



Program Progress Performance Report

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

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Project Title: Southwest Region University Transportation Center (SWUTC)

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Texas A&M University System
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College Station, TX 77843-3135

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Reporting Period End Date: June 30, 2015

Report Term: Semi-annual – January 1, 2015 – June 30, 2015

Melissa S Tooley

Melissa Tooley - Director

1. Accomplishments:

SWUTC Goals as stated in *SWUTC Prospectus* – to produce research, education and workforce development and technology transfer initiatives that serve the needs of Region 6 and support the five strategic goals of USDOT.

SWUTC Goal #1: Research Program

With this grant, SWUTC’s research program will build on historical accomplishments, and make fundamental strides in basic and advanced research that will be implementable by operating agencies responsible for improving accessibility and mobility while reducing congestion in our urban transportation systems; provide infrastructure renewal; harmonize freight movements between Canada, U.S. and Mexico; reduce the bottlenecks while improving the technology and linkages among the freight and passenger modes in the intermodal transportation network; improve the livability of our rural and urban neighborhoods; and contribute to improvements in the overall safety of the transportation enterprise in our region and nation.

New Research Efforts Initiated for this Reporting Period:

Initiation Date	Project Number	Study Title	Consortium Member	Current Status
3/1/15	600451-00050	Intercity and High Speed Rail Passenger Distribution	TSU	In Progress
6/1/15	600451-00090	Boundary Conditions Estimation on a Road Network Using Compressed Sensing	UT-Austin	In Progress

Completed Research Project Accomplishments/Dissemination of Results for this Reporting Period:

◆ SWUTC Project #600451-00041: The Impact of the Conversion of Incandescent Bulbs to LED Bulbs for Traffic Lights in Houston: A Step toward Sustainable Control Devices - This study examined multiple scenarios of incandescent versus LED light sources. A simulation is presented based upon previously calculated costs, power consumption data, and installation costs. These variables provide a baseline for the retrofit of existing incandescent traffic controls to an LED based light source and the associated costs of each intersection.

Research results disseminated through:

- Final Technical Report: The Impact of the Conversion of Incandescent Bulbs to the LED Light Source in Traffic Signals in Houston: A Step toward Sustainable Control Devices, Khosro Godazi, Alexandra Miller, Ronald E. Goodwin, Texas Southern University (TSU), June, 2015.
- Published Article: 1 (*Roads and Bridges* citation in Products Section of previous PPR)

◆ SWUTC Project #600451-00077: A Novel Approach to Modeling and Predicting Crash Frequency at Rural Intersections by Crash Type and Injury Severity Level – In this study, researchers formulate and apply a novel approach for the joint modeling of crash frequency and crash type/injury severity at rural intersections in Central Texas that explicitly models the effects of variables on each of these dimensions, while also accommodating the joint nature of these two dimensions. The empirical results

clearly reveal the benefits, both in terms of capturing flexibility in variable effects and data fit, to adopting the proposed structure. From a substantive standpoint, the results underscore the important effects of intersection design and major road characteristics in determining the number of crashes in each category.

Research results disseminated through:

- Final Technical Report: A Novel Approach to Modeling and Predicting Crash Frequency at Rural Intersections by Crash Type and Injury Severity Level, Jun Deng, Marisol Castro and Chandra R. Bhat, University of Texas at Austin (UT-Austin), April, 2015.
 - New Methodology Developed: A new methodology has been developed for jointly modeling crash counts and injury severity.
 - Thesis Developed: 1 (citation in Products Section of this PPPR)
- ♦ SWUTC Project #600451-00080: Impact of the Gulf Intracoastal Waterway (GIWW) on Freight Flows in the Texas-Louisiana Megaregion – This report examines the question of GIWW viability and utility from a policy perspective, using economic and planning data to provide strategic evidence for a range of potential multistate policies. It is organized to identify and describe the limitations, financing and operational challenges associated with alternative policies. It considers the potential value gained by megaregional planning and identifies opportunities to coordinate, rather than compete, with other modes on a multistate basis. It finds evidence to strengthen GIWW operations, both in terms of state and multistate perspectives. It also recognizes that there may be future transportation water-based freight technologies that can be adopted as long as the GIWW right-of-way is not lost through encroachment or abandonment.

