



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**

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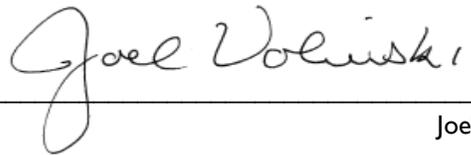
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Signature of Submitting Official: _____



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, the NCTR Advisory Board, and transit professionals from throughout Florida and the nation. Research will be subjected 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 sixth six month reporting period (January 1, 2015 – June 30, 2015) 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. Please see description of projects completed during this reporting period starting at page 11. Provided first is a list of projects that have been completed prior to this reporting period that have either been completed or are in various stages of completion.

2013 Rural Transit Fact Book – NDSU - The rural transit fact book includes information on demographic and travel behavior data as well as financial and operating statistics for agencies receiving FTA Section 5311 funding. A final report was completed July 2013.

Improving Veteran Mobility in Small Urban & Rural Areas – NDSU- The objective of this research was 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 in February 2014.

Cost-Benefit Analysis of Rural and Small Urban Transit – NDSU – This report showed a positive relationship between investment in transit and community benefits and was completed July 2014.

Evaluating the State of Mobility Management and Human Service Transportation Coordination – NDSU
In collaboration with USF and UIC (based on FTA proposal), the project was completed in October 2014.

Workforce Development and Succession Planning to Prepare the Rural Transit Industry for the Future
The objective of this study is to address the perceived recruitment, staff development, and succession problems in the rural public paratransit industry. To date, the survey deployment and data collection

have been completed, the analysis and preliminary summaries are in process. The project is 75% complete and will be finished by June 30, 2016.

Intercity Transit Services Demand in North Dakota

The intent of this study is to develop a model for estimating demand for intercity bus services in rural and small urban areas. To do so, a stated preference survey was conducted in North Dakota and a mode choice model was developed. The lit review, data collection, and modeling are complete, and a draft of the results have been written. This project is 95% complete and will be finished by June 30, 2016.

Estimating Ridership of Demand-Response Transit Services

The objective of this study is to develop a model for estimating ridership for rural, general public demand-response transit. The lit review and data collection are complete. Two models have been developed and estimated. The final report has been partially written. The project is 80% complete and will be finished by June 30, 2016.

Rural Intercity Bus Demand: Phase II

This study incorporates a previously estimated mode choice model into a North Dakota statewide travel demand model to identify corridors in the state with the greatest demand for intercity bus service and to estimate the effects of service changes and external factors on intercity bus demand. The study also examines the impacts of traveler attitudes on mode choice. Data collection has been completed and GIS models have been developed. Initial mode shares have been estimated. Scenario analyses need to be conducted and results written. The project is 50% complete and will be finished by June 30, 2016.

Low-cost Ride-Quality Characterizations for Transit

The “Low-cost Ride-Quality Characterizations for Transit “ research project uses a smartphone-based technology and passenger surveys to assess ride quality for transit riders on select roadway segments in the West Fargo and Fargo downtown areas. The researchers are collaborating with MATBUS (the local public transportation agency) to facilitate the data collection and surveys. As of March 10, 2016 the researchers collected all of the ride quality and survey data from two bus routes that include four roadway segments of distinctly different condition. The PI is currently processing the data using software that he has developed. 20% of the data processing is complete. The final report is expected to be completed in August 31, 2016.

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. Completion is expected in March of 2016.

Texas Transportation Institute Annual Congestion Study: Measuring Transit’s Impact – USF - The methodology report and analysis developed by USF were completed in the previous reporting period and that document is published.

Incorporating Managing Demand into Washington State DOT Planning and Programming – USF – Please see page 11 of this report.

National Transit Safety Research and Assistance Center – USF – Funding for the creation of this center was initially provided through the Transit Focused UTC grant, but all activities during this reporting period were supported by the subsequent UTC Livability grant awarded to USF. The considerable progress made with this project is reported in the PPPR for the UTC Livability grant.

Advanced Transit Energy Portal (ATEP) – USF – Funding for the creation of this clearinghouse was initially provided through the Transit Focused UTC grant, but all activities during this reporting period were supported by the subsequent UTC Livability grant awarded to USF. The considerable progress made with this project is reported in the PPPR for the UTC Livability grant.

National Transportation Demand Management and Telework Clearinghouse – USF – Funding for the creation of this clearinghouse was initially provided through the Transit Focused UTC grant, but all activities during this reporting period were supported by the subsequent UTC Livability grant awarded to USF. The considerable progress made with this project is reported in the PPPR for the UTC Livability grant.

