

RAIL TRANSIT SIGNAL AND CONTROL SYSTEMS RESEARCH PROGRAM
TECHNOLOGY ENFORCEMENT OF TEMPORAL SEPARATION FOR
SHARED-TRACK OPERATIONS

AGENCY: Federal Transit Administration (FTA), DOT

ACTION: Notice for Request for Proposals (RFP)

SUMMARY: FTA is seeking research proposals to study the Technology to Enforce Temporal Separation for Shared-Track Operations. FTA's research activities are authorized by 49 USC 5312, Research, Development, Demonstration, and Deployment Projects. The goal of this research program is to promote the research and development of new technologies that will improve the safety and efficiency of rail transit system operation in the United States (US). The research will include the evaluation of current PTC technology in the automatic enforcement of temporal separation of both freight and passenger trains in shared-track operations.

DATES: An applicant must electronically submit a proposal to <http://www.grants.gov> by January 19, 2011 for consideration. All potential applicants are advised to begin the <http://www.grants.gov> registration process immediately, if they have not previously submitted Federal assistance applications through <http://www.grants.gov>, in order to be able to meet the deadline. FTA expects to award funds to successful contractor(s) through a cooperative agreement by February 19, 2011. In the event of a system problem or technical difficulty with the application submittal, the applicants shall contact the FTA Program Manager for delivery instructions (see FOR FURTHER INFORMATION, CONTACT section below).

ADDRESSES: The website <http://www.grants.gov> allows applicant organizations to electronically find and apply for competitive opportunities from all Federal agencies that award Federal assistance. This website is the single access point for over 1,000 Federal assistance programs administered by the 26 Federal agencies.

FOR FURTHER INFORMATION, CONTACT: Technical, program management and administrative questions shall be directed to Program Manager: Patrick Centolanzi, Office of Technology (TRI-20), E43-463, Federal Transit Administration, U.S. Department of Transportation, 1200 New Jersey Ave, SE, Washington, D.C. 20590; email address: Patrick.Centolanzi@dot.gov, or by phone at 202-366-0234.

SUPPLEMENTARY INFORMATION: Reports on Shared-Track Operations, Temporal Separation, and FRA-Compliant Equipment, Positive Train Control (PTC), and Communication-Based Train Control (CBTC) shall be referenced. See a list of Technical References at the end of this announcement.

Objectives

This project will evaluate the use of PTC to enforce the extended temporal separation rules, and create a demonstration program of a PTC system that improves the safety of shared-track operations.

While the selection of the rail transit agency is left to the grantee, it is desired to seek an agency with an existing shared track waiver, a waiver being planned, or a combination of the above. It is acknowledged that the Peninsula Corridor Joint Powers Board, Southern California Regional Rail Authority, Amtrak California, or the California High-Speed Rail Authority, or a combination, would be excellent choices.

Background

In the past decade, the Transit Cooperative Research Program (TCRP) supported several research programs on shared use of rail corridors. In 2009, TCRP published the Report 130 titled, “Shared Use of Railroad Infrastructure with Noncompliant Public Transit Rail Vehicles: A Practitioner’s Guide.” In 2010, the National Cooperative Highway Research Program (NCHRP) published the Report 657 titled, “Guidebook for Implementing Passenger Rail Service on Shared Passenger and Freight Corridors.” The first report examined the safety issues of rail transit equipment, while the latter assessed the risk associated with passenger rail service and the associated schedule conflicts with freight rail operations. No comprehensive studies were performed on technological solutions to enforce the temporal separation of FRA-Compliant and Conventional (or non-FRA-compliant) rail equipment on the shared rail tracks.

