

Transit Cooperative Research Program

Marking 25 Years of Service through Research

FY 2018

Announcement of Transit Research Projects and Project Panel Nominations November 2017

The Transit Cooperative Research Program (TCRP) undertakes research and other technical activities in response to the needs of the public transportation industry on a variety of problems involving operations, service configuration, engineering, maintenance, human resources, administration, policy, and planning.

The TCRP is a partnership of the Federal Transit Administration (FTA); the National Academies of Sciences, Engineering, and Medicine, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a non-profit educational and research organization established by the American Public Transportation Association (APTA).

The TCRP Oversight and Project Selection (TOPS) Committee, the governing board for the program, recently selected projects for the Fiscal Year 2018 program. This announcement is to inform the research community of these projects and to solicit project panel nominations.

Announcement of Transit Research Projects

This announcement contains problem statements that are preliminary descriptions of the selected projects. Detailed Requests for Proposals (RFPs) for these projects are expected to be released starting in March 2018.

TCRP RFPs are available only on the Internet. Each project statement will be announced by electronic mail. A process to register for e-mail notification of RFPs is available at TCRP's website, <http://www.trb.org/tcrp>. RFPs will be posted

at the same Internet address when they are active.

The TCRP is an applied, contract research program with the objective of developing near-term solutions to problems facing the public transportation industry. Proposals should show evidence of strong capabilities gained through extensive, successful experiences. Any research agency interested in submitting a proposal should first make a frank and thorough self-appraisal to determine whether it possesses the capability and experience necessary to ensure successful completion of the project. The specifications for preparing proposals are quite strict and are set forth in the brochure entitled *Information and Instructions for Preparing Proposals*, available on the Internet at the website referenced above. Proposals will be rejected if they are not prepared in strict conformance with the section entitled "Instructions for Preparing and Submitting Proposals."

Project Panel Nominations for New Projects

The TOPS Committee met on October 20, 2017, and approved new research projects for the Fiscal Year 2018. [Click here or below are the preliminary descriptions of the FY 2018 research projects.](#) It is requested that you nominate individuals with expertise directly relevant to the research proposed, and we would particularly welcome your help in identifying women and minority candidates. Your nominations would be appreciated as soon as possible, **but no later than January 19, 2018**, so that we may move the program forward in a timely manner. We will begin the panel formation process shortly thereafter.

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Nominations received after January 19, 2018 will not be guaranteed full consideration in the panel formation process.

To ensure proper consideration of your panel nominations, we need information on each nominee's affiliation, title, address, approximate age and, most importantly, professional qualifications related to the particular project. Contacts to determine an individual's interest in serving will be made from this office after we have matched available expertise with that required by the nature of the project. Those interested in serving on a specific project oversight panel should complete a [nomination form](#) and send it along with a résumé to [Joseph Snell](#).

Panels for the new research projects are scheduled to meet during March/April 2018. Panel members are prohibited from submitting or participating in the preparation of proposals on projects under their jurisdiction. They serve on the panels without compensation, but are reimbursed for travel and subsistence expenses. Travel insurance is provided at no cost to the members. In many cases, only two meetings are held in the life of a project, and these normally occur in Washington, D.C. The first meeting is to develop a project statement that is used to solicit proposals; the second meeting is to select a research organization from among those submitting proposals. Other meetings may be dictated by project circumstances; however, they are few and usually at least a year apart. Each panel will comprise approximately eight members. Panels operate under the guidance of a permanent chair, and there is liaison representation from the FTA, APTA, and TRB; the TCRP staff serves as the secretariat.

We are grateful for your ongoing support of the TCRP in providing nominees. Typically, nominees for panels in the Cooperative Research Programs outnumber the available positions by about four to one. As a result, we have been able to establish panels truly outstanding in their ability to play a fundamental role in the accomplishment of successful research.

