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RESEARCH RESULTS DIGEST

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Subject Area: VI Public Transit

Responsible Senior Program Officer: Stephanie Nellons Robinson

Research Agenda for Increasing Transit Ridership

This TCRP Digest summarizes TCRP [Project H-5](#), "National Workshop to Develop a Research Agenda for Increasing U.S. Transit Ridership." The objective of the workshop was to develop problem statements for research on increasing transit ridership.

INTRODUCTION

To reverse a growing trend of declining transit ridership in some areas of the country and increase transit ridership nationally, the American Public Transit Association (APTA) implemented the National Transit Ridership Initiative (TRI) in Fiscal Year 1994. The Transit Cooperative Research Program (TCRP) Oversight and Project Selection (TOPS) Committee responded to this industry priority by initiating a quick response ridership project and programming funds for a national effort to increase transit ridership. Under the TCRP Project J-6, *Quick Response for Special Needs*, the "Transit Ridership Initiative" study was conducted by Cambridge Systematics. This study, initiated in March 1994, surveyed and assessed recent transit system efforts that proved successful in increasing ridership and identified research needs to increase ridership. The project final report presented the results of 40 industry interviews on successful ridership experiences and identified 25 potential research topics (Transit Ridership Initiative, August 1994). The potential research topics provided the basis for the national research workshop under TCRP Project H-5, *National Workshop to Develop a Research Agenda for Increasing U.S. Transit Ridership*.

BACKGROUND

The TOPS Committee allocated funds to identify research needs to increase U.S. transit ridership under TCRP Project H-5. Largely comprised of

members of APTA's TRI Committee, the Project H5 Steering Committee members were selected and the International Institute for Surface Transportation Policy Studies (IISTPS) was retained to assist with the project. Project H-5 Steering Committee discussions in July 1994 provided guidance and direction for a 2-day research needs workshop at the National Academies of Sciences' Beckman Center in Irvine, California, in November 1994. Transit system and other industry experts were invited to the workshop to develop research problem statements. Research topics recommended from the "Transit Ridership Initiative" final report and relevant previously submitted research problem statements that were consistent with the Federal Transit Administration's (FTA) Strategic Plan were considered as potential research topics.

National Research Workshop Convened

On November 18-19, 1994, more than 50 individuals representing the transit industry, university and transportation research programs, transportation consultants, and the federal government participated in the *National Workshop to Develop a Research Agenda for Increasing U.S. Transit Ridership* (see Appendix A). Following open discussions of ridership issues in a plenary session, participants met in small breakout sessions assigned by research category: Operations; Fare Policy and Pricing; Marketing, Information, and Public Education; Service Design, Planning, and Evaluation; and Coordination, Institutional, and Intermodal Issues. Each breakout session revised and refined its

goals and objectives. The attendees also identified priorities, reviewed and revised the research problem statements provided, and developed new research problem statements to increase transit ridership. At the workshop, 31 research statements were recommended and rank ordered by priority.

The eight top-ranking research problem statements, totalling \$1.95 million, were forwarded to the TOPS Committee for funding consideration. The TOPS Committee selected the following research statements for FY 1995 funding:

- Market Segmentation Strategies to Increase Transit Ridership
- Role of Passenger Amenities and Transit Vehicle Characteristics in Building Ridership
- Customer-Defined Transit Service Quality

Complete descriptions of these statements are provided in Appendix B.

Requests for Proposals (RFPs) to respond to these research topics will be available by late summer. The remaining research problem statements are included in Appendix C of this Research Results Digest.

These Digests are issued in the interest of providing an early awareness of the research results emanating from projects in the TCRP. By making these results known as they are developed, it is hoped that the potential users of the research findings will be encouraged toward their early implementation. Persons wanting to pursue the project subject matter in greater depth may do so through contact with the Cooperative Research Programs Staff, Transportation Research Board, 2101 Constitution Ave, N W, Washington, DC 20418

Appendix A
Workshop Participants

Joseph Alexander, *Washington Metropolitan Area Transit Authority*
Sandra Althouse, *Care-A-Van Services, Inc.*
Kathy W. Anderson, *American Association of State Highway and Transportation Officials/MTAP*
Gordon Aoyagi, *Montgomery County (MD) Government*
Ronald L. Barnes, *Greater Cleveland Regional Transit Authority*
Peter Benjamin, *Washington Metropolitan Area Transit Authority*
Joseph DaCunha, *Metropolitan Transportation Commission (Oakland, CA)*
Lee L. Davis, *National Transportation Consortium*
Sharon Dent, *Hillsborough Area Regional Transit*
Rebecca Elmore-Yalch, *Northwest Research Group*
Peter B. Everett, *The Pennsylvania State University*
Daniel M. Fleishman, *Multisystems, Inc.*
Ronny Jane Goldsmith, *AC Transit (Oakland, CA)*
Lawrence D. Goldstein, *Apogee Research, Inc.*
Louisa Ho, *New Jersey Transit*
John Kain, *Harvard University*
Roy E. Lave, *SYSTAN, Inc.*
Wade Lawson, *South Jersey Transportation Authority*
Carol Abel Lewis, *Center for Transportation Training and Research, Texas Southern University*
James F. McLaughlin, *Metropolitan Transit Authority (Los Angeles, CA)*
Gwendolyn A. Mitchell, *Washington Metropolitan Area Transit Authority*
Clementine W. Morris, *Transit Authority of River City (Louisville, KY)*
Subhash R. Mundle, *Mundle & Associates, Inc.*
Gail Murray, *International Institute of Surface Transportation Policy Studies, San Jose State University*
Michael Noonchester, *Logan Transit District (Logan, UT)*
Leonard Oppenheimer, *Metropolitan Transportation Commission (Minneapolis, MN)*
Joni Reid, *Oregon Department of Transportation*
Lawrence G. Reuter, *Washington Metropolitan Area Transit Authority*
Will Scott, *Ryder Public Transportation Services*
Franklin L. Spielberg, *SG Associates, Inc.*
Trevor Smith, *Transport Canada*
Robert G. Stanley, *Cambridge Systematics*
Darwin Stuart, *Chicago Transit Authority*
Anne-Catherine Vinickas, *San Diego Metropolitan Transit Development Board*
Marc Warner, *Multisystems, Inc.*
Jeffrey Webster, *Fresno County Rural Transit System*
Marie Bravo, *American Public Transit Association*
Gwen Cooper, *Federal Transit Administration*
Nancy Grubb, *Federal Transit Administration*
Stuart McKeown, *Federal Transit Administration*
Chuck Morison, *Federal Transit Administration*
Bob Owens, *Federal Transit Administration*
Richard Steinmann, *Federal Transit Administration*
Fred Williams, *Federal Transit Administration*

