



NCTR

NATIONAL CENTER for
TRANSIT RESEARCH

**Program Progress Performance Report
for University Transportation Centers
National Center for Transit Research (NCTR)
University of South Florida
a Tier I Transit Focused University Transportation Center**

Grant Number DTRT12-G-UTC22

DUNS and EIN #: DUNS 06-968-7242, EIN 59-3102112 -F5 (Tampa Campus)

Submitted to: Amy Stearns, University Program Specialist
Office of Research, Development and Technology
Research and Innovative Technology Administration
U.S. Department of Transportation
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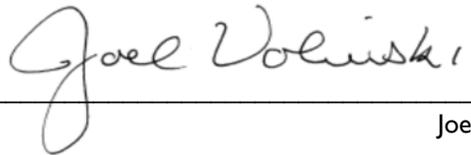
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Submitted on: August 13, 2014

Grant Period: January 1, 2012–January 31, 2016

Reporting Period: January 1, 2014–June 30, 2014, Fifth 6-Month Progress Report

Signature of Submitting Official: _____



Joel Volinski, NCTR Program Director

Accomplishments

What are the major goals and objectives of the program?

The major goals of the National Center for Transit Research are:

- To select and conduct research intended to make public transit and alternative means of transportation safe, efficient, effective, desirable, and secure. This will be done by receiving input from the Federal Transit Administration, the Florida Department of Transportation, the Illinois Department of Transportation, the North Dakota Department of Transportation, and transit professionals from throughout Florida and the nation. Research will be subject to peer review.
- To contribute to the education and preparation of the next generation of transportation professionals and to workforce development initiatives that will help attract, retain, and train employees in the fields of public transportation in particular.
- To disseminate the results of research as broadly as possible to fulfill the goal of making public transportation and alternative forms of transportation safe, efficient, effective, desirable, and secure. In addition, NCTR will continue to invest in projects that result in new patents and licenses that advance the quality of transportation services while creating new technology and employment opportunities.

What was accomplished under these goals?

During the fifth six month reporting period (January 1, 2014 – June 30, 2014) all consortium partners have completed or are substantially engaged in all of the federally funded research projects they lead or participate in as summarized below:

Evaluating the State of Mobility Management and Human Service Transportation Coordination – NDSU as the lead with assistance from USF and UIC (based on FTA proposal) - Objectives are to 1) Synthesize previous research on the effectiveness of mobility management and coordination programs; 2) Develop an onboard survey instrument that could be used in different locations and across time to evaluate the impacts of mobility management and coordination programs on end users; 3) Determine the impacts of mobility management and coordination programs in meeting the goals of efficiency, ease of access, and quality of service; 4) Assess the effectiveness of mobility management and coordination programs in meeting the needs of transportation disadvantaged populations from the perspective of the end users; and 5) Develop and test an evaluation model that could be applied to other communities across the country. **A draft final report was produced during this time period.** Findings of the report were also shared in a poster session at the TRB Annual meeting in January 2014.

Improving Veteran Mobility in Small Urban & Rural Areas – NDSU- The objective of this research is to identify veterans with mobility needs currently living in rural North Dakota, South Dakota, and Montana. The cost of providing different transportation options are quantified in relation to meeting their medical needs as well as other life essential activities. **This project was completed** and posted on the websites of

both USF and NDSU **during this reporting period**. The results of this project were also shared on a webinar hosted by NCTR.

2013 Rural Transit Fact Book – NDSU - The rural transit fact book serves as a national resource for statistics and information on rural transit in America. It includes information on demographic and travel behavior data as well as financial and operating statistics for agencies receiving 5311 funding. Needs and resources were identified, the data were collected, and data analysis was completed. **A draft of the final report was completed during this six month reporting period** and is undergoing peer review.

Cost-Benefit Analysis of Rural and Small Urban Transit – NDSU – This project was completed during this time period, the report posted to websites of USF and NDSU, and results were shared at the Transportation Research Forum Annual Meeting in San Jose, California and via an NCTR webinar.

Intercity Transit Services Demand in North Dakota – NDSU - This study will create an intercity bus network model for the Upper Midwest that will be used to estimate boardings at each stop and ridership on each link in the network and the impacts of possible service changes and population changes on ridership. This project is approximately 50% complete.

National Transit Demand Response Level of Service – NDSU - The primary objective of the study is to develop a method for assessing the national demand response level of service. Some progress was made on the literature review, data needs, and data availability, and also in developing the frame work of the study. Significant progress was made in developing the online survey tool for the state of North Dakota which will be used in the study.

Development of Public Transit II Course – NDSU - A new course, Public Transit II, will be developed and offered in spring 2015 as part of NDSU's Transportation and Logistics program. This class will expand upon TL 786, the public transportation class currently offered at NDSU, by going more in-depth in some quantitative and technical topics covering more advanced areas including modeling, economics, and engineering. Topic areas will be chosen based on the expertise of the instructors and input received from the operators and consultants to the transit industry and will address areas not currently covered in TL 786. Topic areas were identified, key course details were determined, and the class syllabus was completed. Source material for the class was identified, and work began on developing lecture notes.

National Transit Network Level of Service Data and Analysis – USF as lead with assistance from UIC (based on FTA proposal) – **The following tasks have been completed:** Evaluate the state of GTFS data utilization; develop a schema for maintaining a National GTFS dataset; and develop GTFS based measures on mobility and accessibility. The remaining tasks include: Conduct a National GTFS Based Mobility Evaluation; Conduct a National GTFS Temporal Based Accessibility Evaluation; and Recommendation for the establishment of a National Transit Service Database.

Texas Transportation Institute Annual Congestion Study: Measuring Transit's Impact – USF - **The methodology report and analysis were completed in this time period** and that document is published (<http://d2dtl5nnlpr0r.cloudfront.net/swutc.tamu.edu/publications/technicalreports/600451-00013-1.pdf>). USF has subsequently updated the base year data provided to TTI. It is our understanding TTI will be producing their annual urban mobility report in September, after they have improved a new data set

that will help provide a more accurate report. USF specifically collaborated with TTI and utilized a great deal of APTA data as well as USDOT data. It is believed the improved methodology will enhance the credibility of the report and provide a more realistic measure of the impact transit service has on roadway congestion.

