U. S. Department
of Transportation

**Urban Mass
Transportation
Administration**

MOBILITY MANAGEMENT AND MARKET ORIENTED LOCAL TRANSPORTATION

March 1991

ADVANCED PUBLIC TRANSPORTATION SYSTEMS PROGRAM
A Component of the Departmental IVHS Initiative

Office of Technical Assistance and Safety

Mobility Management and Market-Oriented Local Transportation

Final Report
March 1991

Prepared by

Jeffrey A; Parker and Associates
5224 Forty-Second Street N.W.
Washington, D.C. 20015
and
International Taxicab and Livery Association
3849 Farragut Avenue
Kensington, MD 20895

Prepared for

Office of Technical Assistance and Safety
Urban Mass Transportation Administration
400 Seventh Street, S.W.
Washington, DC. 20590

Distributed in Cooperation with

Technology Sharing Program
U.S. Department of Transportation
Washington, D.C. 20590

DOT-T-92-07

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Urban Mass Transportation Administration has since the early 1970's fostered attempts to make greater use of market mechanisms in organizing, financing, and delivering -public transportation services. UMTA's most recent venture in this area occurred in 1989, when it sponsored a program of "consumer choice" initiatives, involving both analytic studies and demonstration projects. The purpose of this program was to take the next step in market-oriented public transportation by developing and demonstrating concepts which went beyond the scope 'of the previous generation of activities in this area. In particular, UMTA requested that the International Taxicab and Livery Association (ITLA) and its contractor, Jeffrey Parker and Associates (JPA), work with local transportation agencies to identify and develop a set of potential demonstration projects which would test both the feasibility and the cost-effectiveness of new market-oriented approaches to local transportation service organization and delivery.

This report describes the study that JPA conducted of consumer choice approaches to public transportation service delivery, and the evolution of the project towards a "mobility management" approach to service delivery which is consistent with, but more broadly construed, than market-oriented local transportation.

The Mobility Manager is a mechanism for achieving the integration and coordination of transportation services offered by multiple providers--public, private for-profit, and private non-profit--involving a variety of travel modes--bus, taxi, vanpools, rail, etc.--and multiple sources of funding. This integration is accomplished through electronic technologies, allowing the programmatic integrity of all participants to be preserved, while at the same time automating most of the transactions--financial and otherwise--which occur in the system. The Mobility Manager's function resembles that of a travel agency and a financial clearinghouse. Through a single point of contact it offers information to tripmakers on all relevant travel choices and their price-service characteristics. It can make trip reservations directly or refer prospective users to a service provider for this purpose. It also handles most or all of the financial transactions in the system, aided by software designed for this purpose. Various hardware and software technologies, such as magnetic or electronic fare media, in-vehicle card readers which can commmunicate with computers, computer-assisted vehicle scheduling and dispatching, and computer database systems would be used in such a system.

The Mobility Manager is in many respects analagous--within the urban travel context--to airline reservation systems,, as well as the systems of large package delivery firms such as Federal Express and UPS. In these systems, as with the Mobility Manager, prospective users initially contact a central telephone number--either a travel agent or the

transportation provider itself--to access information on service options and prices and, if appropriate, to make service reservations. In the case of package delivery service, a vehicle may be dispatched to the pick-up location at a predetermined time. Financial transactions in these systems are usually handled electronically and an automated central accounting system subsequently generates invoices and other documentation of the transaction. In a matter of a few minutes, or even less, a potentially complicated transportation transaction is arranged and financial transactions documented, with all relevant information maintained in a readily accessible form for future reference.

The Mobility Manager concept is attractive for a number of reasons. First, it represents an important alternative for facilitating service delivery to certain target population groups in a community, including addressing the issue of funding integration between public transit funds and human service agency funds. 'This becomes increasingly important in view of the requirements of the Americans with Disabilities Act. Second, by creating a single market for intra-city transportation, the Mobility Manager may provide improved alternatives to single occupant automobile travel, as well as providing special population groups with greater mobility. Third, it takes advantage of technological advances, such as those included in the scope of the Intelligent Vehicle-Highway System program, to improve local mobility options and to increase program cost-effectiveness. Fourth, it is consistent with a variety of local institutional arrangements for transit service organziation and delivery. While it provides the necessary organizational-technological infrastructure for comprehensive market-oriented local transportation initiatives, it can also be of benefit to traditionally organized transit systems.

The degree of technological sophistication needed to implement a Mobility Manager system will vary depending upon the conditions in each community--there is no single "package" that is likely to fit all cases. The electronic technologies which will be utilized include computerized vehicle scheduling and dispatching systems, automated route information systems and similar voice communication systems, magnetic and/or electronic fare media, in-vehicle card readers, and large-scale database management systems. All of these technologies are currently in use in the private and public sectors.

The three most critical areas from the technology perspective are:
(1) computer assisted or fully automated routing, scheduling, and dispatching of vehicles participating in the system;
(2) electronic fare collection systems;
(3) computer database systems to record and process all financial and non-financial transactions.

A review of technological status in these three areas indicates that the current state of the art readily supports the requirements of the Mobility Manager system. Moreover, these

technologies appear to be quite affordable, and are likely to drop in cost in the near future. The primary challenge is to achieve improved integration of the electronic technologies needed for vehicle scheduling and dispatching, fare collection, and financial transaction mangement. In fact, a system already exists in Sweden which integrates some of these technologies, and the Chicago region is proceeding with the implementation of a major project for demand responsive transportation for the disabled which features substantial integration of these technologies, including the use of "smart" cards.

After conducting discussions with approximately 20 localities about potential demonstration projects, the project team visited 9 communities for more in-depth analysis. From these, five areas were selected in which a "forum" was convened to discuss in detail the possible characteristics of a Mobility Manager demonstration activity. These five areas are Los Angeles, Portland (OR), Medford (OR), Pinellas County (FL), and Prince Williams County (VA). In the first three areas local interest had already reached a point of sufficient focus that relatively well-defined demonstration activities could be identified and discussed by forum participants. Project proposals have been developed by these three areas; the latter two areas may subsequently develop demonstration project proposals.

The potential demonstration activities in Los Angeles, Portland, and Medford initially focus on applying the Mobility Manager concept to elderly and disabled transportation services. Within this framework, they focus on the establishment of organizational models for funding and service integration, the implementation of component hardware and software technologies, the evaluation of particular software components, and the integration of the various technologies into a workable, user-friendly system. In addition, the proposed Medford project would extend the Mobility Manager framework to general public transportation at a subsequent phase of the project. If these, or similar, projects proceed to the demonstration stage, they will establish the organizational and technological feasibility of this approach to local transportation service organization and delivery. They will also provide valuable insight into the merits of this approach as a means of meeting the requirements of the ADA legislation.

It is also important to note that many of the technologies which are central to the function of the Mobility Manager are also prominent in DOT's Intelligent Vehicle and Highway System (IVHS) program. Computerized dispatching of vehicles, automatic vehicle locator systems, geographic information systems, intelligent databases, smart cards and other electronic payment media are common to both the Mobility Manager and IVHS. It is apparent that this approach to local transportation service organization and delivery represents an important testing ground for IVHS technologies. As these technologies mature and new ones appear, the prospects for the Mobility Manager are likely to be further enhanced.

CHAPTER 1
INTRODUCTION

I. Background

Since the mid-1970's, the Urban Mass Transportation Administration has fostered attempts to make greater use of market mechanisms in organizing, financing, and delivering public transportation services. UMTA's most recent venture in this area occurred in 1989, when it sponsored a program of "consumer choice" initiatives, involving both analytic studies and demonstration projects. The purpose of this program was to take the next step in market-oriented public transportation by developing and demonstrating concepts which went beyond the scope of the previous generation of activities in this area. Previously, the primary focus of market-oriented public transportation had been on the development of user-side subsidy projects targeted at special population groups, notably the elderly and/or the disabled.

In implementing this consumer choice initiative, UMTA selected the International Taxicab and Livery Association (ITLA) to develop a set of local transportation projects which would demonstrate both the feasibility and the cost-effectiveness advantages of new market-oriented approaches to service organization and delivery. ITLA contracted with Jeffrey Parker and Associates (JPA) to actually conduct the study and to work with local transportation agencies to develop demonstration project proposals; these projects would be funded by subsequent UMTA demonstration grants.

This report describes the study that JPA conducted of consumer choice approaches to public transportation service delivery, and the evolution of the project towards a "mobility management" approach to service delivery which is consistent with, but more broadly construed, than market-oriented local transportation. The mobility management approach is itself the subject of considerable analysis. The report also chronicles the project team's evaluation and subsequent selection of potential demonstration sites, and describes the proposed demonstration projects developed in the course of the study.