Appendix B
Problem Statements Selected by the TOPS Committee

< Project B-9

Market Segmentation Strategies to Increase Transit Ridership

Recommended Funding: \$250,000
Research Period: 18 months

Market segmentation has been shown to be an effective marketing tool to gain market share in many industries. Considerable attention has been paid to the concept of market segmentation in the transit industry. There are many ways to define market segments (e.g., by geography, demographics, attitudes, behaviors, values, lifestyles) some or all of which may have been used in the transit industry. Strategies are needed to define market segments that represent the greatest opportunity to increase ridership, to develop the service mix required, and to develop market tools to meet the needs of these varying segments of the travel market.

The proposed research will be a two-phased effort. Phase I will prepare a synthesis of the state of the practice in the use of market segmentation strategies that have been successful in attracting and increasing transit ridership. This synthesis will also summarize other recent work in this area and identify any gaps worthy of further research. With project panel approval, Phase II will undertake further research needs identified in Phase I.

< Project B-10

Role of Passenger Amenities and Transit Vehicle Characteristics in Building Ridership

Recommended Funding: \$200,000
Research Period: 12 months

The role of convenience and comfort in attracting transit ridership is well established. Increasingly, however, systems that are attracting increased ridership are devoting more attention and resources to a variety of passenger and pedestrian amenities. Paralleling this trend is increased attention to the notion of "transit-friendly" environments, "livable communities," and "sustainable development." In addition, many transit systems with the best recent ridership experience have increased efforts to engage the public at the community and neighborhood level. A new, comprehensive

effort to establish the value and impact of enhanced passenger amenities may provide important insights into vehicle design, service design, and investment priorities.

This project will review existing literature on transit facility and vehicle design to determine their influence on current and potential rider choice. The literature review will include any new areas such as "passenger-friendly" vehicles, and livable and transit-friendly communities. A review of the trade press and recent capital grant applications may provide summary data of such projects in process.

The project should also include national surveys and focus group research conducted in selected communities throughout the country. Those selected communities are to be as representative as possible of differences based on geography and climate. Selected communities would also be based on size, urban or suburban characteristics, and the quantity and type of transit service provided.

Finally, the project should identify key issues and findings in areas such as security, comfort, and the generalized cost of amenities, especially security, removal of graffiti, repairs, and general accessibility.

< Project B-11

Customer-Defined Transit Service Quality

Recommended Funding: \$200,000
Research Period: 18 months

Transit agencies are concerned with delivering quality service to current and potential customers. Quality service is often defined as on-time performance, comfort, safety, and convenience. Transit agencies should be commended for such efforts, yet a problem exists—the definitions of quality service often evolve from management's "perception" of what constitutes quality. These management definitions may vary significantly from what current and potential customers perceive to be "quality" services. If transit is to maintain and capture new riders, consumer definitions of quality service must be developed. It is the objective of this research to develop procedures to determine current and potential customer-based definitions of quality transit service. This project will build on work done under Transit IDEA project number 1, "Customer Satisfaction Index for the Mass Transit Industry."

Appendix C
Research Problem Statements¹

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¹ The four problem statements with sources identified were submitted to the TCRP independently; the remaining statements were refined by the TCRP Project H-5 workshop participants.

« *Ridership Goals and Evaluation Through Community Involvement*

Recommended Funding: \$250,000
Research Period: 18 months

Absolute ridership is perhaps the most obvious among several measures of transit performance and value. Relatively few systems, however, have adopted specific ridership goals through community input, and fewer yet have adopted formal market share goals. Indeed, ridership is frequently subordinated to managing a transit system's financial and revenue requirements. The bridge between ridership and revenue goals has traditionally been a series of performance or utilization measures and standards applied on a route-specific basis. These are typically used to leverage adjustments in service to bring revenues and costs into better balance. Forces such as the Clean Air Act Amendments, however, are forcing more specific goal-setting and more precise specification of performance. All too often, such forces exclude actual community input to the service design process. It may be of strategic as well as practical importance to thoroughly explore the use and implications of more specific, ridership-oriented goal-setting in the industry and possibly link the examination of goals to future analysis of market segments.

Goal-setting is an important component of performance monitoring to assess ridership. Research is needed to determine the impact of defining, working toward and monitoring relevant, measurable goals and ridership growth, as developed within a community involvement atmosphere, including social and environmental issues. A study should be designed and conducted to examine the relationship between goal setting, ridership and attracting new market segments.

< *Measures for Evaluating Ridership Performance Increases: How Do We Know When We've Achieved Our Goals?*

Recommended Funding: \$300,000
Research Period: 24 months

A disparity exists among transit operators between the collection of ridership data and the use of that data in service planning and estimating future ridership. The difficulty of collecting good ridership data tends to result in inefficient planning and inefficient use of operating and capital resources. All marketing is dynamic. Methods are needed to identify travel markets in which transit can increase its share and to establish realistic market share targets.

