



USDOT Tier 1 University Transportation Center

Program Progress Performance Report #3

Agency: USDOT Research and Innovative Technology Administration

Federal Grant #: DTRT13-G-UTC50

Project Title: Maritime Transportation Research and Education Center (MarTREC)

Program Director: Heather Nachtmann, Ph.D., Professor, Department of Industrial Engineering, University of Arkansas, hln@uark.edu, 479.575.3484

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Recipient Organization: University of Arkansas

Project/Grant Period: Start Date September 30, 2013
End Date: September 30, 2018

PPPR#2 Reporting Period Start Date: October 1, 2014
PPPR#2 Reporting Period End Date: March 31, 2015

Report Term or Frequency: six months

Signature:

Maritime Transportation Research & Education Center (MarTREC)

MarTREC is a USDOT Tier 1 University Transportation Center funded in September 30, 2013 under MAP-21. Our consortium consists of the University of Arkansas (UARK), Fayetteville, AR; Jackson State University (JSU), Jackson, MS; Louisiana State University (LSU), Baton Rouge, LA; and University of New Orleans (UNO), New Orleans, LA. Each institution is strategically located to support the MarTREC theme and consists of renowned maritime transportation researchers dedicated to transferrable research and inclusive education and workforce development.

MarTREC's theme is building economic competitiveness through efficient, resilient, and sustainable maritime and multimodal transportation systems. Our vision is to be recognized as the Nation's premier source for expertise on maritime and multimodal transportation research and education.

1. Accomplishments of Goals and Objectives

1.1 Research

Goal: MarTREC will conduct research that contributes to building economic competitiveness through efficient, resilient, and sustainable maritime and multimodal transportation systems.

Objectives:

- 1) Conduct research projects related to MarTREC's research goal
- 2) Engage a diverse set of faculty and students in MarTREC research activities
- 3) Disseminate research findings

Accomplishments:

Metric	Achieved PPPR#3	Objective Addressed
# of ongoing projects in each MarTREC research area	16	1
# of peer-reviewed journal articles (published, accepted, submitted)	19	3
# of conference presentations	14	3
# of tenure track faculty who conduct MarTREC research activities	14	2
# of external partners involved in center research activities	14	3
# of research activities that impact diversity through participants and/or outcomes	22	2
# of UG/G students participating in transportation research projects funded by UTC	31	2
# of MS/PhD transportation-related advanced degree programs	8	2
# of MS/PhD graduate students supported by MarTREC	18	2
# of MS/PhD students supported by MarTREC who received degrees	0	3

1.2 Leadership

Goal: MarTREC will become the premier source for expertise on maritime transportation research, education, and workforce development.

Objectives:

- 1) Demonstrate academic leadership towards MarTREC's leadership goal
- 2) Demonstrate industry leadership towards MarTREC's leadership goal

Accomplishments:

Metric	Achieved PPPR#3	Objective Addressed
# of national and regional leadership positions held	25	1
# of conference planning positions held	9	1
# of invited talks given	25	1
# of leadership and research awards received	4	1
# of impactful research citations by stakeholders	0	2
# of UG/G students participating in transportation research projects funded by UTC	31	1
# of junior faculty mentored	2	1
# of leadership workshops held	0	2
# of external grant proposals submitted	2	2

1.3 Education and Workforce Development

Goal: MarTREC will develop educational resources to elucidate scientific and engineering practices involved in maritime and multimodal transportation systems and practices.

Objectives:

- 1) Conduct education and workforce development (EWD) projects related to the EWD goal
- 2) Educate college students within MarTREC theme
- 3) Conduct workforce development related to MarTREC theme
- 4) Conduct outreach activities related to MarTREC theme
- 5) Make societal impact related to EWD goal

Accomplishments:

Metric	Achieved PPPR#3	Objective Addressed
# of projects in MarTREC educational and workforce development areas	2	1
# of UG/G transportation-related courses offered	27	2
# of distinguished lectures & seminars offered	7	3
participant count of distinguished lectures & seminars offered	161	3
# of short courses and workshops offered	0	3
participant count of short courses and workshops offered	0	3
# of technician certification programs offered	17	3
participant count of technician certification programs offered	269	3
# of educational modules and case studies developed	1	2
# of student-authored publications	6	2
# of student-presented presentations	5	2
# of K-12 programs offered	10	4
participant count of K-12 programs (events) offered	1078	4
% of female participants in K-12 programs	42%	4
% of minority participants in K-12 programs	26%	4
# of pre-college programs offered	2	4
participant count of pre-college programs offered	40	4
# of online K-12 educational resources posted	2	4

1.4 Technology Transfer

Goal: MarTREC consortium institutions will participate in national, regional, and local education and workforce development outreach to provide state-of-the-art knowledge to private and public transportation organizations and provide a forum where government employees, academic researchers, and private sector can exchange ideas on current issues.

