



# Center for Advanced Multimodal Mobility Solutions and Education



## Annual Performance Indicators Report for University Transportation Centers



**November 30, 2016 to September 30, 2017**

*Submitted by*  
**Center for Advanced Multimodal Mobility Solutions and Education**

*Prepared for*  
**Office of the Assistant Secretary for Research and Technology (OST-R)  
U.S. DEPARTMENT OF TRANSPORTATION**



University of North Carolina at Charlotte (Lead)  
University of Texas at Austin  
University of Connecticut  
Washington State University – Pullman  
Texas Southern University

Charlotte, NC 28223  
Austin, TX 78712  
Storrs, CT 06269  
Pullman, WA 99164  
Houston, TX 77004



# TABLE OF CONTENTS

<b>1. PROGRAM INFORMATION</b> .....	ii
<b>2. PROGRAM-WIDE INDICATORS</b> .....	1
<b>3. UTC-SPECIFIC INDICATORS</b> .....	3
3.1. University of North Carolina at Charlotte .....	3
3.2. University of Texas at Austin .....	9
3.3. University of Connecticut .....	11
3.4. Washington State University – Pullman .....	13
3.5. Texas Southern University .....	16





# 1. PROGRAM INFORMATION

## USDOT Tier 1 University Transportation Center Annual Performance Indicators Report

**Submitted to:** U.S. Department of Transportation  
Office of the Assistant Secretary for Research  
and Technology (OST-R)

**Grant Number:** 69A3551747133

**Project Title:** Center for Advanced Multimodal Mobility Solutions  
and Education (CAMMSE)

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**Submission Date:** October 27, 2017

**DUNS:** 06-630-0096

**EIN:** 56-0791228

**Recipient Organization:** University of North Carolina at Charlotte

**Project/Grant Period:** November 30, 2016 - September 30, 2022

**Reporting Period Start Date:** November 30, 2016

**Reporting Period End Date:** September 30, 2017

**Report Term or Frequency:** Annual Performance Indicators

**Signature of Submitting Official:**



## 2. PROGRAM-WIDE INDICATORS

### University Transportation Centers Program Performance Indicators

<b>UTC Name:</b>	Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)
<b>University:</b>	Lead University: <ul style="list-style-type: none"> <li>University of North Carolina at Charlotte (UNCC)</li> </ul> Consortium Member Universities: <ul style="list-style-type: none"> <li>University of Texas at Austin (UT Austin)</li> <li>University of Connecticut (UConn)</li> <li>Washington State University – Pullman (WSU)</li> <li>Texas Southern University (TSU)</li> </ul>
<b>Grant #:</b>	69A3551747133
<b>Reporting Period:</b>	November 30, 2016 to September 30, 2017

Performance Indicators	Total	UNCC	UT Austin	UConn	WSU	TSU
<b>1. Number of transportation-related courses offered during the reporting period that were taught by faculty and/or teaching assistants who are associated with the UTC</b>						
Undergraduate courses	20	5	1	10	2	2
Graduate courses	27	6	1	7	3	10
<b>2. Number of students participating in transportation research projects during the reporting period funded by this grant</b>						
Undergraduate students in research	3	0	1	0	2	0
Graduate students in research	24	7	3	3	2	9
<b>3. Number of transportation-related advanced degree programs that utilize grant funds during the reporting period to support graduate students</b>						
Masters level programs	3	0	1	0	1	1
Doctoral level programs	4	1	0	2	1	0
<b>4. Number of students supported by this grant during the reporting period</b>						



Undergraduate students	3	0	1	0	2	0
Masters students	12	0	2	0	1	9
Doctoral students	10	6	0	3	1	0
<b>5. Number of degrees awarded during the reporting period to students supported by this grant</b>						
Undergraduate degrees	0	0	0	0	0	0
Masters degrees	0	0	0	0	0	0
Doctoral degrees	0	0	0	0	0	0
<b>6. Number and total dollar value of research projects selected for funding during the reporting period using UTC grant funds (Federal and/or Recipient Share) that you consider to be applied research and advanced research</b>						
Number of applied research projects	9	1	2	2	2	2
Dollar value of applied research projects	\$952,634.50	\$91,864.00	\$280,000.00	\$120,000.00	\$221,000.00	\$239,770.50
Number of advanced research projects	2	1	0	1	0	0
Dollar value of advanced research projects	\$150,033.00	\$90,033.00	-	\$60,000.00	-	-