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**Transit Cooperative Research Program
Projects in the Fiscal Year 2018 Program**

Project No.	Title	Page
A-43	Recent Decline in Public Transportation Ridership: Analysis, Causes, and Responses	4
B-46	Tactile Walking Surface Indicators to Aid Wayfinding for Visually Impaired Travelers in Multimodal Travel	4
F-27	Evaluation of Non-Punitive Employee Safety Reporting to Improve Transit Safety	5
H-56	Reinventing Transit Networks for a New Mobility Future	6
H-57	Guide to Joint Development for Public Transportation Agencies	6
*J-11/Task 31	Application and Monetization of Data Collected by Transit Agencies	7
*J-11/Task 33	Guidebook for Deploying Zero Emissions Transit Vehicle Fleets	8

**Note: These projects will be conducted as expedited research projects. Consequently, all panel meetings will be conducted as conference calls.*

Summary of Approved Research Projects

- **Project A-43** *Recent Decline in Public Transportation Ridership: Analysis, Causes, and Responses*
- Research Field: Operations
Allocation: \$400,000
TCRP Staff: Dianne Schwager

Public transportation ridership has been declining nationally as outlined in a recent article in the U.S. News and World Report: "Analysis by the Eno Center for Transportation of data from the American Public Transportation Association found that from 2014 to 2016, all but seven of the country's largest urban areas lost riders. For the nation as a whole, ridership declined by 4.5 percent. These decreases are coming at a time when the U.S. population has actually increased by 4.5 million people and our economy has added 5 million new jobs. The vast majority of this growth is occurring in major cities and metropolitan areas."

The transit industry is generally aware of this challenging situation but most of the discussion to date has been anecdotal with little in-depth analysis of trends and causes—let alone potentially strategic or desirable responses. There is thus a critical need to conduct research that will analyze ridership trends, both nationally and within specific different types of communities. This analysis should lay the foundation for understanding the causes of this decline and identify policies, strategies, and operational tactics that can help address the root causes, and counter the trends.

There are likely to be numerous causes, both external and/or internal to transit agencies, that are working in combination and affecting different communities in different ways and to different degrees. Sorting this out will be a complex challenge.

The objectives of the research are to (1) analyze broad mobility trends for the last 10 years for public and private transportation modes and external factors affecting ridership; (2) conduct in-depth analyses for a number of communities representing a variety of contexts to understand the diversity of factors that may be causing transit ridership declines; and (3) identify response strategies being implemented or contemplated.

- **Project B-46** *Tactile Walking Surface Indicators to Aid Wayfinding for Visually Impaired Travelers in Multimodal Travel*
- Research Field: Service Configuration
Allocation: \$215,740
TCRP Staff: Stephan A. Parker

Many countries make extensive use of tactile walking surface indicators (TWSIs) and may require that they are implemented according to the adopted standards to aid wayfinding for travelers who are visually impaired, including those who are blind or who have low vision. TWSIs are typically made up of attention fields (truncated domes—referred to in the United States as detectable warning surfaces [DWSs] and guiding patterns (raised parallel bars). The truncated domes and the guiding patterns are combined to define paths of travel in pedestrian areas, including public rights-of-way and multimodal transportation facilities.

There is increasing recognition in the United States that tactile guiding patterns may be an effective solution to wayfinding problems for visually impaired travelers where there are insufficient cues in the built environment to enable effective wayfinding. Examples are rail and

transit stations and hubs, intermodal terminals, plazas, irregular and confusing intersections such as roundabouts and channelized turn lanes, alternative intersections, shared streets, and parallel pedestrian/cycle paths at the same level.

Consistency in cues for wayfinding is extremely important to travelers who are visually impaired in order for them to understand the messages of such cues and because they are unable to use many other cues available to travelers with unimpaired vision. TWSIs, including both attention patterns (DWSs) and guidance patterns (raised bars), are loosely standardized on the basis of then existing research and practice in ISO 23599: Assistive Products for Blind and Vision-Impaired persons—Tactile Walking Surface Indicators (2012). The only systematic use of TWSIs in the United States is detectable warning surfaces (DWSs), which are required at transit platform edges and curb ramps as well as other locations where there is no distinction in level between pedestrian and vehicular ways. Standards ensuring consistency for the surface texture and some consistency in the installation of DWSs in the United States are contained in the 2006 Standards for Transportation Facilities and the 2010 Americans with Disabilities Act Standards. Similar consistency is needed in the surface textures and installation of guiding patterns.