GIS in Transit Clearinghouse - USF – Funding for the creation of this clearinghouse was initially provided through the Transit Focused UTC grant, but all activities during this reporting period were supported by the subsequent UTC Livability grant awarded to USF. The considerable progress made with this project is reported in the PPPR for the UTC Livability grant.

Development of Training Manuals for Transit Planning and Scheduling – FIU – The final draft of this report is being reviewed and edited. The manual consists of two sections: Transit Planning and Transit Scheduling. It covers material for performing essential transit tasks. The intent of the manual is to be used by new transit staff as well as seasoned professionals who want to review key concepts.

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 main objective of this work is to conduct research on the use of AVL data for improving transit service reliability. A final draft is being reviewed and edited.

State of Good Repair Performance Measures: Assessing Asset Condition, Age, and Performance Data – FIU - 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. 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 existing data and asset rehabilitation/replacement alternatives. Work is 75% complete.

Transit Value Capture Coordination: Case Studies, Best Practices, and Recommendations – UIC – see page 12 of this report.

Adapting Transit to Climate Change Impacts – UIC as the lead with assistance from USF (based on FTA proposal) - The final regression model was completed to analyze the association between the extreme weather and the number of CTA ridership. The project team is working with transit agencies in Boston, Utah, and Florida as case studies. The project will be completed in August 2016 .

An Online Tool for Computing and Presenting Regional Accessibility Measures (UIC) - This research led to development of an online tool that allows users to gauge accessibility to Chicago neighborhoods, suburbs, or other parts of the metropolitan area using different modes of transportation. The tool measures accessibility by summing up the number of opportunities that can be reached from each location by different modes. A report was produced entitled: "Mapping Metropolitan Chicago's Accessibility." The product was the Metropolitan Chicago Accessibility Explorer – accessed at <http://urbanaccessibility.com>. It is a map-based web-tool covering metropolitan Chicago. A news story was sent out to a wide range of local and national media, and the news story was published on the UTC web site. The research also was sent to Chicago area planning and transportation organizations.

Optimal Rail Service Planning in a Passenger-Freight Shared Corridor (UIC) - This research resulted in a paper that led to development of a two-level hyper graph model to address optimal use of shared passenger and freight rail corridors. The paper is entitled: "Integrated Modeling of High Performance Passenger and Freight Train Operation Planning on Shared Use Rail Corridors: A Focus on the US Context." One unique feature of the study is its explicit consideration and modeling of passenger schedule delay based upon passenger preferred departure time profiles over the course of a day. Researchers used a hypergraph to address an important omission of train path conflicts due to track resource use during transitions. A key finding of the research: Operating more passenger trains on a shared rail corridor with freight trains can result in fewer delays for travelers, but may lead to higher costs for freight railroads. A news story was sent out to a wide range of local and national media, and the news story was published on UIC's UTC web site. The research also was sent to railroad and transportation organizations. A feature article was published in Mass Transit Magazine. PI Bo Zou presented in a webcast in December hosted by the Center for Urban Transportation Research.

Examining Pedestrian Behavior at Railroad Crossings (UIC) – PIs continued the analysis of data from interviews with users recorded at selected grade crossings and continued reviewing the latest literature. The interviews have created data on users at selected grade crossings.

CPS Travel Training Evaluation Project (UIC)

Public transportation and public educational programs are mandated to provide transportation services for mentally and physically disabled individuals. While programs to transport members of disabled populations are important to ensure access and participation in important educational and work related activities, they are often highly expensive to operate. Travel training programs (TTP), particularly those offered by public school systems, are in their infancy. Chicago Public School's (CPS) TTP is one of the oldest in existence. While there is ad hoc evidence that these programs are beneficial in many respects, to date there has been little effort to formally assess the costs and benefits of these programs. Given this lack of evidence and within a constant context of fiscal constraint, travel training programs are consistently vulnerable to closure. In response, this project will undertake systematic effort to assess the benefits and costs of the CPS TTP.