Incorporating Managing Demand into Washington State DOT Planning and Programming – USF - The objective of this research is to develop guidelines for WSDOT business areas to identify and select potential demand management strategies appropriate to the context of the land use and transportation environment to meet their objectives. The anticipated benefits from this research include increasing capacity in the WSDOT transportation system by expanding participation in alternative modes (carpools, vanpools, transit, cycling, walking, and telecommuting). With a large gap in unfunded needs and growing environmental concerns such as climate change, WSDOT will take a forward step in managing demand for vehicle trips to improve overall performance of the highway system, mitigate congestion during construction, and reduce greenhouse gases.

National Transit Safety Research and Assistance Center – USF – The website for this center was created during this six month reporting period as a comprehensive transit safety resource (<http://transitsafetycenter.org/>). The Center employs a number of methods to successfully provide resources to public transportation providers, local and state governments, the private sector, and other transit stakeholders to improve public transportation safety in the United States. The focus areas include operational and vehicle related safety topics, human factors, and substance abuse management. Technical assistance and training aspects are structured to provide ample support to transit agencies that are transitioning to a Safety Management Systems approach to safety as well as those agencies responding to MAP-21 and corresponding regulations, guidelines, and other directives issued by the Federal Transit Administration.

Alternative Fuels Clearinghouse – USF – Renamed the Advanced Transit Energy Portal (ATEP), it is an online information exchange resource covering all aspects of adoption and operation of the alternative fuel buses in the U.S. transit fleet. The website: www.advancedtransitenergy.org has been up and running since October 2013. **In the past 6 months the following activity has taken place:**

- Regular posts on the website in the following categories: agency news, industry news, events, laws and incentives, publications, and research results.
- Worked on search engine optimization to increase website's visibility during internet searches
- Attended APTA conference in May of 2013 to distribute information about ATEP and network with industry professionals.
- Made brief presentation about ATEP project at APTA's Clean Propulsion and Support Technology Committee meeting. Handouts about ATEP were distributed at the committee meeting to provide information about the project, as well as to seek ideas and comments from the industry regarding planned data collection initiative.
- Continued work on developing data collection page on the ATEP website that will allow this portal to collect operation and maintenance (O&M) cost data from registered users (transit agencies) regarding alternative fuel vehicles in their fleets. Main elements of the page have been completed and are currently being tested and adjusted.

Transportation Demand Management and Telework Clearinghouse – USF - the National Center for Transit Research (NCTR) located at the University of South Florida, the [Association for Commuter Transportation \(ACT\)](#), and the [International Telework Association and Council \(ITAC\)](#) teamed up to improve the delivery of transportation demand management (TDM) and telework programs . This project includes information about alternatives to driving alone and telework programs to meet the congestion, air quality, and mobility challenges facing our communities. The Clearinghouse provides the most comprehensive and up to date information related to TDM services and products such as ridesharing systems and marketing materials; commuter tax benefit information for employers; databases of case studies of employer TDM programs, listservs that connect over 3,000 subscribers; free software to download to predict the impacts of trip reduction programs (developed by research funded through NCTR; research reports and TDM training materials; and information on how employers can earn the designation of “Best Workplaces for Commuters.” The TDM and Telework Clearinghouse sponsored two webinars in the six month period. (Ongoing)

GIS in Transit Clearinghouse - USF - The Transit GIS Clearinghouse was created by the National Center for Transit Research (NCTR). It is an outgrowth of the NCTR-sponsored GIS in Transit Conference. This site is managed by the staff of the GIS and Transportation Informatics Group at the Center for Urban Transportation Research. Moreover, the Clearinghouse’s purpose is to share innovative GIS solutions and how they can improve public transportation. This site seeks to reach out to the public transit industry, and maintain a repository of data and information that keeps professionals abreast of the latest developments, innovations, and research from a holistic point-of-view. It continues to serve the purpose of allowing information sharing among professionals in GIS throughout the world, and keeps visitors posted on upcoming events and new articles dealing with GIS applications in the field of public transportation.

Development of Training Manuals for Transit Planning and Scheduling – FIU - A vast amount of information on the subject matter has been gathered and the PI is in the process of writing the manual that includes the Transit Planning and Scheduling sections. The research team also prepared a detailed structure of the subjects to be covered in the manual, following a “book” format that was created for this purpose. USF faculty with extensive transit planning and scheduling experience will assist with peer review.

Transit Service Reliability: Analyzing Automatic Vehicle Location (AVL) Data for On Time Performance and to Identify Conditions Leading to Service Degradation – FIU as the lead with assistance from USF (based on FTA proposal) - The research team is in the process of completing the literature review, identified and started to use the AVL data from selected transit agencies through the Google General Transit Feed Specification (GTFS), and it is working on the development of the Methodology

State of Good Repair Performance Measures: Assessing Asset Condition, Age, and Performance Data – FIU - This research is intended to facilitate this process by using objective performance measures for measuring the condition of capital assets. To improve efficiencies, there is a need to have an ongoing process of asset management that can be assisted with a software application. Using data in an asset management system can help prioritize investments based on limited resources and the assets’ condition. The main objective of this scope of work is to develop a web-based software application that transit agencies can use for the collection, storage, querying, analysis, and reporting of transit assets: Enterprise Transit Asset Management (ETAM). The idea is to develop a system in which different departments at the transit agencies can access the system for entering data, analyzing, or for retrieving

information. Therefore, this tool can assist transit agencies in evaluating and assessing transit asset data with regard to age, condition, and performance against established performance targets as well as an approach for project prioritization based on budget data and asset rehabilitation/replacement alternatives.

The Challenges to Creating Transit Value Capture by linking Transit Investment, Station Area Planning, Attraction of Appropriate Development, and the Application of Effective Value Capture Tools – UIC -

The focus was on completing case study visits as well as documenting the case studies and literature review. Real estate developer information gathering was completed during this period as well as interviews with stakeholders. **The draft final report was completed** after the completion of the interviews with stakeholders. A paper based on the research findings of this project was presented at the 29th Annual Transport Chicago Conference in June, 2014.