A number of jurisdictions and transit authorities have begun to explore or install guiding patterns where it has been determined that there are insufficient cues for wayfinding. These include Caltrans, Los Angeles METRO, BART, New York DOT, DC DOT, Seattle, Minneapolis, Cambridge, MA, Vancouver, BC, and Alexandria, VA. While most of these installations are raised bar surfaces, there is great variation in the installation and materials, including the width and height (detectability) of the guiding pattern and where it is located.

The objective of this research is to produce guidance for transportation planners and engineers, based on research that will provide for consistency in the design and installation of TWSIs in multimodal transportation in the United States.

■ **Project F-27** *Evaluation of Non-Punitive Employee Safety Reporting to Improve Transit Safety*
Research Field: Human Resources
Allocation: \$100,000
TCRP Staff: Dianne Schwager

In response to the Moving Ahead for Progress in the 21st Century Act (MAP-21) and its successor, the Fixing America's Surface Transportation (FAST) Act, the Federal Transit Administration (FTA) has established the Safety Management Systems (SMS) framework as the basis for their new National Public Transportation Safety Program. One key aspect to effective SMS implementation is the establishment of a proactive, non-punitive employee safety reporting system, to assist in establishing a positive safety culture within the organization. A successful non-punitive self-reporting system will aid in the resolution of potential risks prior to any bus accident or incident occurring.

The FTA presentation titled "Safety Management System (SMS) Approach and FTA's Research Initiatives" indicates that the purposed final rule for Public Transportation Agency Safety Plan (PTASP) has a requirement that an employee reporting program be developed as part of an agency's SMS implementation.

In the past, transit unions and their employees have often faced disciplinary actions when bringing issues forward to management. A cultural shift is needed across the board to ensure that safety is the ultimate goal with

root cause analysis and corrective actions being developed and shared throughout the industry. In order to establish the SMS framework, including non-punitive employee reporting, an evaluation of the implementation would be beneficial to the transit industry to minimize the challenges associated with program implementation.

The objective of this research is to produce a compilation of the best practices used in non-punitive employee-reporting programs at transit agencies. The best practices would include examples of how non-punitive employee-reporting programs benefit transit agencies and their employees and could be used to assist transit agencies with developing their programs.

■ **Project H-56** *Reinventing Transit Networks for a New Mobility Future*
Research Field: Policy and Planning
Allocation: \$300,000
TCRP Staff: Dianne Schwager

Transit agencies across the United States are faced with an unprecedented rate of change in the mobility environment in which they operate. Transportation Network Companies (TNCs), ‘microtransit’, carshare, bikeshare, and ultimately autonomous vehicles all are creating a highly dynamic situation where traditional fixed route bus systems are faced with a critical need to rethink their role in the mobility ecosystem. Further, commute patterns have shifted as job locations have changed, work schedules vary as never before, and household and demographic compositions continue to shift as society is re-shaped by a range of factors. Significant risks and opportunities exist in this emerging multimodal setting and the way that transit systems respond will not only shape their own futures but the futures of the cities and communities that they serve.

Over the past several years, many agencies across North America have initiated efforts to ‘re-imagine’ their transit networks and to rethink how their routes and modes of service can best meet the evolving needs of the communities where they provide mobility. There are many lessons to be learned from these efforts: How has ridership responded? What has been the effect on agency budgets? What are the policy and public perception implications? How has efficiency and effectiveness changed after implementation? What partnership models, both public and private, have proven successful? What more needs to be done to prepare transit agencies to succeed in the ‘new mobility’ environment?

The objective of this research is to provide transit agencies with guidance on how the rapidly evolving mobility landscape is likely to affect their role and to provide potential responses.

■ **Project H-57** *Guide to Joint Development for Public Transportation Agencies*
Research Field: Policy and Planning
Allocation: \$400,000
TCRP Staff: Larry Goldstein

Joint development (JD) is the value capture tool used most often for public transportation purposes. Transit agencies are increasingly looking to JD to generate non-farebox revenue to supplement limited resources. Real estate offices in many transit agencies around the country are taking a more proactive role in driving transit-oriented development around their transit stations by expanding their JD programs. For example, WMATA has completed at least 18 projects since 2006; LA Metro has completed at least 14 projects since 1995 and has at least 16 projects in the queue; and BART has adopted plans to build 20,000 housing units (35% affordable) and 4.5 million square feet of commercial space on their properties by 2040.