Many other projects have either been completed or are being completed using matching funds from the Departments of Transportation of the consortium members. Virtually all research projects are scheduled to be completed by June 2016, 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. The clearinghouse activities are now being funded through the USF UTC Livability grant and are therefore described in the PPPR prepared for that grant:

1. **Florida Transportation Demand Management Clearinghouse**
2. **Improving the Cost Effectiveness of Financial Incentives in Managing TDM** – This project was completed in October 2013. Researchers focused on the evaluation of the feasibility of reducing individual VMT rather than changing mode as a means of achieving the outcomes of reduced congestion and emissions. Two different incentive schemes in the pilot test produced valuable insights to expand the approach to statewide TDM programs.
3. **Analysis of Transit Contracting Models and Proper Incentives for Long-term Success** - This research project was completed and accepted by FDOT in November 2013 and placed on the NCTR website.
4. **Improved Traffic Control Measures to Prevent Incorrect Turns at Highway-Rail Grade Crossings** This project was completed in December 2013 and placed on the NCTR website. FDOT accepted the recommendations from the study and intends to apply them at sites throughout the state.
5. **Impacts of Dialysis Transportation on Florida's Coordinated Public Transportation Programs** - FDOT accepted the final report in April 2014 and was posted to the website.
6. **Bus Operator Safety Critical Issues Examination and Model Practices** - This project was completed and enthusiastically accepted by FDOT in January 2014. FDOT has funded continuing transit safety research and training as a result of this report.
7. **Evaluation of Rear-end Bus Collisions and Identifying Possible Solutions and Assessing the Effectiveness of Bus Pull-out Bays in Reducing Collisions** – This project was completed in March 2014. FDOT has funded USF to do further analysis.
8. **Best Practices in Enhancing Transit in Multimodal Transportation Elements** – This report was completed and accepted by the Florida Department of Transportation in June 2014. This report provides guidance in developing a multimodal transportation element of a local government comprehensive plan. 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.
9. **Investigation, Quantification, and Recommendations - Performance of Alternately-fueled Buses** – This project was completed in August 2014. Information from this report continues to inform the clearinghouse activities that are funded through the federal side of the grant.
10. **Florida Transit Safety Network** – This program, which provides thousands of hours of safety training each year, is now funded through the Livability grant and described in that PPPR.
11. **Impact of Transportation Demand Management (TDM) Elements on Managed Lanes Toll Prices** - The purpose of this research was to quantify the extent to which transit and ridesharing reduce traffic density and lower tolls on the I-95 Express Lanes. This research benefits the state

because dynamically priced managed lanes feature prominently in the state's future transportation plans, particularly in South Florida. The final report was produced just prior to this reporting period and placed on the NCTR website. The authors presented their paper at the 2015 TRB Annual Meeting and it was published in TRR.

12. **Smart Parking Guidance System Demonstration** - This project was funded in part by the USF Student Green Energy Fund (SGEF). The SGEF Council voted to redirect the efforts of the project to the development of a mobile app that Sean Barbeau and his students have worked on to provide real time information about bike sharing and the location of campus bicycle amenities, HART and Bull Runner real time location, car sharing, and other information. It will be completed in the next reporting period.
13. **Technology Application Among Florida Community Transportation Providers** – See page 13.
14. **Improving Access to Transit through Crowd Sourced Information** - The purpose of this research is to facilitate the ongoing collection of information about potential areas of multimodal service and infrastructure improvements from the public that can be easily shared with transit agencies, departments of transportation, and city and county governments. This research will enable the capture of various types of data from actual users of public transportation via a real-time transit information system. Using this data, transit agencies, departments of transportation, and city and county government will be able to better target improvements to bike and pedestrian infrastructure for access to transit based on actual transit use and issues reported by the general public. The project will be completed by September 2016.

FIU is engaged in the following research 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 was 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. 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. The Work Plan Development for Phase I for the Informed Traveler Program and Applications task was completed in late 2014.
2. **Analysis of Movable Bus Stop Boarding and Alighting Areas – FIU** - This project explored the feasibility of creating movable bus stop boarding and alighting areas for Florida transit agencies. This report was completed in May 2013.
3. **Guidelines for Bus Transit Stops in Highway Construction Zones – FIU** - The objective of this study was to develop guidelines/recommendations 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 and as a design and construction guide for Maintenance of Traffic (MOT) coordination for transit agencies, highway design engineers, and construction managers. The project was completed in December 2014.