Adapting Transit to Climate Change Impacts – UIC as the lead with assistance from USF (based on FTA proposal) - The work completed included: the construction of an influence diagram for the decision problem, the construction of a decision tree, and cost estimations. Preliminary frameworks for both the influence diagram and decision tree were completed. Preliminary statistical analysis and modeling of ridership as a function of temperature and station platform coverage (canopy) was completed. The statistical model was refined and completed. The research team is currently in the process of documenting the results and the policy implications for the Chicago Transit Authority.

Many other projects have either been completed or are being completed using matching funds from the Departments of Transportation of the consortium members. Research projects are scheduled to be completed from December 2014 to December 2015, while the Clearinghouse activities will be ongoing throughout the term of the grant.

Provided below is a list of the projects funded by the Florida Department of Transportation (FDOT) that have been undertaken **at USF** as match to the grant:

1. **Florida Transportation Demand Management Clearinghouse** - \$143,325 – This ongoing project has been in place for 15 years, with results similar to those noted above for the National TDM and Telework Clearinghouse, with a focus on Florida applications. (Ongoing)
2. **Improved Traffic Control Measures to Prevent Incorrect Turns at Highway-Rail Grade Crossings** - \$99,033.88 – **This project was completed** in the prior six month reporting period, but FDOT has accepted the recommendations from the study and intends to apply them at additional sites throughout the state.
3. **Impacts of Dialysis Transportation on Florida's Coordinated Public Transportation Programs** - \$115,100 – FDOT accepted the report in final form which has helped them to understand the growing demand for paratransit services for those needing dialysis treatment. The report identified numerous ways that local agencies are dealing with the growing demand. This information sharing can help agencies serve as many people as possible while addressing the urgent needs of dialysis patients for transportation. **(Completed this reporting period)**

4. **Analysis of Transit Contracting Models and Proper Incentives for Long-term Success** - \$137,074 – This research project was also completed and accepted by FDOT in the previous six month reporting period. It was prepared to provide all operating transit agencies with techniques to consider should they be interested in contracting for more service in the future. **(Complete)**
5. **Bus Operator Safety Critical Issues Examination and Model Practices** - \$242,005 – **This project was completed** and enthusiastically accepted by FDOT during the previous six month reporting period. FDOT has expressed its intent to fund continuing transit safety research and training as a result of this report. Findings were presented at the APTA Annual Bus and Paratransit conference in May in Kansas City, Missouri; at the Florida Public Transportation Mid-Year Professional Development Workshop in Tampa in June; and at the Canadian Urban Transit Association Summer Meeting in Gatineau, Quebec, Canada.
6. **Best Practices in Enhancing Transit in Multimodal Transportation Elements** - \$174,871 – **This report was completed** and accepted by the Florida Department of Transportation during this six month reporting period. This report provides guidance in developing a multimodal transportation element of a local government comprehensive plan. Two model elements were developed to address differences in statutory requirements for communities of different sizes and planning context. The first model element includes guidance for large local governments and those within the boundary of a metropolitan planning organization (MPO). The second includes guidance for smaller or more rural communities outside of MPO boundaries. Each model element encourages a range of best practices in multimodal transportation planning as identified through a review of the literature, agency plans, and related documents. Emphasis is placed on ensuring a multimodal transportation system appropriate to the size and character of the community, providing for public transportation as feasible, improving accessibility and connectivity between modes, and coordination with land use and plans of other transportation agencies and modal providers. Contents include guidance on establishing a community vision and priorities, relevant and professionally accepted data sources and analysis procedures/tools, guidance on existing and future conditions analysis and mapping, establishing quality/ level of service standards and other performance measures or benchmarks, future transportation system network planning strategies, and example goals, objectives, policies, and strategies.
7. **Evaluation of Rear-end Bus Collisions and Identifying Possible Solutions and Assessing the Effectiveness of Bus Pull-out Bays in Reducing Collisions** - \$150,000 – **This project was completed during this six month reporting period.** Results were presented at the Florida Public Transportation Association Professional Development Workshop in June, and via webinar hosted by the Center for Urban Transportation Research in June. Florida is experiencing a disproportionate amount of rear-end accidents to public transit buses, and a variety of actions will be taken to try to reduce those incidents.
8. **Investigation, Quantification, and Recommendations - Performance of Alternately-fueled Buses** - \$140,000 – **The final draft of this report was completed** and sent to the Florida

Department of Transportation. Information from this report helps to inform the clearinghouse activities that are funded through the federal side of the grant.

9. **Evaluation of Automated Vehicle Technology for Transit** – \$25,000 - The purpose of this project is to conduct a synthesis of available AV technologies that could be installed today on transit vehicles. Depending on the research findings, the scope of work may be expanded later to include assisting JTA, or another Florida transit agency, with the solicitation of AV technology and the evaluation of the technology in a demonstration program.
10. **Florida Transit Safety Network** - \$133,650 – As noted in item #5 above (Bus Operator Safety Critical Issues Examination and Model Practices), FDOT wanted to take advantage of the excellent results from that report to continue to make transit safer for operators and passengers in Florida. The Florida Transit Safety Network (FTSN) has been established with membership representing each of Florida’s public transit agencies. The FTSN will follow a set of prescribed objectives, including: Providing a forum/platform for discussion of transit safety issues and opportunities; Being a resource to FDOT for the identification of transit safety issues, including areas of greatest risk; Providing a mechanism for consolidated stakeholder input for proposed modifications to Rule Chapter 14-90, Florida Administration Code or other statewide efforts; Serving as a forum by which transit agencies can discuss transit safety issues and share successful methods used to address those issues; Maintaining a coordinated front to address FTA transit safety program requirements issued in accordance with MAP-21 mandates; Coordinating with the Florida Operations Network (FON) and Florida Transit Maintenance Consortium (FTMC) on those topics of shared interest Identifying transit safety training needs.
11. **Impact of Transportation Demand Management (TDM) Elements on Managed Lanes Toll Prices** - \$128,091 - The purpose of this research is to quantify the extent to which transit and ridesharing reduce traffic density and lower tolls on the I-95 Express Lanes. The tolls on the I-95 Express Lanes are variable and are based on traffic density. Therefore, transportation strategies that increase person throughput can contribute to lower tolls that benefit the traveling public and improved traffic flow. This research benefits the state because dynamically priced managed lanes feature prominently in the state’s future transportation plans, particularly in South Florida. This research will add to the body of research done already on the I-95 Express Lanes. It will help the Florida Department of Transportation have a better understanding of the positive role played by transit and ridesharing in relation to dynamically priced managed lanes.
12. **Ridership Impacts of South Florida’s Easy Card** - Smart card-based Automated Fare Collection Systems (AFCS) are being increasingly deployed in transit systems across the US. Miami-Dade Transit (MDT) has recently deployed such a system branded as the EASY Card. The South Florida Regional Transportation Authority (SFRTA) also deployed the same system for Tri-Rail. The technology provides a stored value electronic purse or the choice of various period passes, and in that respect is similar to smart card systems in other US cities. The EASY Card system was used as a case study to document some of the issues related to the ridership and customer