The proposed project would document existing data collection methodologies for a sample of transit operators. The focus will be to identify methods for improved data

collection of current ridership, losses in ridership, and gains in new ridership.

The project will develop a process to establish goals for use by operators to evaluate ridership performance. A market segmentation technique should be devised that provides bench marks against which the success of strategies to increase ridership can be evaluated. It is important to look at market share and efficiency as well as raw ridership, but the ridership numbers must be available in a form to support analysis and strategic thinking.

< *Identify Strategies to Improve Transit's Image in the Media*

Recommended Funding: \$250,000
Research Period: 36 months

Transit has consistently had a bad image in both print and visual media. Whether in hard news or fiction, transit is depicted as the poor relative of all travel modes. Crime, poor operating conditions and inaccurate portrayals of service depress ridership and reinforce negative perceptions. The present negative perception of transit being the mode for the disadvantaged adversely impacts the industry's initiatives to stimulate service in other markets as well.

The proposed project would include the following tasks:

(1) Identify, classify, and document current perceptions presented on television, radio, film and the print media. Note repeated message themes, system characteristics, context of use and impact.

(2) Identify and document true operating and service characteristics in response to often repeated media themes. Characterize and classify discrepancies and note additional operating conditions that reinforce the value of transit.

(3) From the above, develop media sensitive strategies incorporating documents, videos, audio tapes and similar dissemination techniques to call attention to the situation and gain media support.

(4) Develop these strategies for a comprehensive variety of market segments.

(5) Develop criteria for and procedures to monitor the success of the strategies identified in Task 4. Commence monitoring procedures and documentation for transit industry use.

< *Fare Prepayment Equity*

Recommended Funding: \$300,000
Research Period: 18 months

Many transit systems have monthly passes, weekly passes, and other forms of fare prepayment. The prepayment method generally offers some level of discount over paying

the fare on a daily basis. However, the outlay of a larger amount of money at a given time is perceived by some as not allowing economically disadvantaged individuals to take advantage of the discount. Further, as systems develop "cashless" fare collection based on credit cards, ATM cards, and other electronic media, economically disadvantaged individuals may not have the same access to such media and therefore may not be able to reap the advantages of their use. This lack of access to prepayment may have a negative effect on ridership.

The study will explore the relationship between income and ability to take advantage of prepayment discounts. Are certain economic groups being closed out of the monthly pass market because the individual cannot afford the one-time payment even though it is less costly over time? The study would research the relationship between income and access to all forms of prepayment, including electronic media. As we develop "cashless" fare systems, to what extent are we excluding certain individuals from participating? The study should address the equity issues involved in offering prepayment discounts or in developing "cashless" fare systems. The study should attempt to quantify the relationship between income, level of prepayment discount, and the ability to make the required cash outlay.

< *Standardized Ridership Definitions and Procedures*

Recommended Funding: \$200,000
Research Period: 21 months

Most systems conduct regular on-board surveys either systemwide or on a more limited scope to monitor performance and trigger service changes. Definitions and methodology problems exist in the industry regarding ridership data, data collected, characteristics of riders, fare structures and performance measure that make consistency of data problematic.

Data on ridership characteristics are increasingly critical to support service planning, design, and evaluation. At the aggregate level, limited information has been developed from U.S. Census data and APTA research on transit rider characteristics. Less has been done on systematically synthesizing the results of recent on-board surveys, or regular reporting of results from ongoing surveying. Transit managers and supportive interest groups and users might be well-served by a more systematic approach to reporting current results, or possibly a comprehensive, well-structured series of uniform on-board survey exercises and standardized methodologies for using Section 15 and other data gathering activities.

Considerable standardization in reporting has been achieved over the years through the Section 15 reporting to FTA. While definitions and methods of calculation were established, there are problems with certain definitions and levels of reporting. For instance, sampling data used for

Section 15 reporting may not be compatible with other similar data collected for monitoring and evaluating services. Available data are not used as effectively as possible.

Research is proposed to develop uniform definitions and a standardized method for processing, storing, and reporting ridership information to improve service planning, design, and evaluation.

The research effort should identify and evaluate existing methods and techniques for collecting on-board data; develop and test a model for collecting, processing, analyzing and storing on-board data; and recommend standardized definitions and procedures for the transit industry.

Improved methodology for and information from onboard data collection may assist transit systems in assessing system performance, community perception, potential markets, and strategic direction. Assessing transit need from the consumer perspective may improve transit system capability to respond better to user need and to increase ridership.

< *Examining the Relationship Between Employee Performance and Increasing Ridership*

Recommended Funding: \$200,000
Research Period: 18 months

Considerable interest has been expressed in Total Quality Management (TQM) and other customer service driven programs and the growing evidence of their contribution to customer satisfaction. This research seeks to determine if there is a relationship between an improvement in employee morale, behavior, and empowerment and improving customer perception of transit and increasing ridership and system performance.

This project will review the impact of employee morale and behavior on system performance and the goal of increasing ridership. The project will include research into identifying sources and causes of disempowering behavior, which may include reviews of the workplace, management styles, work rules, labor contracts, and other impediments that affect behavior and may inhibit system performance. This project will also include a synthesis of transit industry success stories and a review of applicable or transferable customer service strategies used in the private sector.

