



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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Recipient Organization: Texas A&M Transportation Institute
Texas A&M University System
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Reporting Period End Date: December 31, 2015

Report Term: Semi-annual – July 1, 2015 – December 31, 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.

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

♦ SWUTC Project #161302: Developing the *Urban Mobility Report* - This continuing SWUTC effort provided funding to enhance and update the *Urban Mobility Report* (UMR) methodology, and support the dissemination of the report. The UMR is the most widely quoted report on urban congestion and its associated costs in the nation, and serves as a resource for decision-makers across the country. The methods and measures developed and used in the UMR have been successfully implemented for policy making and prioritizing congestion-mitigating projects.

This particular UMR provides a base knowledge on US congestion levels with data through 2013.

Research results disseminated through:

- Final Report: 2014 Urban Mobility Report, David Schrank, Bill Eisele and Tim Lomax, Texas A&M University (TAMU), July, 2015.
- Presentations: 12 (citations in the Products Section of previous PPRs)
- Publications: 2 (citations in the Products Section of previous PPRs)

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/161302-2/>

♦ SWUTC Project #600451-00008: Decision Theory Models for Selecting Traffic Control Devices - It is beyond the scope of the Manual on Uniform Traffic Control Devices (MUTCD) to provide the breadth of knowledge necessary for evaluating traffic control devices (TCDs) as part of the larger transportation system. With this research, investigators used existing theory and a survey of transportation professionals to develop a new decision support tool for use in selecting TCDs in a consistent manner. Findings from this research will improve selection of traffic control devices and enhanced public support for, and compliance with, traffic control devices in the field.

Research results disseminated through:

- Final Report: A Decision Support Tool for Selecting Traffic Control Devices, James Robertson and H. Gene Hawkins, Jr., Texas A&M University (TAMU), July, 2015.

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00008/>

♦ SWUTC Project #600451-00027: Forecasting the Impacts of Shale Gas Developments on Public Health and Transportation Systems on Both Sides of the Mexico-USA Border - For this project, researchers gathered a collection of spatial data from the Eagle Ford Shale, including transportation infrastructure, geology, hydrology, demography, and well production. Researchers then developed an improvement of the proposed Bayesian Network for the regional assessment of environmental and social risk (i.e., transportation infrastructure and public health) by enhancing the BN+GIS Model for Environmental Sensibility assessment including a Surface Water variable. This required the improvement and optimization of the code producing BN+GIS results to reduce computational time. Afterward, researchers attained results on the implementation of enhanced BN+GIS model in the Barnett Shale Play.

Research results disseminated through:

- Final Technical Report: Forecasting the Impacts of Shale Gas Developments on Public Health and Transportation Systems on Both Sides of the Mexico-U.S. Border, Zenon Medina-Cetina, and Patricia Varela, TAMU, August, 2015.
- Presentations: 5 (citations in the Products Section of this and previous PPPRs)
- Journal Article under Review: 2 (citations in the Products Section of this PPPR)

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00027-2/>

♦ SWUTC Project #600451-00043: Developing a Methodology for Projecting Intercity Commuting - Texas agencies are investigating passenger rail options in several corridors connecting people between the state's major cities. Popular thinking is that there is commuter travel between a number of these markets. Specifically, Austin to Houston and Dallas to Houston rank as highly desirable connections to be made by passenger rail. There has been significant study of corridors linking Austin, Dallas and San Antonio; but little research considers the State Highway 290 corridor that would link Houston to Austin. A tool to project the commuter travel between these cities would be beneficial for Metropolitan Planning Organizations (MPOs) and local transit authorities. This research assessed existing methodologies, and then modified, developed and recommend for testing a methodology to determine the volume and frequency of commuter travel between these markets.

Research results disseminated through:

- Final Technical Report: Developing a Methodology for Projecting Intercity Commuting, Carol A. Lewis, Vincent Hassell, and Veronica Green, Texas Southern University (TSU), December, 2015.
- TRB Paper Developed: 1 (citation in the Products Section this PPPR)
- Results from this study have also been forwarded to Ray Miller in the Texas Department of Transportation - Rail Division.