behavior aspects related to fare policy when smart card systems are introduced. Given the benefits of such AFCS in terms of reduced fare evasion, cash handling fraud, transfer abuse, and increased customer convenience, it is likely that other transit systems in Florida will deploy such systems in future years. This report documented the effects on ridership and customer satisfaction, and provided lessons learned in implementing such a system to inform other agencies that are contemplating deploying similar systems. **Findings from this research were shared via CUTR's bi-weekly webcast program during this six month period.**

FIU is engaged in the following projects undertaken with local match:

1. **Informed Traveler Program and Applications – FIU - \$265,261** - The University City Prosperity Project addresses transportation mobility and safety problems facing Miami-Dade County and the Southeast Florida Region. One of the major components of this project is the development of a first phase of the Informed Traveler Program and Applications (ITPA). ITPA will provide personalized, timely information and advice regarding the most efficient and cost effective travel paths for consumers in advance of their travel decision points. This would include easy-to-access and use of information needed to avoid congestion, construction, or accident delays and to otherwise optimize each trip; whether and how to use transit or other modes, delay the start of a trip, take an alternate route, and act on secondary destination suggestions, to easily park, and to encourage remote parking with completion of the trip via transit. Matching funds are being provided by the Miami-Dade Expressway Authority. The program's software will be predictive in nature, allowing users to make better travel decisions before they decide whether or not to get in their private vehicles.
2. **Analysis of Movable Bus Stop Boarding and Alighting Areas – FIU - \$110,667** -The goal of this project was to explore the feasibility of creating movable bus stop boarding and alighting areas for Florida transit agencies. The specific objectives included: Researching the state-of-the-practice and issues involved in meeting bus stop ADA requirements; Developing design alternative(s) for movable/reusable/relocatable boarding and alighting pads, considering their relation to other bus stop amenities such as benches and shelters; Performing life-cycle cost analysis of each design alternative; and Recommending one or more alternatives that are acceptable to both transit agencies and riders with disabilities. Less expensive alternatives are identified to allow reduce the costs associated with the moving of bus stop boarding and alighting areas. **This report was completed in May 2013.**
3. **Guidelines for Bus Transit Stops in Highway Construction Zones – FIU - \$122,600** - The objective of this study is to develop guidelines/recommendations and estimated costs for managing transit stops during adjacent highway construction operations with a focus on safety and the customers. This guidance will serve as a planning tool, design and construction guides

for Maintenance of Traffic (MOT) coordination for transit agencies, highway design engineers, and construction managers.

The following projects are being undertaken by UIC with matching funds from the Illinois DOT. These projects provide a full 100% cash match to the portion of the federal grant that is being implemented by UIC:

1. Igo Car Sharing: Feasibility of Charging Stations for Hybrid Cars
2. Study of Integrated Corridor Management in Greater Chicago Area
3. Mobility Case Studies: Where Integrated Corridor Management has Worked and Why
4. Modeling of Transit Mode Choice in Greater Chicago
5. Ranking Northeast Illinois New Starts Transit Potential Expansion Projects for Metra and CTA
6. Online Tool for Computing and Presenting Regional Accessibility Measures
7. Manufacturers' Use of Industrial Rail Spurs in Metropolitan Chicago
8. Optimal Rail Service Planning in a Passenger-Freight Shared Corridor
9. Capturing Economic Loss of Climate Change Through Interconnectivity Modeling of Transport Infrastructure

The following project **was completed** by North Dakota State University with funding made available from the North Dakota Department of Transportation:

- Regional Transit Coordination Pilot Project - \$150,000

In addition, NDSU has requested approval for the following project to be funded by NDDOT:

Title: Identifying and Satisfying the Mobility Needs of North Dakota's Transit System

PI: Jill Hough and Jeremy Mattson

The objective of this study is to determine the financial needs of the state transit providers. In order to accomplish this, the study will take into account all applicable State and Federal laws and will look into the following:

1. Construct a demographic profile of the state of North Dakota
2. Develop a mobility needs index
3. Describe existing levels of transit service across the state
4. Identify base levels of required transit service and gaps in existing service
5. Develop recommendations for meeting mobility needs
6. Determine the level of funding to maintain the current level of service
7. Determine the level of funding to expand the existing level of service

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

- Dr. Jill Hough of NDSU and Dr. Steve Polzin of USF continued to develop modules that will be incorporated into a **national transit course** that will be able to be delivered by any transportation faculty at universities around the country. This course will be ready to offer in the spring semester of 2015.
- SURTC developed a training module entitled “FTA 101” with the American Association of State Highway and Transportation Officials (AASHTO). This module is designed to help DOT and new transit managers understand the basics of the Federal Transit Administration (FAR0022506).
- NDSU faculty made 9 different presentations at 5 different venues throughout the country as well as two webinars. A total of 372 professionals attended these presentations for a total of 817 contact hours.
- The scopes for virtually every research project noted in this report incorporated **student research assistants** to help prepare them for careers in transportation.
- **The NCTR Scholars program** was initiated the fall of 2013, providing students who have career aspirations in public transportation to obtain a Masters degree in Civil Engineering with an emphasis on public transportation. Two students (Patrick Buddenbrock and Casey Jarrell) were selected to receive the scholarships and have engaged in a variety of NCTR research projects as assistants. During this six month reporting period they provided substantial input to a “Future Corridors” strategy that was presented to the Secretary of the FDOT and his top staff. They are also authoring white papers on how transit agencies are working to help assure access to transit by truly low income people, how transit agencies are involved with school districts in providing transportation to students, and what other contributions transit agencies make to their communities beyond providing essential mobility. Both students have been registered to attend the APTA Annual Meeting and EXPO in Houston in October as well as the Florida Public Transportation Association Annual Meeting in Naples, Florida.
- USF hosted 13 **free webcasts** in its bi-weekly series to share the results of transportation research with transportation professionals from all over the nation and the world. Eight of the 13 webinars shared results of research funded through the UTC grant. An average of approximately 45 people viewed each webcast live, while the recorded versions are available to view on the CUTR website at USF. In addition, USF’s TDM program co-hosted five additional webinars in conjunction with the Association for Commuter Transportation: (1) “Introduction to Commuter Benefits” (2) “Exploring Airport Employee Commute and Parking Strategies” (3) “Tax Penalties for Commuting: State Tax Policies that Prevent both Employees and Employers from Adopting Telework” (4) “University Campuses as Leaders in the Shift Away from Driving” and (5) “Strengthening the TDM to LEED Connection: Opportunities for Growth.”

