DEPARTMENT OF TRANSPORTATION (U.S.DOT)

Federal Transit Administration

PILOT PROGRAM TO DEMONSTRATE THE BENEFITS OF VEHICLE ASSIST AND AUTOMATION (VAA) APPLICATIONS FOR FULL-SIZE PUBLIC TRANSIT BUSES

AGENCY: Federal Transit Administration (FTA), U.S.DOT
ACTION: Notice for Request for Proposal (RFP)

SUMMARY: The U.S. Department of Transportation (DOT), through the Federal Transit Administration (FTA) and Research and Innovative Technology Administration (RITA), ITS Joint Program Office (JPO), hereby requests proposals from public entities that will ultimately result in the award of one or more cooperative agreements to demonstrate, in revenue service, one or more vehicle assist and automation (VAA) applications for bus-based, full-size public transit vehicles. The award will support the implementation of innovative technology-based strategies to improve transit agency performance, increase ridership and attractiveness of public transit, and reduce congestion.

This RFP is focused on the demonstration of one or more types of VAA technology applications, in transit revenue service, and the documentation of their costs and benefits. The overall objective of the VAA demonstration is to facilitate the implementation of innovative strategies incorporating ITS systems in vehicle guidance that can demonstrate measurable travel time savings (reduced vehicle run times) and the reduction of operational costs, as well as other benefits including short-term and sustainable increases in ridership and long-term congestion mitigation.

Successful implementation of this VAA Demonstration will assist transit agencies in assessing the technical merit and return on investment of VAA systems, shed light on the benefits versus the costs of these systems, and provide objective justification for implementing VAA systems or for spending funds on comprehensive VAA capital projects. If the results are favorable (e.g., technically feasible and positive return on investment), this VAA Demonstration Project may lead to a more widespread deployment of these VAA systems.

DATES: An applicant must submit a proposal electronically to *www.grants.gov* by 4:15 pm Washington, DC time on December 28, 2007 for consideration. The applicant should also e-mail an electronic copy of the proposal to the FTA Project Manager. Late proposals will not be reviewed or considered unless the FTA Project Manager determines it is in the Government's best interest to consider the late proposal. All potential applicants are advised to begin the *www.grants.gov* registration process immediately, if they have not previously submitted Federal assistance applications through *www.grants.gov,* in order to be able to meet the deadline. FTA expects to award funds through a cooperative agreement in early 2008 which will allow for a 2-year execution of all phases of the project, including the final project report. All proposals should reference "Demonstration of Vehicle Assist and Automation (VAA) Applications for Bus-Based, Full-Size Public Transit Vehicles."

The FTA Project Manager for this project is Mr. Michael Baltes, ITS Program Manager, Office of Mobility Innovation, Federal Transit Administration.

ADDRESSES: The website *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 1000 Federal assistance programs administered by the 26 Federal agencies.

FOR FURTHER INFORMATION CONTACT: Technical, program management and cooperative agreement administrative questions should be directed to Mr. Michael Baltes, Office of Mobility Innovation via phone at 202-366-2182, via e-mail to *michael.baltes@dot.gov*, or via U.S. Mail at the following address:

Michael R. Baltes, ITS Program Manager
Federal Transit Administration
Office of Mobility Innovation
1200 New Jersey Ave., SE
4th Floor - East Building - Rm E43-451
Washington, DC 20590

The secondary point-of-contact is Steve Mortensen, Deputy Project Manager, Senior ITS Engineer, E-mail: *steven.mortensen@dot.gov*, Phone: (202) 493-0459

CONTENTS

I. Background
II. Visions, Goals and Objectives
III. Funding
IV. Schedule
V. Eligibility
VI. Proposal
VII. Proposal Review Information
VIII. Award Administration Information
IX. Document Requirements
X. Additional Resources

I. BACKGROUND

The FTA is the primary federal agency of thirteen operating agencies within the U.S. DOT that carries out the Federal mandate to improve public mass transportation. FTA is the principal source of Federal financial assistance to America's communities for the planning, development, improvement, and maintenance of public transportation systems.

This requirement is for FTA's Office of Mobility Innovation, under the Associate Administrator for Research, Demonstration, and Innovation (TRI). TRI seeks to deliver solutions that improve public transportation. Research is conducted to address the strategic goals of increasing transit ridership, improving safety and emergency preparedness, improving capital and operating efficiencies, and protecting the environment and promoting energy independence. In addition, TRI seeks to provide transit research leadership across the transit industry.