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** – The objective of this project was to determine the feasibility of placing shared vehicles at or near Amtrak stations and municipal buildings in four Illinois communities to determine potential demand. The project is designed to develop a “last mile” solution to improve access to businesses, universities and centers of commerce. This project was completed in 2014.
2. **Study of Integrated Corridor Management/Mobility Case Studies in Greater Chicago Area** - This project combines two separate research studies. A literature review was completed in June 2015. A survey is being planned of regional stakeholders; this element of the research is currently being reviewed by the University of Illinois Institutional Research Board. Research is still in progress and is expected to be completed by March 2016. This study will attempt to increase interconnectivity between various transit modes to attract more new riders off existing roads, reduce travel times for existing riders, and create more travel opportunities for all commuters and travelers.
3. **Modeling of Transit Mode Choice in Greater Chicago** -The research was completed in June 2015. Among the key findings: The completed research was used to develop a mode of choice model for metropolitan Chicago. The model covered auto, transit and non-motorized modes of travel and employed data from the CMAP Travel Tracker Survey.
4. **Ranking Northeast Illinois New Starts Transit Potential Expansion Projects for Metra and CTA** - UIC will develop a method for the ranking of proposed rail transit expansion projects in Northeastern Illinois. A literature review was completed for some U.S. states; more work is underway. The partial literature review was completed in June 2015. Research is still in progress and is expected to be completed in the second quarter of 2016. The study will provide planners with a method for ranking of proposed rail transit expansion projects in Northeastern Illinois.
5. **Nature Express** – This project will identify transit strategies to connect low-income individuals, disadvantaged families and people of color to Cook County Forest Preserves in a meaningful way. PIs have finished a draft report for the project. Preliminary findings have been shared with the Forest Preserves of Cook County to help with the Long Range Plan development for Cook County. The findings of this project are likely to provide the basis for gauging accessibility issues for disadvantaged population groups living in Cook County to Forest Preserves in the County.
6. **Shareholder Decision Support** - This research will expand upon an existing planning tool in the following ways: Updating it with recent data, expanding to make it relevant for business location decisions, and expanding for use by suburban planning bodies.
7. **Transportation Needs Assessment** - A report, "Planning Transportation to Meet the Needs of an Aging Illinois: An Assessment," was completed in the first quarter of 2015. Three main conclusions were reached by the project team: 1. Housing types geared to aging adults - Municipalities statewide should consider changes to zoning laws to allow for development of multifamily housing and residential construction on more compact lot sizes to accommodate

older adults planning to downsize and move to smaller homes. 2. Older adults will be able to stay in their homes longer and have greater access to services if homes can be modified for those with disabilities or limited mobility. New construction should include homes that offer greater accessibility. 3. The research showed that rural communities across Illinois have a greater concentration of older adults in proportion to the overall population.

8. **CPS Travel Training** - Researchers are studying how to encourage physically challenged Chicago public school children to use existing forms of public transportation on fixed rapid transit and bus routes over paratransit options. In December of 2015, the team received a data set of physically challenged students from the Chicago Public Schools and began analysis. A final report will be produced by July 2016.

North Dakota State University has worked on the following match projects:

- **Regional Transit Coordination Pilot Project** - This NDDOT SPR Project providing match looks at coordination/mobility managers and better coordinating regions – two specific regions in North Dakota served as the pilots. The project was completed in December 2014.
- **Identifying and Satisfying the Mobility Needs of North Dakota’s Transit System** - The objective of this study was to determine the financial needs of the state transit providers. Target levels of transit service were identified, and the funding needed to reach those targets, including funds to cover increased operating expenses and vehicle purchases, was estimated. Findings show a need for expansion of services across the state, especially in areas experiencing population growth, improvements in staffing, and additional vehicles. The final report was produced in April, 2015.

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

NCTR continued providing a massive amount of training during the six month period in the areas of transit, leadership, and commuter assistance programs as listed below:

- Dr. Jill Hough of NDSU is preparing to teach 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 2016.
- NDSU faculty made 4 different presentations at 3 different venues throughout the country as well as one webinar. A total of 208 professionals attended these presentations for a total of 606 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. Matthew Kessler continues his course work while three new

scholars began their program (Ibrahim Hinds, Katrina Corcoran, and Austin Dibble) in this reporting period.

- USF hosted 5 **free webcasts** in its bi-weekly series in subject areas related to the transit-focused NCTR theme. An average of approximately 50 people viewed each webcast live, while the recorded versions are generally viewed by even more people as their schedules allow.
- **Florida Transit Operator Trainer Training Program** – The accomplishments of this program, which includes hundreds of hours of training and was started through the Transit Focused grant, are now reported through the Livability grant which has continued funding this program.
- **Transit Manager Certificate Program** - The accomplishments of this program, which includes thousands of hours of training, and was started through the Transit Focused grant, are now reported through the Livability grant which has continued funding of this program.
- **Florida Statewide Transit Training and Technical Assistance Program** - The accomplishments of this program which were formerly reported through the Transit Focused grant are now reported through the Livability grant PPPR.
- **Development of Public Transit II Course – NDSU** - A new course, Public Transit II, has been developed and will be offered in spring 2016 as part of NDSU's Transportation and Logistics program. The objective of this project is to develop a new course, Public Transit II, that will be offered as part of NDSU's Transportation and Logistics program. The class will expand upon TL 786, the public transportation class currently offered at NDSU, focusing on concepts and modeling procedures used when planning and operating public transportation systems.