- Faculty of USF helped to prepare and manage the **Mid-year Professional Development Workshop of the Florida Public Transportation Association** held in Tampa in June, 2014 which was attended by over 250 public transit agency managers. Results of NCTR research were presented at this conference, while potential topics for future research were also discussed among the various marketing, planning, operations, and maintenance networks that attend this workshop.
- **Florida Transit Operator Trainer Training Program** - \$186,900 – The Florida Transit Operator Trainer Training Program was developed by the FDOT Office of Freight, Logistics, and Passenger Operations. The program provides standardized state and federal curriculum training to Florida’s transit operator trainers. The program has grown to include a voluntary statewide transit operator trainer certificate program, as well as an effective and proactive Florida Operations Network. Additionally, the program works closely with the USDOT’s Transportation Safety Institute (TSI) to develop and offer transit training. The Florida Transit Operator Trainer Training Program provided 3 classes with 56 participants for a total of 1216 training hours.
- **Transit Manager Certificate Program** - \$125,147 –The TCMP offers professional development to Florida’s public transportation managers, and provides them with the educational tools and resources necessary to solve today’s public transportation challenges. The program, sponsored and directed by FDOT, is administered by USF’s Center for Urban Transportation Research (CUTR) and offered in cooperation with the University of South Florida’s (USF) Continuing Education’s University College and CUTR. The Program is structured to offer a combination of online courses, self-paced computer based training, traditional classroom courses, and peer to peer exchanges. By being at the forefront of the progressive educational movement and integrating technological advancements, students have easy access to courses that are relevant to today’s public transportation professional. As noted above, this program is funded by FDOT and is used as match to the federal grant. USF’s Transit Manager Certificate Program taught 10 courses that were attended by a total of 219 professionals receiving 2628 hours of training.
- **Florida Statewide Transit Training and Technical Assistance Program** - \$184,268 - The Florida Statewide Transit Training and Technical Assistance Program provides training and technical assistance to Florida’s transit professionals and FDOT District Offices. The purpose of the program is to ensure the highest level of productivity among transit professionals; promote and encourage management and operational efficiencies; promote and ensure safety and security at Florida’s transit properties; and ensure the provision of more cost-effective transit services. Training and technical assistance is made available to Florida’s transit professionals and FDOT District Office staff including those in operations, planning, marketing, and maintenance. The training and technical assistance is provided in a number of topic areas including professional

development, planning, operations, management, marketing, and other topics when deemed necessary by the FDOT Project Manager. The Florida Statewide Transit Training and Technical Assistance Program provided 20 classes with 520 participants for a total of 3854 training hours.

- **Florida Commuter Choice Training Program** – CUTR at USF provides training and instruction annually on Commuter Choice related topics primarily using a combination of live instruction, net conferences, and/or asynchronous distance learning methods (e.g., self-paced online courses). The project also includes course planning, logistics, outreach elements, training materials, and a final report. The scope of work is divided into four distinct tasks, each geared to deliver a high quality-training program. The Commuter Choice Training Program presented 17 training modules during the six month reporting period, providing training on subjects including but not limited to Ride Sharing Options, Bicycle and Pedestrian Issues, Introduction to Commuter Benefits, and Basic Social Marketing for TDM Professionals. Participation in these sessions resulted in the following totals: 574 people participated in the live presentations; 235 others participated in the recorded sessions; there was a total of 891 contact hours of training provided.
- The Florida Transit Safety Network provided 3 classes with 206 participants for a total of 961 training hours.
- The Transit Maintenance Analysis and Resource Center provided 6 classes with 72 participants and 2504 training hours.
- Dr. Pei-Sung Lin of USF, President of the International Chinese Transportation Professionals Association, served as Conference Chair of the 10th Asia Pacific Transportation Development Conference and the 27th ICTPA Annual Conference held in Beijing, China in May 2014.

How have the results been disseminated? If so, in what ways?

PIs for all projects have established peer reviewers who are most likely to be interested in the results and in a position to implement findings. PIs have also been instructed to identify opportunities to share results of research through webinars, conferences, and direct notification to lists of professionals that have been identified in advance of conducting the research. USF's webcasts are free to all participants and can be viewed in real time, or viewed as a recording at the viewer's convenience. An average of approximately 50 people view each webcast on a live basis, with many more watching the webinars on a recorded basis at a time convenient for them. **During this six month reporting period**, consortium members made 17 presentations at professional conferences including the TRB Annual Meeting, the APTA Bus and Paratransit Conference, and the Transportation Research Forum. In addition, three papers based on NCTR research were published by TRB as part of the Annual Meeting.

USF's TDM program has developed a knowledge base (KB) to reduce the inquiry burden on Clearinghouse staff by providing an intelligent self-service option by providing information on hundreds of frequently asked questions as well as case studies and examples. This approach provides a means to reduce the total number of basic inquiries or repeat requests that require personal attention. It also allows staff to respond quickly to inquiries drawing on the information in the KB. The objective is to be more cost-effective and to handle more interactions by providing lower cost transactions with the KB's self-service feature. During this reporting period there were 1,168 searches (up from 939 in previous reporting period) and 14,732 answers viewed (up from 10,991 in previous period).