## 3. UTC-SPECIFIC INDICATORS

### 3.1. University of North Carolina at Charlotte

Part II – UTC-Specific Performance Indicators		
UTC Name	Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)	
University	University of North Carolina at Charlotte	
Grant #	69A3551747133	
Reporting Period	November 30, 2016 to September 30, 2017	
Category	Description of indicator	Metric
1. Research Capability	<ul style="list-style-type: none"> <li>Research results published in: <i>Journal of Advanced Transportation</i>, <i>ASCE Journal of Transportation Engineering, Part A: Systems</i>, <i>International Journal of Transportation Science and Technology</i>, <i>Journal of Transportation Systems Engineering and Information Technology</i>, <i>Accident Analysis and Prevention</i>, <i>Transportation Letters: the International Journal of Transportation Research</i>, <i>World Wide Web</i>, <i>IEEE Transactions on Vehicular Technology</i>, <i>IEEE/ACM Transactions on Networking</i>, <i>IEEE Transactions on Mobile Computing</i>, <i>IEEE Internet of Things Journal</i>, <i>Personal and Ubiquitous Computing</i></li> <li>Research results presented at: the Transportation Research Board 96<sup>th</sup> Annual Meeting, 2017 Southern District ITE (SDITE)</li> </ul>	<ul style="list-style-type: none"> <li>Number of refereed journal publications (15)               <ol style="list-style-type: none"> <li>Pu, Z., Li, Z., Ye, M., Fan, W. and Wang, Y., Evaluating the Interference of Bicycle Traffic on Vehicle Operation on Urban Streets with Bike Lanes, Accepted for Publication in <i>Journal of Advanced Transportation</i>, September 27, 2017.</li> <li>Gong, L. and Fan, W., Developing A Systematic Method for Identifying and Ranking Freeway Bottlenecks Using Vehicle Probe Data, Accepted for Publication in <i>ASCE Journal of Transportation Engineering, Part A: Systems</i>, August 2017.</li> <li>Yu, M. and Fan, W., Calibration of Microscopic Traffic Simulation Models Using Metaheuristic Algorithms, <i>International Journal of Transportation Science and Technology</i>, 6(1), pp. 63–77, 2017.</li> <li>Zhang, H.H., Fan, W., Liao, Z.H. and Jiang, J., Impacts of Parallel Runway Operation Modes on Air Traffic Flow</li> </ol> </li> </ul>