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). This project is now reported as part of the activities funded through the NCTR Livability grant.

SURTC of North Dakota State University has provided many thousands of hours of training through the Transit Focused grant in previous reporting periods, but now provides that training as part of the Western Transportation Institute Tier I UTC.

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 31 presentations at state and national professional conferences including the Community Transportation Association of America (CTAA), the American Public Transportation

Association, the Florida Public Transportation Association, the American Public Health Association, and webinars.

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 over 1,000 searches. The number of answers viewed continues to grow significantly.

SURTC maintained an education and outreach display booth at the 2015 APTA Annual Conference in Houston, TX, in October 2015. SURTC distributed summaries of recent research and displayed information about available training opportunities.

SURTC continues to maintain and use its weblog that was launched September 2009. The blog keeps readers up-to-date on SURTC's research, training, and outreach efforts as well as news and information on developments in small urban and rural transit.

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

- During the next six months virtually all of the research projects that have been approved as part of the grant will be completed. The end date of the grant is September 30, 2016.
- 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, though they are now recorded as part of the Livability Grant.
- The development of training modules for the national public transit course will be fine-tuned and scheduled to be taught by NDSU in the spring of 2016.
- Two 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.
- A new editorial board will be constituted for the Journal of Public Transportation to bring additional energy and input and provide guidance to NCTR. Efforts will also be made to modify the composition of the NCTR Advisory Board due to retirements.

Products

Publications

Two editions of the Journal of Public Transportation (Volume 18, issues #1 and #2) were produced during this progress report period featuring a total of 16 papers. The Journal is now produced in electronic format only, saving the project approximately \$30,000 per year which has been reprogrammed into additional reviews and other projects under NCTR. The Editor continued to contact potential new members for the Journal's Editorial Board to determine their interest in serving, though the Board was not yet reconstituted. The Journal is now receiving over 20 papers a month from all over the world for consideration for publishing (approximately 38 papers are published annually). The list of professional reviewers now numbers over 160. During the reporting period, 412 articles were downloaded a collective 20,570 times from the Journal. To give an idea of the breadth of issues addressed in the Journal, the top dozen papers downloaded during the reporting period were:

1. A Worldwide State-of-the-Art Analysis for Bus Rapid Transit: Looking for the Success Formula
2. Bike-sharing: History, Impacts, Models of Provision, and Future
3. Citizens or Customers? Transit Agency Approaches to Community Engagement
4. Use of Statistical Process Control in Bus Fleet Maintenance at SEPTA
5. What Do Passengers Do During Travel Time? Structured Observations on Buses and Trains
6. Using GIS to Identify Pedestrian-Vehicle Crash Hot Spots and Unsafe Bus Stops
7. Effects of Light-Rail Transit on Traffic in a Travel Corridor
8. A Scientometric Analysis of Public Transport Research
9. Bus Passenger Origin-Destination Estimation and Related Analyses Using Automated Data Collection Systems
10. Measuring Passenger Loyalty to Public Transport Modes
11. Factors Influencing Young Peoples' Perceptions of Personal Safety on Public Transport
12. An Analysis of Commuter Rail Real-Time Information in Boston

The following reports were published by members of the NCTR Consortium in the six month reporting period:

Developing a Method for Assessing National Transit Demand Response Level of Service – NDSU

The primary objective of the study is to develop a method for assessing national demand response level of service. The project was completed in September 2015.

Incorporating Managing Demand into Washington State DOT Planning and Programming – USF –

The objective of this research has been to develop guidelines for WSDOT functional areas to identify and select potential transportation demand management (TDM) strategies in the areas of statewide planning, multimodal planning, construction mitigation, and corridor planning. Strategic deployment and support for ridesharing, transit, bicycling, walking, flexible work arrangements parking management and other TDM strategies enables WSDOT to advance their Moving Washington approach of optimizing operational efficiencies before investing in higher cost capacity improvements. Final recommendations for WSDOT functional areas were provided to the WSDOT advisory panel, in addition to the report, "Transportation Demand Management Guidance for Corridor Planning Studies," to be used by WSDOT regional offices. Recommendations also were developed to expand upon TDM strategy identification in

WSDOT's corridor sketch planning process, a new approach developed by WSDOT to develop early corridor improvement concepts.