II. The Consumer Choice Initiative: Market-Oriented Approaches to Local Transportation

The consumer choice initiative was motivated by an interest in evaluating alternative, market-oriented organizing schemas for public transportation. In the traditional public transit service organization system, which characterizes the large majority of transit

operations, a single organization provides service in each transit market--i.e., route, **zone,** etc.--and receives public subsidy simply by virtue of providing this service. The problematic aspects of this system of publicly subsidized monopoly service organization are well-known--the system contains no inherent economic incentives for either service quality improvements, cost containment, or experimentation with new price-service options. These conditions have since the mid-1970's stimulated efforts, by UMTA and others, to devise alternative, more market-oriented methods of organizing and delivering urban transit services. The consumer choice inititiative was the most recent of these efforts:

In a "pure" consumer choice public transportation system, any qualified transportation operator may participate by offering services--fixed route and/or paratransit--at prices that they establish. Transit users select that service provider which offers the most attractive price/service option for the specific trip they wish to take. Many or all of the trip makers in a consumer choice system will be given subsidy to defray some or all of the cost of their trip. Thus, rather than providing direct subsidies to operators, user trips are subsidized. Consequently, operators are not guaranteed revenues from the transit subsidy program, but must compete for them in the marketplace. The choices of consumers, not the decisions of a government agency, determine the allocation of transit subsidies among participating transportation providers.

The consumer choice concept in its simplest manifestation is not new, for it has been implemented in the form of user-side subsidy public transportation services in many locales in this country. User-side subsidy services are consumer choice systems. But even though such services have been widely implemented, existing user-side subsidy projects do not represent the entire range of potentially feasible market-oriented local transportation systems. Three limitations of existing user-side subsidy projects are particularly significant.

First, this particular consumer choice concept has--with a single notable exception--been applied only to "marginal" public transit services, most notably relatively low ridership services targeted at an elderly and/or disabled clientele. Typically, the consumer choice service represents a small element of a region's overall public transportation service, the vast bulk of which is supplied by a public agency which is directly subsidized.

Second,' user-side subsidy systems have only rarely managed to integrate human service agencies and their clients and funds into the system, even though this has been an objective of a number of projects. Because user-side subsidy systems rely on existing,' private sector transportation providers, they represent an important

alternative to human service agencies developing and operating their own transportation delivery systems.

Third, user-side subsidy programs have with few exceptions relied upon very simple technologies to link users, providers, and funding sources together. Most programs utilize "manual" technologies--cash transactions, paper vouchers or tickets, paper documentation, and physical transmittal of such items as invoices and reports. Few programs handle transactions with the technological level of sophistication which characterizes most business financial transactions in the private transportation industries (i.e., airlines, trucking, railroads, etc.).

As a result of these limitations, the consumer choice approach has been subject to only a partial experiment. Little is known about its viability when applied to more "mainstream" type of services or to a broader user group than the elderly and disabled, when it is the foundation for an integrated human service agency-public transit system transportation service, or when it utilizes the types of electronic technologies which are increasingly the norm in private transportation businesses.

The primary objective of the UMTA Consumer Choice initiative was to assess the merits of consumer choice as a broad-based schema for routinely organizing and delivering any or all forms of local public transportation, not merely specialized services. The essential means of conducting this assessment, moreover, was not to be through analytic studies, but rather through the development and evaluation of actual demonstration projects which address one or more key issues affecting the feasibility of market-oriented approaches to delivering local transportation.

III. Mobility Management: Refocusing Market-Oriented Public Transportation Initiatives

UMTA in 1989 selected the ITLA to work with local transportation agencies and private transportation providers to develop projects at four sites (at a minimum) for the demonstration project component of its Consumer Choice initiative. JPA had the operational responsibility for implementing this task. The objective of the demonstration projects, considered as a whole, was to advance the state of the art in market-oriented public transportation well beyond the user-side subsidy projects implemented to date.

As the project proceeded, it became apparent that it would be extremely difficult to develop demonstration activities which involved the application of consumer choice either to all public transit users or to the supply side of an entire transit system. As a

result, the project increasingly focused on the issues of funding integration--between transit and human services funds--and technological facilitation of market-oriented local tranportation systems. These two themes found a common framework in the concept of the "mobility manager".

The Mobility Manager is a mechanism for achieving the integration and coordination of transportation services offered by multiple providers--public, private for-profit, and private non-profit--involving a variety of travel modes and multiple sources of funding. This integration is accomplished through electronic technologies, allowing the programmatic integrity of all participants to be preserved, while at the same time automating most of the transactions--financial and otherwise--which occur in the system. The Mobility Manager's function resembles that of a travel agency and a financial clearinghouse. It has information on all relevant travel choices and their price-service characteristics, can make trip reservations directly or refer a user to a service provider for this purpose, and handles most or all of the financial transactions in the system, aided by software designed for this purpose. Various hardware and software technologies, such as magnetic or electronic fare media, in-vehicle card readers which can communicate with computers, computer-assisted vehicle scheduling and dispatching, and computer database systems are likely to be used in a Mobility Manager system.

The Mobility Manager is in many respects analagous--within the urban travel 'context--to airline reservation systems, as well as the systems of large package delivery firms such as Federal Express and UPS. In these systems, as with the Mobility Manager, prospective users initially contact a central telephone number--either a travel agent or. the transportation provider itself--to access information on service options and prices and, if appropriate, to make service reservations. In the case of package delivery service, a vehicle may be dispatched to the pick-up location at a predetermined time. Financial transactions are usually handled electronically. Credit cards are used to purchase airline tickets over the telephone, and package delivery customers often have prearranged account+ An automated central accounting system subsequently generates invoices and other documentation of the financial transactidn. In a matter of a few minutes, or even less, a potentially complicated transportation transaction is arranged and financial transactions documented, with all relevant information maintained in a readily accessible form for future reference. The system is designed to be very user-friendly--the user has to exert relatively minimal effort to initiate and complete the transaction. The purpose of the Mobility Manager is to provide similar functionality for urban travel.

The Mobility Manager represents a refocusing of the consumer choice approach, away from an emphasis on applying consumer choice to a wide spectrum of users and

providers, and towards an emphasis on the technological means of facilitating the implementation of market-oriented local transportation systems. The focus of Mobility Management is on creating the infrastructure--in the form of electronic linkages, software, and databases--which permit a local transportation system which includes multiple providers and multiple funding sources to function in a user-friendly and cost-effective manner. In addition, by providing high level integration of local transportation services and facilitating user transactions, the Mobility Manager offers the potential for diverting some automobile trips to other modes.

The Mobility Manager is consistent with--and some might argue, necessary for--the development of a fully market-oriented local transportation system. However, the Mobility Manager concept is applicable whether or not a locality has chosen to implement such a system. Any locality whose transportation delivery system is characterized by multiple providers, multiple funding sources, and some elements of consumer choice--such as a user-side subsidy program--is a candidate for the Mobility Manager. Precisely because of its broader applicability, it has become the focus of the demonstration project development activities.

IV. The Broader Context of Mobility Management

The Mobility Manager concept is an outgrowth of a perspective on local transportation service delivery which focuses on the use of modern information technologies to organize and integrate transportation resources (including fiscal resources) to provide improvements in service cost-effectiveness. As the American Public Transportation Association states in its Transit 2000 report,

> "Transit agencies and professionals must act aggressively as catalysts in the community and play a broader role as managers of mobility. This responsibility requires actions beyond the direct operation and management of on-street services. Coordinating, advising, and promoting better management of the supply of and demand for transportation services are all part of this larger responsibility. "

The Department of Transportation's recently promulgated National Transportation Policy and DOT's Intelligent Vehicle-Highway System (IVHS) program reinforce the emphasis on developing a range of technological systems which improve local mobility. The National Transportation Policy also emphasizes intermodal coordination and private sector participation, two important features of the Mobility Manager. The advent of low-cost computing power, increasingly sophisticated computer software,

and micro-processor control of all types of hardware systems offers substantial promise for technological improvements to numerous aspects of the urban transportation system. The IVHS program in particular is premised upon the use of electronic technologies to improve system performance; the Mobility Manager approach is built upon this technological foundation.

The requirements of the Americans with Disability Act (ADA) represent another major factor affecting the future course of development of public transportation, and one which is likely to require many localities to develop service delivery mechanisms similar to that embodied in the Mobility Manager. Because the Mobility Manager will accomodate a multiplicity of trip purposes and travel modes, while simplifying user access to service and accompanying financial transactions, it could play an instrumental role in implementing ADA-required services in a community.