Complete listing of publications and presentations generated by this research available at:
<http://swuttc.tamu.edu/research/swuttc-completed-research/600451-00043/>

♦ SWUTC Project #600451-00048: Transportation Designs and Concepts to Make Houston METRO's Southwest Line at Palms Area More Livable - Over the years, the Palm Center (PC) in Houston, Texas, has been the beneficiary of several economic development endeavors designed to ignite economic and community growth and revitalization. While these endeavors brought forth initial success, they have failed to transform the PC into a lasting model of economic growth and prosperity and to inspire community pride and engagement. The development of METRO's Southeast Line light rail station at the Palm Center Transit Center presents the prime opportunity for meeting the needs of the community by implementing design concepts and principles that provide social, environmental, and economic benefits to those living within close proximity of the transit station.

This research explored community partnerships and initiatives, Transit Oriented Development (TOD) and livable center concepts and principles, features from previously successful TODs, and lessons learned from past development initiatives designed to foster revitalization. The information gathered was synthesized and presented as recommendations to help ensure the PC area reaches its full social, environmental and economic potential. The outcome of this project provides communities, local government and transportation planning agencies with innovative ideas and planning strategies that will place the PC area on the path to sustainable growth and prosperity.

Research results disseminated through:

- Final Technical Report: Proposing Transportation Designs and Concepts to Make Houston METRO's Southeast Line at the Palm Center Area more Walkable, Bikeable, and Livable, Khosro Godazi, Latissha Clark, and Vincent Hassell, TSU December, 2015.
- Study findings provided to the OST Alameda Corridor Association and the City of Houston (COH) Planning Department.

Complete listing of publications and presentations generated by this research available at:
<http://swuttc.tamu.edu/research/swuttc-completed-research/600451-00048/>

◆ SWUTC Project #600451-00108: The Confluence of Transportation and Economic Activity in a Mega Region Disaster - Jane Jacobs famously wrote, “The economic foundation of cities is trade.” Increased global connectivity and expanding domestic markets around major city hubs have led to a spatial reorganization of regional economies towards a higher level of scale referred to as the megaregion. These trade networks rely on a complex mix of freight and telecommunications infrastructure, low trade barriers, as well as international business and social networks. Policymakers have a responsibility to recognize the vital relationship between economies and freight, and it is imperative that national policies reflect the domestic and global environments in which megaregions must now compete. The United States (US) lacks a national freight strategy and most metropolitan areas fail to implement comprehensive trade strategies, indicating a disconnect between policy and practice. This research determined the status of freight planning strategies at the megaregion scale of an economically integrated section of the United States Gulf Coast.

The results of the research project will be distributed to all planning professionals, state DOT chief planners and state economic developers and invited to provide feedback. The research project was designed to open up a window where divergent disciplines could see where they could work congruently to achieve a higher level of economic development coordination while maximizing their efficiency with public funds – at a level not previously considered - the megaregion.

Research results disseminated through:

- Final Technical Report: The Gulf Coast Megaregion: In Search of a New Scale to Understand Freight Transportation and Economic Development, Bethany Stich, Kyle Griffith and Peter Webb, University of New Orleans (UNO), October, 2015.
- Presentations: 2 (citations in the Products Section of previous PPPRs)

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00108/>

◆ SWUTC Project #600451-00113: Manual Traffic Control for Planned Special Events and Emergencies - The goal of this research was to quantify the effect of manual traffic control on intersection operations and to develop a quantitative model to describe the decision-making of police officers directing traffic for special events and emergencies. This was accomplished by collecting video data of police officers directing traffic at several special events in Baton Rouge, LA and Miami Gardens, FL. These data were used to develop a discrete choice model (logit model) capable of estimating police officer’s choice probabilities on a second-by-second basis. This model was able to be programmed into a microscopic traffic simulation software system to serve as the signal controller for the study intersections, effectively simulating the primary control decision activities of the police officer directing traffic. The research findings suggested police officers irrespective of their location, tended to direct traffic in a similar fashion; extending green time for high demand directions while avoiding gaps in the traffic stream.