Research results disseminated through:

- Final Technical Report: Impact of the Gulf Intracoastal Waterway (GIWW) on Freight Flows in the Texas-Louisiana Megaregion, Robert Harrison, UT-Austin, June, 2015.
 - Presentations: 2 (citations in Products Section of this PPPR)
 - Course Module Developed: Study results incorporated in curriculum for CE 392U *Transportation Systems Management* at the University of Texas at Austin.
- ♦ SWUTC Project #600451-00084: Changing Perceptions of Cycling in the African American Community to Encourage Participation in a Sport that Promotes Health in Adults - This research produced two interventions designed to influence perceptions of cycling among African Americans. The training program was implemented in two 3- hour workshops in May 2012 and March 2013. It was found that the greatest motivation for riding a bicycle that participants reported was fitness, and the training they received which increased the level of confidence of participants to ride a bike for recreation purposes. Participants were least motivated to ride a bicycle for commuting, but the mean rating for this parameter increased significantly following training.

This research was focused on providing introductory bicycle training; however the training method would also be very effectively in a series of community rides led by an experienced cyclist.

The results of this research were presented in a keynote address at a Town Hall Meeting hosted by the Austin Police Department (APD) and attended by members of the Austin Region III neighborhoods. Impressed by the research results, the Austin Police Department invited Dr. McCray and her research team to reproduce their cycling program at a large biking event sponsored by APD. The Austin Police

Department is considering adoption of Dr. McCray's cycling program at future local events to increase resources and activities in the historically underserved part of Austin.

Research results disseminated through:

- Final Technical Report: Changing Perceptions of Cycling in the African American Community to Encourage Participation in a Sport that Promotes Health in Adults, Adriana Torcat, Talia McCray, and Teri Durden, UT-Austin, June, 2015.
 - Presentation: 1 (citation in Products Section of previous PPPR)
- ♦ SWUTC Project #600451-00088: Identifying the Local and Regional Travel Effects of Activity Centers in the Austin, Texas Area - Metropolitan planning organizations (MPOs) have become increasingly interested in incorporating innovative land use planning and design into transportation plan-making. Many design ideas are recommended under the umbrella of the New Urbanism; yet in practice they hardly get fully implemented in the standard transportation planning procedures. This project included two parts. Part one refined the analysis of trip generation as it relates to mixed use development (MXD), with a focus on trip-chaining behavior, an approach taken by Capital Area Metropolitan Planning Organization (CAMPO). Part two looked into the potential of and challenges facing land use intervention as an emission reduction tool. Through the Austin case study, it investigated the regional and local distributional effects of vehicle miles traveled (VMT) and Green House Gas (GHG) emission changes pertaining to recommended land use and design innovations.

Results from this research allow urban planners and designers to work together with engineers to help improve the professional practice for a better living environment.

Research results disseminated through:

- Final Technical Report: Identifying the Local and Regional Travel Effects of Activity Centers in the Austin, Texas Area, Ming Zhang, Wenjia Zhang, and Hao Pang, UT-Austin, February, 2015.
 - Poster Presentation: 1 (citation in Products Section of this PPPR)
 - Publication: 1 (citation in Products Section of this PPPR)
 - Presentation: 1 (citation in Products Section of this PPPR)
- ♦ SWUTC Project #600451-00102: Calibration of the Louisiana Highway Safety Manual - In this research, Highway Safety Manual (HSM) predictive model calibration factors were calculated using a series of iterations in which the amount of data and assumed crash conditions were varied from one iteration to the next. The overall results of this work demonstrate the extent of the variability and sensitivity of HSM calibration factors to the inclusion of data that may or may not be included in roadway databases and how crashes that occur within various distances away from intersections are included or excluded.

Among the general findings was that the more data that was included in the computational process, the more reliable the calibration factor became. A somewhat unexpected finding, however, was that reasonably accurate calibration factors may be attainable without enormous time expenditures.

The results of this research were transferred to the Louisiana Transportation Research Center and the Louisiana Department of Transportation and Development for application in their roadway crash prediction models. It is anticipated that the factors developed from this research will serve these two entities for the next several years, before ultimately being updated and replaced.