	<p>Annual Meeting, and UNC Charlotte Research Institute (CRI) Spring Reception</p> <ul style="list-style-type: none"><li>• Working papers for the ASCE International Conference On Transportation &amp; Development, Pittsburgh, Pennsylvania, July 15-18, 2018</li></ul>	<p>Characteristics in Terminal Areas, <i>Journal of Transportation Systems Engineering and Information Technology</i>, Volume 17, Issue 3, 2017.</p> <p>5. Gong, L. and Fan, W., Applying Travel Time Reliability Measures in Identifying and Ranking Recurrent Freeway Bottlenecks at Network Level, <i>ASCE Journal of Transportation Engineering, Part A: Systems</i>, Volume 143, Issue 8, 04017042, pp. 1-15, 2017.</p> <p>6. Gong, L. and Fan, W., Modeling Single Vehicle Run-Off-Road Crash Severity in Rural Areas: A Mixed Logit Model Approach, <i>Accident Analysis and Prevention</i>, Vol. 101, pp. 124-134, 2017.</p> <p>7. Fan, W., Social Welfare Maximization by Optimal Toll Design for Congestion Management: Models and Comprehensive Numerical Results, <i>Transportation Letters: the International Journal of Transportation Research</i>, Volume 9, Issue 2, pp. 81-89, 2017.</p> <p>8. Fan Li, Zhuo Li, Kashif Sharif, Yang Liu, and Yu Wang, Multi-layer-Based Opportunistic Data Collection in Mobile Crowdsourcing Networks, <i>World Wide Web</i>, to appear.</p> <p>9. Yufeng Zhan, Yuanqing Xia, Yang Liu, Fan Li*, and Yu Wang, Time-sensitive Data Collection with Incentive-Aware for Mobile Opportunistic Crowdsensing, <i>IEEE Transactions on Vehicular Technology</i>, Volume: 66, Issue: 9, Pages: 7849-7861, September 2017.</p> <p>10. Liqiong Chang, Xiaojiang Chen, Yu Wang, Dingyi Fang, Ju Wang, Tianzhang Xing, and Zhanyong Tang, FitLoc: Fine-grained and Low-cost Device-free Localization for Multiple Targets over Various Areas, <i>IEEE/ACM Transactions on Networking</i>, Volume: 25 Issue: 4, Pages: 1994-2007, August 2017.</p> <p>11. Fan Li, Hong Jiang, Hanshang Li, Yu Cheng, and Yu</p>
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		<p>Wang, SEBAR: Social Energy BAsed Routing for Mobile Social Delay Tolerant Networks, <i>IEEE Transactions on Vehicular Technology</i>, Volume: 66, Issue: 8, Pages: 7195-7206, August 2017.</p> <p>12. Bin Guo, Huihui Chen, Qi Han, Zhiwen Yu, Daqing Zhang, and Yu Wang, Worker-Contributed Data Utility Measurement for Visual Crowdsensing Systems, <i>IEEE Transactions on Mobile Computing</i>, Volume: 16, Issue: 8, Pages: 2379-2391, August 2017.</p> <p>13. Yang Liu, Hongyi Wu, Yuanqing Xia, Yu Wang, Fan Li, and Panlong Yang, Optimal Online Data Dissemination for Resource Constrained Mobile Opportunistic Networks, <i>IEEE Transactions on Vehicular Technology</i>, Volume: 66, Issue: 6, Pages: 5301-5315, June 2017.</p> <p>14. Cheng Bo, Xuesi Jian, Taeho Jung, Junze Han, Xiang-Yang Li, Xufei Mao, and Yu Wang, Detecting Driver's Smartphone Usage via Non-intrusively Sensing Driving Dynamics, <i>IEEE Internet of Things Journal</i>, Volume: 4, Issue: 2, Pages: 340-350, April 2017.</p> <p>15. Yu Wang, Hanshang Li, and Ting Li, Participant Selection for Data Collection through Device-to-Device Communications in Mobile Sensing, <i>Personal and Ubiquitous Computing</i>, Volume: 21, Issue: 1, Pages: 31-41, February 2017.</p> <ul style="list-style-type: none"> <li>• Number of conference papers presented and other presentations made (8)</li> <li>• Number of technical research reports published (1)</li> </ul>
<p><b>2. Leadership</b></p>	<ul style="list-style-type: none"> <li>• Associate Editor, <i>IEEE Transactions on Intelligent Transportation Systems</i>, and</li> </ul>	<ul style="list-style-type: none"> <li>• Editorship (6)</li> <li>• Organizing committee member, session chair or</li> </ul>