Research results disseminated through:

- Final Technical Report: Manual Traffic Control for Planned Special Events and Emergencies, Scott Parr and Brian Wolshon, Louisiana State University (LSU), November, 2015.
- Presentations: 4 (citations in the Products Section of this PPPR and previous PPPRs)

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00113/>

♦ SWUTC Project #600451-00115: Transportation and Access to Opportunity: Metropolitan Size, User Experience, and Employment Quality - Through qualitative analysis, this study examined the role of transportation in the lives of low-income adults in two medium-sized metropolitan areas and how their actual, lived transportation experiences function as stressors with potentially compounding impacts. The study finds that job accessibility models that only account for travel time and location may not reflect the transportation time tax associated with accessing employment for some low-income households.

Research results disseminated through:

- Final Technical Report: The Conceptual Mismatch: Transportation Stressors and Experiences for Low-Income Adults, Kate Lowe, Kim Mosby, and Tara Tolford, UNO, October, 2015.
- Presentations: 2 (citations in the Products Section of previous PPPRs)
- Journal Articles Submitted for Review: 2 (citations in the Products Section of this PPPR)

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00115/>

♦ SWUTC Project #600451-00117: Achieving Regional Fare Integration in New Orleans: Innovative Cost Sharing Arrangements and Technologies - Many regions across the country have more than one transit agency providing vital public transportation services. While a transit agency may see their role limited by a jurisdictional boundary, transit riders' commutes know no such political boundaries. For those riders whose commutes are reliant on one or more transit agencies, a fractured fare system among the various transit agencies they ride means higher user costs. This study examined the history of regional fare integration in the New Orleans metropolitan region, and the challenges and successes of varying approaches taken by transit agencies in various metropolitan regions, to reveal options for achieving regional fare integration in New Orleans today.

Following this research, transit advocacy organization Ride New Orleans incorporated the findings of this study on fare integration best practices into their key recommendations presented as part of the *2015 State of Transit in New Orleans: Ten Years after Katrina* report, which was widely publicized and presented to transit stakeholders and elected officials. As a direct result of this research, discussion is underway about next steps for developing a coordinated regional fare structure.

Research results disseminated through:

- Final Technical Report: Achieving Regional Fare Integration in New Orleans: Innovative Cost Sharing Arrangements and Technologies, Vivek Shah (UNO Transportation Institute), Rachel Heiligman (Ride New Orleans), Alexandra Miller (Ride New Orleans), September, 2015.
- Presentations: 2 (citations in the Products Section of this PPPR)

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00117/>

♦ SWUTC Project #600451-00118: Assessing the Potential for Gulf Coast NAFTA Maritime Trade Corridors - The North American Free Trade Agreement (NAFTA) was enacted in 1994 with the expressed intent of reducing barriers to trade. Since that time, however, transborder congestion and delays between the United States (US) and Mexico threaten achievement of this goal. As a partial mitigation strategy, maritime shipping offers a modal alternative for NAFTA trade with the potential for not only strengthening the resiliency of the North American transportation system, but also alleviating congestion for traditional overland modes. To that end, Gulf Coast economies are preparing for increased shipping activity in both vessel size and commodity volumes upon completion of the Panama Canal expansion by 2016. This study assesses the potential for maritime shipping corridors in the Gulf of Mexico between the US, Mexico, and Cuba. Researchers document current trade patterns and infrastructure, analyze potential opportunities for trade expansion, and analyze the policy barriers that need to be addressed to strengthen these maritime trade corridors. The prospect of reduced transborder congestion, increased system resilience, and expanded economic cooperation with Cuba has opened a policy window for more deliberate coordination between national and state governments to make the necessary infrastructure investments and policy changes to bolster maritime shipping capacity.

Research results disseminated through:

- Final Technical Report: Assessing the Potential for Gulf Coast NAFTA Maritime Trade Corridors, Bethany Stich, Kyle Griffith, Peter Webb, Brittany Waggener, and James Amdal, UNO, December, 2015.

