

TRANSPORTATION  
RESEARCH

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# *CIRCULAR*

## Research Problem Statements

**Public Transportation: Marketing,  
Fare Policy and  
Rural Public Transportation**



**RESEARCH PROBLEM STATEMENTS**

**PUBLIC TRANSPORTATION: MARKETING, FARE POLICY, AND RURAL PUBLIC TRANSPORTATION**

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## Preface

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An important function of the Transportation Research Board is the stimulation of research toward the solution of problems facing the transportation industry. One of the techniques employed by technical committees in support of this function is the identification of problems and the development and dissemination of research problem statements. The aim of this activity is to provide guidance to financial sponsors such as governmental agencies, research institutions, non-profit organizations, industry, the academic community and others in allocating the scarce research funds and manpower.

The problem statements in this Circular represent the efforts of two of the fifteen TRB transit committees, the Committee on Public Transportation Marketing and Fare Policy (A1E06), and the Committee on Rural

Public and Intercity Bus Transportation (A1E08). The problem statements for the latter committee were developed before the intercity bus and rural public transportation activities were merged into a single committee. Accordingly they should not be considered an all inclusive recognition of transit research needs, because they represent only the problems identified by those committees.

Committee A1E06 ranked their seven problem statements in order of priority. They are listed in that order, with Problem No. A1E06-1 being most important and of highest priority. Committee A1E08 did not prioritize the problem statements. Their eleven problem statement listing does not reflect any order of priority.

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**COMMITTEE A1E06 - PUBLIC TRANSPORTATION  
MARKETING AND FARE POLICY**

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**PROBLEM STATEMENT NO. A1E06-01**

**Title:** INVESTIGATE INNOVATIVE AND/OR AUTOMATED FARE MEDIA DISTRIBUTION AND COLLECTION TECHNOLOGY (Both On Vehicle and Off Vehicle)

**Problem:** Examples (1) Automated Teller Bank Machines have introduced a new potential distribution method for prepaid transit fare media. Investigate the conditions under which such applications are feasible and successful. (2) Scratch-off validation for day passes and visitor passes is of interest. (3) Round trip or one-way transfers. (4) Swipe cards. (5) Validation cards are of interest. (6) Ticket vending machines. (7) Honor fare systems, and free fare zones for rail systems with automated fare cards are also of interest.

**Objective:** The objective is to demonstrate and document the applicability, costs and benefits of new fare payment distribution and collection technologies.

**Key Words:** Transit. Fares. Automation. Banking. Transfers. Technology.

**Related Work:** These applications of technology to transit fares are new. There is not an extensive literature to date although some work has been done with swipe cards and automated teller machines. Extensive work has been done with rail fare cards for BART and Washington DC Metro.

**Urgency:** Most Important

**Committee Priority Ranking:** 1

**Cost:** \$300,000-\$500,000

**User Community:** Transit operators.

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**PROBLEM STATEMENT NO. A1E06-02**

**Title:** WHAT IS ROLE OF MARKETING IN DEMAND MANAGEMENT WHEN MULTIPLE COMMUTING ALTERNATIVES EXIST

**Problem:** Investigate the effects of marketing and fare policy in shifting commuters from congested travel modes to modes that have available capacity. Examples: (1) Reduced feeder bus fare to alleviate parking shortages at rail stations. (2) Employer subsidies on

transit and ridesharing. (3) Providing missing links such as shuttle buses from stations to increase use of existing transit service. (4) Commute planning assistance.

**Objective:** The objective of this research is to identify the impact of specific marketing and fare policy actions on commuter behavior.

**Key Words:** Marketing. Pricing. Demand Management. Incentives.

**Related Work:** There is a large body of pricing literature and a growing body of literature about Transportation Management Associations (TMAs). New work should build on the old.

**Urgency:** Most Important

**Committee Priority Ranking:** 2

**Cost:** \$200,000

**User Community:** Planners. TMA managers. Transit operators. Business community.

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**PROBLEM STATEMENT NO. A1E06-03**

**Title:** INVESTIGATE DEMOGRAPHIC AND OTHER METHODS FOR IDENTIFYING TRANSIT MARKETS IN SUBURBAN NEIGHBORHOODS: HOW IS A QUALITY PRODUCT DESIGNED AND MARKETED?