	<p><i>ASCE Journal of Transportation Engineering, Part A: Systems,</i></p> <ul style="list-style-type: none"> <li>• Editorial Board, <i>International Journal of Transportation Science and Technology</i>, and <i>Journal of World Review of Intermodal Transportation Research</i>, and <i>International Journal of Transportation</i>, and <i>International Journal of Natural Disasters, Accidents and Civil Infrastructure</i></li> <li>• Area Editor, “Smart Mobility and Shared Economy”, “Public Transit”, and “Transportation Policy, Planning and Modeling”, 18<sup>th</sup> COTA conference International Conference of Transportation Professionals (CICTP2018)</li> <li>• Chaired an IEEE workshop on crowd sensing, the 5<sup>th</sup> International Workshop on Crowd Assisted Sensing, Pervasive Systems and Communications (CASPer 2017)</li> <li>• Member, TRB Standing Committees (AHB60, AHD60), ASCE Connected &amp; Autonomous Vehicles Impacts Committee, Public Transport Committee, Rail Transportation Committees, and At large member of PENC state board</li> <li>• Panel Member, NCHRP 08-116, NCHRP 03-131, National Science Foundation (NSF) Proposal Review, National Defense Science and Engineering Graduate (NDSEG) Scholarship Evaluation Panel, IEEE PerCom Panel, Textbook Review for “Highway Capacity Analysis”, Cognella, Inc., Luxembourg National Research Fund (FNR) Proposal Review</li> </ul>	<p>area editor of conference (4)</p> <ul style="list-style-type: none"> <li>• Number of professional committees or board member (6)</li> <li>• Number of review panels (7)</li> </ul>
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<b>3. Education and Workforce Development</b>	<ul style="list-style-type: none"><li>• Five existing undergrad courses and six existing graduate courses</li><li>• Seven graduate students in CAMMSE projects</li><li>• One degree program in the College of Engineering in the Department of Civil and Environmental Engineering at UNC Charlotte</li><li>• UNC Charlotte Transportation Summer Camp in 2017</li><li>• Eight UNC Charlotte ITE student chapter bi-weekly seminars and four UNC Charlotte transportation graduate students weekly seminars 2017</li></ul>	<ul style="list-style-type: none"><li>• Transportation related courses offered by faculty (11)</li><li>• Number of students participating in CAMMSE funded projects (7)</li><li>• Number of transportation related degree programs with students funded by CAMMSE (1)</li><li>• Number of transportation summer institute/camp (1)</li><li>• Number of transportation summer campers (8)</li><li>• Number of transportation seminars (12)</li></ul>
<b>4. Technology Transfer</b>	<ul style="list-style-type: none"><li>• Six invited presentations (Tongji University, Huazhong University of Science and Technology, University of Science and Technology of China, and UNC Smart and Connected Cities Workshop), a short tutorial at 2016 NSF I/UCRC ROSE-HUB Fall Meeting, and six other presentations (at the Transportation Research Board 96<sup>th</sup> Annual Meeting, 2017 Southern District ITE Annual Meeting, UNC Charlotte Research Institute Spring Reception, and Professional Engineers of North Carolina Annual Meeting in June 2017)</li></ul>	<ul style="list-style-type: none"><li>• Presentations given at professional and academic meeting (13)</li><li>• Number of professionals in the audience (95)</li></ul>
<b>5. Collaboration</b>	<ul style="list-style-type: none"><li>• North Carolina DOT, Charlotte Area Transit System, Centralina Council of Governments, Illinois Institute of Technology in collaborative research and UNC Charlotte in providing cash, in-kind support, facilities, etc.</li><li>• Research Collaboration with Tongji University, Nanjing University of Science and Technology, Beijing Institute of Technology in 2017</li></ul>	<ul style="list-style-type: none"><li>• Number of collaborative partners (4)</li><li>• Number of international collaboration (3)</li><li>• Number of Center personnel involved (5)</li></ul>



	<ul style="list-style-type: none"><li>Center personnel: Dr. Wei Fan, Dr. Miguel Pando, Dr. David Weggel, Dr. Martin Kane, and Dr. Yu Wang</li></ul>	
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## 3.2. University of Texas at Austin

Part II – UTC-Specific Performance Indicators		
UTC Name	Center for Advanced Multimodal Mobility Solutions and Education (Cammse)	
University	University of Texas at Austin	
Grant #	69A3551747133	
Reporting Period	November 30, 2016 to September 30, 2017	
Category	Description of indicator	Metric
1. Research Capability	N/A	N/A
2. Leadership	<ul style="list-style-type: none"><li>• Associate Editor, Journal of Transportation of the Institute of Transportation Engineers, Institute of Transportation Engineers</li><li>• Member, Transportation Research Board, Research and Technology Coordinating Committee</li></ul>	<ul style="list-style-type: none"><li>• Editorship (1)</li><li>• Committee membership (1)</li></ul>
3. Education and Workforce Development	<ul style="list-style-type: none"><li>• One undergraduate course and one graduate course</li><li>• One undergraduate student and two graduate students in Cammse projects</li><li>• One degree program in the Cockrell School of Engineering in the Civil, Architectural and Environmental Engineering Department</li><li>• Supervised a UTC summer intern</li></ul>	<ul style="list-style-type: none"><li>• Transportation related courses offered by faculty (2)</li><li>• Number of students participating in Cammse funded projects (3)</li><li>• Number of transportation related degree programs with students funded by Cammse (1)</li></ul>
4. Technology Transfer	<ul style="list-style-type: none"><li>• Survey data was collected from Austin's Capital Metro Red Line riders to create an access mode model</li></ul>	<ul style="list-style-type: none"><li>• Number of datasets (1)</li></ul>
5. Collaboration	<ul style="list-style-type: none"><li>• City of Austin in collaborative research and UT's Center for Transportation providing in-kind support, facilities, etc.</li></ul>	<ul style="list-style-type: none"><li>• Number of collaborative partners (2)</li></ul>