In March of 2010, the Office of the Secretary of Transportation (OST) and FTA Office of Technology (TRI-20) signed an Inter-Agency Agreement (IAA) to support the Rail Transit Signal and Control Systems (RTSCS) Research Program. This IAA made a total of \$2,000,000 available to rail transit research, management, and consulting organizations to undertake a study of the implementation of PTC on commuter railroads, rail transit systems, and shared-use rail operations. This announcement is under the RTSCS Research Program for a study on PTC functionality to ensure the safe operation of light rail and conventional rail equipment on the general railroad system—in other words, the temporal separation of FRA-Compliant and Conventional equipment operating on the shared use of freight and passenger rail tracks (also called Temporal Separation of Shared-Track Operations).

The Rail Safety Improvement Act (RSIA) of 2008 requires the Class I freight railroads and intercity passenger railroads to implement PTC systems by December 31, 2015. This will give the rail transit authorities an opportunity to apply PTC on the shared use of freight and passenger rail tracks. With a new communication system, PTC technology will permit more efficient operations over conventional systems by allowing trains to operate safely at much closer headways, greater flexibility, and greater precision in train control, and by providing continuous safe train separation assurance and over-speed

protection. Additional benefits of PTC technology include the improved reliability and reductions in maintenance costs through a reduction in wayside equipment. However, a business case needs to be presented to the transit operators and local officials to demonstrate the safety and reliability of PTC systems for shared-track operations.

Project Description

The project shall study the functional requirements and performance standards of communications-based train control systems meeting the PTC mandate for multiple types of train-sets in the shared use of rail tracks and rights of ways. The purpose is to evaluate the risk and reliability of current PTC technology, and to identify the enhancements needed to enforce the temporal separation of FRA-Compliant (often heavy in weight) equipment and Lighter-Weight equipment in shared-track operations, which may include both freight and passenger railroad systems.

The selected organization shall conduct the following tasks;

- 1) **Review the operating rules** that govern the shared-track operation and temporal separation in particular, including all currently active temporal separation waivers issued to US commuter and light rail transit systems operating on the general freight railroads. The review is not looking for technical details, but for the top-level structure and/or framework of operating rules that are related to temporal separation, for both freight and passenger railroads. The findings of this review shall be published in a report.
- 2) **Analyze the functionality of PTC systems and software** to automatically enforce the spatial separation and closing speed limitations of multi-type train-sets (FRA-Compliant and Conventional Equipment) operating on the same and nearby rail tracks and rights of way. The analysis of PTC systems and software functionality shall include the following areas:
 - A general description and/or illustration of the system architecture;
 - Onboard train control and monitoring components;
 - Wayside signal and switch control components;
 - Central office dispatching and traffic control components;
 - Critical infrastructure for communication and information technology support.
- 3) **Evaluate the feasibility, risk and reliability of current PTC technologies** for shared-track operations of multi-type train-sets (FRA-Compliant and Conventional Equipment). The following features are desired by rail transit practitioners:
 - Provide more accurate and real-time information about train movements and locations;
 - Share one's track authority and train location with other railroads;