Research results disseminated through:

- Final Technical Report: Calibration of the Louisiana Highway Safety Manual, Bridget Robicheaux and Brian Wolshon, Louisiana State University (LSU), February, 2015.
- Presentations: 2 (citations in Products Section of previous PPPR)
- Journal Article Submitted for Review: 1 (citation in Products Section of this PPPR)

♦ SWUTC Project #600451-00109: Accessing the Mega-Region: Evaluating the Role of Livable Community Patterns in Gulf Coast Mega-Region Planning - This research analyzes both the need and mechanisms for integrating livability components such as transit and active transportation into a broader mega-regions transportation framework. The research builds a conceptual framework for understanding how transportation livability concepts fit within the larger mega-regions literature. This framework based around the study of regional green infrastructure greenbelt systems is then used to analyze key strategies that could be integrated into the larger Gulf Coast/Texas mega-region transportation planning framework through analysis of three case studies in greater Houston, Austin/San Antonio, and New Orleans/Baton Rouge regions. Major existing and emerging opportunities to tie infrastructure into a mega-region transportation system are identified in these three case studies.

Research results disseminated through:

- Final Technical Report: Accessing the Mega-Region: Evaluating the Role of Livable Community Patterns in Gulf Coast Mega-Region Planning, Billy Fields, University of New Orleans (UNO), March, 2015.
- Presentations: 2 (1 citation in Products Section of this PPPR, 1 citation in Products Section of pervious PPPR)
- Journal Article in Preparation: Submission to the *Journal of Planning Education and Research* on disaster resiliency utilizing background information developed by this research.
- Book in Preparation: Planned book on smart cities which will use case study information obtained in this research.

♦ SWUTC Project #600451-00111: Use of Infrared Thermography to Control the Quality of Joint Construction and to Detect Reflective Cracking in Asphalt Pavements - This study assessed whether temperature differentials measured using Infrared Thermography (IRT) occur in an overlay built on top of discontinuities such as joints and cracks in an existing concrete pavement. And to study the horizontal and vertical thermal profiles in the asphalt overlay using a validated Finite Element (FE) modeling approach.

Based on the results of the study, it was concluded that cracks in the existing pavement do not influence the thermal profiles in a HMA overlay. This was expected given the small width of the crack in comparison to the mat surface area, which would not cause major convection losses through the crack. However, thermal measurements on top of a joint were consistently lower than away from it, which may indicate that temperature loss may occur at the joints. While this difference may not be large enough to be identified as thermal segregation, it can influence the bulk properties of the overlay at the joints and promote early cracking.

Research results disseminated through:

- Final Technical Report: Use of Infrared Thermography to Detect Thermal Segregation in Asphalt Overlay and Reflective Cracking Potential, Mostafa A. Elseifi and Nirmal Dhakal, LSU, March, 2015.
- Curriculum Module Developed: Results from this research will be utilized in a technical elective class taught by Dr. Mostafa Elseifi at Louisiana State University.
- Journal Article Submitted for Review: 1 (citation in Products Section of this PPPR)

Plans for Next Reporting Period to Accomplish Research Goal:

- Provide support, guidance and assistance to project Principal Investigators to facilitate the achievement of individual research project objectives in compliance with approved work plans.

SWUTC Goal #2: Education and Workforce Development Programs

With this grant, SWUTC will promote excellence and the preeminent status of the education programs at each of the consortium member universities. This consortium nurtures world-class innovators in the education and preparation of transportation leaders for the emerging information-rich economy, through a continuing process of improvement in curriculum, courses and teaching methods.

Efforts Active January 1, 2015 – June 30, 2015:

♦ **SWUTC graduate scholarship programs** have the ultimate goal to prepare a highly qualified cadre of new professionals into transportation science. These programs provide financial support to students to participate in classroom and sponsored research activities. In addition, the program provides increased communications skills as students make presentations, participate in debates, and write proposals and reports. Students also participate in technical tours and professional meetings throughout the year. Students in these programs receive tuition, fees and/or stipend support.