CHAPTER 2
DEVELOPING MARKET-ORIENTED LOCAL TRANSPORTATION SYSTEMS: LESSONS FROM PREVIOUS EXPERIENCES AND CURRENT ISSUES

I. Overview

UMTA's Consumer Choice initiative was motivated by an interest in applying the principles of market choice to a broader range of local public transportation activities than had previously been the case. Accordingly, before embarking in new directions, it is useful to first review the landscape previously traversed and to identify the issues posed by the experiences to date with market-oriented local transportation programs.' The prior experiences may provide much useful guidance in indicating the new directions which are most beneficial to explore.

II. User-Side Subsidy Experiences

Numerous local public transportation Services have been organized on a user-side subsidy basis since the late 1970's. A recent computerized search of the major transportation literature database retrieved 106 publications relating to user-side subsidy transportation services. Many of these publications are evaluations of specific user-side subsidy projects, but the literature also includes scholarly treatments of the . general topic, policy analyses of this approach to transit financing and subsidization, planning handbooks, and studies of the impacts of these services on user travel behavior. One of the items retrieved was a TRB produced bibliography which itself contained 105 items! This gives some indication of the extent to which user-side subsidy 'services have been studied and implemented.

This literature, as well as the project team's personal' knowledge of user-side subsidy services, permits the following characterization of these experiences. (1) Several major user-side subsidy systems have been implemented, often in the form of UMTA demonstration projects, (2) Numerous small user-side subsidy services have been implemented--it is possible the number is in the hundreds. (3) With few exceptions, both the major projects and the smaller services have relied exclusively on the local 'taxi industry to provide service; other types of operators have only rarely been involved. (4) With very few exceptions, user-side subsidies have been restricted to the elderly and/or disabled. (5) Most services have low ridership (many have fewer than 100 riders per day), relatively high cost, and relatively unsophisticated payment and administration systems. (6) With virtually no exceptions, the services

implemented to date do not represent "mainstream" public transportation. (7) The more ambitious attempts to implement the user-side subsidy concept--notably those in Danville, IL and Montgomery, AL--revealed that certain practical problems had to be resolved before this system could- routinely deliver mainstream public transportation.

The results of the Danville, IL project are particularly illuminating, for in several respects this was the most comprehensive and interesting of the UMTA demonstration projects. Implemented between 1976 and 1978, the Danville project involved both fixed route and paratransit services in a community of about 50,000 population. Subsidies for fixed route service were available to all residents of Danville, not merely the elderly and disabled. In addition, the elderly and disabled had subsidies available for shared ride taxi service. Multiple providers were involved--a bus company and the local taxicab company. The project was planned-and implemented with the assistance of the Urban Institute and was extensively evaluated by Crain and Associates.

The Danville project clearly demonstrated that consumer choice concepts could be used to deliver transit services to the general public, and that this type of service organization did not adversely affect the level of transit demand. The project also demonstrated, however, that-at least in one seemingly typical small city--local transportation markets differed in important respects from the premises of the consumer choice theorists.

Of primary significance was the reluctance of private providers to participate in the project without financial guarantees. It proved impossible to find a private bus operator who would provide service in Danville without revenue guarantees, and only one operator was willing to provide service at all. Moreover, this operator insisted upon such high levels of revenue guarantees that the guarantees, not the consumer choice mechanism; determined in practice the payments it received from the City. Guarantees were also necessary to induce the local taxi operator to provide service on low density "routes" which could not sustain regular bus service. Although revenue guarantees were not necessary for the areawide shared ride taxi services provided by the local taxi company--services for which user-side subsidies were available to the elderly and handicapped--there was no competition in this market. As implemented, therefore, the Danville system had no intra-modal competition and required revenue guarantees for fixed route services, thereby nullifying the concept that consumer choice would determine provider revenues.

The Danville project also demonstrated that the administration of a user-side subsidy system could be problematic. Fewer local businesses than anticipated agreed to act as ticket agents, and the project had high administrative costs per ride. Because the

project was implemented before the availability of low cost computer information systems, there was no significant computerization to minimize administrative overhead.

Overall, the Danville project demonstrated that the concept of consumer choice could be applied to an entire transit system for the general public and produce a workable operation, but local market conditions had a significant influence on the extent to which all elements of the concept could be realized in practice. The element of provider risk and the cost of program administration, in particular, emerged as problems. Similar lessons could be drawn from the Montgomery demonstration project.

The importance of Danville and Montgomery is that they represent the only attempts to date to broadly apply user-side subsidy in a local public transit operation. Since the late 1970's, user-side subsidy projects have essentially been confined to the delivery of paratransit services for special user groups. Although most of these systems are small, several large programs targeted at mobility impaired individuals have been developed in major metropolitan areas.

The Chicago Transit Authority's transportation program for the disabled represents perhaps the best example of a recently implemented attempt to deliver a large amount of service through consumer choice mechanisms. The CTA program involves only paratransit service, and is restricted to a disabled clientele, but the size of the program is impressive--over 1000 passenger trips per day. Users choose from among 4 service providers, and payments to providers are strictly on a per passenger trip basis. Substantial shifts in the market shares of the providers have occurred over time, indicating that users can discern differences in level of service and that the best performing providers will be the beneficiaries of consumer choice.

It bears mentioning that an objective of several user-side subsidy projects, including some of the UMTA demonstration projects of the late 1970's, was to attract human service agency participation. In theory, human service agencies which would otherwise have to provide their own transportation services should find a user-side subsidy service an attractive option. They could work with the sponsor of the project to devise mutually satisfactory subsidy sharing, they could make use of existing transportation resources rather than have to create their own program, and they could also benefit from using another organization's program delivery structure to arrange for client transportation and provider payment. Despite these advantages, human service agencies chose not to participate in the user-side subsidy projects, unless their involvement was the central feature of the project, as in the ACCESS program in

Pittsburgh. When agencies had their own transportation program, they continued to operate their own services.

III. Lessons of the Experiences to Date

The user-side subsidy projects have convincingly demonstrated that consumer choice mechanisms are a practical, cost-effective approach to delivering paratransit services to targeted user groups. For low ridership services, i.e., services for which demand density is inherently low because of use restrictions or market conditions, the user-side subsidy approach tends to produce more cost-effective paratransit services than does a dedicated vehicle provider-side subsidy system. Program administration, while often somewhat expensive, has not proved to be a major problem. Mechanisms for detecting fraud and abuse are usually straightforward to implement, and typically accomplish their purpose. The consumer choice mechanism promotes competition among providers, and those providers that offer the best service tend to attract the most passengers over time.

While much has been learned from the projects implemented to date, the following questions about using market mechanisms to deliver public transportation services remain to be answered:

--Is this an appropriate approach to service delivery for the general public in a system of significant size?

--Will market mechanisms result in more cost-effective systems than traditional single provider systems? .

--Will the needed technology perform satisfactorily in day to day operations?

--Can this approach attract the participation of human service transportation programs?

It is issues such as those specified above that demonstration projects should test in order to realistically evaluate the feasibility and benefits of more ambitious uses of market-oriented approaches for public transportation service delivery.

IV. Issues in Developing Market-Oriented Demonstration Projects

Expanding the Market for Public Transportation

UMTA's Consumer Choice initiative was premised in part on a conviction that currently untapped opportunities exist for public transportation if the transit delivery system can be made to become more market oriented. On the one hand, consumer choice may represent an improved method of organizing and delivering local transit, i.e., a mechanism for increasing the efficiency and responsiveness of serving the existing market for public transportation in a community. On the other hand, consumer choice may also represent a new approach to serving local mobility needs, i.e., a strategy for expanding transit usage in certain market niches in the overall local transportation market.

The conventional approach to transit tends to aim at the mass market and ignore market niches. In contrast, by providing subsidies to users and allowing all willing providers to develop services which can capture those subsidies, it may prove possible to stimulate the establishment of economically viable services which currently do not exist. The market for these services would consist of individuals who formerly used an automobile for the type of trip in question or who did not make the trip at all. To the extent that the consumer choice approach can expand the transit market, moreover, it becomes more acceptable to established organizations which serve the existing market.

Making the Market Work

The success of market-oriented approaches to public transit is heavily dependent upon marketing and information availability. Information on different price/service options must be readily and widely available in order for consumers to make appropriate choices among competing services. In Great Britain, the uneven availability and quality of consumer information on local transit services has been the one major continuing problem in that country's otherwise generally successful policy of privatizing and deregulating public transportation. A viable market oriented approach to public transportation requires that current transit users, and potential new users, be able to easily access the information needed to make choices among different services and then be able to readily access the services themselves when they wish to travel.