	<ul style="list-style-type: none"><li>• Capital Metropolitan Transportation Authority in collaborative research and UT's Center for Transportation providing in-kind support, facilities, etc.</li><li>• Center personnel: Dr. Randy Machemehl and Ms. Carolina Baumanis</li></ul>	<ul style="list-style-type: none"><li>• Number of Center personnel involved (2)</li></ul>
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### 3.3. University of Connecticut

Part II – UTC-Specific Performance Indicators		
UTC Name	Center for Advanced Multimodal Mobility Solutions and Education (Cammse)	
University	University of Connecticut	
Grant #	69A3551747133	
Reporting Period	November 30, 2016 to September 30, 2017	
Category	Description of indicator	Metric
1. Research Capability	<ul style="list-style-type: none"> <li>Research results published in: <i>IEEE Transactions on Reliability</i>, <i>Journal of Risk and Reliability</i>, <i>Transportation Research Record</i></li> <li>Research results presented at: 2017 Transportation Research Board 96<sup>th</sup> Annual Meeting, INFORMS</li> <li>Statewide Household Travel Study; Strategies to Minimize CT Public Transportation Carbon Footprint; Service and Fare Equity Analysis – CTRail, Working paper for the 15<sup>th</sup> International Conference on Travel Behaviour Research, July 15-20, 2018, Santa Barbara, CA; 98<sup>th</sup> Annual Meeting of the Transportation Research Board, Washington, D.C.; and 7<sup>th</sup> International Conference on Innovations in Travel Modeling (ITM), June 24-27, 2018, Atlanta, GA.</li> </ul>	<ul style="list-style-type: none"> <li>Number of refereed journal publications (3)                             <ol style="list-style-type: none"> <li>Basavaraj, V.; Venkateswaran, S.; Fiondella, L.; Rahman, A. and N.E. Lownes. (2017) Algorithm to Prioritize the Restoration of a Multiple Facility, Multiple Hazard Road Network, <i>Journal of Risk and Reliability</i>, 231(3):221-231.</li> <li>Fiondella, L., Rahman, A., Lownes, N. &amp; Basavaraj, V. V. (2016) Optimal Defense of High Speed Rail: An Evolutionary Algorithm guided by Game Theory, <i>IEEE Transactions on Reliability</i>, PP(99), 1-13.</li> <li>Enam, A., and Konduri, K.C. (2017). A Continuous Time and Temporally Constrained Tour Pattern Generation System for Jointly Modeling Daily Tours and Stops: Application of a Bi-level Multiple Discrete Continuous Probit (MDCP) Model. <i>Transportation Research Record, Journal of the Transportation Research Board</i>. (Accepted)</li> </ol> </li> <li>Number of conference papers presented (3)</li> <li>Number of technical research reports published (3)</li> </ul>
2. Leadership	<ul style="list-style-type: none"> <li>Associate Editor, Transportation Letters</li> </ul>	<ul style="list-style-type: none"> <li>Editorship (1)</li> </ul>



	<ul style="list-style-type: none"> <li>• Session Chair INFORMS; Paper Review Coordinator TRB Standing committees AP025, ADB10</li> <li>• Member, TRB Standing Committees (AP025, ADB10), ASCE Public Transportation Committee, Connecticut Transportation Institute</li> </ul>	<ul style="list-style-type: none"> <li>• Organizing committee member or subcommittee chair of conference or workshop (3)</li> <li>• Number of professional committees or affiliated centers (4)</li> </ul>
<b>3. Education and Workforce Development</b>	<ul style="list-style-type: none"> <li>• Three existing undergrad courses and three existing graduate courses</li> <li>• Three graduate students in CAMMSE projects</li> <li>• One degree program in the School of Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation related courses offered by faculty (6)</li> <li>• Number of students participating in CAMMSE funded projects (3)</li> <li>• Number of transportation related degree programs with students funded by CAMMSE (1)</li> </ul>
<b>4. Technology Transfer</b>	<ul style="list-style-type: none"> <li>• Three invited presentations (Fastrak East of the River, Northeast Regional Conference on Economic Development), and two other presentations (TRB 96<sup>th</sup> Annual Meeting)</li> </ul>	<ul style="list-style-type: none"> <li>• Presentations given at professional and academic meeting (5)</li> <li>• Number of professionals in the audience (est. 200)</li> </ul>
<b>5. Collaboration</b>	<ul style="list-style-type: none"> <li>• Connecticut DOT, partnership for Strong Communities, University of Queensland, Associate Editor, Transportation Letters</li> <li>• Dissertation Reviewer, UNSW; Research Collaboration with University of Queensland, 2017.</li> <li>• Center personnel: Dr. Nicholas Lownes and Dr. Karthik Konduri</li> </ul>	<ul style="list-style-type: none"> <li>• Number of collaborative partners (3)</li> <li>• Number of international collaboration (2)</li> <li>• Number of Center personnel involved (2)</li> </ul>