Vehicle Assist and Automation Technologies

Vehicle assist technologies are defined as technologies which help the driver maintain lateral control of the bus. Vehicle automation technologies provide both longitudinal and lateral control of the movement of the transit vehicle. Initial transit VAA research has shown that these technologies have significant promise to provide benefits to transit agencies in terms of more efficient operations. In most cases, full technical feasibility and the benefits have not been quantified yet, and extrapolating results from small initial demonstrations to revenue service is generally not convincing. However, the technical merits and benefits of these technologies could be fully quantified in a broad demonstration involving revenue service.

VAA technologies are not widely deployed, so most of the current state of knowledge comes from U.S.-based university research and initial demonstration projects and limited international VAA implementations. However, there is an extensive body of research dating back to the Automated Vehicles Highway System research effort that has been published. Recently, in 2004 and 2005, four research studies were conducted to obtain useful information on these systems. Reports from these studies are listed in the "Additional Resources" section of this RFP. The reports are available on the FTA (*www.fta.dot.gov*) and NBRTI (*www.nbrti.org*) websites.

Three viable VAA technologies/methods have been identified to this point:

- **Magnet Systems** — Using sensors and steering actuators, the bus follows a trail of magnetic nails, disks, or tape in, or on, the pavement.
- **Vision/Optical Systems** — The bus follows a line of special pavement striping or retro-reflective tape using machine vision and steering actuators.
- **DGPS/Onboard Map Guidance** — On-Board equipment guides vehicle movement using Differential GPS to determine location and an on-board map to determine the path.

The FTA is specifically interested in demonstrating two viable VAA applications that have been identified in recent research as having the most potential — precision docking and lateral guidance. These are core applications that VAA systems could enable in different transit operational scenarios. Different operational scenarios would require different configurations/combinations of these applications, such as precision docking at bus stops on local streets or a combination of precision docking on local streets and lateral guidance on a narrow shoulder or other exclusive lane.

Vehicle Assist and Automation Benefits and Costs

Based on initial research, it appears that the basic technology for VAA systems is viable. Available technology can meet parameters for performance of vehicle guidance functions in terms of precision, accuracy, repeatability, and reliability. Costs for equipment and infrastructure can be estimated. While initial prototypes may require significant systems integration costs, the equipment itself appears to be relatively inexpensive even in relatively small production volumes of currently available technology.

Benefits, infrastructure costs, and operating costs for VAA have been estimated as a result of initial demonstration projects and early deployments, and the early estimates appear promising. Benefits may include improved trip times, quicker and easier boarding for all passengers, reduced operating and maintenance costs because of fewer accidents and less wear-and-tear on the vehicle by the driver, a smoother "rail like" service and the potential for a reduction in right-of-way requirements. Preliminary analysis would seem to indicate that VAA technologies could provide a cost-effective bus alternative to traditional light or heavy rail systems in selected corridors. However, more data from actual deployment is needed to unambiguously demonstrate that VAA is a cost-effective alternative. A need exists to determine the technical feasibility, benefits, and costs of these systems in different scenarios and to determine the return-on-investment.

II. VISION, GOALS AND OBJECTIVES

The FTA is seeking proposals from public entities to demonstrate the technical merit and feasibility of one or more different types of VAA technology applications in transit revenue service in different operating environments (e.g., weather conditions), and to identify and document their costs and benefits. The overall objective of the VAA demonstration is to facilitate the implementation of innovative strategies incorporating ITS systems in vehicle guidance that can demonstrate measurable travel time savings (reduced vehicle run times) and the reduction of operational costs, as well as other benefits including short-term and sustainable increases in ridership and long-term congestion mitigation. Expected results of this demonstration effort include the following.

- Detailed functional requirements to implement VAA projects
- System specific architecture, based upon the demonstration environment and application
- Project operational plan
- Operating legacy system that can be used as a point-of-reference for other transit agencies in the U.S.
- Documentation of the VAA system technical feasibility, costs, and benefits
- Lessons learned in implementing the project
- VAA system(s) leading to a commercially viable product

The FTA anticipates substantial involvement between the U.S. DOT and the recipient(s) during the course of this project. FTA anticipates the Federal involvement will include:

- Coordination with recipient on the U.S. DOT's program development and research activities
- Technical assistance and guidance
- Close monitoring during performance
- Involvement in technical decisions
- Conduct of an independent evaluation of the project which will include collection of data from the recipient
- Participation in status meetings including, but not limited to, a kick off meeting and periodic budget reviews

The effort also includes presentations to, and feedback from, the VAA Working Group and U.S. DOT staff at key status meetings and milestones during the life of the project. The VAA Working Group will be established during the development of the VAA Demonstration Program and will be composed of representatives from domestic transit operating agencies and VAA vendors from the proposal teams, academic and research entities, and the U.S. DOT.