Current Status:

Transportation Scholars Program at Texas A&M University (TAMU) - Number of students currently in program: 2

Advanced Institute at the UT-Austin – Number of students currently in program: 11

Graduate Stipend Program at Texas Southern University (TSU) – Number of students currently in program: 3

♦ **Summer Undergraduate Fellows Programs**

The SWUTC Summer Undergraduate Transportation Scholars (UGTSP) at TAMU continues to be an extremely successful recruiting endeavor, attracting a diverse group of students into the graduate programs in transportation. Each year, the UGTSP recruits juniors and seniors from other universities and from diverse academic backgrounds into a summer-long program in transportation research and education as a first step towards graduate study in transportation. While at TAMU, the students have the opportunity to work with graduate students, faculty members, and researchers and are also exposed to research through meetings with project sponsors and weekly research seminars. Students make field trips to various transportation agencies and attend professional meetings such as the summer meeting of TexITE. At the end of the summer term, the students make presentations on their research and

produce a paper for publication. These papers are published annually as a *Compendium of Student Papers* and posted on the SWUTC website.

Current Status:

Undergraduate Transportation Scholars Program (UGTSP) at TAMU. 2015 program in progress.
Number of students participating: 2.

♦ **Ph.D. Candidate Assistantship Program** at TAMU:

This competitive program selects Ph.D. candidates for a maximum of 12 months of salary support while their dissertation is being completed. No tuition or fees are paid. Candidates are chosen based on the quality and value of the proposed research. The goal of this program is to expedite the progress of students to complete doctoral requirements and begin their careers as transportation leaders.

Current Status:

2012 PhDCA Program:

Of the six proposals selected for funding in FY12, all six are now complete. (5 citations in Products Section of previous PPPRs and 1 in this PPPR).

2013 PhDCA Program

Of the six proposals selected for FY13 funding – three are now complete (2 citations in Products Section of previous PPPR and 1 in this PPPR). The remaining three are in final edit.

2014 PhDCA Program

One project selected for funding in FY14 – and is currently in progress.

Plans for Next Reporting Period to Accomplish Education and Workforce Development Goal:

- Continue support of graduate scholarship programs at TAMU, UT-Austin and TSU, and the Ph.D. Candidate Assistantship Program at TAMU.
- Complete the 2015 Undergraduate Transportation Scholars Program at TAMU.

SWUTC Goal #3: Technology Transfer

Timely information, delivered to the right people is the desired outcome for SWUTC's technology transfer program. SWUTC supports a varied menu of techniques to transfer SWUTC derived results. These include: continually updating the SWUTC website at <http://swutc.tamu.edu/> with center news and downloadable publications; publishing and distributing research final technical reports to 20 state and national libraries; and support for SWUTC researchers as they present their research results through peer-reviewed publications and professional presentations.

See complete listing of publications and presentations produced during this reporting period in the following Products Section.

Plans for Next Reporting Period to Accomplish Technology Transfer Goal:

- Continue to update website with recent center activities and accomplishments.
- Publish final technical reports as individual research projects are completed.
- Continue to support researchers as they present their research results through peer-reviewed publications and professional presentations.

2. Products:

SWUTC Publications/papers/presentations for this reporting period:

Publications Submitted for Review:

Influences of Data Inclusion on HSM Calibration and Crash Prediction, B. Robicheaux and B. Wolshon, LSU, submitted for publication in the *Journal of Transportation Safety and Security*. Under review. (Product of SWUTC Project #600451-00102)

Development of a Manual Traffic Control Model for Signalized Intersections, Scott Parr and Brian Wolshon, LSU, submitted to *Transportation Science*, March 2015. Under review. (Product of SWUTC Project #600451-00113)

The Tensions and Opportunities of Historic Preservation and Transit Oriented Development, John Renne, UNO, submitted to the *Journal of the American Planning Association*. Under review. (Product of SWUTC Project #600451-00116)

Use of Infrared Thermography to Control the Quality of Joint Construction and to Detect Reflective Cracking in Asphalt Pavements, Mostafa Elseifi, LSU, submitted to the *ASCE Journal of Materials in Civil Engineering*, Under review. (Product of SWUTC Project #600451-00111)

Book/Journal Submissions Published (citations not captured in previous PPPRs):