Objectives:

- 1) Transfer MarTREC outcomes into practice
- 2) Develop products in support of MarTREC technology transfer goal

Accomplishments:

Metric	Achieved PPPR#3	Objective Addressed
# of peer-reviewed journal articles (published, accepted, submitted)	19	2
# of conference presentations	14	2
# of technical briefs	3	2
# of guidebooks	0	2
# of short courses and workshops offered	0	1
participant count of short courses and workshops offered	0	1
# of conference planning positions held	10	1
# of editorial journal positions held	12	1
# of technician certification programs offered	17	1
participant count of technician certification programs offered	269	1

1.5 Collaboration

Goal: MarTREC will continue our existing partnerships with maritime and multimodal transportation stakeholders and develop new partnerships at the consortium, institution, and project levels to facilitate our planned research, leadership, education, workforce development, and technology transfer activities.

Objectives:

- 1) Develop external partnerships related to MarTREC's collaboration goal
- 2) Develop collaborative products related to MarTREC's collaboration goal
- 3) Engage faculty and students in achieving MarTREC's collaboration goal

Accomplishments:

Metric	Achieved PPPR#3	Objective Addressed
# of collaborative partnerships formed	23	1
# of collaborative activities conducted	5	2
# of collaborative deliverables completed	3	2
# of collaborative team events held	3	2
# of collaborative outreach events held	9	2
# of faculty involved in collaborative activities	7	3
# of students involved in collaborative activities	5	3

1.6 Plans for Next Reporting Cycle

MarTREC has sixteen research projects up and running during this reporting period. The faculty researchers will be engaging with industry experts to ensure that these projects are making transformational contributions. One of the sixteen projects was completed during this time period. We will continue to expand our collaborative partnerships to support this. We plan to increase our focus on educational and technology transfer activities now that our research projects are up and running. We are holding a meeting of our Advisory Board on November 13, 2015.

2. Products

2.1 Publications

Journal Articles

1. Bu, Lei (student), F. Wang, and C. Yin, "Modeling Gate Control Strategy for Traffic Management in Emergency Evacuation", submitted to International Journal of Transportation (under review)
2. Zhou, Y (student), Y. Qi, and F. Wang. "Survey Study of Inventory Data Collection Methods for Public Road Systems", Advances in Transportation Studies, an International Journal (accepted)

3. Jiang, Z., Y. Tan, F. Wang, L. Bu (student), "Turnback Capacity Assessment and Delay Management at a Rail Transit Terminal with Two Tail Tracks", *Journal of Mathematical Problems in Engineering* (in press)
4. Lowe, K. (2014), "Commute behavior of and accessibility for low-income workers in Post-Katrina New Orleans", *Transportation Research Record*, 2452, 46-52. DOI: 10.3141/2452-06, published
5. Lowe, K. (2014), "Rethinking competition in TIGER: Lessons for federal funding and public administration", *Public Works Management & Policy*, 19(4), 345-350. DOI: 10.1177/1087724X14550758, published
6. Lowe, K., Reckhow, S., & Gainsborough, J. (Forthcoming, 2016), "Capacity and equity: Federal funding competition between and within regions", *The Journal of Urban Affairs*, accepted
7. Cowell, M., Gainsborough, J., & Lowe, K. (Forthcoming, 2016), "Resilience and mimetic behavior: Economic visions in the Great Recession" *The Journal of Urban Affairs*, accepted
8. Stich, B., Plant, J.; "ASPAs Section on Transportation Policy and Administration: A Look Back", *Public Works Management and Policy*; 2015; published
9. Stich, B., Griffith, Kyle (student); "Ending Transportation Neglect in America"; *Public Works Management & Policy*, Volume 19, Issue 4, 2015, published
10. Stich, B.; "Intermodal Transportation Disruption and Reroute Simulation Framework"; *Transportation Research Board; Journal of the Transportation Research Board of the National Academies of Science*; 2015; published
11. Renne, J., Bennett, P.; "Socioeconomics of Urban Travel Evidence from the two thousand and nine National Household Travel Survey with Implications for Sustainability"; *World Transport Policy and Practice*: 2014; published
12. Tolford, T., Renne, J. and Fields, B. "Development of Low-Cost Methodology for Evaluating Pedestrian Safety in Support of complete Streets Policy Implementation", *Transportation Research Board: Journal of the Transportation Research Board*, No. 2464, *Transportation Research Board of the National Academies*, Washington, D.C. 2014, pp 29-37. DOI: 10:3141/2464-04; accepted
13. Shima Hamidi, Reid Ewing and John Renne: "How Affordable is HUD Affordable Housing?", Submitted January 2015 to *Housing Policy Debate*
14. Renne, John; Ewing, Reid and Hamidi, Shima; "Transit Commuting, the Network Effect and the Built Environment", Submitted February 2015 to *Journal of the American Planning Association*.
15. Renne, John and Listokin, David; "The Tensions and Opportunities of Historic Preservation and Transit Oriented Development", Submitted February 2015 to the *Journal of the American Planning Association*
16. Renne, John; Tolford, Tara; Hamidi, Shima and Ewing, Reid; "The Cost and Affordability Paradox of Transit-Oriented Development, Abstract accepted for Special Issue of *Housing Policy Debate*"
17. Tong, Jingjing (student), Heather Nachtmann, and Edward Pohl, "Value-Focused Assessment of Cargo Value Decreasing Rate," to appear in the *Engineering Management Journal*
ACCEPTED