**Problem:** Demographic characteristics and dispersed travel patterns make suburban areas difficult to serve with public transit. Niche markets can be served, however, with customized services and fare policies. What works and what does not?

**Objective:** Provide the transit industry with guidance on successful suburban service types.

**Key Words:** Demographics. Suburbs. Transit.

**Related Work:** There is a literature on use of taxicabs on low volume routes, feeder services to rail systems, express buses, High Occupancy Vehicle Lanes, and park-ride services. Existing work should be referenced in support of new work.

**Urgency:** Important

**Committee Priority Ranking:** 3

**Cost:** \$150,000

**User Community:** Planners. Transit operators.

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**PROBLEM STATEMENT NO. A1E06-04**

**Title:** USER INFORMATION SYSTEMS

**Problem:** Many new technologies exist or are in development which provide opportunities for public transportation. Among them are:

- Real Time Vehicle Location Information (can be expanded to provide ETA data for passengers)
- Cable TV (and two-way cable)
- Traffic Signal Priority for Buses/Joint Use of Traffic Signal Communications
- Scanner Data -- swipe cards and read/write cards
- Dynamic Ride Matching (European prototypes)
- Electronic Fare Collection and Passenger Information Collection

These and other technologies are being adopted by the transportation industry. There is opportunity for investigating new applications and producing syntheses of current affiliations, expanding the operations use of these technologies to user information systems.

**Objective:** Identify ways in which new technologies can be used in fare payment and marketing.

**Key Words:** Transit. Technology. Automation. SMARTCARDS.

**Related Work:** FHWA sponsored a study of transit applications of traffic signal communications networks. AVL has been in the literature for about ten years, but applications are proliferating now.

**Urgency:** Most Important

**Committee Priority Ranking:** 4

**Cost:** \$300,000-\$350,000

**User Community:** Transit Managers. Commuters.

**PROBLEM STATEMENT NO. A1E06-05**

**Title:** INFLUENCES, CONSTRAINTS AND FACTORS AFFECTING FARE POLICY

**Problem:** Local conditions affect fare policy. For example, in Pennsylvania the State allocates Lottery funds to pay for senior citizens' transit rides at one-half the cash fare rate. Therefore, some systems have set a very high cash fare but offer deep discounts for pass users. Attitudes toward peak period pricing vary as do perceptions of what base fare is appropriate and how it should be determined. Reduced fares for special groups are sometimes justified initially as a percentage of full cash fare, but then, for political reasons, cannot be increased proportionally as cash fare is increased.

**Objective:** Identify local issues, constraints and factors affecting fare policy and identify how transit systems have adapted to achieve revenue goals.

**Key Words:** Politics. Fare Policy.

**Related Work:** Issues of this type may be mentioned in existing research but there is not an extensive literature focusing on locally imposed constraints.

**Urgency:** Moderately Important

**Committee Priority Ranking:** 5

**Cost:** \$75,000

**User Community:** Transit operators. Planners. Elected officials.

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**PROBLEM STATEMENT NO. A1E06-06**

**Title:** INVESTIGATE EFFICIENCY OF COLLECTION AND EQUITY OF ALTERNATE FARE STRUCTURES

**Problem:** Evaluate the efficiency, cost and equity impacts of various fare payment and prepayment and promotional mechanisms.

**Objective:** The objective is to provide guidance to transit operators on the likely results of innovative fare structures, fare-related promotions, and treatment of special rider groups.

**Key Words:** Fares. Passes. Tickets. Tokens. Prepayment. Equity. Cost. Promotions. Discounts.

**Related Work:** There is an extensive body of literature on fare structure impacts. Most recent work involves deep discounts for pass users with premium fares for cash.

**Urgency:** Moderately Important

**Committee Priority Ranking:** 6

**Cost:** \$100,000

**User Community:** Transit operators.

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**PROBLEM STATEMENT NO. A1E06-07**

**Title:** INVESTIGATE RETAIL AND SALES APPROACHES TO SELLING FARE MEDIA

**Problem:** "Transit stores" operate now in Berkeley, California; Arlington, Virginia; and some other cities. Third party vendors of fare media and employers offering subsidies must be contacted by a sales force and supported by invoicing and delivery systems. Can telephone information operators sell transit passes, tickets, etc.? How can bus drivers become more active as sales agents? How successful are these approaches?