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

During the next six months another seven of the projects identified and established in the grant will be completed. NCTR will energetically share the results of the research projects with sponsors and with all other parties that can benefit from the findings through every technology transfer avenue available. Webinars featuring results from these projects will be held every two weeks, and opportunities to present findings at professional transportation conferences will also be pursued as normal. Final drafts of all research projects will be peer reviewed. The ongoing training programs will continue in the next six months based on input received from operating agencies requests, while preparations for the GIS in Transit conference to be held in October 2015 will continue. The development of training modules for the national public transit course will be completed. New students for the NCTR Scholars program will be selected and placed with faculty members as graduate research assistants, and they will be given the opportunities to attend TRB and the FPTA Annual conferences. The NCTR website will be updated to include the completed research reports from all four consortium members.

Products

Publications

Two editions of the Journal of Public Transportation were produced during this progress report period featuring a total of 16 papers. A new editor (Joel Volinski) has replaced the retiring editor (Gary Brosch). The new editor will be reconstituting the Editorial Board for the Journal, seeking guidance on the type of articles they believe are best suited for this publication. The decision was made to "go green" by producing the Journal in electronic format only to save money and reduce the carbon footprint associated with the production and transport services associated with delivering the Journal.

Websites

The website for NCTR (www.nctr.usf.edu) has been in place since 1999 and remains very active. It is rated the number one site for “transit research” results on Google, and is number two on Bing and Yahoo search engines. It includes information on the center’s history, key personnel, research activities, links to all reports and webinars, the various programs and clearinghouses hosted by NCTR, all volumes of the Journal of Public Transportation, and a section on career opportunities in transit. It has been updated to include the contact information for the directors of the research centers at NDSU, FIU, and UIC. The links to their websites (<http://www.surtc.org/>; <http://lctr.eng.fiu.edu/>; <http://www.utc.uic.edu/>) have also been included. Those websites also include information on key personnel, active research, downloadable reports, student participation in their programs, and webinars that can be viewed. The NCTR website will continue to be updated to include all projects completed by consortium members and the projects yet to be undertaken through the federal grant and matching funds. A website for the National Transit Safety Research and Assistance Center (<http://transitsafetycenter.org/>) was established during this six month reporting period.

Technologies or Techniques – In addition to the patents that are reported on below, during this six month reporting period two new websites (identified immediately above) were established, a new model for identifying the impact of transit on traffic congestion was completed, and the project entitled “Best Practices in Enhancing Transit in Multimodal Transportation Elements” developed two model elements to address differences in statutory requirements for communities of different sizes and planning context. The first model element includes guidance for large local governments and those within the boundary of a metropolitan planning organization (MPO). The second includes guidance for smaller or more rural communities outside of MPO boundaries.

Inventions, Patent Applications, and/or Licenses – The six month reporting period was particularly notable for patents received by USF made possible by research funded by the UTC grants. The following patents were awarded during the reporting period:

System for Pattern Recognition in Real-time Location-based Services Applications - U.S. Patent # 8,751,162 B2 | Issue Date of U.S. Patent June 10, 2014

A prediction method that estimates the real-time position of a mobile device based on previously observed data is provided. The present invention can be used in real-time navigation, including providing real-time alerts of an upcoming destination and notifications of emergency events in close geographic proximity. The prediction method utilizes neural networks and/or functions generated using genetic algorithms in estimating the mobile device’s real-time position. The prediction method provides reliable Location-Based Services (LBS) in events where traditional positioning technologies become unreliable. It is also seamless, as the user remains unaware of any interruption in accessing the positioning technology.

Architecture and Two-Layered Protocol for Real-Time Location-Aware Applications - U.S. Patent # 8,725,831 B2 | Issue Date of U.S. Patent May 14, 2014

A two-layer communication protocol that supports efficient real-time location-aware application on multiple mobile devices that must communicate with each other and/or a centralized server. The two-layer protocol includes a method of communicating data between a first mobile device and a second mobile device using a server to facilitate the communication of the data. The two-layer communication protocol also includes a method of communicating data between a first mobile device and a second mobile device using a server to facilitate the connection between the two devices. The communication of data occurs directly between the two mobile devices. Each method uses reliable, connection-oriented protocols to exchange application-level information and control signals while utilizing unreliable, connection-less protocols to communicate real-time location data. Also provided are architectures implementing these methods.

Adaptive Location Data Buffering for Location-Aware Applications - U.S. Patent # 8,718,671 | Issue Date of U.S. Patent May 6, 2014

This patent covers technology used in mobile tracking apps which supports the use of an unreliable protocol (e.g., UDP) to transmit location data from a mobile device to a server in real-time, while occasionally checking if a connection with the server exists using a reliable protocol (e.g., TCP). If a reliable connection fails, location data is buffered on the device until the next successful reliable connection. This allows energy and data-efficient communication of real-time tracking information, while still providing some measure of reliability.

Other Products – Nothing to report

Participants and Collaborating Organizations

What organizations have been involved as partners?

The National Center for Transit Research (NCTR) is a consortium of four universities as follows:

- University of South Florida located in Tampa, Florida, featuring the National Center for Transit Research (NCTR), a Tier I UTC that is part of the Center for Urban Transportation Research, contributing to the program financial support and collaborative research.
- North Dakota State University located in Fargo, North Dakota, featuring the Small Urban & Rural Transit Center (SURTC), a Title III UTC, contributing to the program financial support and collaborative research.
- University of Illinois at Chicago located in Chicago, Illinois, featuring the Urban Transportation Center (UTC) in the College of Urban Planning and Public Affairs, contributing to the program collaborative research.
- Florida International University located in Miami, Florida, featuring the Lehman Center for Transportation Research (LCTR), contributing to the program collaborative research.