18. Gedik, Ridvan, Chase E. Rainwater, Heather Nachtmann, and Edward A Pohl, Analysis of a Parallel Machine Scheduling Problem with Sequence Dependent Setup Times and Time Windows," European Journal of Operations Research UNDER REVIEW
19. Zhang, Z., Parr S., Jiang H., and Wolshon, B. "Optimization Model for Regional Evacuation Transportation Systems Using Macroscopic Productivity Function," submitted for publication in Transportation Research, Part B, July 2014

Conference Presentations

1. Bu, Lei (student), F. Wang, C. Yin, and R. Guo, "Development of Gate Control Model for Traffic Management in Localized Emergency Evacuation", 94th TRB Annual Meeting, Washington DC, January 2015
2. Bu, L. (student) and Y. Twumasi, "Graphical Visualization of Traffic Performance of Mississippi Gulf Coast Area", Annual Meeting of the Mississippi and Alabama Chapters of the American Planning Association Joint Annual Conference
3. Riley, I.(student) , K.N. Mitchell, P.K. DiJoseph, R.W. Whalin, and F. Wang, "Analysis of Vessel Travel Times and River Stages", 94th TRB Annual Meeting, Washington DC, January 2015
4. Mousavi, S.M., Parr, S. A., Kent, J., Pande, A., Wolshon, B., and Dixit, V.V., "Forecasting Long-Term Crash Patterns on Interrupted Flow Roadways Using Naturalistic Driving Data," Presented at the 94th Meeting of the Transportation Research Board, January 2015
5. Brown, Donovan, Savage & Varnado (2015, submitted) "Do people with aphasia interpret road signs differently than people without aphasia?" Clinical Aphasiology Conference, Monterey California
6. Brown, Donovan, Savage & Varnado, (2015, accepted) "Do people with aphasia interpret road signs differently than people without aphasia?", LSU Life Course and Aging Student Research Symposium Baton Rouge, LA
7. Parr, S., "Application of a Productive Function to Assess Network Performance During Mass Evacuations," 94th Annual Meeting of the Transportation Research Board, Washington, DC, January 2015
8. Rainwater, Chase, Nachtmann, Heather, Adbesh, Fereydoun, Denny, Kaitlin, "Optimal Dredge Fleet Scheduling within Environmental Work Windows", MarTREC 2014, November 7, 2014
9. Nachtmann, Heather, "The Inland Waterway System and Waterborne Freight," USDOT UTC Spotlight Conference, December 2014
10. Oztanriseven, Furkan (student) and Heather Nachtmann, "Heuristic Approach to Navigation Dredge Scheduling," INFORMS 2014
11. Lowe, K. & Mosby, K., "The conceptual mismatch: Rethinking transportation accessibility" Association of Collegiate Schools of Planning Annual Conference, October 30, 2014, Philadelphia, PA
12. Renne, John, Ewing, Reid and Hamidi, Shima, "Transit Commuting and the Built Environment in Station Areas across the United States," Transportation Research Board Conference, Washington, D.C., January 2015
13. Stich, B. (2015) "The Gulf Coast Mega Region: In Search of a New Scale to Understand Freight Transportation & Economic Development." American Society for Public Administration, Chicago, IL, March 6-10

14. Griffith, Kyle (student) "Housing and Economic Development in Columbia", University of New Orleans, November 25, 2014

