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Office of the Assistant Secretary for Research and Technology
University Transportation Centers Program
National University Transportation Center Grant No. 69A3551947136



**NATIONAL INSTITUTE FOR
CONGESTION REDUCTION**

SEMI-ANNUAL PROGRESS REPORT FOR UNIVERSITY TRANSPORTATION CENTERS

University of South Florida
in partnership with University of California, Berkeley • Texas A&M University and its affiliated
Texas A&M Transportation Institute • University of Puerto Rico at Mayagüez
DUNS 06-968-7242 • EIN 59-3102112-F5 [Tampa Campus]

Submitted by:

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Grant Period: July 1, 2019–September 30, 2023

Reporting Period: July 1, 2019 – March 31, 2020, First Semi-Annual Progress Report

Signature of Submitting Official:

A handwritten signature in blue ink that reads "Robert Bertini". The signature is written in a cursive style.

Robert L. Bertini, Ph.D., P.E., Center Director

1. ACCOMPLISHMENTS: What was done? What was learned?

The information provided in this section allows the OST-R grants official to assess whether satisfactory progress has been made during the reporting period.

What are the major goals and objectives of the program?

The **National Institute for Congestion Reduction (NICR)** mission is to emerge as a national leader in providing multimodal congestion reduction strategies through real-world deployments that leverage advances in technology, big data science and innovative transportation options to optimize the efficiency and reliability of the transportation system for all users. Our efficient and effective delivery of an integrated research, education, workforce development and technology transfer program will be a model for the nation. NICR is pursuing ideas for reducing surface transportation congestion through three of the research Topics specified by the Secretary of Transportation:

- **OPTIMIZE:** optimize efficiency and reliability of travel for all transportation system users;
- **TRANSIT:** data modeling and analytical tools to evaluate the effects of shifting transit incentive structure; and
- **OPTIONS:** ridesharing and alternative forms of transportation.

NICR is measuring our progress with performance metrics specifically in the areas of: Research, Leadership, Education and Workforce Development, Collaboration, Diversity, and Technology Transfer. NICR has selected its Year 1 projects (in the original proposal) as shown in Table 1.

Table 1. NICR Year 1 Projects 2019 – 2020.

| Project | Lead | Collaborator |
|--|-------------------------|------------------------|
| Pillar 1 Urban and Rural Traffic Management in the Age of Big Data | | |
| 1-1 Demand-Side Management of Auto Traffic | Walker & Hansen UCB | Lin & Z. Wang USF |
| 1-2 Supply-Side Management of Auto Traffic | Sunkari TAMU/TTI | Cassidy & Shen UCB |
| 1-3 System Monitoring of Auto Traffic | Brydia TAMU/TTI | Shen & Cassidy UCB |
| 1-4 Transit Priority | Li & Bertini USF | Daganzo UCB |
| Pillar 2 Battling Congestion Using Innovative Mobility Platforms | | |
| 2-2 Formulating Innovative Mobility Policies to Reduce Congestion | Shaheen & Frick UCB | Sener TAMU/TTI |
| Pillar 3 Incentivizing Transit in the Face of Innovative Alternatives | | |
| 3-1 Influencing Travel Behavior via an Open Source Platform | Barbeau & Maness USF | Turner TAMU/TTI |
| 3-3 Targeting Transit Incentives to Congestion Sources | Rodriguez & Chatman UCB | P. Chen & Winters USF |
| Pillar 4 Battling Congestion on Freeway Corridors | | |
| 4-1 Pricing Mechanisms for Managed Lanes | Burriss TAMU/TTI | Figueroa UPRM |
| 4-2 Proactive Congestion Management | Concas & Perk USF | Kuhn TAMU/TTI |
| 4-3 Corridor-Wide Surveillance Using Unmanned Aircraft Systems | Colucci UPRM | Zhang & Kourtellis USF |

What was accomplished under these goals?

- NICR was officially established on September 9, 2019 when the agreement was received from U.S. DOT.
- On November 7-8 NICR held the official OST-R kickoff meeting that included meeting with Deputy Assistant Secretary Diana Furtchgott-Roth and OST-R UTC staff. Representatives from all four universities were present and productive discussions were held.
- NICR's Data Management Plan was submitted December 30, 2019 and approved January 28, 2020.
- NICR's Technology Transfer (T2) Plan was submitted on December 20, 2019.
- NICR developed a faculty principal investigator (PI) toolkit consisting of templates for project work plans and budgets and held a workshop for all faculty investigators on February 17, 2020. As each project will have PIs from more than one campus, this served as an opportunity for faculty to meet and kickoff their project collaborations.
- Projects listed in Table 1 are moving forward, university financial systems are set up for several of the projects. In particular 4-1, 3-3, and 4-2 are underway. Student support (e.g. student groups and fellowships) task orders are also set up with the partner campuses.
- NICR partner campuses are continuing to make progress in finalizing the subcontracting relationships between USF and UCB/TAMU/UPRM.