As described earlier in this report, the four universities are collaborating on four different projects, lending their expertise toward completing research reports. Collaboration with other parties has been quite extensive as noted below:

1. **The Federal Transit Administration** – The FTA has been a fully engaged partner not only in its role as the source of federal funds for the program for the two transit-focused UTCs, but as a source of ideas for research projects to be undertaken. FTA established an internal process to solicit, screen, and submit research ideas to the two transit-focused UTCs to be funded through both the first and second year of the federal grant. FTA submitted eight project proposals. Four of them are being completed by USF’s consortium and three were undertaken by the San Jose State consortium. FTA staff have agreed to serve as peer reviewers of the projects.
2. **The Florida Department of Transportation** – FDOT has been a vital partner in the development, selection, and funding of the research that will be conducted by USF and FIU researchers under this grant. FDOT is providing cash match to USF’s and FIU’s portion of the grant. It is also providing project managers for each project to manage and oversee the completion of each project done by USF and FIU. Similar arrangements have been made with the Illinois and North Dakota Departments of Transportation. **IDOT** is providing a full cash match to UIC’s portion of the grant, while **NDDOT** is providing approximately one-third cash match.
3. **The Florida Public Transportation Association** – FPTA, in conjunction with FDOT, is collaborating on a number of training projects through the engagement of various public transit networks (e.g., Transit Operations Network, Planning Network, Maintenance Network) to serve as advisors and peer reviewers of research projects. Several Florida transit agencies are also providing vital information for some of the research projects and the time and effort they have devoted has been indispensable to the success of the projects.
4. **The Washington State Department of Transportation** has provided full cash match funding for the project entitled “Incorporating Managing Demand into Washington State DOT Planning and Programming.”
5. **The Florida Commission for the Transportation Disadvantaged** served as the project managers and reviewers of the project entitled “Impacts of Dialysis Transportation on Florida’s Coordinated Public Transportation Programs” and provided final approval of the report in the last six months.
6. Consortium members have worked closely with the **American Public Transportation Association** on the Higher Education Subcommittee of the Human Resources Committee; with the Research and Development Committee on making a closer connection between UTC transit research results and APTA members; with the Alternative Fuels Committee in providing information for NCTR’s Advanced Transit Energy Portal; and with the Bus Safety Committee. A draft Memorandum of Agreement between CUTC and APTA is scheduled to be discussed at the APTA Annual Meeting in October.

7. USF has collaborated with the **Texas Transportation Institute** in developing a new methodology to determine the impact of transit services on roadway congestion for its Annual Congestion Study
8. **The Community Transportation Association of America** assisted NDSU in identifying small urban and rural transit agencies to survey, and provided comments on the Rural Transit Factbook.
9. Provided information on bicycle commute benefit for **Commuter Services of Southwest Florida**
10. Updated the Commuter Benefits brief for 2014 and place on **Commuterservices** and Best Workplaces for Commuters' websites. <http://www.bestworkplaces.org/resource-center/free-ebook-commuter-benefits/>
11. Participated in conference calls and reviewed draft documents provided by the **Association for Commuter Transportation's** Public Policy, Vanpool and Sustainable Transport councils
12. Planning netconference on LEED and TDM for spring with the Association for Commuter Transportation's Sustainable Development Council and **the TDM Institute**
13. Reviewed and commented on **FDOT District 7's** proposed regional transit project selection process
14. Collected information on the cost of maintaining a parking space for **South Florida Commuter Services**
15. Identified cities or counties that have outstanding TDM programs for **Broward County** (at South Florida Commuter Services' request)
16. Participated in conference calls for the Association for Commuter Transportation's **Public Policy committee and Sustainable Development Council.**
17. Finalized and released TMA Survey in collaboration with **Association for Commuter Transportation's TMA Council**
18. Attended Best Workplaces for Commuters' employer recognition events for reThink (**FDOT District 5**) and Commuter Services of Southwest Florida (D1)
19. Provided summary of the development and funding of the **Transportation Management Organization Coordinating Group for FDOT District 7.**

Many organizations have lent their considerable experience and expertise to NCTR by agreeing to have representatives serve on the NCTR Advisory Board. Those that have not already been mentioned are in bold. Included among them are:

Michael Melaniphy, President – American Public Transportation Association

Dr. Mary Leary, Senior Director – **Easter Seals Project Action**

Kim Adair, Public Transportation Office – North Dakota Department of Transportation

David Spacek, Public Transportation Office – North Dakota Department of Transportation

Tim Garling, Director, **Broward County Mass Transit Division** – President, Florida Public Transportation Association

Ed Coven, Manager, Public Transportation Office, Florida Department of Transportation

Darryll Dockstader, Manager, Research Office, Florida Department of Transportation

Bill McCloud, Senior Vice President, **Veolia Transportation**

Donna Vlasak, Senior Program Officer, **The National Academies, TRB**

Jon Martz, Vice President, **Van Pool Services, Inc.**

Joe Calabrese, GM/CEO, **Greater Cleveland Regional Transit Authority**

Michael Baltus, Director – Office of Technology, Federal Transit Administration

Dr. Minnie Fells Johnson, Chair, **Project for Public Spaces**

Perry Maull, Director – **Indiana University Bus Services**

Have other collaborators or contacts been involved?

Most of the significant collaboration has been described in previous sections. It should be noted again that consortium members are collaborating on four projects listed in the federal projects to be undertaken after discussions were held with the **Mineta Transportation Institute**. NCTR is conducting two case studies on a federally funded project headed by MTI that identifies ways to improve access to transit stops for people with disabilities. USF also sought guidance from Dr. Graham Currie of Monash University in Australia who has extensive background in researching public private partnerships and contracting for transit services.

NCTR's The Best Workplaces for Commuters' **Race to Excellence** awards ceremony was held in January. The Race to Excellence is an annual challenge that encourages, recognizes, and highlights dedicated TDM professionals across the country who promote commuter benefits, transportation options, and the Best Workplaces for Commuters (BWC) designation in their workplaces and throughout their local communities. The organizations who successfully complete the Race take exemplary steps to offer their employees viable alternatives to driving alone, thereby reducing air pollution, traffic congestion, and fuel consumption. The BWC program has over 300 participants among public and private employers throughout the country including some of the largest and most prominent employers in the United States.

Impact

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

As noted earlier, FDOT accepted the report entitled "**Improved Traffic Control Measures to Prevent Incorrect Turns at Highway-Rail Grade Crossings.**" With the information collected through this study, FDOT has awarded another contract to USF to continue work on this subject through the deployment and testing of the remedies that were identified in the initial study in as many as six locations throughout the state.

The project entitled "**Investigation, Quantification, and Recommendations - Performance of Alternatively-fueled Buses**" was completed and the Advanced Transit Energy Portal continued to provide information on the pros and cons of alternative fuels. During this time frame, two transit agencies in Florida, aided to some extent by the information developed by NCTR, decided to switch to compressed natural gas, while two other agencies will now order paratransit vehicles that run on propane.