Furthermore, the Federal Transit Administration (FTA) published a Joint Development Circular in 2014 (and updated it in 2016). Transit agencies must now also ensure compliance with this guidance when requesting financial assistance from the FTA for JD projects or pursuing projects on property with an FTA interest. Since publishing its updated guidance, FTA has approved several JD projects, at least one of which is fully implemented. Of the projects approved since 2014, FTA's total original investment was \$24.8 million and the sponsors of those projects have leveraged that investment to generate \$277.8 million in contracted future revenue for transit purposes. The project sponsors estimate that these projects will also generate local economic development benefits and attract private investment worth an additional \$335 million.

With this growth in the use of JD and FTA's updated JD guidance, interest among transit agencies in sharing best practices and developing a comprehensive guide to JD has increased.

The objective of this guide is to provide a comprehensive overview of JD for transit agencies that want to pursue JD but have less experience working on land use planning issues and/or executing complex real estate transactions. The guide would include: a primer on JD, separate and distinct from transit-oriented development (TOD); the costs and benefits of JD; an overview of the JD process – from zoning, to site planning and massing /design, preparing requests for qualifications /proposals (RFQs/RFPs), working with developers, conducting public outreach, and negotiating agreements; an overview of the state of JD practice; best practices and lessons learned from agencies with robust JD programs; and strategies for successfully navigating the FTA approval process.

■ Project J-11/Task 31	<i>Application and Monetization of Data Collected by Transit Agencies</i>
Research Field:	Operations (Under series of continuing projects titled, <i>Quick Response Research on Long-Term Strategic Issues</i>)
Allocation:	\$90,000
TCRP Staff:	Dianne Schwager

A recent article in the *Economist* magazine titled “Fuel of the Future: Data Is Giving Rise to A New Economy,” stated that “Data are to this century what oil was to the last one: a driver of growth and change. The new economy is more about analyzing rapid real-time flows of often unstructured data: the streams of photos and videos generated by users of social networks, the reams of information produced by commuters on their way to work, the flood of data from hundreds of sensors in a jet engine.”

In the past decade, the variety of transit industry data sources have increased. These include: 1) customer-facing real time arrival information, 2) smartcard data collection, and 3) cell phone usage and call records. An important focus of the proposed research is to explore how these data can be leveraged. Additionally, research is needed to review and analyze advanced data collection activities and the potential for application by public transit agencies. These include addressing questions such as

- Private companies increasingly seek transit data-What is the data worth?
- How can transit agencies better use the data they generate to plan improved services and support vehicle state of good repair?
- What data should transit agencies begin collecting that may be lucrative?

The objective of this research is to produce guidance and timelines for transit agencies so that they can take near-term actions to take advantage of important data-related opportunities.

■ **Project J-11/Task 33** *Guidebook for Deploying Zero Emissions Transit Vehicle Fleets*

Research Field: Operations (Under series of continuing projects titled, *Quick Response Research on Long-Term Strategic Issues*)
Allocation: \$100,000
TCRP Staff: Dianne Schwager

Many agencies and an increasing number of municipalities and other public agencies are in the process of deploying entire fleets of zero emissions vehicles but are largely doing so based on an experience of deploying a handful of vehicles. There is no guidance on fleet-wide deployments (which are fundamentally different and are higher risk in terms of operational challenges). Research is needed to ensure that agencies deploying vehicles make decisions that are generally cost-neutral and do not affect the ability to operate service efficiently or effectively.

The objective of this research is to produce a guidebook and a toolkit for use by transit agencies planning to deploy zero emissions transit vehicle fleets. The focus of this research will be on all types of transit systems, from small rural systems to large urban systems. It will produce a product that will guide agencies through the decision to deploy electric vehicles—how to decide which type to buy, how to determine a charging approach, how to plan and schedule. It will also discuss cost/revenue considerations, maintenance concerns, operational considerations, and facility and infrastructure planning. Finally, it will discuss other stakeholder considerations and needs, such as the need to work with energy providers, potential regulatory concerns, how to approach and manage customer acceptance, and other issues.