< *Develop Methods of Communicating Overall Community Benefits of Transit Through Strategic Alliances and Partnerships*

Recommended Funding: \$200,000
Research Period: 18 months

Public education has traditionally been an industry function. The focus of typical public education efforts has

been to build recognition of transit's importance generally and encourage transit use specifically. Development of local and regional transit advocacy programs is a more recent phenomenon, focused primarily on efforts to adopt new funding mechanisms or to embark on major new service initiatives. The actual impact of these efforts on ridership levels, past or future, has not been examined in a comprehensive way. To the extent that broad-based advocacy programs and coalitions will play a more important role in increasing both transit's ridership and relevance, the bases on which these types of programs are built should be examined more systematically in greater detail.

Transit must communicate effectively to a variety of constituents including: the general public, nonriders, elected officials, state DOTs, federal agencies and the private sector. Methods and techniques as well as best practices should be developed and documented to assist transit in meeting overall community needs as well as building a constituency leading to increases in both ridership and overall support.

Given the enhanced community decision making and public participation requirements of the ISTEA, in conjunction with increased financial pressures, many public transit systems have begun to build community coalitions and develop relationships with local and regional advocacy organizations. Though current literature may address the effectiveness of such organizations in these more traditional roles, few address their impact as advocates for building ridership. Research is needed to determine the effectiveness of local and regional advocacy organizations on increasing ridership. The research should examine the transit-related agenda of typical advocacy groups and coalition partners, their transportation programs and activities and the impact of those activities. The project should also examine the genesis and progress of selected, broad-based public interest campaigns, to examine specific strategies and actions, and their relevance in building transit advocacy programs focused on increasing transit use. Examples might include nonsmoking, fitness, seat belt, diet and exercise campaigns.

Research will document current best practices showcasing transit's efforts relating to community values such as energy, the economy, environment, and safety and security. Other national initiatives will be explored and documented relating to nonsmoking, recycling, and so on. Finally an action plan will be developed defining transit's role in support of livable communities.

< *Market Research on Mode Choice Factors*

Recommended Funding: \$200,000
Research Period: 12 months

A transit authority can influence demand for transit services by the design of the service provided and the way it is promoted. By understanding the issues surrounding modal

choice, products can be designed that will help increase ridership among discretionary markets not now being served by transit. It is vital that service design and promotion take into account knowledge of the travelers who use and also those who do not use transit, in order to influence travelers in such a way that public transit becomes the preferred modal choice.

The transit industry has employed a number of effective marketing strategies and techniques to increase ridership. In other industries, some businesses have mastered the process of capturing and maintaining market share. There is some question, implied in interviews with system managers, whether the transit industry has moved as effectively as it might into the realm of "retailing" its products and services. The marketing processes and techniques employed to capture specific markets or increase ridership would be a valuable resource to system managers. A research program should be designed to identify and examine the most effective marketing strategies inside and outside the industry and evaluate their potential for broad application to transit.

This research should also determine why urban travelers choose their mode of travel and demonstrate how to use this information to design services that are more attractive to consumers. It will also provide case studies that will illustrate service restructurings that have created a more cost-effective service. The requirement here is to determine how a transit agency can best promote public transit or improve the service to capture the latent demand. This work will be a synthesis of previous transportation research in modal choice, techniques to examine modal choice in a specific urban environment, and the application of this market research to influence modal choice.

< *The Relationship Between Perceived Security and Ridership: The Effectiveness of Various Operating Techniques and New Technologies in Improving Security in Public Transit Systems*

Source: Karla Karash for TRB
Committee A1E06
Recommended Funding: \$250,000
Research Period: 18 months

There has been a significant decline in public transit ridership in the United States over the past several decades. This decline has often been associated with a decline in the quality of service. Customers often define quality in terms of perceived security i.e., personal safety when using public transit. This research will evaluate (a) the relationship between perceived security and transit ridership; (b) the effectiveness of various operating techniques; and (c) new technologies in improving security on public transit systems.

This research will include (1) a review of the literature on customer perceptions with regard to security and their decision to use public transit; (2) analysis of data (Section

data) with regard to security related incidents on public transit and ridership trends; and (3) evaluation of various operating techniques and new technologies for improving security and their effectiveness in improving security and maintaining and attracting riders to public transit.

< *Integrating Americans with Disabilities Act (ADA) Paratransit Services and Health and Human Services Transportation*

Source: Jim McLaughlin and
Ann Flemer
Recommended Funding: \$300,000
Research Period: 12 months

The Americans with Disabilities Act (ADA) establishes a new civil right to persons with disabilities that ensures access to public transportation services. As the target year for implementation (1997) approaches, more and more transit agencies are recognizing the potential cost impact of the complementary paratransit services on their ability to fund general public fixed-route services. The preliminary estimate of the cost of providing the paratransit services nationwide is \$1 billion per year. This represents approximately \$300 million over the current level of annual federal transit operating assistance. If public transit operators are unable to identify new revenues to support these paratransit services, they will be forced to make unacceptable tradeoffs between other objectives for transit, including accessibility, air quality, and economic vitality.

At the same time, it has been estimated that over \$1.2 billion a year is spent by the Department of Health and Human Services (HHS) on transportation services to program clients. A significant portion of these funds are likely spent on transporting persons who are considered eligible for complementary paratransit services under the ADA. However, it has been difficult to determine the amount of service provided by these programs funded by HHS and the fully allocated cost of delivering these services because funds are typically not budgeted or expended in a manner that makes cost per trip, cost per mile, or other similar unit costs available.

The Los Angeles County Metropolitan Transportation Authority (LACMTA) and the Metropolitan Transportation Commission (MTC) in the San Francisco Bay Area have asserted that by acting as mobility managers and brokering the mandated ADA paratransit services, they can provide trips for the HHS system at reduced costs and increased quality. The sharing of transit revenues and HHS funding to support an integrated system would allow administrative and other costs to be spread over more trips, thereby reducing the cost per trip for each entity that contributes funds to the brokered system. Funds that are saved in a cost-sharing mode could provide a source to fund, in part, the ADA

transportation system and more cost-effective mobility options for persons who need them.