A major goal of the U.S. DOT is to promote the development of innovative applications of Intelligent Transportation System (ITS) technologies. In order to assess the performance and impact of the VAA system, the project will be independently evaluated. The recipient(s) shall agree to support and work with the independent evaluator, which will be selected by the U. S. DOT. The recipient(s) will provide the evaluator access to the VAA demonstration site, collect and provide the evaluator necessary data, and work with the evaluator if it conducts surveys of and/or interviews with transit customers and agency staff concerning their perceptions of the VAA system. The evaluation of the VAA system will be conducted based on an evaluation plan developed by the independent evaluator with input from the project recipient(s). The independent evaluator will produce a final report that documents the evaluation results.

The FTA encourages the submission of project proposals that can demonstrate a prototype of the proposed VAA applications in a showcase at the 2008 American Public Transit Association (APTA) Annual Meeting and Expo in San Diego, California.

III. FUNDING

The FTA anticipates Federal funding in an amount up to $1,900,000 will be made available for one or more cooperative agreements to demonstrate VAA operations in revenue service. Federal funds are restricted to 80 percent of total project costs. A minimum of 20 percent of the total cost of the project must be from non-Federally derived funding sources and must consist of either cash, substantial equipment or facilities contributions that are wholly utilized as an integral part of the project, or personnel services assigned to the proposed operational test for a substantial period as long as such personnel are not otherwise supported with Federal funds.

The non-Federally derived funding may come from state, local government, or private sector partners. State and local agencies will be subject to the requirements of 49 CFR Part 18.24, Matching or Cost Sharing (available at *www.dot.gov/ost/m60/grant/49cfr18.htm#18.24*). Non-profit organizations are subject to 49 CFR Part 19.23, Matching or Cost Sharing (available at *www.dot.gov/ost/m60/grant/49cfr19.htm#19.23*). In general, only funds expended after the effective date of the award will be eligible for consideration as match.

NOTE: Cost share contribution must represent a minimum of 20 percent of total project costs, not 20 percent of the Federal funds requested. For example, if the total project cost is $100,000, the required local cost share is $20,000. If the Federal share is $100,000, the required local cost share is $25,000, not $20,000.

IV. SCHEDULE

It is anticipated that the VAA project period of performance will be a maximum of twenty-four (24) months commencing from the date the cooperative agreement(s) is(are) executed. This includes project start-up, design, procurement, installation, technology integration, operation, and test for 12 months. This means that the cooperative agreement recipient(s) will complete the project in 24 months. This will provide a minimum of six (6) months prior to the demonstration showcase of the technology at the 2008 APTA Annual Meeting and Expo in San Diego, California. The cooperative agreement recipient(s) shall

make certain that the VAA system will remain operational throughout the independent evaluation process until the final report is received by FTA, unless otherwise permitted by FTA.

The Delivery Schedule shall be submitted in a Gantt chart and Microsoft Project formats and updated with the planned and actual schedules by task in the monthly reports. The initial schedule and progress reporting updates will be provided to the FTA Project Manager in electronic file format with the progress reports.

V. ELIGIBILITY

Competition is limited to State or local governments or public authorities, such as State departments of transportation, transit authorities, and tolling agencies. Although prime awards must be with the aforementioned public entities, those entities may partner with for-profit companies and non-profit organizations at the sub-award level.

VI. PROPOSAL

FTA will select one or more VAA proposals for funding under this RFP. This RFP is intended to solicit proposals for a cooperative agreement(s) for the installation and operation, in revenue service, of VAA technology. Proposals must discuss the applicant's proposed approach for the conducting the project and expected accomplishments. Proposals that provide the most innovative approaches and VAA applications, and demonstrate the greatest operational testing value and use of VAA technology, with commensurate benefits demonstrated, will receive greater consideration.

Proposal Guidelines

A proposal should not exceed thirty (30) pages in length, including title, index, tables, maps, appendices, abstracts, and other supporting materials except resumes (i.e., resumes may be in addition to the 30 pages). In the event a proposal exceeds the page limitation, the Government will evaluate only the first 30 pages.

The format of the proposal shall be as follows:

1. Proposals shall be prepared on 8½ x 11 inch paper except for foldouts used for charts, tables or figures, which shall not exceed 11 x 17 inches. Foldouts shall not be used for text, and shall count as two pages.
2. A page is defined as one side of an 8 ½ by 11-inch paper. Therefore, a piece of paper with printing on both sides is considered two pages.
3. Text shall be printed using a font size no less than 12 cpi and in one of the Times New Roman fonts.
4. Page margins shall be a minimum of 1-inch top, bottom and each side.