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00118/>

♦ SWUTC Project #600451-00119: Evaluation of Complete Streets Policy Implementation by Metropolitan Planning Organizations - Over the last ten years, communities around the country have begun to implement comprehensive reforms designed to ensure that roadway users of all ages and abilities can safely utilize the transportation system. This complete streets policy framework has emerged as an important tool for communities to improve opportunities for active living with over 500 policies adopted nationwide.

Complete streets policy diffusion has been rapid, but uneven, and the extent to which policy adoption is making a difference in the implementation of projects at the local and regional level is unclear. This research project addressed this need through a national survey of the 385 metropolitan planning organizations (MPOs) around the country, evaluating the extent to which complete streets policies are being adopted and implemented at the MPO level, what opportunities and barriers to complete streets exist, and implications for future policy diffusion and innovation efforts.

Research results disseminated through:

- Final Technical Report: Evaluation of Complete Streets Policy Implementation by Metropolitan Planning Organizations, Tara Tolford, Billy Fields, and Tom Longoria, UNO, September, 2015.
- Presentations: 3 (citations in the Products Section of this PPPR and Previous PPPRs)
- Policy Brief: 1 (citation in the Products Section of this PPPR)

Complete listing of publications and presentations generated by this research available at:
<http://swutc.tamu.edu/research/swutc-completed-research/600451-00119/>

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 July 1, 2015 – December 31, 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 TAMU - Number of students currently in program: 2

Advanced Institute at the UT-Austin – Number of students currently in program: 8

Graduate Stipend Program at TSU – Number of students currently in program: 2

♦ **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:

2015 program completed. Number of students participating in 2015 program: 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. (6 citations in Products Section of previous PPRs).

2013 PhDCA Program

Of the six proposals selected for FY13 funding – five are now complete (3 citations in Products Section of previous PPPRs and 2 in this PPPR).

2014 PhDCA Program

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

2015 PhDCA Program

Three projects selected for funding in FY15 (listed below) – Initiated on 10/1/15 and all are currently in progress.

FY 15 Efforts Selected

Study Title	Student Name
Methodologies for Developing Driveway Functional Areas for Urban Corridor Access Management	Yanfen Zhou
Integration of Heuristics and Statistics to Improve the Quality of Network-Level Pavement Condition Data	Salar Siabil
Modeling and Measuring Deformation of Freezing Concrete: Towards the Identification of D-Cracking Susceptible Aggregates and Construction of all Concrete LNG Tanks	Syeda Rahman

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.
- Support and conduct the 2016 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:

Causal Probabilistic Mapping of States of Risk: Integrating Bayesian Networks and GIS (BN+GIS) for the Environmental Risk Assessment of the Barnett Shale, Zenon Medina-Cetina, Texas A&M University, submitted to the *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems*. (Product of SWUTC Project #600451-00027)

Parametric Sensitivity Analysis for Risk Assessment using Bayesian Networks and GIS, Zenon Medina-Cetina, Texas A&M University, submitted to the *International Journal of Geographical Information Science*. (Product of SWUTC Project #600451-00027)

The Conceptual Mismatch: A Qualitative Analysis of Transportation Costs and Stressors for Low-income Adults, Kate Lowe and Kim Mosby, UNO, submitted to *Transport Policy*. (Product of SWUTC Project #600451-00113)

Keeping Cars “On the Road”: A Qualitative Analysis of Car Ownership Dynamics among Low-income Adults, Kate Lowe, UNO, submitted to *Transportation*. (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)

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

A Methodology to Predict Intercity Commute Volume: Focus on Texas Megaregion Communities, Holmes Hassell and Carol Lewis, published by the Transportation Research Board - 15-4890. (Product of SWUTC Project #600451-00043)

Wind Tunnel Tests for Mean Wind Loads on Road Vehicles, Xianzhi Liu, Yan Han, C.S. Cai, Marc Levitan and Deimitris Nikitopoulos, published in the *Journal of Wind Engineering and Industrial Aerodynamics*, 2016 (Product of SWUTC Project #600451-00112)