Bridging the Gap between the New Urbanist Ideas and Transportation Planning Practice, Ming Zhang, H. Pang and A. Kone, UT-Austin, published in the *Transportation Research Record: Journal of the Transportation Research Board of the National Academies*. (Product of SWUTC Project 600451-00088)

Products of SWUTC Ph.D. Candidate Assistantship Program at TAMU: (citations not captured in previous PPPRs):

Arterial Signal Coordination with Uneven Double Cycling, Hongmin Zhou, TAMU, January 2015, 38 pp. (Product of SWUTC Project #600451-00024)

Nondestructive Test Methods for Rapid Assessment of Flexible Base Performance in Transportation Infrastructures, Hakan Sahin, TAMU, August 2014, 278 pp. (Product of SWUTC Project #600451-00035)

Thesis Developed (citations not captured in previous PPPRs):

A Novel Approach to Modeling and Predicting Crash Frequency at Rural Intersections by Crash Type and Injury Severity Level, Jun Deng, MS Thesis, Department of Civil, Architectural and Environmental Engineering, UT-Austin, December 2013. (Product of SWUTC Project #600451-00077)

Dissertation Developed (citations not captured in previous PPPRs):

Analysis and Modeling of Manual Traffic Control (MTC) for Signalized Intersections, Scott Parr, LSU, Dissertation, December 2014. (Product of SWUTC Project #600451-00113)

Presentations (citations not captured in previous PPRs):

Agent-Based Modeling for Evacuation Traffic Analysis in Megaregion Road Networks, Brian Wolshon, LSU, presented to the 4th International Workshop on Agent Based Mobility, Traffic and Transportation Models, Methodologies and Application (ABMTrans 2015), London, England, June 2015. (Product of SWUTC Project #600451-00114)

Mobility Strategies and Employment in Secondary Metropolitan Areas, Catherine Lowe, UNO, presented to the Urban Affairs Association Annual Conference, Miami, FL, April 9, 2015. (Product of SWUTC Project #600451-00115)

The Gulf Coast Megaregion: In Search of a New Scale to Understand Freight Transportation & Economic Development, Bethany Stich, UNO, presented to the American Society for Public Administration, Chicago, IL, March 6-10, 2015. (Product of SUWTC Project #600451-00108)

Understanding Freight Based Economic Development Transportation Planning, Bethany Stich, UNO, presented to the Arizona State University Transportation Engineering Seminar, Tempe, AZ, February 5-7, 2015. (Product of SUWTC Project #600451-00108)

Evaluation of Complete Streets Policy Implementation by Metropolitan Planning Organizations: From Policy Adoption to Implementation, Billy Fields, Tara Tolford and Tom Longoria, UNO, presented at Active Living Research 2015 Annual Conference, San Diego, CA, February 23, 2015. (Product of SWUTC Project #600451-00119)

Dynamic Ride-sharing and Optimal Fleet Sizing for a System of Shared Autonomous Vehicles, Kara Kockelman, and Dan Fagnant, UT-Austin, presented at the 94th Annual Transportation Research Board Meeting, Washington, D.C., January 2015. (Product of SWUTC Project #600451-00081)

Operations of a Shared Autonomous Vehicle Fleet for the Austin, Texas Market, Kara Kockelman, Dan Fagnant and Prateek Bansal, UT-Austin, presented at the 94th Annual Transportation Research Board Meeting, Washington, D.C., January 2015. (Product of SWUTC Project #600451-00081)

A Novel Utility-based Methodological Framework for the Valuation of Road Infrastructure, Zhanmin Zhang, UT-Austin, presented at the 94th Transportation Research Board Annual Meeting, Washington, D.C., January 2015. (Product of SWUTC Project #600451-00089)

Bridging the Gap between the New Urbanist Ideas and Transportation Planning Practice, Ming Zhang, H. Pang and A. Kone, UT-Austin, poster presentation to the 94th Annual Transportation Research Board Meeting, Washington, D.C., January, 2015. (Product of SWUTC Project 600451-00088)

Safety Performance of Freeway Weaving Sections, Y. Qi X. Chen and J. Liu, TSU, presented at the 94th Annual Transportation Research Board Meeting, Washington, D.C., January 2015. (Product of SWUTC Project #600451-00045)