The proposals should be submitted electronically on *www.grants.gov*. An electronic copy must also be submitted to the FTA Project Manager via e-mail. The cover sheet or front page of the proposal shall include the name, address, and phone number of an individual to whom correspondence and questions about the proposal may be directed. In addition, an SF-424 Application for Federal Assistance form must be completed and submitted with the proposal. The form may be obtained at *www.grants.gov*.

Each proposal shall include a Technical Plan, Financial Plan, and a Management and Staffing Plan, as discussed below, that clearly demonstrates the implementation and operation of the VAA system, and that describes how the proposed objectives will be met within the specified time frame and budget.

Technical Plan

The Technical Plan shall provide a project overview and shall discuss the project technical approach as described below.

Project Overview – The project overview shall discuss the agency, authority, or authorities requesting funding, and describe the local area/jurisdiction where the operational test will take place. In addition, the following should be highlighted:

1. Identify the facilities that will be covered by the operational test. Describe how the existing infrastructure will be expanded and used to support the proposed VAA system.
2. Describe the proposed system, including new and improved services, and how it will be integrated with ITS infrastructure as well as other non-transportation applications and participating private sector institutions (if applicable).
3. Define the goals and objectives of the VAA system. Address both customer service and operating efficiency.
4. Summarize the expectations of the proposed system (e.g., costs, benefits, risks, operations, maintenance issues, plans, and system support). Describe the anticipated effects of the VAA system on reducing travel times for transit, congestion relief, altering travel behavior toward transit, etc.

Technical Approach – Within the Technical Approach, the following areas must be clearly addressed:

1. Describe the system design concept. Include evidence of consumer input in design, if any.
2. Describe the technologies to be used and the proposed system integration. Discuss previous experience with VAA technologies and operations, if any.
3. Discuss the operational testing value of the proposed project. Operational testing value is the extent to which the project demonstrates to other states, metropolitan areas, and other jurisdictions the potential of VAA technologies. The proposal should also discuss what elements of the applicant's strategy are novel, and how the applicant believes these elements hold promise to improve transit service delivery and potentially reduce congestion in other metropolitan areas.
4. Outline the plan, including timeline broken down by phases for implementing the VAA system, such as system design, development, deployment, and operations.
5. Include a project statement of work that clearly identifies and discusses each task to be conducted during the project and the corresponding task deliverable(s).
6. Include a project schedule that identifies the phases, tasks, major milestones, and deliverables of the project.
7. Document the assumptions and technical uncertainties, and propose specific approaches to resolve any uncertainties.
8. Describe the approach by which the system design concept will be refined, developed, and operationally tested. Include consumer participation and input in testing.
9. Show evidence that the project team has considered service delivery issues. Examples include: Who will use or gain from the enhanced transit benefits? What problems will it solve for the participating transportation provider? How will the project team market the system to the user?
10. Describe the plan for concluding the operational test, indicating whether hardware, software, and infrastructure will remain in service, be sold, or returned to participating vendors, if applicable. Describe how long the VAA system will remain operational for independent evaluation.
11. Discuss plans for meeting all Federal, State, and local legal and administrative requirements for project implementation, including relevant Federal-aid planning and environmental requirements.
12. Discuss previous public involvement, including public meetings, in the development of the proposed VAA system. Include any expressions or declarations of support from public officials, industry, and/or the public. Future plans for involving key affected parties, coalition building, and media

relations, and more broadly for ensuring adequate public and private sector involvement prior to implementation (applicants are encouraged to provide more than just letters of support, but instead reference any implemented policies and/or legislation that will enable successful implementation).

Management and Staffing Plan

1. Identify the lead agency and describe the roles for each agency that will be responsible for implementing, operating, and maintaining, the operational testing project.
2. Describe private entities, if any, involved in the project and the arrangements therewith, including any cost sharing or debt retirement arrangements associated with revenues.
3. Identify project management and key professional/technical staff roles for the project. Include an organizational chart providing the names and positions of project management and key professional/technical staff.
4. Identify the project manager and demonstrate that he or she is capable, available, and able to commit to a level of involvement that ensures project success.
5. Provide names and positions of all other personnel related to managing the project, and discuss their management responsibilities for the project.
6. Provide the estimated number of hours by task for each job classification. Provide names for project management and key professional/technical staff.
7. In an appendix, include resumes for proposed management and key professional/technical personnel (Note: resumes do NOT count against the page limit).