### 3.4. Washington State University – Pullman

Part II – UTC-Specific Performance Indicators		
UTC Name	Center for Advanced Multimodal Mobility Solutions and Education (Cammse)	
University	Washington State University – Pullman	
Grant #	69A3551747133	
Reporting Period	November 30, 2016 to September 30, 2017	
Category	Description of indicator	Metric
1. Research Capability	<ul style="list-style-type: none"> <li>Research results published in: <i>Transportation Research Part B: Methodological</i>, <i>ASCE Journal of Cold Regions Engineering</i>, <i>Journal of the Chinese Ceramic Society</i>, <i>Transportation Research Record</i>, and <i>ACM Transactions on Embedded Computing System</i></li> <li>Research results presented at: 2017 Agricultural &amp; Applied Economics Association Annual Meeting and the Transportation Research Board 96<sup>th</sup> Annual Meeting.</li> <li>Working paper for the University of Sydney. Institute of Transport and Logistics Studies (ISSN 1832-570X), and for the Clear Roads Pooled Fund</li> </ul>	<ul style="list-style-type: none"> <li>Number of refereed journal publications (7)               <ol style="list-style-type: none"> <li>Xiao, Y. B., Fu, X., Oum, T. H., &amp; Yan, J. (2017). Modeling airport capacity choice with real options. <i>Transportation Research Part B: Methodological</i>, 100, 93-114.</li> <li>Muthumani, A., Shi, X. Effectiveness of Liquid Agricultural By-Products and Solid Complex Chlorides for Snow and Ice Control. <i>ASCE Journal of Cold Regions Engineering</i>, 2017, 31(1).</li> <li>Jungwirth, S., Shi, X. Laboratory Investigation of Naturally-Sourced Liquid Deicers and Subsequent Decision Support. <i>ASCE Journal of Cold Regions Engineering</i>, 2017, 31(3).</li> <li>Jiang, Y., Dang, Y., Qian, J., Li, X., Shi, X., Yang, Z. Influence of Surface Status of Hardened Cement Paste on Its Microhardness and Statistical Distribution. <i>Journal of the Chinese Ceramic Society</i>, 2017, 45(2), 212-219.</li> <li>Du, S., Petrie, J., Shi, X. Use of Snow Fences to Reduce the Impacts of Snowdrifts on Highways: Renewed Perspective. <i>Transportation Research Record</i>, 2017, 2613, 45-51.</li> <li>Xu, G., Sturges, L., Chapman, M., Albrecht, C.P., Bergner, D.L.,</li> </ol> </li> </ul>



		<p>Shi, X. Snow Removal Performance Metrics: Past, Present, and Future. <i>Transportation Research Record</i>, 2017, 2613, 61-70.</p> <p>7. Chen, Q., Liu, Y., Liu, G., Yang, Q., Shi, X., Gao, H., Su, L., Li, Q., 2017. Harvest Energy from the Water: A Self-Sustained Wireless Water Quality Sensing System. <i>ACM Transactions on Embedded Computing Systems</i> 2017, 17(1).</p> <ul style="list-style-type: none"> <li>• Number of conference papers presented (4)</li> <li>• Number of technical research reports published (2)</li> </ul>
<p><b>2. Leadership</b></p>	<ul style="list-style-type: none"> <li>• Associate Editor, <i>Transportmetrica A: Transport Science</i></li> <li>• Session Chair and Co-Chair of Subcommittee, 1st World Transport Convention; Organizing Committee and Co-Chair of Subcommittee, 2nd Transportation Research Congress; Chair, Organizing Committee for 2017 Annual Workshop of IACIP, Advances in Smart, Sustainable and Resilient Transportation Infrastructure, held during 2017 TRB Annual Meeting; Academic Committee, 10th International Conference on Road and Airfield Pavement Technology; Technical committee, 2017 International Conference on Transportation Infrastructure and Materials</li> <li>• Member, TRB Standing Committees (AFN30, ADC60, AFP40), ASCE CI Bituminous Materials Committee, WSU Center for Environmental Research, Education, and Outreach, and WSU Composite Materials &amp; Engineering Center</li> </ul>	<ul style="list-style-type: none"> <li>• Editorship (1)</li> <li>• Organizing committee member or subcommittee chair of conference or workshop (5)</li> <li>• Number of professional committees or affiliated centers (6)</li> </ul>