Working with the Department of Health and Human Services, the Health Care Financing Administration, and others, the primary objective of the proposed research would be to develop a common understanding of (1) how much funding is currently invested in transportation services by non-DOT programs at the federal level and the rules by which such programs are required to ensure access to their program activities; and (2) the fully allocated cost comparison of the HHS and ADA paratransit programs on a line-by-line basis.

The results of this research could then be used to evaluate the above assertions, determine the potential for cost savings, identify possible strategies for integrating the transportation services and provide cost-effective services for these non-DOT program clients.

< *Identify Techniques of Successful Industries and Grassroots Organizations to Gain Funding and Support*

Recommended Funding: \$150,000
Research Period: 12 months

The transit industry faces stiff competition in funding and in national policy. There doesn't seem to be a core foundation of support for transit issues inside or outside the industry. Other industries and organizations such as the environmental community, the electronic industry, and health-related organizations have developed strong coalitions both inside and outside their industries to support their goals and objectives. This research is required so that the transit industry can learn the importance of internal consensus and how to build similar coalitions to influence national policy and secure funding.

The proposed research would identify successful industries and grassroots organizations that have noticeably influenced national policy, public awareness, and funding. The project will research the historical process by which these organizations have done the following:

- developed a unified vision within their organizations;
- evaluated public perception around their vision and goals;
- identified their strategies to accomplish their vision and goals;
- built internal support within their organization;
- built coalitions with external organizations that shared or benefitted from a similar vision;
- identified mechanisms for increasing public support for and awareness of their vision; and
- identified strategies to influence legislation and funding.

The project should then include a national conference that would review the research findings and set a national strategy. The goal of the national strategy would be to create a core foundation of support, increase public awareness, and influence funding decisions and national policy.

The conference should include the following: (1) presentations from key players of organizations evaluated by the research, and (2) an Action Plan for the transit industry that would include (a) a mechanism for internal support, (b) steps to build coalitions and (c) strategies to increase public awareness and influence legislation. The Action Plan will identify who is responsible for each element, completion dates, and evaluation criteria.

Conference proceedings accompanied by a proposed Action Agenda should be included as the final element of the project.

< *Institutional, Operational, and Financial Barriers to Intermodal Travel by Trip Type*

Recommended Funding: \$200,000
Research Period: 24 months

Most trips are made on highways and streets in single occupant vehicles because that is the only realistic choice. Although this mode of travel will continue to be the backbone of the transportation system; financial and environmental constraints make it impossible to accommodate the projected growth in travel if the current mode split remains the same.

One of the strategies to induce a change in mode split is to provide a seamless transportation system that is rich with travel mode choices. Implicit in this vision is the expanded development of nonauto modes. Transportation development to date has been generally focused on building a transportation infrastructure that would accommodate all trip purposes. The result has been that travelers often adjust their travel behavior to the transportation system. Unless the trip is made by car, the transportation system is not user friendly.

Identify institutional, operational, financial, and informational barriers that prevent the use of transit by travelers using one or more modes to complete a trip or type of trip. Consider the special cases and circumstances of work trips, vacation and business travel. Identify the mechanisms that would overcome these barriers in a way to increase transit ridership.

< *Building Ridership Through Broadening the Range of Purchasers of Service*

Recommended Funding: \$150,000
Research Period: 12 months

Opportunities to achieve increased transit ridership may exist through broadening the range of purchasers of service. Potential sponsors of transit trips include Medicaid buying prepaid instruments on transit for their clients and employers subsidizing trips made by their employees. There are other sponsors such as businesses, malls, and universities. Not only can this sponsorship result in tangible benefits in the form of rides, but it can create support for transit as a mode by increasing the importance of transit in the community. There is a need to document the range of current and potential purchasers of service.

The research should document existing experience and identify potential impacts on revenue, ridership, and costs. How the relationships were created is to be explained, as well as the nature of the agreements and manner of purchases. This research is to include both fixed-route and paratransit modes, and the research should focus on those examples that have general applicability.

< *Evaluate the Impact of Size and Spacing of Fare Increases on Ridership*

Recommended Funding: \$300,000
Research Period: 18 months

Most transit systems view fare increases as unavoidable measures of last resort leading to large, widely spaced fare increases. If fares must be raised, does the time gap between hikes make any difference? Economics says price increases lead to decreases in quantities of services demanded: raising fares reduces trips and riders. Is there any difference between the ridership likely to be lost from small, periodic (e.g., annual or biennial) increases vs. large, less frequent increases of equal magnitude over equal time spans? What are the advantages and disadvantages of following a policy of planned hikes (frequent and infrequent) vs. unplanned hikes.

Compare and contrast the ridership and revenue effects in the following three cases where transit systems (1) actively use a policy of planned, periodic fare increases (e.g., Toronto); (2) have frequent but unplanned fare increases; and (3) have large increases after many years of stable fares.

The study should explore the ridership and revenue impacts (while holding other effects invariate) at the transit systems as well as impacts on customers' attitudes. Do frequent hikes that are not part of a plan create adverse publicity in media or customers' minds? Do such periodic increases help "move" the demand curve by de-sensitizing customers to price changes and building in their expectations of increasing fares? Also, do changes in inflation help cushion or mitigate ridership losses from fare increases: is the customer responding to real or nominal prices?

