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NATIONAL INSTITUTE FOR CONGESTION REDUCTION

TECHNOLOGY TRANSFER PLAN

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

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INTRODUCTION

This document serves as the National Institute for Congestion Reduction (**NICR) Technology Transfer Plan,** outlining the people and organizations involved in the Technology Transfer (T2) process, their roles, activities, and desired outcomes.

NICR faculty are motivated by the potential for implementing our research results in real settings. NICR will implement a holistic, proactive T2 program through the lifetime of this grant. NICR will continually evaluate and adapt T2 activities to address time and cost pressures facing transportation professionals, policymakers, students, and the media, and recognizes that preferred communication channels differ by audience, especially for current transportation practitioners. In addition to publishing reports, journal articles and delivering conference presentations, NICR will rely on an expansive use of webinars, social media, licensing, and other means to guide in the deployment of research findings and in the development of research products.

1. Technology Transfer Organizational Structure

The T2 organizational is shown in Fig. 1. **Dr. Sean Barbeau** will serve as **Associate Director for T2**. He will be supported by Assistant T2 Directors at each campus: **Philip Winters** (USF), **Laura Melendy** (UCB), **Dr. Melissa Tooley** (TAMU), and **Dr. Benjamin Colucci** (UPRM). Each Assistant T2 Director will oversee research dissemination and implementation activities and will coordinate these activities with Associate Director Barbeau. Each campus Assistant T2 Director will also assist with engaging stakeholders before, during and after the lifespan of NICR projects—from

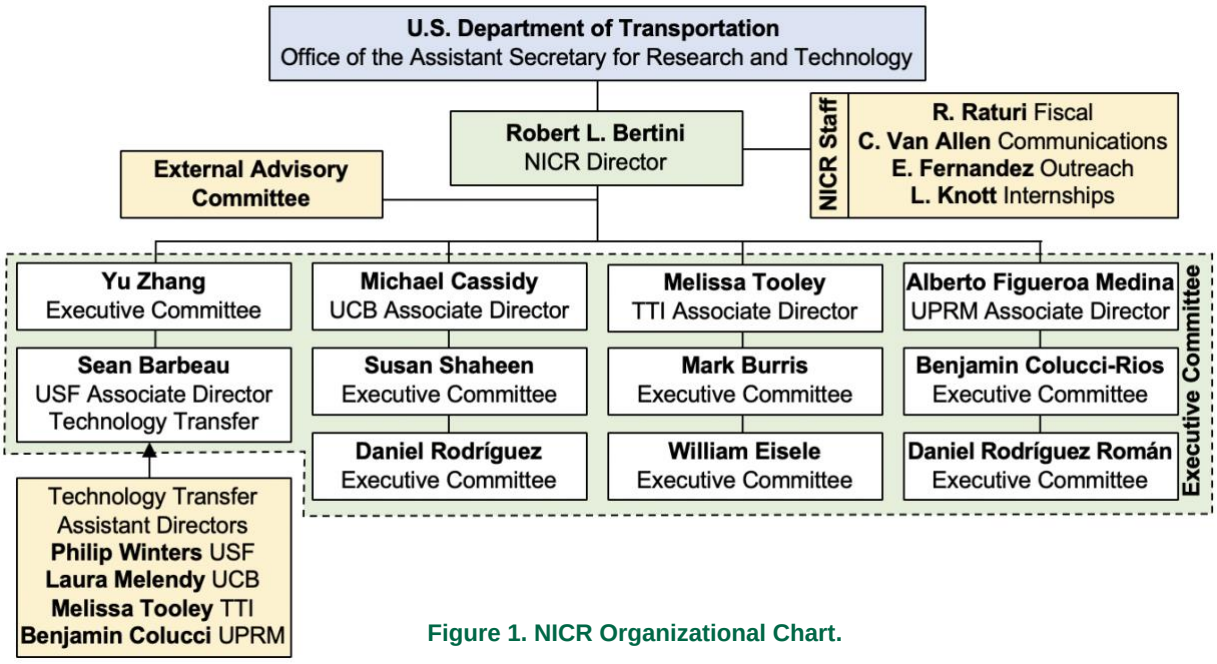

Figure 1. NICR Organizational Chart.

needs assessment, through research, implementing the T2 plan, engaging stakeholders and securing resources.

2. Stakeholders and Funding Partners

NICR institutions have rich histories of partnering with both private and public institutions to move research into practice. To illustrate, Table 1 presents nine categories for the types of stakeholders that we envision working with during the life of the center. Importantly, our member institutions have already established professional relationships with stakeholders in each category, including the public and private entities listed in the second column of Table 1. We note for clarity that the first six categories in Table 1 represent stakeholders that may fund some of NICR's research activities.