Developments in the air travel market also illustrate the increased importance of information as a transportation industry becomes more. market oriented. Travel agents have emerged as information agents in the wake of airline deregulation; the numerous price/service options which now characterize airline travel virtually require consumers to use a neutral information intermediary to obtain the best value for their money.

Human Service Agency Participation

A major institutional challenge is how to implement consumer choice systems which feature substantial participation by human service agencies. Human service agency participation is desirable for two reasons. First, it increases the overall demand level, thereby making more productive services possible. Second, it injects another source of revenue into the system, helping to offset overhead costs which are not likely to vary widely with demand level.

The limited success of user-side projects in achieving this participation indicates that consumer choice systems are not inherently attractive to human service transportation programs. Most human service agencies apparently perceive that the transportation services available through user-side subsidy programs are either less responsive to their clients' needs or represent no. financial advantage compared to maintaining in-house services. The accuracy of these perceptions is not the issue. The fact that they are widespread indicates that human service agency participation cannot be assumed, and must be induced by program features which are attractive to these agencies. These may involve devising special arrangements for human service agency participation as consumers of service. A demonstration project which could provide a transferable model--in terms of type of organization, financial arrangements, and administrative skills--for this element of a market-oriented local transportation system would be a major step forward institutionally.

Technological Feasibility

There are essentially three aspects of the technology issue. The first is whether the technology--hardware, software, management systems--currently exists to perform all the functions that are desirable in a consumer choice system. The second, and probably more significant issue, is whether the technologies will perform satisfactorily in the environment in which they will be used The third issue is the level of sophistication of electronic technology which is necessary for cost-effective service.

A key aspect of technological feasibility is whether such electronic technologies as computerized trip scheduling and vehicle dispatching, in-vehicle card readers, remote fare replenishment, and computerized voice communications systems will work conveniently and with high reliability in the day to day world of bus transit and paratransit. A related issue is how well these technologies will serve the needs of users while also preventing abuse by users or providers. In a user-friendly consumer choice system, obtaining payment media should be no more difficult than accessing one's bank account through an automatic bank teller or a merchant debit system. At the same time, systems must exist which effectively detect patterns of fraud or abuse, without compromising the requirements for user-friendliness. This will be an important area in which to demonstrate technological feasibility.

The issue of technological feasible is strongly related to the issue of cost-effectiveness. Highly sophisticated electronic technologies suitable for a consumer choice system already exist, and others could be readily developed without technological breakthroughs. But how much does such technology cost relative to the functions it performs, and does it result in reductions in overall service delivery costs compared to the conventional local transportation system? Use of electronic technologies and appropriate software can minimize the administrative overhead of a consumer choice system, but the costs of such overhead may nonetheless be quite significant. Moreover, the initial purchase costs (including the cost of software development) and subsequent maintenance of hardware and software may also be substantial. Technology thus emerges as a major demonstration issue on several dimensions.

User Acceptance

User acceptance of the consumer choice approach is obviously critical to its wider application. Market-oriented transit offers both potential benefits and costs to users. The primary benefit is the ability to choose among different providers offering--at least potentially--different price/service options, as opposed to having to rely on the service offerings of a single provider. On the other hand, consumer choice requires more of the user compared to conventional public transit. Users must initially register for the program in order to receive subsidies, they must use a payment media other than cash and must secure this media prior to making trips, and they must determine which provider and which service to select among several competing options. In addition, the price structure for services is likely to be considerably more complex than for conventional transit.

Two factors appear to be of primary significance in determining user acceptance: ease of payment and the availability of information. Whatever payment media is used, it must be readily obtainable, simple to use, and easy to account for. With respect to information requirements, it is essential that users can readily determine what services are available and what their characteristics are--routes, schedules, area of coverage, advance reservation requirements, prices, etc. This becomes particularly important as services change in response to market conditions. It bears mentioning that much of the transit market is not highly literate, so that appropriate types as well as sufficient amounts of information must be available.

Provider Acceptance

Provider acceptance is also critical to the feasibility of market-oriented public transportation systems. Of primary importance is the existing public transit operator, whose support must be secured. While this requirement could prove to be "institutionally difficult!', it cannot be avoided if the prospect for market-oriented transit on a broad scale is to be adequately tested.

Risk management is likely to be the key to gaining provider acceptance of consumer choice. Whether it is the existing public transit operator or an outside private transportation company considering whether to establish operations in the community, providers must be able to handle the financial risks imposed by a consumer choice program. Those few user-side subsidy projects implemented to date which have had any significant risk for providers (such as Danville and Montgomery) quickly found that transportation operators were unwilling to accept such risks; guarantees became necessary to induce participation. Unless financial risks can be adequately managed, incumbent providers are likely to successfully oppose demonstrations projects involving market-oriented Public transit. In practice, this means that revenue guarantees for incumbent providers will probably be necessary for a transitional period. It bears emphasizing that the incumbent operators potentially have great market power in a consumer choice system. They are the first into the market (always an advantage), they know the market (at least in theory), and their mere presence may deter large-scale entry by new competitors.

Issue Summary

It is clear that the issues discussed above are interrelated. Technology influences user acceptance and cost-effectiveness, market conditions affect provider acceptance and the level of competition, institutional responsibilities may determine the level of information availability which in turn affects how well the market works. These issues, and others, are interrelated because consumer choice is a system for organizing and delivering local transportation services. As such, it implies many different types of changes whose impacts are often uncertain.

Because of the substantial institutional, economic, and technological uncertainties associated with a major consumer choice demonstration involving mainstream public transit, to simply demonstrate some market-oriented features in a mainstream transit system would be a significant advance. Similarly, to demonstrate sophisticated, integrated technology in a small-scale transit system would be an important step towards establishing the feasibility of organizing market-oriented transit around a sound technological infrastructure. Moreover, a project which demonstrated that a market-oriented approach could effectively integrate transit and human service programs would represent a breakthrough in its own right. What is most essential is that the demonstration projects illuminate the issues associated with the implementation of more ambitious market-oriented approaches to local transportation service organization and delivery.

CHAPTER 3
FROM CONSUMER CHOICE TO MOBILITY MANAGEMENT

I. A Strategy for Achieving Implementable Demonstrations

In November, 1989 the project team conducted an all-day meeting with the project Steering Committee in San Diego. The Steering Committee is composed of representatives of taxicab companies, other private transportation providers, human service agencies, public transit authorities, and national associations for regional planning agencies and neighborhood organizations. At the San Diego meeting, the Steering Committee expressed clear preferences for the types of demonstration activities it wished to see implemented.

The Steering Committee was primarily interested in demonstration projects which involved one or more of the following characteristics. First, a high priority was placed upon the development of projects in which consumer choice was applied to a mainstream transit operation. Second, demonstration activities were sought which would involve the integration of transit subsidies and human service agency funds under the rubric of consumer choice. Third, demonstration projects should include a substantial technological component involving such technologies as computerized scheduling and dispatching systems, smart cards or magnetic fare media,, comprehensive electronic linkages among all participants, etc.

The Steering Committee's priorities posed a significant institutional challenge for securing demonstration sites. In particular, their conviction--shared by the project team--that strategies must be devised for working through mainstream institutions in implementing these potentially ambitious ventures meant that the thrust of the demonstrations had to be at least minimally acceptable to public transit agencies. But consumer choice, at least in its pure form, is not a concept which is attractive to most transit agencies.

The project team decided that the most promising approach for reconciling market-oriented service delivery approaches with the institutional interests of public transit agencies was to emphasize the development of a <u>system</u> for facilitating local transportation transactions. This system--which was given the name "mobility manager"--consists of technological and administrative components for organizing **and** facilitating local transportation service delivery. By focusing on technologies involving new fare media, electronic transactions, enhanced information systems, computerized vehicle scheduling and dispatching systems, and improved methods of subsidy delivery, it was much more likely that transit agencies would find something

of practical benefit in the market-oriented concept. If initial agreement could be reached on implementing the technological infrastructure which would support a market-oriented public transportation system, then it might be possible to subsequently reach agreement on permitting provider competition, at least in certain situations.

A second element of the project team's strategy for achieving implementable demonstration projects was to focus on projects which involved testing component parts of consumer choice, rather than the overall concept in toto. It appeared to be neither necessary, nor wise, to simultaneously test in a single demonstration project all of the components of the most ambitious version of the consumer choice concept. Again, technology appeared to be a promising starting point. Later phases of a demonstration could involve consumer choice among providers on a limited scale (geographically or in terms of services), with possible eventual implementation of the fully market-oriented public transit system. Provided that the project components are consistent with the longer term objectives, component testing will yield valuable information, and represent the basis for more comprehensive applications of market-oriented approaches.