Policy Brief Developed (citations not captured in previous PPPRs):

Opportunities and Barriers to Complete Streets Policy Implementation, Tara Tolford, distributed to the 2014 Louisiana Bike-Walk Summit, Baton Rouge, LA, November 10, 2014. (Product of SWUTC Project #600451-00119)

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

Link Travel Time Estimation Based on Network Entry/Exit Time Stamps of Trips, Wen Wang, December 2015, 132 pp. (Product of SWUTC Project #600451-00033)

Queue Length Estimation and Platoon Recognition using Connected Vehicle Technology for Adaptive Signal Control, Kamonthep Tiaprasert, TAMU, December 2015, 114 pp. (Product of SWUTC Project #600451-00038)

Presentations (citations not captured in previous PPPRs):

Dynamic Mapping of Climate Change Impacts on Transmission and Distribution Grids, Zenon Medina-Cetina, Texas A&M University, presented to the Center Point Energy Strategic R&D Meeting, Center Point Houston, TX, June 23, 2015. (Product of SWUTC Project #600451-00027)

Risk-based Weather Impacts on the Grid, Zenon Medina-Cetina, Texas A&M University, presented to the Smart Grid Workshop, Texas A&M University, College Station, TX, April 21, 2015. (Product of SWUTC Project #600451-00027)

Diagnosis and Prognosis Analysis of Ecological Management under Varying Climate Change Scenarios, Zenon Medina-Cetina, presented to the SIAM Conference on Computational Science and Engineering, Boston, MA, February 25 – March 1, 2013. (Product of SWUTC Project #600451-00027)

Effect of Aggregate Micro- and Macro-texture on Pavement Skid Resistance, Prasad Buddhavarapu, University of Texas at Austin, to be presented to the Southern African Transportation Conference, Pretoria, South Africa, July 2015. (Product of SWUTC Project #600451-00085)

Influences of Data Inclusion on HSM Calibration and Crash Prediction, Brian Wolshon, presented to the 2015 Road Safety & Simulation International Conference, Orlando, FL, October 2015. (Product of SWUTC Project #600451-00102)

Driving Simulation of Vehicles in Harsh Environment, Jiexuan Hu and C.S. Cai, presented at the Second International Symposium on Life-Cycle Performance of Bridges and Structures, Changsha, China, December 18-20, 2015. (Product of SWUTC Project #600451-00112)

Achieving Regional Fare Integration in New Orleans: Innovative Cost Sharing Arrangements and Strategies, John Renne, Presented to the UNO Transportation Institute Lunch and Learn Seminar, New Orleans, LA, April 21, 2015. (Product of SWUTC Project #600451-00117)

Study Findings: Achieving Regional Fare Integration in New Orleans: Innovative Cost Sharing Arrangements and Strategies, John Renne, Presented to the newly appointed New Orleans Regional Transit Authority's Riders Advisory Committee, New Orleans, LA, November 4, 2015. (Product of SWUTC Project #600451-00117)

Complete Streets and MPOs: Findings from a National Survey, Tara Tolford, presented to the UNO Transportation Institute Lunch and Learn Seminar, New Orleans, LA, March 31, 2015. (Product of SWUTC Project #600451-00119)

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 Technology Developed:**

- SWUTC Project #600451-00027 – Forecasting the Impacts of Shale Gas Developments on Public Health and Transportation Systems on Both Sides of the Mexico-USA Border - This research acquired spatial data in the Eagle Ford to test an implementation of the BN+GIS technology (Integration of Bayesian Networks with Geographical Information Systems) developed by the PI's research group. Providing validation of a risk model on environmental impacts of shale gas developments at the Barnett Shale and Eagle Ford plays.

Inventions/patent applications/licenses for this reporting period:

Nothing to report at this time.

Other Products for this reporting period:

♦ **Methodology Developed:**

- SWUTC Project #600451-00043 – Developing a Methodology for Projecting Intercity Commuting – This study developed a new time/cost saving Sketch Planning Method to predict intercity travel.