In the early stages of each research proposal, NICR will work with PI's to identify and match them with prospective project partners. PIs and partners will work together to create a ***T2 Plan*** to be part of the proposal. Guidelines for these T2 Plans are shown in Table 2. The plans will help ensure that center-supported research generates outputs that can be implemented.

3. Assisting Stakeholders in Implementing and Deploying Research Outputs

NICR institutions have proven track records of assisting stakeholders in deploying research findings. An example is USF's *Best Workplaces for Commuters* program which assists MPOs in satisfying the FAST Act's required consultation with employers, private/non-profit public transportation providers, transportation management organizations, and organizations providing reverse commute or job-related services to low-income individuals. NICR will continue in this vein by leveraging the **NSF Innovation Corps** (I-Corps) framework (USF is a designated I-Corps site). The framework brings PIs together with stakeholders early in the process for "customer discovery" so that all parties work together from the ideation/proposal stage through the conduct of research into project deployment.

Table 1. Stakeholder Categories.

	Stakeholder Group	Example	Role
Project Partners	Research sponsors	Federal agencies, State Departments of Transportation, national labs, foundations	Sets statewide policies. Funds congestion mitigation solutions.
	Tribal/local governments	Tribes, cities, counties	Set parking requirements. Operates local traffic management centers. Elected officials seeking to respond to constituent questions/demands.
	Regional agencies	Metropolitan planning organizations, councils of government, transit agencies	Develops congestion management plans. Provides travel options to move people.
	Industry/ Employers/non-profits	Best Workplaces for Commuters such as Google, IBM, Mayo Clinic, Intuit, SalesForce, and LegoLand.	Affects demand by subsidizing employee transit passes; allowing telework and flextime.
	Consultants and Vendors	INRIX, Siemens, Enterprise Holdings, Brightline	Commercialize data results.
	Professional and Trade associations	LTAP and T2 Centers, Institute of Transportation Engineers, American Planning Association, COMTO	Provide technical assistance to people in the field.
Other	Students and their organizations	K12, undergraduate, graduate (existing and potential)	Seeking knowledge to pursue career in transportation.
	Core faculty		Develop and execute T2 plans/activities.
	Media	Local and national print, television, radio	Reactions to release of new research.

Table 2. Technology Transfer Plan Guidelines from Proposal to Deployment.

Before Research	Each PI will be required to submit a **T2 Plan** for the project as part of the proposal process. The goal of a project's **T2 Plan** should be further development, commercialization and practical applications of the research. PIs will be directed to submit proposals for research or outreach activity that address some or all of the following criteria: ▪ Provides evidence of customer discovery in regard to identified needs and expected outcomes. ▪ Identifies tangible products, including reports, software, and instructional material. If software is a product, identify if the source code will be closed or open-source, as well as the expected license to be used if open-source. ▪ Describes how results will be incorporated in teaching, training, and learning. ▪ Identifies how the proposed activity will develop and/or leverage partnerships beyond the life of this research or outreach activity. ▪ Describes the process PI recommends for transferring project findings to other researchers, professionals and practitioners. ▪ Demonstrates that the research team has a successful track record with T2, especially regarding deployment. ▪ Each PI will be required to scale their project on the Technology Readiness Level (TRL) based on the following USDOT guidelines. Details on USDOT technology readiness can be found here: https://www.fhwa.dot.gov/publications/research/ear/17047/index.cfm
During Research	NICR will take proactive steps to allow stakeholders to track progress of the projects using means such as email marketing announcements, project web pages, social media, blog posts, and webinars.
After Research	Monitoring of activity via NICR's key distribution channels will continue after the individual project is complete. This includes tracking status of patent applications (often a multiyear process), commercialization and deployment in real world settings.

Additionally, PIs will work with the NICR communications and marketing officer, its webinar/learning technology specialists, and its university licensing managers (when appropriate) in the preparation of T2 products (see Fig. 1). Activities in these areas will focus primarily on assisting stakeholders to make use of NICR research outputs. Each PI will be required to conduct a webinar on their project.

4. Commercializing Research Outputs

NICR universities have leveraged NSF's I-Corps program to commercialize their research products. For example, a research team at USF recently participated in I-Corps to assess the commercialization potential of the Travel Assistance Device for aiding transit patrons with cognitive disabilities.

NICR will continue to leverage I-Corps in the effort to expand the commercialization of and corporate support for its research outcomes. We will host a **2-day NSF I-Corps Workshop** at USF in the summer of Year 1, so that NICR core faculty and graduate students can benefit from the program's training in entrepreneurship and systematic matching with business mentors. NICR will thereafter encourage and support its PIs in applying the I-Corps methods for product commercialization and T2 in general. We will also single out research projects that show the greatest potential for commercialization in the early going; and will redouble our efforts to connect PIs with stakeholders so that T2 aspects of the research can be pursued more collaboratively.