- Implement moving block and dynamic headways, and reduce the length of track circuit block;
 - Implement multiple signal aspects;
 - Allow the train control systems (onboard computer) to automatically stop the train and prevent train-to-train collisions to override operator error;
 - Prevent/protect track-to-track crossing conflicts and siding roll outs;
 - Accommodate different performance characteristics of passenger and freight equipment;
 - Provide for operator alerts and a visual transition zone when going from signaled track to street-running territory;
 - Provide hazard warning and avoidance systems;
 - Accommodate equipment that may not be recognized by the train control system on the line, including maintenance of way vehicles;
 - Report equipment failure and accidents in a timely manner.
- 4) **Identify the changes needed on PTC systems** to prevent train-to-train collisions in shared-track operations. The functional enhancements may include the modifications of Computer-Aided Dispatching (CAD) systems for the back offices, and a new generation of Automatic Train Stop (ATS) systems for locomotives and cab cars. The research shall identify the time and cost needed for the development and testing of these changes to existing PTC systems.
- 5) **Document lessons learned in the development of PTC and CBTC** for freight and passenger rail systems. The existing PTC systems may include:
- Vital Train Management System (V-TMS) developed Union Pacific Railroad and Wabtec. The system is currently under development for shared-track operations with Metrolink in Los Angeles, CA;
 - Electronic Train Management System (ETMS) developed by BNSF Railway and Wabtec. The system is currently in testing by METRA Commuter Rail in Chicago, IL;
 - Advanced Civil Speed Enforcement System (ACSES) developed by Amtrak and ALSTOM. The system is currently in revenue service in the Northeast Corridor between Boston and Washington, DC;
 - Ohio Central Railroad System (OCRS) PTC (also known as Train Sentinel) System developed by INVENSYS Rail Group (Safetran and Quantum Engineering)
- 6) **Create a Demonstration Program of a PTC System** that automatically enforces separation waiver rules. This demonstration project, as all FTA research projects, will result in a final research report published for public consumption. All technical specifications, performance requirements, designs, and other material describing the research results and proposed systems, will be published for public consumption.
- 7) **Conduct a return on investment or cost/benefit analysis of enhanced PTC systems** for rail transit authorities. The case studies may include New Jersey Transit

RiverLINE, Southern California Rail Authority Metrolink, Amtrak ACSES lines, and other commuter rail projects awarded by the New Start Grants.

Project Schedule

The proposal must include a Project Schedule with detailed timetables on Task Number, Task Description, Start Date, and Period of Performance (POP). Separately, the proposal also needs to identify the Major Milestones with Task Number, Deliverable Name, and Date of Delivery in a table or in Microsoft Project format. The Final Report shall be delivered to FTA for publication by June 15, 2013. The project shall be closed with a Final Progress Report by June 30, 2013.

Eligibility Information

This is an unrestricted solicitation. Any responsible source may submit a proposal concept paper for consideration, including, but not limited to, states or local governments, or organizations of state or local governments, universities or institutions of higher education, non-profit organizations, private individuals, corporations, and businesses or commercial organizations, except that any business owned in whole or in part by the Federal Government is not eligible. Although businesses owned in whole or in part by the Federal Government are not eligible for funding under the Program, they may contract with eligible participants. Cooperative arrangements (e.g., joint ventures, limited partnerships, teaming arrangements, or collaboration and consortium arrangements) are permitted and encouraged.

Small, Small Disadvantaged (SD), and Service Disabled Veteran Owned Business Concerns, and Veteran Owned (VO) and Woman-Owned (WO), and Historically Underutilized Business Zone (HUBZone) Small Business Concerns, and Historically Black Colleges and Universities (HBCU) and Minority Institutions (MIs) are encouraged to submit proposal concept papers on their own and/or in collaboration with others. However, no portion of this BAA will be set aside or reserved exclusively for Small, SD, or Service Disabled Veteran Owned Business Concerns, or for VO, WO, or HUBZone Small Business Concerns, or for HBCU and MIs.

Award Information

FTA will fund one application under this program. The total available funding is \$450,000. Future funding will depend on Appropriations. FTA will participate in activities by attending review meetings, commenting on technical reports, maintaining frequent contact with the project manager, and approving key decisions and activities including redirecting activities if needed.

Cost Sharing or Matching

Federal transit funds are available to research projects at up to 100 percent of the project cost. However, cost sharing will be an evaluation criterion.

Proposal Content

This announcement includes all of the information that you need to apply. The following forms are available on grants.gov and are required to be completed:

1. SF 424 Mandatory
2. Other Attachments Form

SF 424 Mandatory

Most of SF 424 is self-explanatory. The application shall include the following items:

- 1a – Application
- 1b – Annual
- 4a – Leave blank
- 4b – 26

Other Attachments Form:

1. The application shall attach a pre-application (not more than 15 pages in length) as outlined in Chapter II (Item 9.b) of FTA Circular 6100.C: Transit Research and Technology Programs: Application Instructions and Program Management Guidelines: http://www.fta.dot.gov/laws/circulars/leg_reg_4121.html.