<p><b>3. Education and Workforce Development</b></p>	<ul style="list-style-type: none"> <li>• Two existing undergrad courses and three existing graduate courses</li> <li>• Two undergraduate and two graduate students in CAMMSE projects</li> <li>• One degree program in the College of Engineering and Architecture and another degree program in the College of Agricultural, Human and Natural Resource Sciences at WSU</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation related courses offered by faculty (5)</li> <li>• Number of students participating in CAMMSE funded projects (4)</li> <li>• Number of transportation related degree programs with students funded by CAMMSE (2)</li> </ul>
<p><b>4. Technology Transfer</b></p>	<ul style="list-style-type: none"> <li>• Four invited presentations (ASCE Congress on Technical Advancement, 1<sup>st</sup> World Transport Convention, Wuhan Polytechnic University, and ASCE Construction Institute Summit), and three other presentations (2<sup>nd</sup> Transportation Research Congress, and TRB 96<sup>th</sup> Annual Meeting)</li> </ul>	<ul style="list-style-type: none"> <li>• Presentations given at professional and academic meeting (7)</li> <li>• Number of professionals in the audience (95)</li> </ul>
<p><b>5. Collaboration</b></p>	<ul style="list-style-type: none"> <li>• Washington State DOT in collaborative research and Washington State University in providing in-kind support, facilities, etc.</li> <li>• Member of the Dissertation Committee and 1<sup>st</sup> Opponent, Norwegian University of Science and Technology, Dissertation of Kine Nielsen entitled "<i>Ice Melting Capacity of Deicing Chemicals in Cold Temperatures</i>", 2017.</li> <li>• Center personnel: Dr. Xianming Shi and Dr. Jia Yan</li> </ul>	<ul style="list-style-type: none"> <li>• Number of collaborative partners (2)</li> <li>• Number of international collaboration (1)</li> <li>• Number of Center personnel involved (2)</li> </ul>





### 3.5. Texas Southern University

Part II – UTC-Specific Performance Indicators		
UTC Name	Center for Advanced Multimodal Mobility Solutions and Education (Cammse)	
University	Texas Southern University	
Grant #	69A3551747133	
Reporting Period	November 30, 2016 to September 30, 2017	
Category	Description of indicator	Metric
1. Research Capability	<ul style="list-style-type: none"> <li>Research results published in: <i>International Journal of Transportation Science and Technology</i>, <i>Journal of Transportation Planning and Technology</i>, <i>Transportation Research Part A: Policy and Practice</i>, <i>Transportation Research Record: Journal of Transportation Research Board</i>, and <i>Journal of Infrastructure Systems</i></li> <li>Research results presented at: the Transportation Research Board 96<sup>th</sup> Annual Meeting</li> <li>Technical reports for Texas Department of Transportation Research Project 0-6915: “Identify Project Criteria for ITS Deployment in Work Zones” and 0-6911: “Development of Systemic Large Truck Safety Analyses”</li> </ul>	<ul style="list-style-type: none"> <li>Number of refereed journal publications (5)               <ol style="list-style-type: none"> <li>1. Qi, Y and A. Guo, “Pedestrian Safety Under Permissive Left-Turn Signal Control”, accepted for publication at <i>International Journal of Transportation Science and Technology</i>, 2017</li> <li>2. Qi, Y. and Q. Zhao, “Safety impacts of signalized lane merge control at highway work zones”, <i>Journal of Transportation Planning and Technology</i>, Vol. 40, Issue 5, pp.577-591, 2017.</li> <li>3. Kou, W., X. Chen, L. Yu, Y. Qi, and Y. Wang. “Urban Commuters’ Valuation of Travel Time Reliability based on Stated Preference Survey: A Case Study of Beijing”, <i>Transportation Research Part A: Policy and Practice</i>, Vol. 95: 372-380, 2017</li> <li>4. Wang, Y., X. Chen, L. Yu, and Y. Qi. “Calibration of the Platoon Dispersion Model by Considering the Impact of the Percentage of Buses at Signalized Intersections”, In <i>Transportation Research Record: Journal of Transportation Research Board</i>, No. 2647, DOI 10.3141/2647-11, Transportation Research Board of the National Academies, Washington, DC, 2017.</li> <li>5. Teng, H., A. Puli and Y. Qi , “Identification of Influencing Factors of Graffiti Occurrence at</li> </ol> </li> </ul>