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

- NICR has supported the USF Friday Transportation Seminar series and will be launching the NICR webinar series.
- NICR has planned a Citizen's Transportation Academy to be piloted with the City of Tampa; original plans called for in person sessions, currently shifting to a virtual format.
- NICR is partnering with the Florida Local Technical Assistance Program (LTAP) and the Florida DOT to launch further training and professional development opportunities.
- NICR is making progress with FDOT, TxDOT and Caltrans regarding matching funds/projects.

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- A meeting was held between USF and UPRM faculty to discuss deploying the OneBusAway technology on buses in Mayagüez to enable future research on congestion reduction strategies.

How have the results been disseminated? If so, in what way/s?

- NICR has established a website that will be the hub for dissemination: www.cutr.usf.edu/nicr.

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

- In the next period all subcontracting arrangements will be complete, Year 1 projects will be up and running, project web pages set up, all project details in RIP, with faculty and students actively working.
- The Executive Committee is considering whether to redeploy some resources to respond to the COVID-19 pandemic and determine which congestion-related research issues should be addressed.
- Preparations for Year 2 project solicitation will also continue.

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| 2. PARTICIPANTS & COLLABORATING ORGANIZATIONS: Who has been involved? |
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| OST-R needs to know who has worked on the project to gauge and report performance in promoting partnerships and collaborations. |
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What organizations have been involved as partners?

- NICR has worked closely with FDOT, TxDOT and Caltrans as well as the City of Tampa during this period. We expect to increase the number of partners.
- NICR has given presentations about our plans to our FDOT Community Traffic Safety Team (CTST) and to the Tampa Bay Smart Cities Alliance.

Have other collaborators or contacts been involved?

- Nothing to Report.

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| 3. OUTPUTS: What new research, technology or process has the program produced? |
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| Research outputs are any new or improved process, practice, technology, software, training aid, or other tangible product resulting from research and development activities. They are used to improve the efficiency, effectiveness and safety of transportation systems. Many Centers develop significant outputs other than publications. OST-R assesses and reports both publications and other products to Congress, communities of interest, and the public. |
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- *Publications, conference papers, and presentations*
- *Policy papers*
- *Website(s) or other Internet sites*
- *New methodologies, technologies or techniques*
- *Inventions, patents, and/or licenses*

- *Other products, such as data or databases, physical collections, audio or video products, application software, analytical models, educational aids, courses or curricula, instruments, equipment, or research material*
- NICR has established the Center website at www.cutr.usf.edu/nicr.
- NICR has begun framing its webinar series and Policy Brief formats.
- NICR has begun planning how to leverage the TTI “[How to Fix Congestion](#)” toolbox toward creating the planned “Congestion Help Desk.”

Performance measures for research output (minimum of two) in Technology Transfer Plan and the targets for each measure

- The NICR T2 Plan only has one research “output,” shown in Table 2 below. We have added two more outputs from the research activity performance metrics. The targets will be presented and discussed in the next semi-annual progress report.

Table 2. Performance Measures for Research Outputs.

| A. T2 Goal and Description | B. Performance Measure | C. Achieved | D. Target |
|---|--|--------------------|------------------|
| Goal 1. Share new knowledge to address society’s challenges and opportunities for reducing congestion | Number of presentations and estimated audience sizes | 0 | TBD |
| | Number of research reports and their downloads | 0 | TBD |
| | Number of peer reviewed journal publications and their citations | 0 | TBD |
| Goal 2. Provide diverse research products to meet the needs of stakeholders; i.e., to put the right information in the right hands at the right time to combat congestion. | TBD | TBD | TBD |
| Goal 3. Professional & workforce development including educating & mentoring next generation transportation professionals, training existing workforce and grooming future leaders | TBD | TBD | TBD |
| Goal 4. Commercialize research products to leverage public investment and yield broader implementation | TBD | TBD | TBD |

4. OUTCOMES: What outcomes has the program produced? How are the research outputs described in section (3) above being used to create outcomes?

Outcomes are the application of outputs; any changes made to the transportation system, or its regulatory, legislative, or policy framework, resulting from research and development outputs.

- *Increased understanding and awareness of transportation issues*
- *Passage of new policies, regulation, rulemaking, or legislation*
- *Increases in the body of knowledge*
- *Improved processes, technologies, techniques and skills in addressing transportation issues*
- *Enlargement of the pool of trained transportation professionals*
- *Adoption of new technologies, techniques or practices*
- Nothing to Report.