This pre-application shall also address the six criteria laid out below in the Application Review Information section. The project budget justification shall include identification of any matching funds and their source. The Formal Application described in the Circular is not being requested at this time.

2. The application shall attach information on the qualifications of key personnel, including biographies.

Anyone intending to apply shall initiate the process of registering on <http://www.grants.gov> by December 19, 2010 for consideration. All potential applicants are advised to begin the <http://www.grants.gov> registration process immediately, if they have not previously submitted Federal assistance applications through <http://www.grants.gov>, in order to meet the deadline.

Application Review Information

A review panel will be convened to review each proposal. Project proposals will be evaluated based on the following criteria:

1. Proposed Research, which includes the applicability of the proposed research to the requirements, the uniqueness and or need for the research, and the expected results. Proposals shall explain how a particular practice or technology will improve rail operations. The proposed project must identify train control issues facing public transportation, why it is of national significance, the uniqueness or

- relationship of this project to other research, and how the proposed research will address the issue.
2. Qualifications of Key Personnel, which includes knowledge of and prior experience with train control technology.
 3. Technical Management Plan, which includes the management approach for planning, scheduling, administering, coordinating and conducting the work effort.
 4. Past Performance on activities relevant to the proposed work.
 5. Cost and Cost Sharing.
 6. Plan for evaluation and data collection. The proposal must address how success will be measured (e.g. before and after studies).
 7. Existing positive relationship between grantee and rail transit agency.
 8. Selection of rail transit agency or agencies.
 9. Details and Plans for Demonstration Project.

Award Administration Information

The successful applicants will be notified of their grant award in February 2011. Following receipt of the notification letter, the successful entities will be required to submit the Formal Application as outlined in Chapter II (Items 10-25) of FTA Circular 6100.C: Transit Research and Technology Programs: Application Instructions and Program Management Guidelines http://www.fta.dot.gov/laws/circulars/leg_reg_4121.html through the FTA Transportation Electronic Award Management (TEAM) system website.

FTA will manage the cooperative agreement through the TEAM system website. Before FTA may award Federal financial assistance through a Federal grant or cooperative agreement, the entity must submit all certifications and assurances pertaining to itself and its project as required by Federal laws and regulations. Since Federal fiscal year 1995, FTA has been consolidating the various certifications and assurances that may be required of its awardees and the projects into a single document published in the Federal Register. Fiscal year 2008 Annual List of Certifications and Assurances for FTA Grants and Cooperative Agreements and guidelines is published in the Federal Register and posted on the FTA website at: http://www.fta.dot.gov/funding/apply/grants_financing_10736.html.

Recipients will be required to manage their projects in accordance with FTA Circular 6100.C: Transit Research and Technology Programs: Application Instructions and Program Management Guidelines: http://www.fta.dot.gov/laws/circulars/leg_reg_4121.html. This includes requirements on project management and administration including quarterly reporting, financial management, and payment.

Technical References:

- 1) FRA/FTA (2000). Statement of Agency Policy Concerning Jurisdiction Over the Safety of Railroad Passenger Operations and Waivers Related to Shared Use of

the Tracks of the General Railroad System by Light Rail and Conventional Equipment. Federal Railroad Administration and Federal Transit Administration, Washington, D.C., July 10, 2000.

- 2) FRA/Zeta-Tech Associates (2003). Catalog of Common-Use Rail Corridors. Federal Railroad Administration, Washington, D.C., 2003.
- 3) TCRP (2009). Shared Use of Railroad Infrastructure with Noncompliant Public Transit Rail Vehicles: A Practitioner's Guide (TCRP Report 130).
- 4) NCHRP (2010). Guidebook for Implementing Passenger Rail Service on Shared Passenger and Freight Corridors (NHCRP Report 657)