Impacts of Market Penetration and Observation Period on Safety Performance Monitoring at Signalized Intersections Using Connected Vehicle Data, P. Songchitruksa, presented to the 94th Annual

Transportation Research Board Meeting, Washington, D.C., January 2015. (Product of SWUTC Project #161303)

The Efficiency Claim of Public-Private Partnerships: A Look into Project Operations and Maintenance Costs, Sergio Martinez and C. Michael Walton, UT-Austin, presented at the 94th Annual Transportation Research Board Meeting, Washington, D.C., January 2015. (Product of SWUTC Project #600451-00072)

A Methodology to Predict Intercity Commute Volume: Focus on Texas Megaregion Communities, Vincent Hassell, Roderick Holmes and Carol Lewis, TSU, presented at the 94th Annual Transportation Research Board Meeting, Washington, D.C., January 2015. (Product of SWUTC Project #600451-00043)

Simulation of Aerodynamic Forces of Vehicles in Cross Wind, Jiexuan Hu, C.S. Cai and Yan Han, LSU, presented to the 2015 International Conference, The Hong Kong Polytechnic University, Hong Kong, China, January 7-9, 2015. (Product of SWUTC Project #600451-00112)

Opportunities and Barriers to Complete Streets Policy Implementation, Billy Fields, UNO, presented at Louisiana Walk and Bike Summit, Baton Rouge, LA, November 10, 2014. (Products of SWUTC Project #600451-00119)

Megaregion Evacuation Analysis Using Traffic Simulation, Brian Wolshon, LSU, presented to the 39th Annual Hazards Research and Applications Workshop, Broomfield, CO, July 2014. (Product of SWUTC Project #600451-00101)

Impact of the Gulf Intracoastal Water (GIWW) on Freight Flows in the Texas-Louisiana Megaregion, Robert Harrison, UT-Austin, presented to the 2013 NASCO Conference, San Antonio, TX, October 7-9, 2013.

Bridging the Gap between the New Urbanist Ideas and Transportation Planning Practice, Ming Zhang, UT-Austin, presented at the AESOP/ACSP Joint Congress, Dublin, Ireland, July 15-19, 2013 (Product of SWUTC Project 600451-00088)

Impact of the Gulf Intracoastal Water (GIWW) on Freight Flows in the Texas-Louisiana Megaregion, Robert Harrison, UT-Austin, presented to TxDOT, Austin Headquarters Office, July 2013.

Websites (other than SWUTC website) and other social media utilized for this reporting period:

Project 161302: <http://mobility.tamu.edu/ums/>

Project 600451-00117: <http://Rideneworleans.org>

Project 600451-00119: <http://pbriLA.org>

Technologies or techniques for this reporting period:

♦ **New Techniques Developed:**

- SWUTC Project #600451-00111 - Use of Infrared Thermography to Control the Quality of Joint Construction and to Detect Reflective Cracking in Asphalt Pavements - developed a

technique which utilized infrared thermography to analyze overlays placed on top of an existing concrete pavements.

Inventions/patent applications/licenses for this reporting period: Nothing to report at this time.

Other Products for this reporting period:

◆ **Methodology Developed:**

- SWUTC Project #600451-00077 – A Novel Approach to Modeling and Predicting Crash Frequency at Rural Intersections by Crash Type and Injury Severity Level - developed a new methodology for jointly modeling crash counts and injury severity.

◆ **Course Modules Developed:**

- SWUTC Project #600451-00090 – Impact on the Gulf Intracoastal Waterway (GIWW) on Freight Flows in the Texas-Louisiana Megaregion – study results incorporated in curriculum for CE 392U Transportation Systems Management at the University of Texas at Austin.
- SWUTC Project #600451-00111 – Use of Infrared Thermography to Control the Quality of Joint Construction and to Detect Reflective Cracking in Asphalt Pavements – study results utilized in a technical elective class taught by Dr. Mostafa Elseifi at Louisiana State University.