Transit Value Capture Coordination: Case Studies, Best Practices, and Recommendations – UIC – This study was based on the hypothesis that coordination between transit capital planners, municipal taxation authorities, and private developers and stakeholders can be a benefit to transit capital projects that choose to use value capture as a funding mechanism. Value capture is the means by which the increase in property or other values is tied to investments in infrastructure and other amenities and, through taxation or other agreements beneficiaries of the increase in property value help fund the improvements. The project was completed in July 2015.

Technology Application Among Florida Community Transportation Providers – The objective of this project was to gather and disseminate best practices in the application of technology in the paratransit field. A survey of all Florida transit systems and all CTCs was conducted. A final report was accepted by the Florida Department of Transportation in October 2015, and a poster presentation was approved for the 2016 TRB Annual Meeting.

Green Transportation Programs in the Healthcare Sector: Best Practices and Potential Opportunities (UIC) - The researchers identified three key recommendations: 1) Hospitals need to cultivate awareness for the availability of alternative transportation programs and engage support from workers. 2) Financial considerations are an important factor in employee mode choice; offering a cash “incentive” to employees who do not drive alone or replacing monthly parking fees with daily charges can drive participation in using public transit or carpooling. 3) Consistency and convenience are important considerations in mode choice, especially for women on the evening shift; hospitals need to provide alternatives, such as better information, subsidies for parking in commuter stations and emergency rides if needed. A report, "Exploring Commuting-Related Environmental Impacts in the Healthcare Sector," was finalized in July 2015.

Development of an Analytical Framework to Rank Pedestrian and Cyclist Projects – UIC - The research resulted in a ranking process and method to measure proposed pedestrian and cyclist projects in order to increase their effectiveness within the Chicago community and make the best use of available funds. A report was completed in October 2015.

Development of an Analytical Framework to Rank Pedestrian and Cyclist Projects - The research resulted in a ranking process and method to measure proposed pedestrian and cyclist projects in order to increase their effectiveness within the community and make the best use of available funds. A final report was produced in October 2015.

Optimal Rail Service Planning in a Passenger-Freight Shared Corridor (UIC) - This research resulted in a paper that led to development of a two-level hyper graph model to address optimal use of shared passenger and freight rail corridors. The paper is entitled: “Integrated Modeling of High Performance Passenger and Freight Train Operation Planning on Shared Use Rail Corridors: A Focus on the US Context.”

Journal publications: Godavarthy, Ranjit P., et al. 2015. Developing a Method for Assessing National Demand-Response Transit Level of Service. *Journal of Public Transportation*, 18 (4): 1-15.

Websites

The website for NCTR (www.nctr.usf.edu) has been in place since 1999 and remains very active. NCTR is rated #1 for “transit research” results on Google, #2 on Bing and #2 on 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.

- The numbers of sessions are up slightly to 34,233 for July through December vs 34,131 for the previous 6 months. A session is the period time a user is actively engaged with our website. All usage data (Screen Views, Events, etc.) is associated with a session.
- The numbers of users decreased slightly from 28,813 for Jan-Jun 2015 to 27,497 from July to December, but still shows substantial activity. Users have had at least one session within the selected date range and includes both new and returning users.
- The number of pageviews are up slightly from 61,621 for Jan-Jul 2015 vs 62,516 for Jul-Dec 2015. Pageviews are the total number of pages viewed. Repeated views of a single page are counted.

A number of other websites initially funded through NCTR Transit Focused grant have been established, but are now being supported by the Livability grant. The PPR for the Livability grant should be reviewed to see the level of activity on each.

Technologies or Techniques

The method to measure the level of service of paratransit developed in the report by NDSU entitled “*Developing a Method for Assessing National Demand-Response Transit Level of Service*” is new – it makes use of mapping technology for providers to identify their service area to show how much of the area is served and where gaps of service exist.

New tools also were developed for WSDOT as part of the project entitled “Incorporating Managing Demand into Washington State DOT Planning and Programming”, including a creative thinking exercise and the Mobility Gap Analysis Tool, a spreadsheet addition to WSDOT’s Highway Segment Analysis Program. The Mobility Gap Analysis Tool enable quick calculation of the volume of traffic needed to restore highway function to 70 percent of posted speed limit, or maximum throughput.