Financial Plan

1. Provide a project budget, identifying costs broken down by phase (e.g., system design, development, deployment, operations) and task as identified in the Technical Approach. Clearly delineate Federal share versus non-Federal share.
2. Detailed table providing the following information:
    - Provide labor categories, labor hours or percentage of time, labor rates.
    - Provide indirect rates and bases; include any audit information to support rates.
    - Provide supporting information to justify estimates for Other Direct Costs such as equipment, travel, etc.
3. All financial commitments to the project, from both public and private sectors, shall be documented in a signed Memorandum of Understanding (MOU) and included in the proposal.

VII. PROPOSAL REVIEW INFORMATION

Proposals will be accepted immediately, as of the issue date of this RFP. Each proposal will be evaluated on its own merits against the below criteria.

Technical and Management Criteria

The primary evaluation criterion for the proposal will be the degree to which the proposal demonstrates the potential for successfully implementing an integrated VAA system. Proposals must demonstrate local viability and must also show strong potential for providing the baseline for a national model. The FTA will evaluate proposals based on the following general criteria listed in descending order of importance:

1. Operational testing value
2. VAA application innovation
3. Estimated impacts
4. Technical merit

5. Management approach and schedule

In addition to the above general proposal evaluation considerations, the FTA may use the following specific criteria in evaluating the proposals:

1. Qualifications and experience – qualifications and experience of individuals and organizations with respect to project management and technical capabilities.
2. Reasonableness to execute plan – the project should have a reasonable chance of being successfully executed, schedules met and milestones reached.
3. Ability to upgrade and expand the system – ability to upgrade the system with additional VAA technologies functionality, and to expand the system to include additional organizations and customers/clients.
4. Geographic coverage – a significant percentage of the geographic area in which transportation services are provided should implement VAA technology.
5. System interoperability – ability to integrate VAA technologies with other ITS systems (e.g., existing AVL and GIS systems).
6. Consumer input – the project should involve participation of the consumers who benefit from the VAA system during design and testing.

Cost Criteria

In addition to the project technical and management criteria listed above, relative cost will be considered in the ultimate award decision. The budget proposal will be analyzed to assess cost reasonableness and conformance to applicable principles. In addition, the FTA will review degree of proposed cost sharing above the required minimum. Proposals that exceed the required minimum cost share may receive priority in the evaluation.

Review and Selection Process

The FTA will establish a review panel to evaluate all eligible proposals based on the criteria and requirements defined in this RFP. The panelists may include Federal agencies outside of the U.S. DOT to provide diversified perspectives and expertise related public transit services. The Government is not obligated to make any award as a result of this announcement.

VIII. AWARD ADMINISTRATION INFORMATION

Award Notices

The successful applicant(s) will be notified and sent an award document for signature by the FTA Project Manager. Applicants not selected for award will be notified by the FTA in writing. Before the actual award, the FTA may enter into negotiations concerning such items as program components, staffing and funding levels, and administrative systems. If the negotiations do not result in an acceptable submittal, the FTA reserves the right to terminate the negotiation and decline to fund the applicant.

Project Plan, Statement of Work, and Schedule

After the project is awarded, the recipient(s) will submit a project plan that contains a statement of work, which is mutually agreed by the FTA and the recipient. The project plan will also contain a project schedule.

IX. DOCUMENT REQUIREMENTS

The following items are required for the VAA project:

1. Completion of SF-424 Application for Federal Assistance form
2. Signed Certifications and Assurances
3. Executed FTA Cooperative Agreement, which incorporates FTA's Master Agreement by reference

X. ADDITIONAL RESOURCES

There are a number of resources available that may help in responding to this RFP, as listed below. The FTA website has information about FTA, application forms, statutory, and administrative requirements, etc. Applicants are encouraged to use the FTA website as much as is needed. They are also invited to visit the ITS JPO website listed below.

1. Federal Transit Administration — *www.fta.dot.gov*
2. ITS Joint Program Office — *www.its.dot.gov*
3. *Multimodal Vehicle Assist and Automation, VAA Systems for Transit Operations Synthesis White Paper*, prepared by Noblis (formerly Mitretek Systems) for the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), United States Department of Transportation (U.S.DOT), April 14, 2005.
4. *Multimodal Vehicle Assist and Automation, Transit Operating Scenario Analysis*, prepared by Noblis (formerly Mitretek Systems) for the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), United States Department of Transportation (U.S.DOT), April 14, 2005.
5. *Multimodal Vehicle Assist and Automation, Program Plan and Route Map for Proposed Tier 1*, prepared by Noblis (formerly Mitretek Systems) for the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), United States Department of Transportation (U.S.DOT), April 14, 2005.
6. *Transit Lane Assist System Needs and Requirements*, prepared by University of California PATH Program and National Bus Rapid Transit Institute for Federal Transit Administration (FTA) and California Department of Transportation, April 2004.