Books/Other One Time Publications

1. Renne, J., The Highway (Becoming) "Less Travelled: The History of Highways in America", Journal of Urban History, forthcoming
- 2., Renne, John, Amdal, James, Shah, Vivek, Mosby, Kim and Puczkowskyj, Nicholas, "Alternative Fuels Assessment, Capital Area Transit System" Baton Rouge, Louisiana, 2014
3. Renne, John and Tolford, Tara "Development of Minimum State Requirements for Local Growth Management Policies" Final Report. Prepared for the Louisiana Transportation Research Center, Louisiana Department of Transportation and Development, 2014

2.2 Websites

Website Title	Web Address
MarTREC	http://martrec.uark.edu/
Institute for Multimodal Transportation	http://www.jsums.edu/imtrans/
Gulf Coast Center for Evacuation and Transportation Resiliency	http://www.evaccenter.lsu.edu/
Merritt C. Becker Jr. UNO Transportation Institute	http://transportation.uno.edu/

2.3 Technologies or Techniques

Nothing to report

2.4 Inventions

Nothing to report

2.5 Other Products

Nothing to report

3. Participants & Collaborating Organizations

3.1 Partnerships

Organization Name	Location	Collaboration
Mississippi Department of Transportation, Federal Highway Admin	Jackson, MS	Mississippi Summer Transportation Institute
Louisiana Transportation Research Center	Baton Rouge, LA	Supply facilities and equipment and work site sharing
University of Cal Poly San Luis Obispo	San Luis Obispo, CA	Research collaborator

Megan C. Savage, Ph.D. Assistant Professor, Southeastern Louisiana University, Program of Communication Sciences and Disorders	Hammond, LA	Collaborative research
Port of New Orleans	New Orleans, LA	Financial support
Arkansas State Highway and Transportation Department	Little Rock, AR	Funded \$40,000 to MKARNS project as match
Danny Robbins / DR Railroad	Russellville, AR	worksite sharing: DR TransLoad Facilities
Glenn Bell / Southeast Arkansas Economic Development District	Pine Bluff, AR	Collaborative research
Jeff Pipkin / Arkansas Valley Alliance for Economic Development	Russellville, AR	worksite sharing: Russellville Chamber of Commerce
Morris Jenkins / Arkansas Economic Development Commission	Little Rock, AR	Collaborative research
Van Thomas / White River Planning and Development District	Batesville, AR	Collaborative research
Kenneth Ned Mitchell, PhD, Research Civil Engineer, US Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory	Vicksburg, MS	Collaborative research
U.S. Army Corps of Engineers Fort Worth District, Brian Brasher and Anita Branch	Fort Worth, TX	Testing Location
U.S. Army Corps of Engineers Research and Development Center, Bryant Robbins	Vicksburg, MS	Testing Location

3.2 Other Collaborators

Organization Name	Location	Collaboration
Ms. Jennifer Neubauer, Research Project Analyst, Arkansas Department of Parks and Tourism	Little Rock, AR	Contact
Mr. Mike Armstrong, Deputy Director, Arkansas Game and Fish Commission	Little Rock, AR	Contact
Dr. Dennis Phillip Robinson	University of Arkansas at Little Rock	Contact
Gene Higginbotham, Executive Director, AR Waterways Commission	Little Rock, AR	Contact
Deidre Smith, Waterways Branch Manager, OKDOT	Oklahoma City, OK	Contact

Mr. Matthew Tyler Henry, Regional Economist at the U.S. Army Corps of Engineers	Little Rock, AR	Contact
Charles Laggan/Arkansas Midland Railroad	Malvern, AR	Contact
Gary Hunter / Railroad Industries Inc.	Reno, NV	Contact
Kurt Naumann / Arkansas Economic Development Commission	Little Rock, AR	Contact
Michael Henry / Arkansas State Highway and Transportation Department	Little Rock, AR	Contact
Minghua Qiu Miller / Arkansas State Highway and Transportation Dept.	Little Rock, AR	Contact
Steve Jones / Arkansas Economic Development Commission	Little Rock, AR	Contact
Chuanzhong Yin, Associate Professor of Shanghai Maritime University	Jackson, MS	Visiting Professor
Southwest Jiaotong University, Chengdu People's Republic of China	China	Contact
J.W. Allen & Co. Inc.	New Orleans, LA	Contact
Regional Planning Commission	New Orleans, LA	Collaborative research
City of New Orleans Office of Coastal and Environmental Affairs	New Orleans, LA	Collaborative research
New Orleans City Council	New Orleans, LA	Contact
Southern Sails of Louisiana	New Orleans, LA	Contact
New Orleans Regional Transit Authority	New Orleans, LA	Contact
Greater New Orleans Inc.	New Orleans, LA	Contact
New Orleans Sustainable Transportation Advisory Committee	New Orleans, LA	Contact
Crescent River Port Pilots Association	New Orleans, LA	Contact

4. Impacts

4.1. Impacts on Principal Discipline

Significant impact has been made to the maritime and multi-modal transportation field from the publication of journal articles and presentations to the community. MarTREC researchers published cutting edge work in the areas of maritime transportation logistics and coastal community urban planning. This dissemination of these research efforts will guide best practice behavior in the maritime transportation industry. Research project "Multimodal Transport and TransLoad Facilities in Arkansas" final report has been submitted by Dr. Justin Chimka at the University of Arkansas.