As a result of this concern for developing demonstration projects which had serious institutional prospects for local funding and implementation, the project team refocused the emphasis of the initial demonstration activities on the "mobility manager" concept. Although the mobility manager concept is completely consistent with the objectives of market-oriented public transit, it emphasizes the use of technologies and administrative procedures to establish an information and transaction infrastructure to facilitate the use of market processes for local transportation service delivery. While this infrastructure can provide the basis for introducing consumer choice elements into local public transportation, it does not necessitate a fully market-oriented transit system.

II. The Mobility Manager Concept

The "Mobility Manager" is a mechanism for creating a market for local transportation by matching the preferences of users with service suppliers, and providing a clearinghouse for individual and organizational financial transactions. The purpose of creating a market for intra-city transportation is both to provide alternatives to single occupant automobile travel and to provide special population groups with greater mobility.

The Mobility Manager accomplishes its goals by linking together all travel modes--bus, taxi, rail, vanpools, express bus, specialized services, carpools, etc.--at an

informational level and, in most cases, at a transactional level as well. This linkage is electronic only--all service providers retain their individual identities, policies, and subsidy mechanisms. The Mobility Manager itself does not establish fare, subsidy, or eligibility policies. The Mobility Manager is essentially a facilitator; it operates and administers a clearinghouse network governed by the rules of programs established by others and provides documentation which verifies that transactions have been conducted in accordance with prevailing guidelines and regulations.

A central premise of the Mobility Manager concept is that adequate transportation resources exist in most communities, but that the informational infrastructure and market mechanisms needed to connect consumers--either individuals or organizations acting on behalf of individuals--with suitable providers and to readily manage the financial transactions associated with service provision are often insufficiently developed. The objective of the Mobility Manager is to establish an organizational and electronic infrastructure which permits efficient access to transportation information and which facilitates transactions among participants in the intra-city transportation market.

The Mobility Manager offers users information on local transportation options through a single point of contact. The advantage to the user is the ability to efficiently make informed choices among price and service options. Speed, comfort, price, privacy, special equipment and other requirements can be used as the basis for selecting among public, private, and non-profit providers for any given trip. All public, private, and non-profit service providers can participate in the Mobility Manager system as long as they meet financial and safety standards, and submit a fare schedule.

For human service agencies, the Mobility Manager concept can offer broader travel options to client groups, while the transaction clearinghouse reduces administrative overhead and permits more service for the same program budget. Built-in electronic safeguards protect against fraud and abuse, and the system can automatically generate all needed reports and financial documentation. 'By improving access to a wider range of travel alternatives, the Mobility Manager may reduce the need for non-profit agencies to be service providers and facilitate purchase of service arrangements.

The Mobility Manager could conceivably be implemented privately. Funds to operate the clearinghouse can come from transaction fees paid by providers, or sources of subsidy (such as employers, human service agencies, etc.). Providers benefit primarily from additional business. Analyzing travel requests can yield market information to help plan services, equip vehicles, and design routes. In addition, specialized trip routing and billing services may be marketed to users (similar to the

subscription fees charged for access to computer bulletin boards), providing another potential source of income for the Mobility Manager.

III. How the Mobility Manager Would Work in Practice

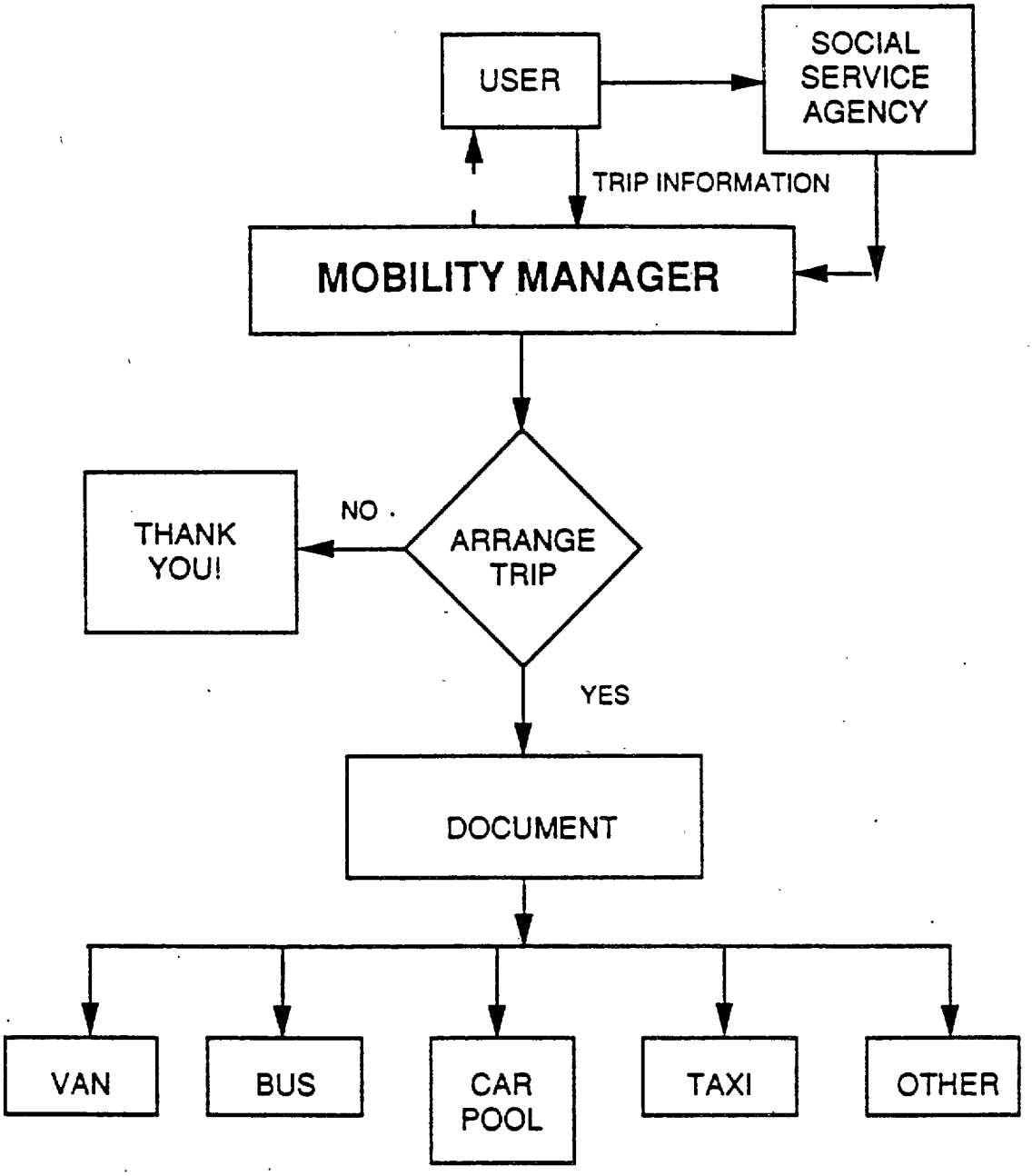
Users access the Mobility Manager system by calling over the phone or through a computer network. An operator, or audio/videotext system can assist in selecting a desired alternative from a menu of options. If a ride is desired, the system makes the arrangements by entering the user's trip into a provider's dispatching system. Figure 1 presents a diagram of how users would utilize the Mobility Manager.

As an example of how the system might operate, assume that employers in a particular area wish to subsidize transportation for their employees. The Mobility Manager issues the employees magnetically-encoded cards. Trips taken by these individuals using particpating providers and which originate from, or are destined to the work sites, are priced to incorporate the employer subsidy. The' Mobility Manager bills the employers for the trips taken. The subsidies are transferred to the provider, along with user fees collected from the sale of the fare media. Transaction fees for each ride are paid to the Mobility Manager by'either the employer or the provider (or possibly both). Figure 2 indicates the flow of funds through the Mobility Manager.