< *Ridership and Operating Implications of Small Vehicle Use*

Recommended Funding: \$150,000
Research Period: 12 months

Increasingly transit systems are introducing a broader range of services and equipment to meet varying travel needs and desires. One of the fastest growing strategies is the deployment of smaller vehicles. Smaller vehicles are being considered in place of conventional 40-ft buses because they can provide service in areas where the capacity of a 40-ft bus is not required, where roadways cannot support the size (turning radius) or weight of a 40-ft bus, or where smaller vehicles would be significantly less intrusive and more acceptable to the community. Smaller vehicles can provide transit agencies with access to new markets and provide a platform for operating more flexible services. The operating implications, community impacts, potential for increasing ridership, and cost impacts should be assessed. Most prior research on small vehicles has focused on design and operational characteristics of a technical nature.

This project should identify systems that are currently using small (low-capacity) vehicles. For each system, information should be provided on the extent (number of units and vehicle miles of travel) and on the types of service provided. Information should also be provided on the characteristics of the areas served.

Several areas should be selected for more intensive study. These case studies should include a variety of operating environments (topography, demographics, density). The consultant should identify characteristics and criteria that went into the decision process to use small vehicles and determine the perceived level of success. Finally, the consultant should quantify the impacts of using smaller vehicles on ridership and cost (both capital and operating).

Using information obtained from the review, the consultant should identify those situations where use of smaller vehicles would likely yield the largest benefits in terms of increased ridership, lower operating and capital costs, and greater community and user acceptance. The consultant should provide a checklist or decision matrix that will enable individual transit operators to assess the potential benefits and costs of using smaller vehicles in their service area. This checklist should include formulas and other procedures for quantifying or assessing the impacts of using smaller vehicles on (1) operating and capital costs, (2) ridership, (3) community relations, (4) labor contracts and work rules, and (5) service coverage.

The consultant should also survey and provide descriptions of the small vehicles currently available with their primary characteristics including capital cost, capacity, length, weight, expected life, power plant, and type of chassis.

< *Effect of Post-Payment Fare Collection on Ridership*

Recommended Funding: \$200,000
Research Period: 12 months

Transit fare elasticities in the literature are based on current fare collection procedures (i.e., cash fares for individual trips). New fare collection procedures may involve post-payment (i.e., use of credit or debit cards in which payment is made through periodic billing based on usage) which may mean that the traveler will perceive the cost of travel differently. It is clearly the case that auto users focus on out-of-pocket costs such as tolls and parking charges and tend to discount costs paid up front (auto acquisition) or periodically (insurance and perhaps gasoline). Research is needed to address the effects of moving toward post-payment (cashless) fare collection procedures, which may make transit users less sensitive to trip-by-trip fares because they become more like fixed or periodic costs.

The research proposed should assess changes in the sensitivities of riders to fare costs if they were charged after the fact rather than trip by trip. Evidence may be available from review of elasticities in other sectors where such changes have occurred. The result would be an estimate of the ridership impact of moving to postpayment of fares and an assessment of the possibility that fares could be increased more in such cases, with lower ridership effects than when cash fares are charged. The research should also address the degree to which cashless fare collection could accept widely varied fare structures, discounts for multiple rides per billing period, and bonuses for frequent riders, and the effect that such policies would have on ridership.

< *Marketing Transit in a Multicultural Environment*

Source: Joseph A. Caruso
Recommended Funding: \$150,000
Research Period: 12 months

America's cities have seen a dramatic growth in minority cultures in the last 10 years. More than 5 million immigrants from all over the world entered the United States during that period. This surge of immigrants, along with the growth of established minority groups (e.g., African-Americans, Hispanic-Americans), will result in a minority population comprising 43% of our national population in the year 2040-compared to 25% today. These new minority groups contain significant numbers of transit dependent people. Yet, urban transit systems are without a basic understanding of appropriate marketing and communications techniques.

It is proposed that research be conducted to identify effective methods of marketing transit to these emerging

minority groups. The research would have the following objectives:

- (1) Summarize demographic data that would indicate significant current minority populations by region, city or SMA (the more localized the better). Information on the level that these groups understand English would also be helpful.
- (2) Identify and summarize successful common principles of conducting market research and communicating with minority cultures in the United States and Canada.
- (3) Identify the most current resources that help to describe the cultures of these minority groups.
- (4) Produce a handbook/report that would be widely circulated in the transit industry. Include a glossary of transit terms in a number of relevant foreign languages, suggestions for dealing with minority media, and information on dealing with key agencies that work with immigrants and minority populations in general. Information relating to the benefits and details of conducting cultural diversity training for front-line employees should also be included.
- (5) Conduct between three and six regional workshops to accelerate acceptance and use of communication to these groups.

< *A Synthesis of Ridership Initiatives and Selected Market Segments*

Recommended Funding: \$75,000 (Synthesis)
Research Period: 12 months

A number of transit systems have been able to selectively increase ridership in specific market segments or submarkets. These successes illustrate the utility of market research and promotional activities. Specific research or case studies on these successes will significantly help industry practitioners. It would also be useful to initiate broader based continuous status reporting or a synthesis program to cover a wide range of experiences, including both individual and institutional markets; public school markets; university markets; human service/health care agencies; major employers; the development community; paratransit; and demand-responsive markets.

The literature suggests that outreach strategies and marketing campaigns to target specific market segments or sub-markets are often successful in recruiting and retaining customers. The proposed research should identify and evaluate innovative programs that have been effective in increasing ridership among specific market segments. A compilation of segment-specific marketing experiences and strategies from both inside and outside the transit industry

may facilitate improved understanding of these submarkets and marketing approaches that can reach these segments. Results should be synthesized in a "best practices" document that suggests strategies for attracting and retaining market segment ridership.