Discuss the performance measures (a minimum of two) for research outcome your Center identified in your Technology Transfer Plan and the targets (goals) for each measure.

Table 3. Performance Measures for Research Outcomes.

| A. T2 Goal and Description | B. Performance Measure | C. Achieved | D. Target |
|---|---|-------------|-----------|
| Goal 1. Share new knowledge to address society’s challenges and opportunities for reducing congestion | Number of downloads of <i>Journal of Public Transportation</i> & <i>Journal of TDM Research</i> | 0 | TBD |
| Goal 2. Provide diverse research products to meet the needs of stakeholders; i.e., to put the right information in the right hands at the right time to combat congestion. | Usage metrics for NICR website, project-related websites, and Congestion Help Desk | 0 | TBD |
| | Number of articles in popular media and their reach | 0 | TBD |
| | Social media engagement (e.g. shares, comments, etc.) | 0 | TBD |
| Goal 3. Professional & workforce development including educating & mentoring next generation transportation professionals, training existing workforce and grooming future leaders | Contact hours in training, instructor-led and asynchronous learning | 0 | TBD |
| Goal 4. Commercialize research products to leverage public investment and yield broader implementation | TBD | TBD | TBD |

- The NICR T2 Plan has five research “outcomes,” shown in Table 3 above. The targets will be presented and discussed in the next semi-annual progress report.

5. IMPACTS: What is the impact of the program? How has it contributed to improve the transportation system: enhance safety, reliability, durability; improve transportation education; strengthen the workforce, etc.?

Impacts are the effects of outcome on the transportation system, or society in general, such as reduced fatalities, decreased capital or operating costs, community impacts, or environmental benefits. The taxpaying public and its representatives deserve a periodic assessment to show them how the investments they make benefit the nation. Through this reporting format, and especially this section, UTCs provide that assessment and make the case for Federal funding of research and education by demonstrating the impacts that UTC funding has had on technology and education. USDOT uses this information to assess how the research and education programs:

- Improve the operation and safety of the transportation system;
- Increase the body of knowledge and technologies;
- Enlarge the pool of people trained to develop knowledge and utilize new technologies; and
- Improves the physical, institutional, and information resources that enable people to have access to training and new technologies.

- *The effectiveness of the transportation system*
- *Technology transfer (include transfer results to entities in government or industry, adoption of new practices, or instances where research outcomes have led to the initiation of a start-up company)*
- *The increase in the body of scientific knowledge*
- *Transportation workforce development*

- Nothing to Report.

Discuss the performance measures (a minimum of two) for impact your Center identified in your Technology Transfer Plan and the targets (goals) for each measure.

- The NICR T2 Plan has four research “impacts,” shown in Table 4 below. The targets will be presented and discussed in the next semi-annual progress report.

Table 4. Performance Measures for Research Impacts.

| A. T2 Goal and Description | B. Performance Measure | C. Achieved | D. Target |
|---|---|-------------|-----------|
| Goal 1. Share new knowledge to address society’s challenges and opportunities for reducing congestion | Number of citations in professional publications by NICR PIs | 0 | TBD |
| | Changes in policies or practice resulting from research | 0 | TBD |
| Goal 2. Provide diverse research products to meet the needs of stakeholders; i.e., to put the right information in the right hands at the right time to combat congestion. | Numbers of subscribers to online networks, social media post reach, and reach of online peer-to-peer networks | 0 | TBD |
| Goal 3. Professional & workforce development including educating & mentoring next generation transportation professionals, training existing workforce and grooming future leaders | TBD | TBD | TBD |
| Goal 4. Commercialize research products to leverage public investment and yield broader implementation | Cumulative number of patent disclosures, patents received, licenses issued, and businesses formed | 0 | TBD |

6. CHANGES/PROBLEMS

The grantee is required to obtain prior written approval from the OST-R grants official whenever there are significant changes in the project or its direction. See agency specific instructions for submission of these requests. If not previously reported in writing, provide the following additional information, if applicable:

- Changes in approach and reasons for change;
 - Actual or anticipated problems or delays and actions or plans to resolve them;
 - Changes that have a significant impact on expenditures; or
 - Significant changes in use or care of animals, human subjects, and/or biohazards.
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- All four campuses have been working remotely since mid-March. While most faculty and some staff have been used to working at home periodically, most staff have not. New communications media and productivity tools such as GoToMeeting, Zoom and Teams are now being used.
 - We are working closely with USF sponsored research and our partner campuses to complete all steps in the subcontracting process.
 - We are also working with the Executive Committee and faculty investigators on all campuses to minimize the impacts of the many uncertainties regarding fall semester due to COVID-19 on our projects and programs.

7. SPECIAL REPORTING REQUIREMENTS

Respond to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.

- Nothing to Report.