An Online Tool for Computing and Presenting Regional Accessibility Measures (UIC) - This research led to development of an online tool that allows users to gauge accessibility to Chicago neighborhoods, suburbs, or other parts of the metropolitan area using different modes of transportation. The tool measures accessibility by summing up the number of opportunities that can be reached from each

location by different modes. A report was produced entitled: "Mapping Metropolitan Chicago's Accessibility." The product was the Metropolitan Chicago Accessibility Explorer – accessed at <http://urbanaccessibility.com>

Inventions, Patent Applications, and/or Licenses

NCTR research has resulted in 16 patents in the past five years. The University of South Florida ranks 10th among universities worldwide for U.S. patents granted in 2015. The following patent was awarded in September 2015: [U.S. Patent # 9,130,995 – System and Method for Rendering a Distributed Location-Aware System](#) – This features a distributed location-aware system that is able to efficiently exchange location data over large geographic areas without requiring a centralized server. Issued Sept 8, 2015, U.S. Patent and Trademark Office.

Other Products

Nothing to report for this reporting period.

Participants and Collaborating Organizations

What organizations have been involved as partners?

The National Center for Transit Research (NCTR), through its transit-focused grant, is a consortium/partnership 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.
- North Dakota State University located in Fargo, North Dakota, featuring the Small Urban & Rural Transit Center (SURTC).
- University of Illinois at Chicago located in Chicago, Illinois, featuring the Urban Transportation Center (UTC) in the College of Urban Planning and Public Affairs.
- Florida International University located in Miami, Florida, featuring the Lehman Center for Transportation Research (LCTR).

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 the source of federal funds for the program as well as a source of ideas for research projects. FTA staff have served as peer reviewers of the projects.
2. **State Departments of Transportation** – FDOT has been a vital partner in the development, selection, and funding of the majority of the research conducted by USF and FIU researchers. It also provides project managers for each project to 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.
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 of the projects entitled “Impacts of Dialysis Transportation on Florida's Coordinated Public Transportation Programs” and “Technology Application Among Florida Community Transportation Providers”.
6. Consortium members have worked closely with the **American Public Transportation Association** on the Higher Education Subcommittee of the Human Resources Committee (Dr. Jill Hough of NDSU is the Chair of that subcommittee); with the Research and Development Committee on making a closer connection between UTC transit research results and APTA members (NCTR Director Joel Volinski is Chair of the University Liaison subcommittee); 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 being updated to allow students to attend APTA meetings without paying registration fees.
7. USF collaborated with the **Mineta Transportation Institute** to provide two case studies for a report dealing with best practices in improving access to transit services for disabled people.
8. NCTR Director Joel Volinski participated as part of the Problem Statement Screening Panel held in August 2015 to help ensure no projects selected for TCRP would duplicate ongoing research.
9. NCTR Director participated as a member of the Executive Board of the National Institute for Transportation and Communities in September 2015 to identify research priorities and share information on the activities as USF. He was also elected to the position of President of the **Council of University Transportation Centers** while Dr. Jill Hough of NDSU was elected Vice President of CUTC. Dr. Hough also took a leadership role in redesigning the CUTC website so it would be more usable to UTCs around the country.
10. CUTR’s Transportation Program Evaluation and Economic Analysis program, partially funded through NCTR projects dealing with alternative fuels, staffs a statewide legislatively created committee to make recommendations on cleaner transportation fuels to the governor and state legislature; works with FDOT on an ongoing project to evaluate the performance of alternatively fueled buses; assists FTA with its transit electrification research plan and other fuel-related research; serves as staff to the Tampa Bay Clean Cities Coalition.

Many organizations have lent their considerable experience and expertise to NCTR by agreeing to have representatives serve on the NCTR Advisory Board. Included among them are:

Michael Melaniphy, President – American Public Transportation Association; David Spacek, Public Transportation Office – North Dakota Department of Transportation; Tim Garling, Director, Broward County Mass Transit Division – Past 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, Transdev (formerly Veolia) Corporation; 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 Baltes, 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 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 completed two case studies on a federally funded project headed by MTI that identifies ways to improve access to transit stops for people with disabilities. AARP contacted SURTC and a conference call was held with them to discuss the demand response level of service project. NDSU also provided input for them on performance metrics.

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, three transit agencies in Florida, aided to some extent by the information developed by NCTR, decided to switch to compressed natural gas.