♦ **Decision Support Tool Developed:**

- SWUTC Project #600451-00008 – Decision Theory Models for Selecting Traffic Control Devices – This research developed a decision support tool for improved performance-measure based selection of traffic control devices. Using the procedures outlined by this research will also enhance the ability of decision-makers to make better economic based decisions.

♦ **Model Developed:**

- SWUTC Project #600451-00113 – Manual Traffic Control for Planned Special Events and Emergencies – This research developed a new mathematical model capable of predicating the choice behavior of police officers directing traffic at signalized intersections. The model formulation is grounded on discrete choice logistic regression. Based on the current state of traffic at the intersection, the model is capable of making accurate, short term, predictions of the police officer's future right-of-way allocation.

♦ **Policy Brief Developed:**

- SWUTC Project #600451-00119 – Evaluation of Complete Streets Policy Implementation by Metropolitan Planning Organizations – Study produced a policy brief titled Opportunities and Barriers to Complete Streets Policy Implementation, distributed to the 2014 Louisiana Bike-Walk Summit.

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. SWUTC Project Monitors furnish in-kind support for SWUTC research by providing guidance to principal investigators to ensure that the research will produce useable results and to review of all reports emanating from the project.

- No new project monitors for this reporting period.

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.

Lawrence Berkeley National Laboratory – Dr. George Moridis’ Earth Sciences Division – In-kind support – provided information concerning software SeTES, to manage large databases on well data to be used for the assessment of shale gas production for SWUTC Project #600451-00027.

Texas Census Research Data Center – Dr. Mark Fossett – In-kind support – helped define long-term collaboration strategy on the use of US Census data to link shale gas production with environmental and social risk assessments for SWUTC Project #600451-00027.

Grupo Plenum (Mexico) – In-kind support – for leveling the use of spatio-temporal data assimilation via haptic technology for SWUTC Project #600451-00027.

Ecosystem Science & Management Department – Texas A&M University – Dr. Marian Eriksson – In-kind support – provided computational assessment of Bayesian Network implementation using Python for SWUTC Project #600451-00027.

Houston/Galveston Area Council – Contribution: In-kind and financial support for SWUTC Project #600451-00050.

Uptown Houston, Inc. – Contribution: Financial support for SWUTC Project #600451-00050.

Central Houston – Contribution: Financial support for SWUTC Project #600451-00050.

Southwest Jiaotong University, Chengdu, People’s Republic of China – Dr. Zhao Zhang - Contribution: In-kind support to develop traffic model and traffic loading and traffic management scenarios for SWUTC Projects #600451-00101 & 600451-00114.

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.

4. Impact

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

Nothing to report.

Impact on other disciplines for this reporting period:

◆ **Applicable to Multiple Disciplines.**

- SWUTC Project #600451-00108: The Confluence of Transportation and Economic Activity in a Mega Region Disaster - The research project was designed to open up a window where divergent disciplines could see where they could work congruently to achieve a higher level of economic development coordination while maximizing their efficiency with public funds – at a level not previously considered, the megaregion. Applicable to the fields of urban planning, transportation planning, economics.

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, 4 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: 12
- ◆ **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 #161302: Developing the Urban Mobility Report - The baseline statistics produced in this research provide the state-of-congestion in urban areas of the US through 2013. As with prior UMRs, these data are often used by policy-makers and decision-makers when discussing the scope of the US congestion problem.
- SWUTC Project #600451-00008: Decision Theory Models for Selecting Traffic Control Devices - This research developed a process for improved performance-measure based selection of traffic control devices leading to enhance public support for and compliance with, traffic control devices in the field. The primary author of this research is now working in a traffic engineering position for a government agency where he is using the research to impact decision-making practices.