		<p>Nevada State Highway Bridges and Soundwalls”, <i>Journal of Infrastructure Systems</i>, Vol. 23 Issue 4 , 2017</p> <ul style="list-style-type: none"> <li>• Number of conference papers presented (2)</li> <li>• Number of technical research reports published (2)</li> </ul>
<p><b>2. Leadership</b></p>	<ul style="list-style-type: none"> <li>• Editorial Board, International Journal of Transportation Science and Technology; Paper review chair for the Transportation Research Board (TRB) ABR10 Committee; Editorial Advisory Board member of Asian Transport Studies</li> <li>• Member, TRB Standing Committees (ABR10, ABR70, AW010(2) ADC20), Member, Maritime Education, Training, and Outreach subcommittee of the Lone Star Harbor Safety Committee (LSHSC)</li> <li>• CAMMSE fund students received notable national and regional awards including <i>Dwight Eisenhower Fellowship (2)</i>, <i>WTS Diane Woodend Jones Leadership Legacy Scholarship (1)</i>, <i>International Road Federation Fellowship (1)</i>, <i>ITMA Scholarship (3)</i> and <i>Texas ITE Houston Section Scholarship (1)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Editorship (3)</li> <li>• Number of professional committees or affiliated centers (5)</li> <li>• Number and type of notable national and regional awards (8)</li> </ul>
<p><b>3. Education and Workforce Development</b></p>	<ul style="list-style-type: none"> <li>• Two existing undergrad courses and nine existing graduate courses</li> <li>• Two undergraduate and nine graduate students in CAMMSE projects</li> <li>• One undergraduate degree program and one graduate degree program in the College of Science, Technology and Engineering at TSU</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation related courses offered by faculty (11)</li> <li>• Number of faculty in transportation areas (3)</li> <li>• Number of students participating in CAMMSE funded projects (11)</li> <li>• Number of transportation related degree programs with students funded by CAMMSE (2)</li> </ul>



	<ul style="list-style-type: none"> <li>Organized <i>Summer Maritime Academy</i> and <i>Summer Internship Program with Elkin High School Engineering Academy</i> in summer 2017</li> <li>One Webinar of “<i>Introducing the Guidelines for Implementing Managed Lanes</i>”, by TRB Standing Committees on Managed Lanes and Operational Effects of Geometrics and one Lecture “<i>The Future of National Security – Maritime cybersecurity</i>” by Dr. Liang – Chieh and Dr. Yunpeng zhang from University of Houston</li> <li>Organized “Fast Forward Leadership and Skills Development Workshop” in April 2017</li> </ul>	<ul style="list-style-type: none"> <li>Number of outreach activities (2)</li> <li>Number of professional development events (seminars, symposia, short courses, workshops, etc.) conducted for practicing professionals (2) and total participants (44)</li> <li>Number of professionals training (1)</li> </ul>
<p><b>4. Technology Transfer</b></p>	<ul style="list-style-type: none"> <li>One invited presentation (Shanghai Polytechnic University), and two other presentations (TRB 96<sup>th</sup> Annual Meeting)</li> </ul>	<ul style="list-style-type: none"> <li>Presentations given at professional and academic meeting (3)</li> <li>Number of technical research reports published by the consortium (2)</li> </ul>
<p><b>5. Collaboration</b></p>	<ul style="list-style-type: none"> <li>Collaborate with Texas DOT, Houston bike share nonprofit organization, and University of Houston</li> <li>Collaborate with Beijing Jiaotong University</li> <li>Center personnel: Dr. Yi Qi, Dr. Lei Yu and Dr. Mehdi Azimi</li> </ul>	<ul style="list-style-type: none"> <li>Number of collaborative partners (3)</li> <li>Number of international collaboration (1)</li> <li>Number of Center personnel involved (3)</li> </ul>



**Center for Advanced Multimodal Mobility  
Solutions and Education**