**Objective:** Identify successful non-traditional methods of distributing fare media to the public and increasing sales

**Key Words:** Fares. Retail Sales. Transit. Telephone Information.

**Related Work:** The existing literature in this area is not extensive.

**Urgency:** Moderate

**Committee Priority Ranking:** 7

**Cost:** \$100,000

**User Community:** Transit operators.

**COMMITTEE A1E08 - RURAL PUBLIC AND INTERCITY BUS TRANSPORTATION**

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**PROBLEM STATEMENT NO. A1E08-01**

**Title:** THE BENEFITS AND COSTS OF MULTI-USER MICROCOMPUTER TECHNOLOGY

**Problem:** While many transit operators have made use of single user microcomputers, only a few have begun to explore the use of multi-user systems. Preliminary indications show that multi-user systems are potentially beneficial for small and large transit systems and for a variety of information needs, including scheduling, dispatching, and administrative purposes.

**Objective:** Review and assess the potential costs and benefits of multi-user microcomputers for small urban and rural transit systems. Special attention should be given to the following aspects: hardware limitations, multi-user capabilities, ad hoc queries, customizability, availability of training, and software licensing and procurement.

**Key Words:** Transit microcomputer applications, microcomputer training and procurement.

**Related Work:** Most of the research work has been done on single use microcomputer applications.

**Urgency:** Will likely contribute to the improvement of performance in transit management and operations.

**Cost:** \$50,000 - \$100,000

**Implementation:** Guidelines will be provided to assist transit operators in determining the potential usefulness and costs of multi-user microcomputer technology and, if appropriate, aid them in the purchasing and procurement process.

**Effectiveness:** Lead to improved use of new microcomputer technology and the more efficient handling of information which may, in turn, bring about performance improvements in transit management and operations.

**PROBLEM STATEMENT NO. A1E08-02****Title: GUIDELINES FOR SMALL TRANSIT VEHICLE PROCUREMENT AND CONVERSION**

**Problem:** Limited information is readily available regarding the procurement and conversion of small transit vehicles.

**Objective:** Collect, analyze, and report information to guide rural transit operators in the procurement and/or conversion of small transit vehicles. A special effort will be made to address the following: modifying vehicles to accommodate higher doors; structural framing when raising roofs; dynamic roll-over crash worthiness; flammability and toxic emissions from interior materials used in head liners, flooring, side liners, and seats; fire and overheating detection equipment; passenger evacuation; and wheelchair securement devices.

**Key Words:** Small transit vehicles, vehicle safety, vehicle procurement.

**Related Work:** Most related research work is associated with the purchase of small transit vehicles such as the *Handbook for Purchasing a Small Transit Vehicle* by Pennsylvania Department of Transportation, and very little to none exists on conversion.

**Urgency:** Deemed very important because the use of small transit vehicles is increasing.

**Cost:** \$100,000

**Implementation:** Guidelines will be developed to aid operators in the procurement and conversion of small vehicles.

**Effectiveness:** Bring about greater overall safety, reduce accident severity levels, and facilitate passenger evacuation.

**PROBLEM STATEMENT NO. A1E08-03****Title: RURAL TRANSIT MANAGEMENT EDUCATION**

**Problem:** It has been recognized that many rural transit managers do not have the proper training and education required to effectively manage their systems.

**Objectives:** Explore and formulate alternative strategies to provide rural transit management training and education. Alternatives to be studied include the

integration of transit management into junior, technical and community college curricula.

**Key Words:** Transit management training and education.

**Related Work:** Training materials developed and being developed by National and State RTAP programs and through the Transportation Safety Institute in Oklahoma City, Oklahoma.

**Urgency:** A high priority to enhance the capabilities and skills of rural transit system managers. The community college networks which are often geographically dispersed throughout the States may provide the proper focus technically, financially and logistically.

**Cost:** Model Curriculum, \$100,000  
Trial Implementation, \$300,000  
Program Evaluation, \$75,000

**Implementation:** Training under RTAP programs potentially funded by UMTA technical assistance grants.

**Effectiveness:** Provide a pool of individuals better equipped to manage the day-to-day operations of a rural transit system.

**PROBLEM STATEMENT NO. A1E08-04****Title: IMPROVED WHEELCHAIR AND LIFT EQUIPMENT**

**Problem:** Indications are present which suggest that little to no coordination exists between wheelchair and lift manufacturers and transit systems. For example, many lifts are not large enough to accommodate wheelchairs in use.