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 how they can help de-escalate situations to contribute to the reduction of incidents.
- FON and FTSN are establishing “Minimum Fixed-Route Bus Operator Annual Refresher Training Guidelines” (which will include assault avoidance/defusing volatile situations module).
- 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 (an example from Lee County was provided earlier in the report). A goal of the pilot applications will be to provide additional guidance and further refine the research results.

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

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?**”

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 400 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 2,471 members. NCTR manages these listservs with the intent of transferring information within this large transportation community. During the six month reporting period, over 600,000 messages were successfully transmitted. Provided below is a listing of all the other Listservs supported by NCTR with the number of subscribers through December 31, 2015:

	Total Active Subscribers - End of 2015	Net Change in Subscribers in 2015	Established in
Transp-tdm	470	316	Oct-98
Best Workplaces for Commuters	201	20	Oct-08
Bus Fleet Maintenance	417	12	Feb-08
Bus Rapid Transit	636	9	May-01
Best Workplaces for Commuters - Champions	140	11	Jul-09
Florida Operations Network	90	31	Feb-13
Journal of Public Transportation	937	25	Dec-13
Large Employers Council (new)	28	28	Aug-15
Parking management research	441	29	Feb-07
Florida Rural Transit Assistance Program	107	14	Mar-07
Substance Abuse Management (new)	53	53	Jun-15
Sustainable Transport Indicators	485	7	May-07
Telework	434	26	Dec-99
Transit Safety	135	62	Jun-15
National Center for Transit Research announcements	821	unknown	unknown

What is the impact on society beyond science and technology?

The “Best Workplaces for Commuters” designation acknowledges employers who have excelled at implementing green commuter programs. These programs include ridesharing, transit benefits, biking/walking/teleworking, flexible work schedules and other transportation demand management strategies designed to decrease traffic congestion and improve traffic related air pollution levels. By offering these commuter benefits, the recognized employers are committing to regional pollution reduction, greater economical savings related to commuting costs and lessening employee stress caused by single occupant vehicle travel to and from work. Over 320 workplaces (many of the largest companies in the country) throughout the country have earned the designation as a Best Workplace for Commuters.

Go Hillsborough is an initiative of the Transportation for Economic Development Policy Leadership Group, which includes all seven Hillsborough County Commissioners; the mayors of Plant City, Tampa and Temple Terrace; and the chair of the HART board. NNTA is a transportation management initiative of public and private members. USF’s TDM Team provides technical support to NNTA. This group helps to identify and implement solutions to transportation challenges in the north Tampa area.

Dr. Steve Polzin, Director of Mobility Policy Research at NCTR/CUTR, served as a member of the Committee for Study of Innovative Urban Mobility Services by the Transportation Research Board (TRB) Executive Committee. This ad hoc committee examined the growth of new on-demand and peer-to-peer mobility services and exploring the implications these services have for consumers and existing transportation services. The study, to be released in early 2016, will identify policy, regulatory, and other issues that policy makers will need to consider as they regulate these services, including the existing regulatory structure for taxi, limousine, and transit services. Priority areas of research to inform public policy decisions will also be identified.

Sean Barbeau, Phil Winters, and Nevine Georggi coordinated efforts with USF Division of Patents and Licensing to find potential licensees for several of their patents. Their technology (including a patent) to help mobile phone users alert first response teams of emergency situations was licensed to the company EmergenSee (<http://emergensee.com/>). This technology, noted earlier and developed through UTC funding, will help save lives for those who need immediate care due to accidents on our highways. (<http://www.bizjournals.com/tampabay/news/2014/07/09/new-tech-at-usf-helps-alert-response-teams-during.html>)

The **Tampa Bay Clean Cities Coalition (TBCCC)** promotes the use of advanced transportation fuels and technologies in the Tampa Bay region. CUTR is a partner along with the Environmental Protection Commission of Hillsborough County and TECO Energy. This group continues to identify opportunities to implement greener technologies, improving the air quality in the Tampa Bay area.

A great deal of the research and training completed provided by NCTR results in more efficient and safer public transportation. This results in the provision of more and better transit service, providing alternative mobility for people open to non-SOV transportation. NCTR's TDM program is dedicated to finding ways to help reduce Single Occupant Vehicle use, and/or to redistribute or reduce the amount of times it is used. These efforts result in less congestion on our highways resulting in safer conditions.

Changes/Problems

Changes in approach and reasons for change

Nothing to report

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

A number of research projects have been granted no-cost time extensions, but all projects are scheduled to be completed by the end date of the grant, September 30, 2016.

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.

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.