A	N/A

3.2. What organizations have been involved as partners?

Table 2 provides a list of the organizations that have partnerships with CAMMSE.

Table 2. A List of Organizations Creating Partnerships with CAMMSE

Organization Name	Type / Location	Partners Contribution to Project				
		Financial Support	In-kind Support	Facilities	Collaborative Research	Personal Exchanges
Capital Metro – Austin Public Transit	Government /TX		X	X		
Centralina Council of Governments	MPO/NC				X	
Charlotte Area Transit System	Government /NC				X	
City of Austin	Government /TX		X	X		
Connecticut Department of Transportation					X	
CTTransit	Transit Operator				X	X
North Carolina Department of Transportation	Government /NC				X	
Texas Department of Transportation	Government /TX		X	X		
Texas Southern University	University /TX	X	X	X		
University of Connecticut	University /CT	X	X	X		
University of North Carolina at Charlotte	University /NC	X	X	X		
University of Texas at Austin	University /TX	X	X	X		
Washington Department of Transportation					X	
Washington State University	University /WA	X	X	X		

Our CAMMSE UTC is in the process of establishing an advisory board which will contain members from a variety of organizations and the private sector.

3.3. Have other collaborators or contacts been involved?

The CAMMSE is working with the Key Laboratory of Road and Traffic Engineering, Ministry of Education and College of Transportation Engineering at Tongji University in Shanghai, P.R.China to develop a collaborative relationship between two universities.

4. IMPACT

The CAMMSE is currently conducting a variety of research, education and outreach, technology transfer, and diversity activities and as such, the impact of this program cannot be measured during this reporting period.

4.1. What is the impact on the development of the principal discipline(s) of the program?

Nothing to Report.

4.2. What is the impact on other disciplines?

Nothing to Report.

4.3. What is the impact on the development of transportation workforce development?

Nothing to Report.

4.4. What is the impact on physical, institutional, and information resources at the university or other partner institutions?

Nothing to Report.

4.5. What is the impact on technology transfer?

Nothing to Report.

4.6. What is the impact on society beyond science and technology?

Nothing to Report.

5. CHANGES/PROBLEMS

5.1. Changes in approach and reasons for change

Nothing to Report.

5.2. Actual or anticipated problems or delays and actions or plans to resolve them

Nothing to Report.

5.3. Changes that have a significant impact on expenditures

Nothing to Report.

5.4. Significant change in use or care of animals, human subjects, and/or biohazards

Nothing to Report.

5.5. Changes of primary performance site location from that originally proposed

Nothing to Report.

5.6. Additional information regarding products and impacts

Nothing to Report.

6. SPECIAL REPORTING REQUIREMENTS

(1) **Website:** Newly-designed website launched February 2017: http://cammse.uncc.edu
(2) **Directory of Key Center Personnel:** Available on the program website: http://cammse.uncc.edu/staff
(3) **Financial and Annual Recipient Share Reports:** The SF 425 requirements will be met by separate reports.
(4) **Research Project Descriptions:** Available on the program website: http://cammse.uncc.edu/research/current-projects

APPENDIX

CAMMSE @ UNC Charlotte Funded Projects, 2016-2017

University	Principle Investigator	Category	Title of the Funded Project
University of North Carolina at Charlotte	Wei Fan	Advanced Research	Estimation of Origin-Destination Matrix and Identification of User Activities Using Public Transit Smart Card Data
	Wei Fan	Applied Research	Improving the Movements of People and Freight: A Case Study of the Piedmont Atlantic Megaregion
University of Texas at Austin	Randy Machemehl	Applied Research	Forecasting Ridership for Commuter Rail in Austin
	Randy Machemehl	Advanced Research	Corridor Level Adaptive Signal Control
University of Connecticut	Nicholas Lownes	Basic Research	Stochastic Multimodal Network Modeling
	Nicholas Lownes	Basic Research	Robust Routing, Assignment, and Simulation of Transit Systems
Washington State University	Xianming Shi	Applied Research	The Use of Connected Vehicle Technology to Facilitate Multimodal Winter Travel
	Jia Yan	Applied Research	The Effect of Competition of Transport Modes on Mobility
Texas Southern University	Mehdi Azimi Yi Qi	Applied Research	Use of Vessel Automatic Information System Data to Improve Multi-modal Transportation in and around the Ports
	Yi Qi	Applied Research	Use of Innovative Intersection Designs for Improving Mobility and Reducing Roadway Traffic Congestion

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