5. Patents and Licensing

NICR universities have strong track records in securing patents and licenses for their research products. USF ranks 1st in number of U.S. Patents granted among Florida universities. Among public universities, it ranks 5th in the nation and 12th world-wide. UTC-funded research at USF has resulted in 17 patents since 2011 (Fig. 2).

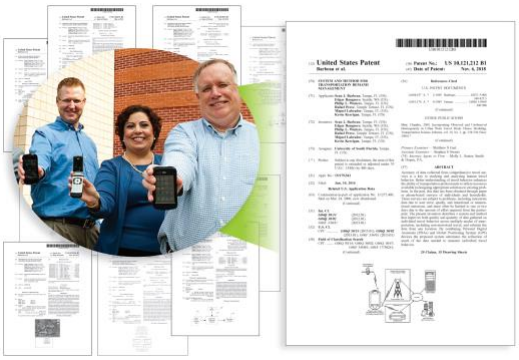

Figure 2. USF and its 17 UTC Related Patents.

The record is also impressive at other campuses. TTI holds 60 U.S. Patents, and employs a patent specialist who will assist core faculty in this aspect of T2. UPRM has over 40 U.S. Patents and recently created a T2 office, which can be used for submitting patents and commercialization applications. UCB research on passively collected mobile phone data has been licensed for use in a product called *Replica* in cities with a combined population of over 30 million.

5.1. Patent Application Support

The patent process is long (Fig. 3), taking more than a year from disclosure to award. Our campuses commit substantial resources for licensing inventions and spawning new businesses. These will support NICR universities in preparing and filing their patent applications and managing licenses. In compliance with the Bayh-Dole Act, our campuses report all inventions and patents developed with UTC funds to the iEdison database.

5.2. Licensing Revenues

All NICR universities have procedures for licensing inventions and determining the distribution of revenues. For example, USF negotiates agreements with companies that include licensing fees, royalty payments, and patent cost reimbursements. Net revenue is typically distributed: 45% to inventor(s), 10% to a research foundation account, , 10% to the colleage,and 35% to USF. The revenues can be fed back into further research and T2 support.

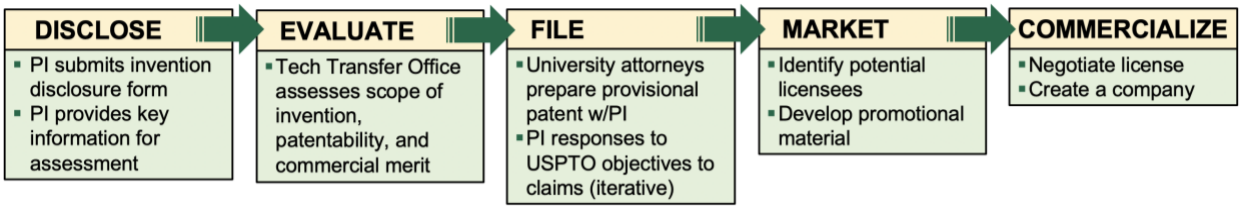

Figure 3. Invention Disclosure to Commercialize Process.

6. Dissemination of Research Results

NICR will disseminate research findings with due consideration of the diverse needs and preferences of our stakeholders. Activities are planned for NICR overall, and for each research project. The diverse means to be used for dissemination with the content to be prepared by PIs, include: website project pages, policy briefs, webinars, online networks, a quarterly newsletter, social media posts and articles distilled for a general audience in some cases, and others targeted to a more technical readership. Much of the work will be managed by the NICR communications and marketing officer in collaboration with the center Director.

6.1. Major T2 Activities Planned for NICR

The NICR website will be a “first stop” for congestion-related information, tools, data and best practices. PIs will submit reports, articles, data, course syllabi, presentations and faculty profiles to NICR communications and marketing officer to place online. We will track site activity and performance with detailed web analytics.

Figure 4. Journal of Public Transportation.

NICR will produce a targeted periodic (monthly/quarterly/biannual) **Congestion Reduction E-newsletter** describing our latest research findings and other center activities. NICR partners will be asked to regularly promote opt-in options to the NICR newsletter through their distribution lists and periodicals to build the mailing list. USF will continue publication of its international, peer-reviewed open access ***Journal of Public Transportation*** (JPT) (Fig. 4). Most of its articles relate directly to the NICR theme by exploring topics such as congestion pricing, managed lanes, shared mobility and others. JPT will serve as an outlet for center-supported research in **Topics 2 TRANSIT** and **3 OPTIONS**. Research results more exclusively aligned with **Topic 1 OPTIMIZATION** may appear in the ***Journal of Transportation Demand Management Research*** (JTDMR), published at USF. NICR will identify findings that lend themselves to **"magazine" style articles** like those in UCB's previously published *ACCESS Magazine*. Our communications and marketing team will work with PIs to distill their work for outlets like *The Conversation*, Planetizen, and Mobility Lab. T2 assistant directors will report to the T2 associate director with content and ideas appropriate and timely content for LinkedIn, Facebook, YouTube, and other social media outlets. The communications and marketing team will then finalize and publish this content. For example, T2 assistant directors will request PIs connect with PIs from other consortiums doing related work via LinkedIn for content to appear in various feeds. Consortium T2 assistant directors will notify T2 associate director with potential candidates for FHWA's **Every Day Counts** (EDC) initiative, to identify and deploy proven yet underutilized technologies.