The most important outcome/potential outcomes of the report entitled "**Bus Operator Safety Critical Issues Examination and Model Practices**" are those activities underway and planned to modify Florida state law and individual transit agency policies and procedures related to training (which includes assault prevention) and criminal history background checks. Activities include:

- Florida Operators Network (FON) and the Florida Transit Safety Network (FTSN) have established "Minimum Fixed-Route Bus Operator Training Guidelines" that have been distributed statewide - this research study contributed to the completion of this process, recognizing the importance of transit operator training in the reduction of incidents
- FON and FTSN will be establishing "Minimum Fixed-Route Bus Operator Annual Refresher Training Guidelines" (which will include assault avoidance/defusing volatile situations module). This will be discussed at network meetings occurring in September and a committee will be assigned to develop the guidelines

- FDOT will begin rule change processes in the immediate future. Potential modifications to Chapter 14-90, Florida Administrative Code, governing “Equipment and Operation Standards for Bus Transit Systems” will likely include minimum training standards and the requirement of Florida’s transit agencies to perform Level 1 Criminal History Background Checks for new bus operator hires and could also include rechecks on a specific rotation (every 2 years as an example).

What is the impact on other disciplines?

FDOT has funded a series of training workshops on the results of the research associated with the project entitled “Multimodal Transportation Best Practices and Model Elements.” Through the workshops, the FDOT project manager and NCTR are soliciting feedback from participants on use of the report and also will be identifying potential locations for pilot application of the model elements. A goal of the pilot applications will be to provide additional guidance and further refine the research results. Each workshop participant is being asked to follow up with USF as to how they have used the research.

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

SURTC developed a module training “FTA 101” with American Association of State Highway and Transportation Officials (AASHTO). This module is designed to help DOT and new transit managers understand the basics of the Federal Transit Administration (FAR0022506). This training was attended by 20 professionals in San Jose, California.

The results of the various training programs conducted by USF and NDSU were documented in the section entitled “**What opportunities for training and professional development has the program provided?**”

The Transit Management Certificate Program graduated its first class (13 members) in May, 2014 and advanced the careers of the following participants: (1) One enrolled as the Superintendent of Paratransit Operations, and is now the Executive Director of the agency (2) One enrolled as a maintenance superintendent, and is now the Maintenance Director of a larger agency and (3) One enrolled as a grants analyst, and is now a FDOT Area Office Director.

The Florida Transit Operator Trainer Training Program program has grown from three (3) transit properties participating to 41 transit agencies represented in the program. In 2000, there were five (5) trainers participating. By June 30, 2014 there are 123 active participants working towards their Florida Transit Operator Trainer Training certificate. Since 2000, the program has graduated 105 participants (including 25 who were awarded their certificates at the Professional Development Workshop in June 2014). Three graduates of the program are now Transportation Safety Institute Associate Staff members. Another participant was promoted from Operations Supervisor to Assistant General Manager.

In summary, 62 classes were provided to 3,052 participants who received 13,224 contact hours of training through the programs that match the federal grant during the six month reporting period.

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

All of the consortium partners represent well established universities with long standing research programs. The grant has not resulted in any significant capital improvements, but it has provided the funds to permit research faculty to manage things such as listservs and webinar series that provide a wealth of information to the thousands that participate at no cost to the participants.

What is the impact on technology transfer?

NCTR has been a leader in providing webinars that are free and can be watched on a live or recorded basis. This helps to minimize expense to those who participate since they can do so from their offices or other remote locations. Over 1300 people have watched the webinars during the six month reporting period. NCTR has also been a leader in the management of listservs that allow flexible and frequent communication among transportation professionals on a variety of subjects. Some decisions cannot wait many months or years for research to be completed, but the listservs allow participants to share information and provide mutual assistance by providing all participants with the best information available.

The TDM Listserv now has 2,320 members after another 181 people joined during the six month reporting period. NCTR manages these listservs with the intent of transferring information within this large transportation community. During the six month reporting period, 600,000 messages were successfully transmitted.

The TDM Listserv managed by USF was noted as one of the top 10 transportation resources in the United States by Paul Steinberg website "The BizDev Highway" (<http://paulasteinberg.com/top-transportation-resources/>).

The Urban Transportation Monitor issue of March 2014 reported that there was a survey conducted among traffic engineers, transportation planners, and transit professionals on the essential transportation publications that every transportation professional should have on his/her bookshelf and the **Journal of Public Transportation, National Center for Transit Research, University of South Florida** was one of them sited for good research, wide range of coverage, and open access.

What is the impact on society beyond science and technology?

The research conducted through NCTR is typically geared toward policy and planning matters. The model elements produced by the Multimodal Transportation Best Practices report will ultimately lead to adoption of policies that will encourage more options for mobility and more livable communities.

The Best Workplaces for Commuters program encourages more employers to gain recognition by offering commute alternatives to their employees thereby reducing traffic congestion and air pollution, improving health through more walking and biking, and allowing employees to do something more beneficial with their income than to fill up gas tanks. Over 300 employers throughout the country have earned the designation as a Best Workplace for Commuters.

Implementing the findings of the research project that analyzed bus rear-end accidents will help to prevent injuries and possibly save lives.

Changes/Problems

One member of the NCTR Advisory Board (Dr. Mary Leary) resigned from the Board since she was joining FTA in Washington, which already has a representative on the Board. She has made recommendations on possible replacements. Kim Adair has also left the Board and NDSU is identifying another NDDOT staff member to replace her.

Changes in approach and reasons for change

Dr. Eric Welch of UIC has left UIC and joined the faculty at Arizona State University. He will continue to be the PI for the project titled "Adapting Transit to Climate Change Impacts" which is two-thirds finished, with assistance from Dr. Sriraj of UIC.

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

There are no anticipated problems due to delays. All subcontracts are well in place among consortium members and all funds are dedicated toward projects that have already been identified and scoped.

Changes that have a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects, vertebrate animals, and/or biohazards

Nothing to report.

Change of primary performance site location from the originally proposed

Nothing to report other than the move of Dr. Eric Welch from UIC to Arizona State University.

Additional information regarding Products and Impacts

Outputs

Nothing more to report

Outcomes

Nothing more to report.

Impacts

Nothing more to report.

Special Reporting Requirements

Nothing to report.