4.2. Impacts on Other Disciplines

The research conducted in MarTREC is guided by practitioners. Much of the work conducted by the University of New Orleans (UNO) contributes to the urban planning discipline in addition to the transportation community. UNO's study will identify the number and type of jobs located in all types of stations and compare and contrast by typology. It will also calculate the number of people and households as well provide a snapshot about commuting behavior, vehicle ownership, housing tenure, and socio-economics of residents. The study will also forecast future development potential by looking at several build-out scenarios to turn TADs and Hybrids into TODs.

Louisiana State University is conducting collaborative research with a Speech Pathologist at Southeastern Louisiana University to determine whether a group of people with stroke compared to a group of people with stroke + aphasia perform differently on computer-based road sign recognition tasks, following directions, attention, and decision making than they perform on similar tasks while in a driving simulator.

4.3 Impacts on Transportation Workforce Development

- At the University of Arkansas, Center for Training Transportation Professional (CTTP), certified 269 students in 17 transportation-related classes during reporting period.
- At the University of Arkansas, 29 students participated in semester-long transportation related internships during reporting period.
- JSU is an HBCU university and more than 90% of the students in our university enrollment are African Americans. We have impacted the minority students and the transportation community by funding research studies in MarTREC designated areas, supporting the MSTI project to foster interests in transportation among K-12 students.
- World Trade Center, Business Meetings, (C. Short, B. Stich, J. Amdal) 10/03/2014-10/06/2014, 12/1/2014, & 02/02/14
- "On the Move" Outreach Events with New Orleans Charter Math and Science High School, (v. Shah) 10/29/2014, 11/05/2014, 11/12/2014.
- Greater New Orleans Port Safety Council Meeting (C. Short, J. Amdal) 01/14/15, 02/03/2015.
- Port of South Louisiana Partnership Meeting (C. Short, B. Stich, J. Amdal) 10/08/2015.
- Louisiana Center for Women in Government and Business Advisory Board Meeting (C. Short, B. Stich) 11/20/2014, 12/01/2014, 03/31/2015.
- Regional Planning Commission Freight Roundtable (B. Stich) 01/26/2015.
- State of the Port (B. Stich, J. Amdal, C. Short, K. Griffith) 10/22/2014.
- Ports Association of Louisiana 2015 Annual Conference (B. Stich, C. Short) 03/25/15-03/27/2015.
- Saturday Academy lectures to 20 high school students, October 18, 2014, JSU campus.
- Stich, B. and Carol Short, participated in Greater New Orleans Inc.'s Future Building Fridays Workshop. They presented Education and Workforce Development Opportunities to 20 High School Guidance Counselors at the Port of New Orleans.

4.4 Impacts on Physical, Institutional, and Informational Resources

Nothing to report

4.5 Impacts on Technology Transfer

The Center for Training Transportation Professionals educated 269 technicians on state of the art transportation construction principles and standards. This makes a significant contribution to the bringing research findings to practice.

4.6 Impacts on Society beyond Science and Technology

University of Arkansas K-12 outreach and pre-college programs reached more than 1000 students and educated these students about STEM careers in the transportation-related fields. Sixty-eight percent of the participants were from underrepresented groups in the STEM field. Exposing these students' minds to these types of career opportunities can have a lasting impact on the future technologically training workforce in the EPSCOR (Experimental Program to Stimulate Competitive Research) states our consortium represents.

MarTREC Director Heather Nachtmann and Center Coordinator Amy Shell along with four female engineering students at the University of Arkansas spent time over spring break helping others to "Dream BIG." The team spent a half day working with forty young women ages 12 through 18 from the Marvel-Elaine school district. The engineering students lead a hands-on water filter project. The students from Marvel-Elaine were here through the Volunteer Action Center's Alternative Spring Break. They are the future of a competitive and productive workforce in engineering and transportation.

5. Changes/Problems

Nothing to report

6. Special Reporting Requirements

Nothing to report