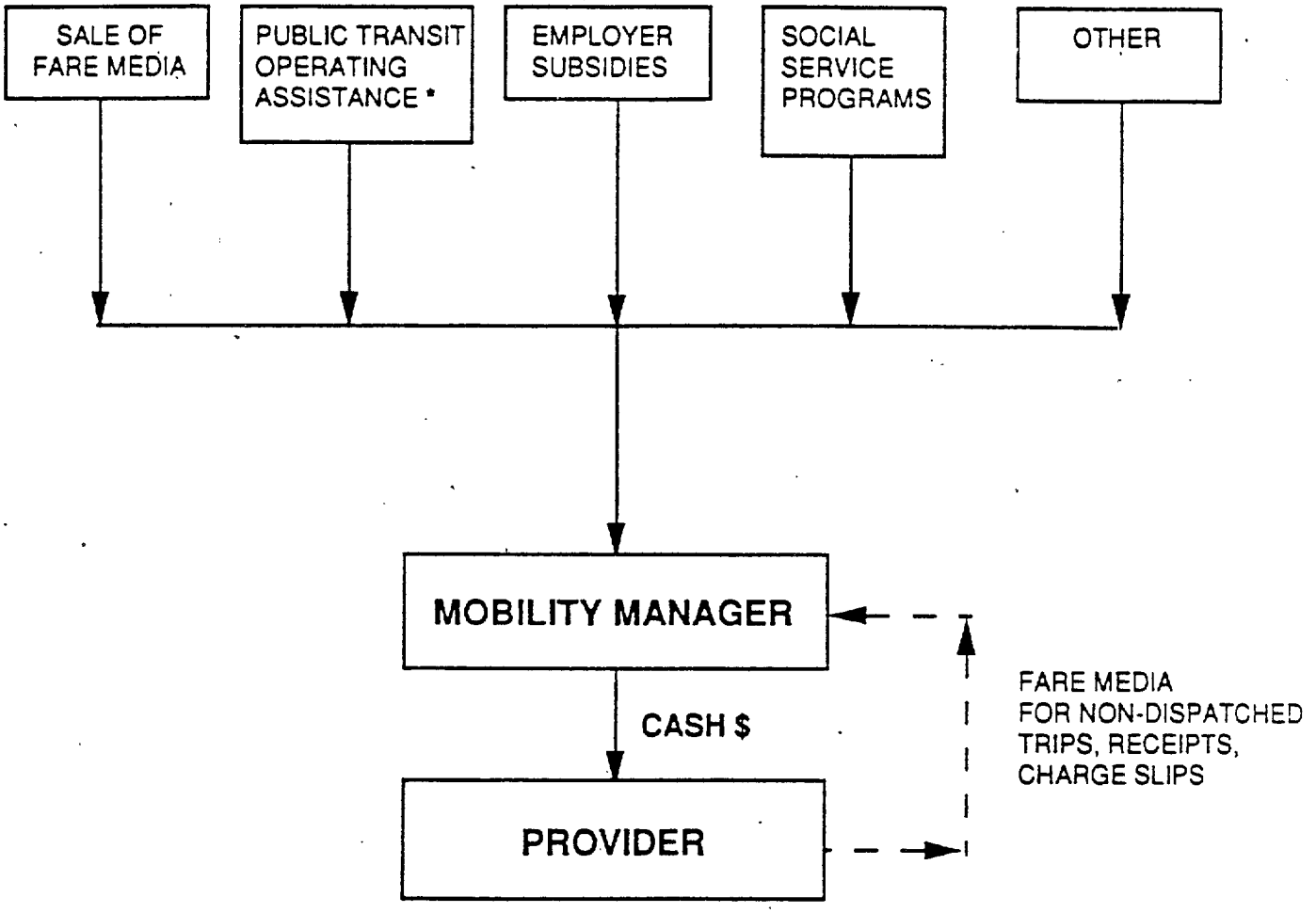
Similar arrangements can be offered to human service agencies. Documentation can be kept on a trip by trip basis (such as those to a job site, program office, treatment center, etc.), with users identified through magnetically-encoded fare media or a billing number. Examples of other applications that can be incorporated into a Mobility Manager concept include: programs to have employers provide free taxi rides home for stranded carp001 users; reverse commute van services for low income workers; suburban communities subsidiiing feeder bus services to fixed guideway stations. Fixed route buses, rail systems, and private franchise operators can all be integrated into the linked service network, as well as the financial clearinghouse.

The degree of technological sophistication needed to implement a Mobility Manager system will vary depending upon the conditions in each community--there is no single "package" that is likely to fit all cases. The electronic technologies which will be utilized include computerized vehicle scheduling and dispatching systems, automated route information systems and similar voice communication systems, magnetic and/or electronic fare media, in-vehicle card readers, and large-scale database management systems. All of these technologies are currently in use in the private and public sectors, and can be readily adapted to fit the needs of a Mobility Manager system. Because of the core informational and transactional functions of the Mobility Manager,

A. HOW TO USE MOBILITY MANAGEMENT SYSTEM



B. FLOW OF FUNDS THROUGH MOBILITY MANAGER



* OPTIONAL

it is likely that virtually all systems will feature automated financial transactions and electronic networking among the providers and the system itself; specific additional features will depend on the requirements of the locality.

IV. Technologies for Mobility Management: An Assessment of Current Status

The Mobility Manager concept relies heavily on electronic technologies to accomplish the various transportation, informational, and financial transactions that are at the core of the operation of this system. Three technologies are of critical importance to the Mobility Manager concept:

(1) computer assisted or fully automated routing, scheduling, and dispatching of vehicles participating in the system;

(2) electronic fare collection systems;

(3) computer database systems to record and process all financial and non-financial transactions.

Because Mobility Manager demonstration projects will involve at least some of these technologies, it is essential to review the status of these technologies to determine whether they have reached a level of maturity where they can be utilized in a demonstration project without major risk.

Computer Assisted Scheduling and Dispatching

Several computerized vehicle'scheduling and dispatching systems are currently on the market. These systems are targeted at both taxi vehicles and paratransit vehicles. These systems generally encompass the following technological features:

(1) Trip, requests are initially entered into the computer system, which then assigns a vehicle to the request. In taxicab. systems, a zonal system is typically used in which vehicles are represented in the computer as an ordered queue in a zone, and the first vehicle in the queue is assigned (or at least offered) the trip.

(2) In paratransit systems, vehicle assignment is typically done on a prescheduled trip basis; real-time scheduling/dispatching of shared ride services is of sufficient complexity that systems typically do **no** more than provide computer assistance to human dispatchers.

(3) Communication between the control room and the vehicle is increasingly being handled digitally; several taxicab systems are built around in-vehicle terminals. Some taxi dispatching systems, for example, feature computerized vehicle assignment and digital communication to in-vehicle terminals to notify drivers of the address of their next pick-up.

It appears that the technology is relatively mature and reliable for computerized taxi scheduling and dispatching. A similar conclusion appears warranted for paratransit systems which are dominated by pre-scheduled trips. The major area for which current technology still requires significant improvement is real time scheduling and dispatching of shared ride vehicles,. In this area, however, manual and computer-assisted approaches appear to give reasonably satisfactory results. The overall conclusion is that currently available technology for vehicle scheduling and dispatching is adequate to meet the objectives of the Mobility Manager concept.

Electronic Fare Collection Systems

The Mobility Manager requires reliable, sophisticated forms of electronic fare collection in order to function adequately. Ideally, the fare collection process will provide electronic inputs into the billing and recordkeeping system. This requires a cashless fare media. Two such media are available: magnetic stripe cards and so-called "Smart" cards. The latter are credit-card like devices which can both read and write data, and can be reprogrammed as necessary.

Both "mag-stripe" and smart cards include the basic functionality needed for a Mobility Manager system, namely the ability to store a fare value on the card and decrement this value when the card is based through a card reader. The difference is that the smart card is capable of holding considerably more information, and that it is reusable and reprogrammable due to the EEPROM (electrically erasable programmable read only memory) chip which is embedded in the card. There also exists a technology intermediate between regular mag-stripe cards and smart cards called "serial" cards. These cards are reusable and reprogrammable, but have more limited intelligence than smart cards.

All three types of fare media are in use throughout the industrialized societies. Smart cards and serial cards are in limited use in both Europe and Japan; they have barely dented the market in the U.S. Recently, Schlumberger tested a smart card on an express bus route in the Pittsburgh transit system, and both manufacturer and transit agency were pleased with the performance of the smart card system. Mag-stripe technologies are relatively common, and of course form the basis for the fare collection systems of BART and Washington Metro. Several suppliers for each type of fare media exist in the U.S.

A key issue with respect to these fare media is economics. All electronic fare media technologies require a card reader. Physically installed in a vehicle, a card reader with write capabilities costs at least $2000 per unit for mag-stripe systems; hand-held units cost several hundred dollars apiece. In addition, some type of data storage device is necessary, and this too can cost a few hundred dollars. Prices for smart card readers have been even higher, but a New York company currently has a contract with Group Bull to deliver 1000 card readers for $700-800 apiece. A hand held device currently can be purchased for as little as $500, and phyically installed card readers 'currently cost about $2500-3000. Data storage is an integral part of smart card readers.