**Objective:** Review the lifts and wheelchairs presently being used on both fixed route and paratransit vehicles to determine the nature and extent of the in-service problems, and make recommendations, where appropriate.

**Key Words:** Wheelchair lifts.

**Related Work:** There are numerous local and national studies on wheelchair equipment, lifts and vehicles fitted with lift equipment. Vehicle guidelines and regulations are provided by State transportation departments, but no work has been done on in-service problems and coordination. U.S. DOT has prepared a handbook on *Best Practices in Specialized and Human Services Transportation Co-ordination*. Project ACTION is also working on this issue.



**Urgency:** Will likely lead to an improvement in safety standards and mobility of handicapped persons.

**Cost:** \$25,000 - \$50,000

**Implementation:** The results of this study will provide a basis for the development of wheelchair lift specifications.

**Effectiveness:** Improved safety for passengers in wheelchairs and reduced operator liability.

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**PROBLEM STATEMENT NO. A1E08-05**

**Title:** ACCIDENT OCCURRENCE AND PREVENTION

**Problem:** An overriding concern of vehicle manufacturers and rural transit operators is safety, particularly in the areas of accident abatement and prevention.

**Objective:** Compile and analyze information on number and types of accidents by type of vehicle for a sample of rural transit operations, and make recommendations to vehicle manufacturers and transit operators for inclusion in their safety improvement programs.

**Key Words:** Vehicle safety, accident prevention.

**Related Work:** The Transportation Safety Institute established by U.S. DOT promotes safety and security to reduce transportation related accidents. It offers Safety and Security course materials such as bus system security and bus accidents investigation.

**Urgency:** Improved accident data are needed to make informed decisions on vehicle design and operator safety programs -- high priority.

**Cost:** \$50,000 - \$100,000

**Implementation:** Identification of vehicle deficiencies together with demonstrated consequences due to uncorrected problems would significantly assist vehicle manufacturers and transit operators and thereby help in the prevention of accidents.

**Effectiveness:** Improvement in the safety standards will result in improved passenger safety and reduced operator liability.

**PROBLEM STATEMENT NO. A1E08-06**

**Title:** SIMPLIFIED VEHICLE MAINTENANCE

**Problem:** Although there are vehicle maintenance manuals available, most such written materials have been deemed unnecessarily complex and, in some instances, inadequate.

**Objective:** Develop guidelines for more simplified and complete vehicle maintenance manuals and test for selected rural transit vehicles.

**Key Words:** Vehicle maintenance, maintenance performance, vehicle utilization.

**Related Work:** Numerous local and national studies are available on transit management and operations and a comprehensive effort has been made by U.S. DOT in their handbook on mass transit management for small communities.

**Urgency:** High priority because it offers a potential source of improvement in overall maintenance and vehicle performance and provides a means of reducing operating costs.

**Cost:** \$100,000 - \$200,000

**Implementation:** The study will provide simplified guidelines resulting in effective maintenance and high overall performance.

**Effectiveness:** Increases in vehicle life and reductions in vehicle operating costs and maintenance labor hours.

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**PROBLEM STATEMENT NO. A1E08-07**

**Title:** EFFECTIVENESS OF TRANSIT MARKETING

**Problem:** While a number of efforts have been made to market transit, little attention has been devoted to examining marketing effectiveness.

**Objective:** Conduct case studies of transit marketing activities in selective states to identify the various ways transit marketing has been carried out in rural communities and to determine their relative effectiveness in terms of the effects on ridership, revenue, and other performance aspects.

**Key Words:** Transit marketing, advertising and promotion, marketing performance analysis.

**Related Work:** A study by Expand Associates entitled "Rural Transit Marketing; UMTA sponsored project": The Idaho Rural/Small City Transit Marketing Demonstration Project." U.S. DOT's technology sharing program has a number of references available for various marketing techniques. U.S. DOT has also published a handbook on *Small Cities Transit Marketing*.

**Urgency:** Since it has potential as a source of improvement in effectiveness in terms of ridership and related increases in revenue, it is a high priority.

**Cost:** \$100,000 - \$200,000

**Implementation:** The study should result in the development of marketing standards leading to increases in transit performance.