◆ **Intervention Developed:**

- SWUTC Project #600451-00084 – Changing Perceptions of Cycling in the African American Community to Encourage Participation in a Sport that Promotes Health in Adults – study produced and implemented intervention modules designed to influence perceptions of cycling among African Americans.

3. Participants & Other Collaborating Organizations

Organizations as SWUTC Partners:

See previous PPPRs for extensive list of organizations providing in-kind support in the form of personnel who serve as project monitors for active SWUTC research projects.

New Project Monitors for this reporting period:

Alan Clark, Houston Galveston Area Council

Guillaume Costeseque, INRIA Sophia Antipolis Mediterranee, ACUMES Team

Partnerships/collaborations for this reporting period:

Rick Schuman, INRIX – Contribution: In-kind support – provided national speed dataset to be used in the production of the Urban Mobility Report for SWUTC Project #161302.

John Robey, Director of Logistics and Public Affairs, Port of Beaumont – Contribution: In-kind support – provided up-to-date information on the large multimodal oil terminal built on POB property and served by all three Class 1 railways that operate in Texas for SWUTC Project #600451-00080.

Brookings Institute – Contribution: In-kind support – Providing assistance related to their Metro Freight Series for SWUTC Project #600451-00108.

City of Baton Rouge – Contribution: In-kind support – assisted in locating suitable field project and facilitating access to the site during road construction – SWUTC Project #600451-00111

Barrier Construction - Contribution: In-kind support – assisted in locating suitable field project and facilitating access to the site during road construction – SWUTC Project #600451-00111

University of New South Wales, Sydney Australia – Dr. Vinayak Dixit – Contribution: In-kind support – assisted in the development of some components of the research methodology for SWUTC Project #600451-00113.

Rutgers University – David Listokin – Contribution: In-kind support – assisted with data collection, data analysis, and writing and editing of case studies and final report for SWUTC Project #600451-00116.

Ride New Orleans – Rachel Heiligman and Alexandra Miller – Contribution: In-kind support – provided research and writing assistance for SWUTC Project #600451-00117.

Port of South Louisiana – Contribution: In-kind support for SWUTC Project #600451-00118

Port of New Orleans – Contribution: In-kind support for SWUTC Project #600451-00118

World Trade Center’s Transportation Committee – Contribution: In-kind support for SWUTC Project #600451-00118

Bike Easy – Contribution: In-kind support – provided feedback about project findings and discussed applications of the research to communities in Louisiana for SWUTC Project #600451-00119.

AARP Louisiana - Contribution: In-kind support – provided feedback about project findings and discussed applications of the research to communities in Louisiana for SWUTC Project #600451-00119.

Bike Baton Rouge - Contribution: In-kind support – provided feedback about project findings and discussed applications of the research to communities in Louisiana for SWUTC Project #600451-00119.

Tulane Prevention Research Center - Contribution: In-kind support – provided feedback about project findings and discussed applications of the research to communities in Louisiana for SWUTC Project #600451-00119.

Center for Planning Excellence, Baton Rouge, LA - Contribution: In-kind support – provided feedback about project findings and discussed applications of the research to communities in Louisiana for SWUTC Project #600451-00119.

Louisiana Public Health Institute - Contribution: In-kind support – provided feedback about project findings and discussed applications of the research to communities in Louisiana for SWUTC Project #600451-00119.

4. Impact

Impact on the development of the principal disciplines of the program for this reporting period:

♦ **Civil Engineering/Pavements:**

- SWUTC Project #600451-000111: Use of Infrared Thermography to Control the Quality of Joint Construction and to Detect Reflective Cracking in Asphalt Pavements applied a unique method of using infrared thermography to analyze asphalt overlays placed on top of an existing concrete pavement to look for weak spots which can promote early cracking.

Impact on other disciplines for this reporting period:

♦ **Applicable to Multiple Disciplines.** The joint modeling developed by SWUTC Project #600451-00077: A Novel Approach to Modeling and Predicting Crash Frequency at Rural Intersections by Crash Type and Injury Severity is applicable to other fields where the dependent variable takes the form of a multivariate count.