< *Innovative Financing Mechanisms*

Recommended Funding: \$150,000
Research Period: 12 months

The need for service improvements must consider increasing modal share, particularly during peak hours. At the same time, the transit industry is caught up in a complex budgetary process whereby increased expenditures can no longer be accommodated through traditional funding mechanisms. Budgets are being cut, demands on public financing are increasing, and political accountability demands more efficient use of available resources. Yet improving transit is necessary in the increasingly congested environment in most urban centers. Research suggests that the positive economic impacts of transit system investments include increasing urban mobility, increasing economic productivity, and decreasing the environmental costs of future growth and development. We cannot afford *not* to invest in improvements; we cannot afford *not* to increase the attractiveness of existing transit systems and their ability to capture a larger share of the tripmaking market. Increase in share responds to the needs of increasing ridership and increasing modal split for transit.

Delaying improvements increases future costs and adds a variety of costly economic burdens. For example, deferred maintenance adds as much as 40% to the per mile cost of operating vehicles. Deferred maintenance also potentially cuts into the ability to increase the status and attractiveness of existing facilities, contrary to the needs of improving access to and desirability for improved transit service.

Funding transit system improvements is complex and demanding, yet there are numerous opportunities for enhanced financing options to assist in meeting increased demands. For example, new mechanisms are available for leveraging funds by private sector contributions to increase the otherwise limited pool of finances available. The purpose of the research proposed is to compile and evaluate the range of innovative financing techniques currently in use as well as those available under ISTEA and other resources, and to test their applicability to programs designed to improve service delivery and attractiveness.

< *Formulating National Policies That Support Transit Ridership: An International Comparative Analysis*

Recommended Funding: \$20,000 per report
Research Period: continuing project

The culture and infrastructure of many other countries are different from those in the United States. As a result, in other countries, there are greater investments in public transit, greater willingness to tax auto use through fuel and other taxes, and greater propensity of the people to use transit. Why is this so and is it a matter of historical chance or public policy? This research effort should identify specific policies that support public transit and investigate why they receive political and public support in various countries.

TCRP Project J-3 sponsors two international study tours abroad each year. The contractor organizing these studies should be charged with investigating this issue as part of the group's duties on each tour and assembling the information for various countries. After three study tours have been completed (Fall of 1996), the Project J-3 contractor should prepare a report on this topic, using the participants of each study tour for input. The input will be two study tours to Europe and one to Asia. As future study tours are completed to other parts of the world, new editions of the report should be issued at approximately 2-year intervals.

< *Ridership Impacts and Elasticity of Reduced Fare Strategies*

Recommended Funding: \$75,000 (Synthesis)
Research Period: 12 months

Classic fare elasticity analyses and results have been in use for a number of years. Recent updates have been carried out by APTA using data collected from selected systems. For the most part, these analyses are designed and carried out to determine the ridership loss and revenue impacts of fare increases. Less work has been done on the elasticity of ridership with respect to fare reductions such as "free fare" or reduced fare promotions (e.g., marketing to first-time users) or reduced fare zones. Most work on reduced fare impacts has been directed to the potential to increase ridership from discount passes and other multiride discounts. Added research on the ridership impact of fare reductions of various types may be of value.

There was extensive work on free-fare and low-fare transit in the 1970s. There has also been UMTA/FTA work on ridership retention following low-fare promotions. This work should be reviewed for current relevance. In addition, research should be conducted into more recent reduced fare efforts. Examples include the following:

- DART (Dallas) reduced its cash fare in 1984. DART also has special "ozone alert" reduced fare days;
- BSDA (St. Louis) reduced its express cash fare in 1993;
- MTC (Minneapolis-St. Paul) reduced its base (off-peak) fare in 1989;
- Capital Metro (Austin) instituted a free fare;

- Queen City Metro (Cincinnati) reduced its cash fare during the summer of 1994.

The research should assess the impact of the fare change on ridership (and revenue)--both short-term and over the long-term. The project should also determine resulting elasticities related to the fare changes.

< *Identifying Attitudinal and Other Factors to Effectively Position Public Transportation*

Recommended Funding: \$150,000
Research Period: 12 months

Positioning is an effective marketing strategy to build familiarity and loyalty to a specific product and service. A product's or service's position is based on customer and noncustomer attitudes and perceptions. While some efforts have been made to identify how riders evaluate service, little is known about attitudinal and other factors that determine those associations that truly determine how transit is perceived. A research effort to identify these factors that differentiate how transit is seen *vis à vis* other mode choices can lead to strategies that will allow agencies to position transit more effectively as a viable alternative transportation mode.

< *Ridership Impacts of Preferential Treatment of On-Street Transit and Other Advanced Technologies*

Recommended Funding: \$150,000
Research Period: 12 months

A significant amount of analysis has been completed on the ridership and related impacts of various types of HOV facilities, including busways, transitways, and HOV-lane use by shared-ride vehicles. Because travel time and delay are a major factor in mode choices and because of the travel-time effects of operating transit service in mixed traffic, it may be important to carry out more comprehensive research on the ridership impacts of preferential treatment options for transit. The analysis of the impact of new technological techniques may provide important added perspectives in evaluating high-capacity, shared-ride vehicle and service options.

HOV lane installations, freeway-ramp metering, and ramp-meter bypasses for HOVs have been tried with varying degrees of success. Signal preemption for transit vehicles has been studied and demonstrated. Though signal preemption (all red) for emergency vehicles is fairly common, research indicates few, if any, permanent U.S. installations of signal preemption for transit vehicles. Computer technology and other communications technology and IVHS concepts have made great strides in the last 10 years.

This study would determine whether advances in existing technologies and new innovations such as Geographic Information Systems (GIS) and real-time vehicle location techniques including global positioning satellites have made them cost-effective enough to provide new opportunities to improve the quality of transit services.

This study would require the selection of a specific number of test sites in congested transit corridors. Then the hypothetical implementation of these techniques, both individually and collectively, would be modeled to determine their estimated cost, travel time, and ridership impacts. These case studies would be selected to test the ability of specific techniques to improve the travel times of transit vehicles in congested areas and the resulting impact on ridership.