**Effectiveness:** Increases in ridership and revenue.

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#### PROBLEM STATEMENT NO. A1E08-08

**Title:** EVACUATION OF E&H PASSENGERS IN RURAL AREAS

**Problem:** The manner in which rural elderly and handicapped transit riders should be removed from a vehicle in the event of an accident is not well understood, and special attention should be given to the evacuation of such riders, especially in rural areas.

**Objective:** Conduct a group of case studies to examine the differences between urban and rural transit delivery in terms of their effects on the evacuation of elderly and handicapped riders. Examples of such differences include vehicle crash worthiness and emergency preparedness forces.

**Key Words:** Vehicle evaluation, E & H special needs, emergency preparedness.

**Related Work:** U.S. DOT National Highway Traffic Safety Administration issues motor vehicle safety standards under the authority of the National Traffic and Motor Vehicle Safety Act of 1966. Administration on Aging (AOA) projects conducted by Transportation Research Board seek to improve safety and mobility of elderly and handicapped persons.

**Urgency:** The results of this study will prove to be extremely important and would be widely applicable to rural communities.

**Cost:** \$100,000 - \$150,000.

**Implementation:** The study would result in the development of better safety standards and emergency preparedness for elderly and handicapped persons.

**Effectiveness:** Will improve highway safety for elderly and handicapped and assist rural transit providers in the development of evacuation techniques.

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#### PROBLEM STATEMENT NO. A1E08-09

**Title:** "OFF THE SHELF" MICROCOMPUTER SOFTWARE FOR RURAL TRANSIT OPERATIONS

**Problem:** A large number of inexpensive microcomputer software packages are readily available for use by small transit systems, and indications are that such software is not being fully utilized.

**Objective:** Identify and evaluate "off the shelf" microcomputer software for management and operational purposes which is of potential use by rural transit operators. These purposes should include maintenance, inventory, accounting, and dispatching activities. The evaluation should focus on the software quality, applicability, availability, costs and limitations.

**Key Words:** Transit microcomputer software.

**Related Work:** *Microcomputers in Transportation, Software and Source Book* published by UMTA. Another source of information is "Transit Industry -- Microcomputer Exchange Support Center."

**Urgency:** With the expanding use of microcomputers by small transit systems, the information from this study is important and would be widely used.

**Cost:** \$25,000 - \$50,000

**Implementation:** Results would include a description of the functional capabilities of available software and respective hardware requirements.

**Effectiveness:** Lead to improved use of microcomputer technology and more efficient handling of information and data analysis, resulting in performance improvements in transit management and operations.

**PROBLEM STATEMENT NO. A1E08-10****Title: DRIVER STRESS**

**Problem:** The ability of transit drivers to deal with stress is extremely important and no method exists to assess and improve such an ability.

**Objective:** Develop a simple, reliable method to assist in selecting transit drivers capable of coping with stress and to aid in stress training.

**Key Words:** Driver training, driver stress.

**Related Work:** Related driver training programs have been conducted by organizations like Community Transportation Association of America and UMTA (Rural Technical Assistance Program) and others. U.S. DOT has also conducted various studies on driver training needs.

**Urgency:** A real potential source of improvement in overall performance of transit systems and rider satisfaction.

**Cost:** \$50,000 - \$75,000

**Implementation:** Results (including the method) could be incorporated into a two to three hour workshop to be offered to drivers on site.

**Effectiveness:** The reduction in stress would lead to better driver comprehension and increased passenger safety and satisfaction.

**Related Work:** Work under MTAP by Walther and Piras.

**Urgency:** As a potential source for analyzing the transportation needs of AIDS/ARS passengers, this project is of moderate to high priority depending on geographic location.

**Cost:** \$100,000 - \$150,000

**Implementation:** In conjunction with local human service organizations, transit agencies could conduct seminars/workshops to present results to transit operators and community groups.

**Effectiveness:** Would result in the provision of better transportation to both AIDS/ARS passengers and resolve concerns of all individuals in the community.

**PROBLEM STATEMENT NO. A1E08-11****Title: TRANSPORTING AIDS/ARS PASSENGERS**

**Problem:** The special transportation needs of persons with AIDS/ARS are not clearly defined and require immediate attention, especially in selected regions of the country.

**Objective:** Analyze the special needs of AIDS/ARS passengers, especially as they relate to (and are different from) the needs of other groups such as the handicapped and elderly.

**Key Words:** Special needs transportation, AIDS/ARS passengers.