- SWUTC Project #600451-00048: Transportation Design and Concepts to Make Houston METRO's Southwest Line at Palms Area More Livable - This research provides decision makers an analysis on the potential effect of Transit Oriented Development on Palm Center in Houston, TX. This researched looked at several TODs across the country to identify similarities to the current Palm Center. Identifying characteristics of the successful TODs, a similar foundation can be laid to revive the Palm Center area of with offices, retail and social activity.
- SWUTC Project #600451-00115: The Conceptual Mismatch: Transportation Stressors and Experiences for Low-Income Adults - Access to critical activities and jobs are important for all citizens, but especially challenging for low-income households. Results from this research show the complexity of addressing these challenges and provide policy makers context for programs designed to improve the mobility of low-income populations.
- SWUTC Project #600451-00117: Achieving Regional Fare Integration in New Orleans: Innovative Cost Sharing Arrangements and Technologies - This research produced findings on fare integration best practices and made an immediate impact on the strategies and efforts of local non-profit organizations and community groups. The results of this study provided these organizations with the data needed to advocate for policy change. For example, transit advocacy organization Ride New Orleans incorporated the findings of this study on fare integration best practices into their key recommendations presented as part of the *2015 State of Transit in New Orleans: Ten Years after Katrina* report, which was widely publicized and presented to transit stakeholders and elected officials. As a direct result of this research, discussion is underway about next steps for developing a coordinated regional fare structure.
- SWUTC Project #600451-00118: Assessing the Potential for Gulf Coast NAFTA Maritime Trade Corridors – Through assessment of current trade patterns and infrastructure, analysis of potential opportunities for trade expansion, and analysis of policy barriers that need to be addressed to strengthen maritime trade corridors, this study provides decision information that assesses the potential for maritime shipping corridors in the Gulf of Mexico between the US, Mexico, and Cuba. In essence, this study produced a plan to improve economic conditions in the Gulf Coast Megaregion, established a basis for improving the social conditions in Cuba and Mexico and addressed congestion associated with international trade, present and future.
- SWUTC Project #600451-00119: Evaluation of Complete Streets Policy Implementation by Metropolitan Planning Organizations - This project's immediate impact was to convene, facilitate, and inform Louisiana's first statewide active transportation policy summit. The project scope included planning an event focused on Complete Streets policy, which brought together experts, community and government leaders, and advocates from around the state. The study's preliminary findings were presented at this event and used to catalyze discussion about best practices in regional policy implementation, as well as implications for local and state-level policy. As a direct result of this event, a new statewide active transportation advocacy group was formed, which has made the summit into an annual event and continues to engage with the research team to develop data-driven policy briefs and needs statements.

More broadly, this project contributed to our national understanding of the mechanisms of policy diffusion generally, and about the opportunities for and barriers to complete streets policy

specifically, including key stakeholders, primary motivations, and most significant obstacles to policy adoption and/or implementation.

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

◆ **Improving Public Knowledge:**

- SWUTC Project #600451-00027: Forecasting the Impacts of Shale Gas Developments on Public Health and Transportation Systems on Both Sides of the Mexico-USA Border - This project improved public knowledge by integrating complex information in a single mapping platform which can provide local communities, land owners and policy makers a better understanding of the risk of installing new energy infrastructure, and to assess the current state of those which already exist.

◆ **New Methods to Aid Decision Makers:**

- SWUTC Project #600451-00043: Developing a Methodology for Projecting Intercity Commuting - There are many communities interested in less costly ways to predict travel than the traditional process, known as the 4-step, which is time and financially intensive. Also, only small numbers of planners are adept at its use. The Sketch Planning method developed by this research has potential to provide reasonable projections more expediently. Results from this study have already been forwarded to Ray Miller in the Texas Department of Transportation Rail Division.
- SWUTC Project #600451-00113: Manual Traffic Control for Planned Special Events and Emergencies – This project produced a new tool that will aid transportation planners in making more accurate estimates concerning the impact of manual traffic control on the overall movement of vehicles. Using the knowledge gained from this research, transportation planners can now optimize (in a mathematical and quantifiable sense) the allocation of police officers for manual traffic control. This would result in having more officers available for other tasks after a disaster such as providing security and search-and-rescue operations. The quantitative model developed by this research is currently being incorporated into the Nuclear Regulatory Commission’s emergency evaluation planning for nuclear power plants.

5. Changes/Problems

Nothing to report.