The final output of this work should include procedures that would permit individual transit operators to assess the potential impacts of implementing these technologies in their service area as well as methods for assessing implementation costs.

< *Use of Transit Fare Media Versus Commercial Media for Transit Fare Collection*

Recommended Funding: \$150,000
Research Period: 12 months

At the same time as transit agencies are adopting a variety of passes, tickets, tokens, and electronic fare media, and as they are experimenting with Smart Cards, the broader commercial markets are accepting uniform purchase media--credit and debit cards--for an increasingly large range of purchases. To the degree that particular media become almost universally accepted for both large and small purchases, should the transit industry continue on a separate course, or should it also accept these media directly for the purchase of service? What are the advantages and disadvantages of accepting commercial bank credit and debit cards (or their successor technologies) directly in bus fareboxes and rail faregates, rather than asking customers to buy transit fare media?

Examine the costs and benefits, including impact on ridership and revenues, to transit agencies to accept credit/debit cards directly for fare payment and bill customers through the banking network, as compared to the continued use of fare media for transit agencies only. Evaluate the financial impact upon the transit agency of potentially losing the "float" associated with prepayment of fares. Determine the cost of equipment needed, interfaces with electronic banking networks, potential financial gains and risks, and impacts on revenue security. Explore advantages, acceptability, and attractiveness to the customer, as well as potential concerns, including privacy issues. Examine interactions with third-party purchasers--such as

employers and social service agencies--and the ability to accommodate various fare structures, fees, and programs (time- and distance-based fares, monthly fees, and volume-of-use discounts).

< *Assessment of Marketing Techniques for Small Transit Organizations*

Source: Karla Karash for TRB
Committee A1E06
Recommended Funding: \$200,000
Research Period: 12 months

Small transit organizations may be at a marketing disadvantage compared to larger transit organizations because of smaller marketing budgets and staff. However, there are a variety of cost effective marketing techniques that have been used successfully by small transit organizations. The purpose of this research will be to describe and evaluate marketing techniques that can be used effectively in a low budget environment.

The objective of this research is to identify and evaluate the state of the art of marketing, market research, information, and public education in small transit agencies. This research would include (1) a review of current industry practice, (2) a description of promising low-budget marketing techniques, (3) a selection of a number of techniques for evaluation, either with available data or through case studies, and (4) the development of a "how to" guidance document aimed at helping small transit organizations implement various strategies.

< *How to Measure/Communicate the Value of Transit Marketing*

Recommended Funding: \$150,000
Research Period: 12 months

Transit marketing typically is viewed as having both direct and indirect values. Direct effectiveness may sometimes be expressed as specific targeted market ridership increases. Indirect value can be attributed to overall image enhancement. Because marketing budgets may sometimes be threatened as nonessential when financial constraints are applied, a need exists to measure and communicate its importance to the community and to transit policy makers. A need exists to educate transit officials on the most effective marketing techniques and strategies.

Via case study analyses, assemble past examples of documented marketing pay-offs. Where case-study transit systems have experienced significant ridership increases for specific market segments, determine the extent to which marketing played a role. Consider the types of

marketing/advertising/promotion employed and the relative impact of each on ridership gains and on any other positive image enhancements that may have occurred. Develop a report that both highlights case-study results, and suggests how a local transit agency could document similar local marketing values.

< *Increasing the Effective Coverage of Bus Networks*

Recommended Funding: \$150,000
Research Period: 12 months

Research has shown that changes in fare levels and the quantity of service (as measured in route miles) are the most significant factors in explaining changes in bus transit ridership. Within constrained resources available for bus services, there is a wide variety of arrangements for deploying fixed-route bus service and for improving average trip time. Among the trade-offs is the possibility of expanding service-area coverage at the expense of shortened headways. Services can be configured radially, in a grid pattern, or in a network of feeders and arterials. Routes can be long and circuitous or can be short but linked together with transfers. A route network can be planned to minimize transfers or based on a philosophy that transfers can be made convenient--by the use of timed transfers, for example--and should be used to match vehicles and headways to routes to maximize efficiency and user convenience.

Different route structures may also be perceived as having different appeal to users as well as different operating costs and coverage. Improving the average trip time of buses in service also increases coverage by reducing the number of vehicles required to serve any route, which frees vehicles for new routes assuming a fixed fleet size is available. Strategies that give buses preference over other traffic, such as dedicated lanes and signal preemption, improve trip times. Finally, strategies for speeding up the loading and unloading process--such as multiple bus doors, fare collection methods,

useful passenger information at stops--also improve trip times.

The research question is to ascertain the impact on ridership of the options for configuring routes, headways, and bus preference methods. Research approaches may include the development and use of models of transit operations. One approach could be to model an actual experience and then examine the changes in ridership flowing from the trial application of different strategies.

The key task is to select models for estimating the impact of ridership as a function of route structure, headways and trip speeds. It is believed that existing models can be used for this purpose and the model developed here would use existing formulations in a network context.

The end product would be a document and a computerized model that guides agencies in the evaluation of alternative designs in their service area. An emphasis would be on developing formats for presenting findings to transit boards and to the public.

< *Impacts of Employer Provided Fare Incentive Programs*

Recommended Funding: \$150,000
Research Period: 12 months

Initial efforts by APTA to describe the progress being made to implement recent federal tax changes proved valuable to the industry. A more systematic program should be initiated to synthesize and document the progress and effects of continued activity in the area of employer-provided pass or voucher programs.

The proposed research should review and evaluate the efforts to implement employer-provided incentive programs, identifying innovative approaches. A best-practices review should describe outreach efforts, level of employer and employee participation, and impact on ridership. Recommendations and suggestions for initiating programs should be provided.