The 'most significant difference in costs between smart cards and mag-stripe cards is the cost of the card itself. Because a smart card contains a small computer chip, it costs several dollars to manufacture. Schlumberger currently has a contract to produce smart cards for Los Angeles for $6 per card, and estimates that they will in the very near future be able to reduce this to $3-5 per card. In contrast, the cost of mag-stripe cards is measured in pennies. A relatively durable polyster card costs $.06 per card in volume, and heavy paper stock cards can cost as little as $.01 per card in volume. Serial cards cost approximately $1.00-1.50 per card.

Although the costs of the electronic fare media systems vary considerably, particularly for the fare cards, they seem to be within the realm of reasonableness from a transit system's perspective. Assuming that in a Mobility Manager system all fare transactions were electronic (i.e., pre-purchased fare media was required), no other fare collection system would be necessary. Assuming a 5 year life for card readers, a 1 year life for smart cards, 1000 registered users, and 30 passenger trips per vehicle per day, the card and reader costs for electronic fare collection would be approximately $.06 per trip for smart cards and slightly less for mag-stripe cards. The cost of the card reader predominates in an economic analysis, which is why the less expensive mag-stripe card does not have a significant economic advantage. Added to these costs would be the cost of the system by which users obtained the cards, but such administrative costs would presumbably be present in any user-side subsidy system. Overall, these costs appear to be acceptable given the functionality that electronic fare collection provides.

Computer Database Systems for Mobility Manager Transportation Programs

In order for the Mobility Manager system to function properly, a relatively sophisticated database management system must be implemented to electronically manage all of the financial and transportation transactions for the system. The ability of database technology to meet this requirement is not in doubt--far more demanding tasks are routinely handled by database systems. The more relevant issue is whether

software systems with similar functionality already exist, or whether this capability must be developed anew. The cost of such database management systems is also an . issue.

A survey of paratransit software vendors revealed that the basic software capability for a Mobility Manager system currently exists, or can be readily developed from existing software technology. Several vendors now offer software packages which include modules for vehicle scheduling, client tracking, agency billing, invoice generation, and other accounting elements. These systems integrate transportation and financial data, and handle allnecessary record keeping', billing, and reporting. Although none of these software systems appear to include all the functions that would be necessary in a Mobility Manager system, their basic functionality appears to be an adequate platform upon which to develop the enhancements needed for the Mobility Manager.

In large measure, the database technology challenge for the Mobility Manager system is one of system integration. Existing software modules for financial transactions will have to be integrated with the electronic fare collection system and more tightly coupled to what is likely to be at least a partially decentralized computer scheduling and dispatching system. But while system integration always poses certain software development issues, the fact that existing software packages go a significant distance towards meeting the requirements of the Mobility Manager system indicates that the task can be accomplished without undue difficulty. Once an appropriate system architecture has been defined, it should prove possible to rely on existing software (at least in generic form and functionality) as the building blocks for a significant fraction of the Mobility Manager database management system.

An Existing Example of a Partially Integrated System

There already exist systems which at least partially integrate the above technologies. A Swedish company, Trancometer ab, has for several years been producing a modular electronic unit (called a Trancometer) which features both electronic fare collection and direct interface with a computer database system. The Trancometer provides an impressive range of features, including the ability to use credit cards (a card reader is part of the unit), preprogramming of up to 49 types of fares (taximeter mileage based fares, flat fares, etc.), digital communication via radio with a central dispatching facility, a thermal printer for producing receipts and hard copies of reports, and a built in modem which can automatically transfer accumulated data to a central computer. The manufacturer believes that the unit could easily be modified to accept smart cards. The central computer contains software which processes the incoming data and can generate agency billings. 'This system is apparently used for both regular taxi operations and humand service transportation in a number of areas of Sweden, and has been certified by the government as providing sufficient financial safeguards

for use with human service agency transportation. The cost of the system is not known'with precision--the U.S. subsidiary of Trancometer was able to state only that the price is less than $5000 per unit, and is affected by the volume of units purchased. The technology is quite mature, having been used in Sweden since 1983.

The RTA Smart Card Project

The most technologically ambitious undertaking to date involving core Mobility Manager technologies is being implemented in Chicago. The Regional Transportation Authority (RTA) has just initiated a 3 year project involving the application of smart cards and a variety of other electronic technologies to the CTA's and Pace's DRT services for the disabled. A $2.4 million contract has been awarded to a systems integration firm to implement this new system. The centerpiece will be the use of smart cards to handle all fare transactions, as well as providing other valuable information services.

The system will involve the distribution of smart cards to all the clients of the CTA and Pace services (approximately 20,000 individuals). The cards will be a full function smart card with an estimated cost of $6-7 per card. These cards will be used for all transactions. A hand-held card reader will be supplied to each vehicle in the system. This card reader includes a keypad and a reading device; a smart card peripheral will do all processing. These card readers can be placed in a cradle device for uploading and downloading at the end of the day. This will be a batch process which uses dial-up phone lines and modems. Over 300 card readers will eventually be used by the system. The cost of the card readers is slightly less than $1100 per unit.

The goal of the project is a fully automated system which provides all needed information and functionality. The reservation system will be computerized, as will the provider invoicing system. Numerous audit checks will be built in. For example, mileage will be recorded at the beginning and end of each trip (through the keypad device), and the card reader will timestamp the beginning and end of each trip. Each driver will also have a card that they insert into the reader at the beginning and end of their shift, so information can be tracked back to the driver level. All of the information sources will then be interrelated through the software to detect any deviations from standards. In addition, a debit feature will be tested with the stored value on the cards. Using a code, a card will be able to have its stored value replenished the next time a trip is taken on the system. This eliminates the need to travel to some fixed facility to get the stored value increased. A LAN system will be developed to transfer data across the network. The LAN will link the CTA, Pace, and the providers together. It will transmit reservation data, financial data, and the trip transaction data. It is anticipated that this will be a PC-based system.

Overall Assessment

The technologies currently exist to support the requirements of the Mobility Manager system. Moreover; these technologies appear to be quite affordable, and are likely to drop in cost in the near future. At this juncture, the primary challenge from a technology standpoint is to achieve improved integration of the electronic technologies needed for vehicle scheduling and dispatching, fare collection, and financial transaction mangement. The fact that a system already exists in Sweden which integrates some of these technologies, and that the Chicago region is implementing a major smart card initiative which also features much integration of the relevant technologies, indicate that technological feasibility is unlikely to be a serious obstacle to implementation of a Mobility Manager system.

CHAPTER 4
SELECTING POTENTIAL MOBILITY MANAGER DEMONSTRATION SITES

I. Site Selection Criteria

As the ultimate purpose of this project is to develop several demonstration activities, the project team devoted considerable attention to evaluating prospective sites for demonstration projects. The site selection process extended over several months, and involved contacts with approximately 20 communities.

There were several key criteria used to assess the appropriateness of potential demonstration sites. These are listed below.

(1) Potential for demonstrating something of value--would the potential project involve mainstream transit, new technologies, human service-transit integration, or an interesting institutional model?

(2) Commitment of locality to objectives of UMTA demonstration program--were the involved actors truly interested in consumer choice and/or mobility management, would they be interested in this approach even if no UMTA funds were involved?

(3) Identifiable local catalyst--did there exist at least one individual among the local organizations with the vision, skill, and motivation to provide project leadership?

(4) Local institutional situation--did the interested parties have sufficient authority ‘at the local level to induce cooperation by other needed actors; was the institutional situation replicated in numerous other locales?

(5) Public sector leadership--did there exist at least one public agency which was willing to spearhead this project?

(6) Potential for transit-human service agency integration--were human service agencies seriously interested in participating in the system, including willingness to relinguish direct service provision under appropriate circumstances?

(7) Local resources for implementation--could local resources--both money and expertise--be generated for this activity, either by obtaining new resources or reallocating existing resources?

(8) Private sector interest--were the local private transportation operators strongly interested in a demonstration project, and were they sufficiently knowledgable to make their participation successful?

These criteria were applied to the 20 localities which were contacted by the project team. The result was to eliminate a number of sites from further consideration.

II. Initial Site Screening

Approximately 20 localities were contacted by the project team relative to their interest in participating in a consumer' choice/mobility manager demonstration project. These localities are listed below.