Impact on the transportation workforce development for this reporting period:

- ♦ **Provide Opportunities for Students to Participate in SWUTC Research.** SWUTC requires that students be involved in a meaningful way in the conduct of all SWUTC research efforts. During this reporting period, 15 graduate students were involved in the SWUTC research activities.
- ♦ **Graduate Scholarships Provided.** The SWUTC graduate scholarship programs provide stipends to students to participate in classroom and sponsored research activities. Graduate students supported this reporting period: 15
- ♦ **Undergraduate Summer Fellowships Provided.** This program recruits juniors and seniors from other universities and from diverse academic backgrounds into a summer-long program in transportation research and education as a first step towards graduate study in transportation. Undergraduate students supported this reporting period: 2

Impact on physical, institutional, and information resources at the university or other partner institutions for this reporting period:

Nothing to report.

Impact of technology transfer for this reporting period:

♦ **Informing the Public and Decision Makers:**

- SWUTC Project #600451-00041: The Impact of the Conversion of Incandescent Bulbs to LED Bulbs for Traffic Lights in Houston: A Step toward Sustainable Control Devices demonstrated that the use of traffic signals equipped with light emitting diodes (LED) provides opportunities for urban municipalities to conserve both tax dollars and energy. With other advantages, such as the reduced maintenance, a longer life span, and more illumination than the standard incandescent light bulb, LED's have become a viable option in cities around the globe as a first step in reducing municipal costs.
- Results from SWUTC Project #600451-00077: A Novel Approach to Modeling and Predicting Crash Frequency at Rural Intersections by Crash Type and Injury Severity produced a new approach for the joint modeling of crash frequency and crash type/injury severity at rural intersections which will impact decision making by allowing transportation analysts to prioritize countermeasures to reduce crashes and their severity.

- Findings from SWUTC Project #600451-00080: Impact of the Gulf Intracoastal Waterway (GIWW) on Freight Flows in the Texas-Louisiana Megaregion argues for the long term preservation of a 1200 mile five state Gulf Intracoastal canal currently underfunded in terms of both capital improvements and maintenance. It is critical for chemicals, petrochemicals and fuels in addition to more mundane bulk commodities. The lower pollution from barges of all sizes impacts social benefits in addition to offering interstate right of way to new designs of barges and propulsion that will occur over the next 15 years.
- Results from SWUTC Project #600451-00088: Identifying the Local and Regional Travel Effects of Activity Centers in the Austin, Texas Area support the practice of urban planners, designers and engineers working together to facilitate improved transportation planning and land use planning for a better living environment.
- Calibration factors developed by SWUTC Project #600451-00102: Calibration of the Louisiana Highway Safety Manual can be used by analysts seeking to apply Part C of the Highway Safety Manual for projects in Louisiana. Ultimately, this research could have a long-term impact on the use of the HSM by State DOT's in accurately evaluating safety. Better understanding of safety and the impact of roadway factors can lead less hazardous roadways and fewer motor vehicle related fatalities nationwide.
- SWUTC Project #600451-00109: Accessing the Mega-Region: Evaluating the Role of Livable Community Patterns in Gulf Coast Mega-Region Planning helps to deepen understanding of the interrelationship of environmental and transportation systems. By coordinating place-based investments, projects that straddle the transportation and environmental line (like greenways) can help improve quality of life, enhance resiliency, and provide needed low-impact transportation corridors. This research uncovered key policy dimensions necessary to make these linkages.
- Findings from SWUTC Project #600451-000111: Use of Infrared Thermography to Control the Quality of Joint Construction and to Detect Reflective Cracking in Asphalt Pavements will help inform asphalt contractors and state agencies in highway overlay construction.

Impact on society beyond science and technology for this reporting period:

◆ **Increasing Transportation Access while Promoting Health.** SWUTC Project #600451-00084: Changing Perceptions of Cycling in the African American Community to Encourage Participation in a Sport that Promotes Health in Adults provides a method for increasing cycling in the African American community. As a result of this study, participants gained access to recreation bicycling, increased their cycling abilities, learned safe cycling habits, and changed their attitudes towards cycling. These have the potential for improving health, creating healthier habits, and increasing transportation access. Regarding economic impacts, cycling is a relatively inexpensive transportation mode suitable for low-income households with limited or no access to a private vehicle.

5. Changes/Problems

Nothing to report.