To provide practitioners and the media with timely responses to queries, NICR will work with the Operations Academy and the National Operations Center of Excellence (NOCOE) to create an online, self-service Congestion "Help Desk." Its knowledge base will be populated with findings from our research activities and presented in an FAQ format. Traffic will be tracked that could influence our future research directions.

6.2. Technology Transfer Activities Planned for Individual Research Projects

We have noted our expectation that PIs publish their findings in peer-reviewed journals and as final reports. We have likewise reported on the T2 plan to be part of every research proposal and on our expectation that research teams will participate in the I-Corps Workshop at USF. Additionally, each PI will:

- Populate a project web page with support from NICR communications and marketing officer.

- Produce a 2-page policy brief and related image summarizing results to inform decision-makers.
- Present a NICR webinar to share the project findings.
- Collaborate with NICR's communications/marketing officer to prepare social media content and press releases to announce completed research.

Travel funds will support presentations at conferences/venues that advance T2 efforts.

7. Technology Transfer Goals and Performance Measures

We have proposed performance measures that will shed light on the complex relations between research products and congestion reduction. The goals of each performance measure are described in column A. of Table 3. The measures are presented in column B. Column C specifies whether the measure is related to research outputs, outcomes or impacts. Column D indicates how we will obtain the information to track these measures. These metrics will be included in the annual **NICR T2 Report**.

8. Plans for Increasing Corporate Research Support

NICR will employ strategies to increase corporate research support, including leveraging existing university assets (e.g. research and technology parks) and increasing industry access to faculty and students via business incubators and targeted funding. Next, we summarize institutional resources, potential sources of matching funding for commercialization, and other potential means of collaboration.

8.1. Research and Technology Parks and Incubators.

NICR universities have research parks that link research to start-ups. USF's research park was named "Emerging Research Park of the Year" by the Association of University Research Parks in recognition bringing technology from the lab to economic viability. The park is also home to Tampa Bay Technology Incubator Shared Lab Facilities, with access to equipment and lab space that would otherwise be cost-prohibitive to most start-ups.

8.2. Public/Private Matching Funding.

NICR will use multiple mechanisms to attract public and private investments in our research. We will use NSF's I-Corps program to better position our research direction for outside funding sources. Funds will be sought by working with established programs such as Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR). Finally, each NICR university will identify outside funding opportunities. Efforts will be modeled after successes that we have already had—for example, the **Florida High Tech Corridor Program** fosters applied research between universities such as USF and their high-tech industry partners by providing matching

grants, and the **Florida Center for Cybersecurity** provides funds for USF to work with industry and government to strengthen the cybersecurity sector.

Table 3. T2 Goals, Performance Measures, and Tracking and Reporting Methods.

A. T2 Goal and Description	B. Performance Measure	C. Type	D. Tracking
Goal 1. Share new knowledge to address society's challenges and opportunities for reducing congestion *NICR research should provide insights and contribute to the body of knowledge.*	Number of presentations and estimated audience sizes	Output	Quarterly progress reports from PIs
	Number of downloads of *Journal of Public Transportation & Journal of TDM Research*	Outcome	Scholar Commons dashboard
	Number of citations in professional publications by NICR PIs	Impact	Google Scholar / Scopus
	Changes in policies or practice resulting from research	Impact	Email survey product downloads
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. *Dissemination and delivery mechanisms will vary based on research and stakeholder group for that research. NICR will apply diverse communication methods and tenacity to connect research results with stakeholders. Seek strategy to maximize reach (number of people touched w/research results) and frequency (number of times we touch each person w/results).*	Usage metrics for NICR website, project-related websites, and Congestion Help Desk	Outcome	Web Analytics
	Number of articles in popular media and their reach	Outcome	Media monitoring tool
	Social media engagement (e.g. shares, comments, etc.)	Outcome	Social media dashboards
	Numbers of subscribers to online networks, social media post reach, and reach of online peer-to-peer networks	Impact	Quarterly reports from online reporting
Goal 3. Professional & workforce development including educating & mentoring next generation transportation professionals, training existing workforce and grooming future leaders *Foster workforce development to ensure students are prepared to enter workforce or academia and keep experienced professionals job ready*	Contact hours in training, instructor-led and asynchronous learning	Outcome	Quarterly or semester reports
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	Impact	Quarterly report by inventors