Huntsville, AL
Winter Haven, FL
Orlando, FL
Pinellas County, FL
Greensboro, NC
Durham, NC
Dedham, MA
Danbury, CT
Prince Williams County, VA
Fairfax County, **VA**
Norfolk, VA
Minneapolis-St. Paul, MN
Portland, OR
Medford, OR
Seattle, WA
Houston, TX
Dallas, TX
Los Angeles, CA
Orange County, CA
Santa Fe, NM

On the basis of the selection criteria outlined above, this list of candidate sites was reduced to 9 locales. The 9 sites which remained after this initial screening were subsequently visited by a member of the project team. These sites were:

Dedham
Seattle
Portland
Medford
Minneapolis-St. Paul
Los Angeles
Fairfax County
Prince Williams County
Pinellas County.

III. Initial Site Visits

During July, August, and September of 1990, site visits were made to each of the 9 localities which were believed to have potential for a demonstration activity. As a result of these visits, four more localities where dropped from the list of candidate sites for UMTA-sponsored demonstrations, at least for the time being. These were Dedham, Seattle, Minneapolis-St. Paul, and Fairfax County. The following summary of the site visits to these locales indicates their potential for a demonstration activity, and the reasons they were not pursued further.

Dedham. MA

The Dedham visit was stimulated by the presence of an aggressive local taxi operator with a strong interest in the Mobility Manager, in the context of a suburban community which has received funds from the State of Massachusetts for several years to operate a small local transit service. A modestly funded user-side subsidy program for taxi service has been in place in a neighboring community for a few years. In addition, the local senior center operates its own transportation service, creating the potential for integrating human service transportation and public transportation, and Dedham is also the site of a commuter rail station which could be the target of feeder services. Offsetting these favorable characteristics is the constrained financial situation of the local government and the small municipal staff. These factors have made the local government very cautious about expending resources on changes in the organization and delivery of local transportation. Consequently, the public sector can provider only limited leadership for a Mobility Manager demonstration.

Seattle. WA

The Seattle visit was the result of interest expressed by Metro, the region's transit authority, in the Mobility Manager concept. Metro has a reputation for innovativeness and competency, and has been seeking to integrate a multi-modal, customer service orientation with on-going transit operations. Metro is also seeking to better serve the needs of the human service cliente. During the site visit, Metro identified five distinct areas of interest that could potentially be transformed into a demonstration activity: Mobility Management Plan for University of Washington (50,000 students, faculty, and staff, plus visitors and human service clients using health care facilities); First Hill Hospital District (improve services to human service clients travelling to major medical center in region); Seattle-Tacoma Airport (improve shared ride options and better utilize existing parking capacity); Redmond High Tech Corridor (limited bus service and need for transit alternatives for close-in trips); Downtown Bellevue (still trying to find the right formula to serve commuting needs in a suburban growth center). All of these areas of interest represent potentially interesting Mobility Manager projects. It was the appraisal of the project team, however, that Metro staff

did not currently view a demonstration of the Mobility Manager concept as a priority in meeting these needs at this time. Seattle remains a potential site for future demonstration activities, but other sites appear to have greater immediate prospects for public sector action.

Minneapolis-St. Paul, MN

The Twin Cities region has for many years been in the forefront of efforts to make more'productive use of existing transportation resources. It has a reputation for innovativeness, and a tradition of competent public agencies. It has a strong elderly and disabled user-side subsidy program which relies upon the taxi industry and uses brokerage concepts. In addition, it has a definite need for new approaches to meeting commuting problems in the suburban area, and for more cost-effective public transportation in the suburbs as well. Despite some encouraging initial contacts, however, the site visit revealed that no public sector actors viewed the Mobility Manager approach as a high priority strategy for solving the problems they were most interested in. As a result, there was insufficient local interest to actively pursue demonstration possibilities.

Fairfax County, VA

Because of its proximity to the project team, the presence of several rail transit stations with inadequate parking capacity--and therefore potential candidates for a feeder service, and its use of private contractors to deliver transit, Fairfax County was perceived to be a site worth exploring further. However, County officials have not as yet identified a specific project for the Mobility Manager concept.

IV. Mobility Manager Forums

On the basis of the initial site visits, it was determined that forums should be held in Los Angeles, Portland, Medford, and Pinellas County to explore in detail the potential for demonstration activities in each of these locales. During November, 1990 forums were held in the first three localities; the Pinellas County forum occurred in January, 1991. In addition, a forum may be held in Prince Williams County at a future date. The project opportunities identified at each of the forums conducted to date are described below.

LOS ANGELES MOBILITY MANAGER FORUM

The Mobility Manager Forum in Los Angeles was organized and hosted by the Los Angeles County Transportation Commission (LACTC). Approximately 20 individuals from the Los Angeles region attended the forum; these included representatives of the LACTC, the City of Los Angeles, other municipalities, the Pomona Valley Transportation Authority, private transportation providers, and human service agencies.

The LACTC's interest in the Mobility Manager stems from its own strategy for coordinating and integrating human service transportation in Los Angeles County. The LACTC plan features the use of electronic technologies for information and referral, vehicle dispatching, and financial transactions. The plan also emphasizes the use of market mechanisms to facilitate the accomplishment of service integration and agency coordination.

The dimensions. of elderly and disabled/human services transportation in Los Angeles County are staggering--290 agencies actually providing transportation services utilizing 3800 vehicles, (This includes local government paratransit operations as well.) There is a myriad of funding sources, program eligibility requirements, and target populations. The City of Los Angeles alone has sponsored 24 different transportation programs. Given the existing resource base, and the diversity of programs and operations, the LACTC has decided to build upon the existing system in its efforts to achieve greater integration of resources and improved service delivery.

As a first priority, the LACTC is funding the development of a computerized information and referral (I&R) database, which will be accessed through the regional transit agency's Computerized Customer Information System. This system now includes 13 fixed route systems and 6 paratransit systems. Agencies and individuals will be able to obtain information on available transportation resources from this system by mid-1991. In addition, the LACTC has recently implemented a Transit Store (a shopping mall location where individuals can walk in and obtain transportation information) and an I&R system in the Pomona Valley. Second, the LACTC is involved with the City of Los Angeles in a project to create a universal registration database, whereby all participating agencies will agree on eligibility standards and a single database can be accessed to determine user eligibility. This regional database will be used by the Pomona Valley demonstration site. Third, the LACTC is attempting to improve service quality and cost-efficiency by establishing training programs and joint procurement activities for agencies which provide transportation services.

Overlaying these activities is the concept of market management. The LACTC hopes to develop a market oriented service delivery system in which agencies and individuals have a choice about which services to obtain. They will be able to choose among a family of transportation providers which must meet certain service quality standards in order to participate in the system.

A key element of this overall system will be coordinated dispatch of services--users and/or agencies will be able to call a single number which will connect them to the transportation resources of their choice. Some vehicles may be directly dispatched from this center, while in other cases the trip request will be referred directly to the provider for dispatching, This system also depends upon the universal registration database (which enables a user's eligibility and subsidy level to be determined at the point of initial telephone contact) and electronic linkages to transportation providers (including agencies whose clients are consumers of service). While database updates and provider vehicle status information will not initially be universally real-time, the ultimate objective is to conduct all information dissemination, vehicle dispatching, and financial transaction activities in real-time. Electronic technologies, including electronic fare media, are thus an integral element of this market management system. The LACTC's objective is to expand the demonstration project throughout‘the county within the next two years, and create the infrastructure to serve -long trips even more rapidly in order to meet the mandates of the Americans with Disabilities Act.

The Pomona Valley has been selected as the test site for these concepts. The PVTA . has for many years operated a paratransit system which provides service both to the general public and to agency clients. The paratransit system recently implemented a computerized dispatch operation, which also does automated billing of agency clients. 20 agencies are currently included in the network that has been developed in this region. As noted previously, the I&R database and Transit Store have already been implemented in the Pomona Valley, and over the next year, increasingly sophisticated electronic technologies will be integrated into the system to manage the elderly and disabled transportation system of this region.

The City of Los Angeles, due to both its sheer size and its receipt of $35 million of local transit subsidies annually, is the other major actor in the elderly and disabled transportation situation. The City is in the process of implementing a new system for elderly and disabled transportation, which includes centralized registration with universal certification requirements, a consolidation of service areas (into 3 large areas of the city), and the development of a user-side subsidy system for all modes. Eligible users will be able to receive $48 worth of transportation for $12 per month, which will then be used to purchase taxi service, Dial-A-Ride service, and transit bus passes (at an already highly discounted cost of $6 per month). Currently, users can

make unlimited trips on the Dial-A-Ride vans at a nominal cost per trip and the subsidized taxi program is limited to certain areas of the city. This adoption of a more market-based system for resource allocation is expected to cause a significant shift in demand to taxi service, as taxi trips will typically become less costly to users than the Dial-A-Ride service (which in most areas of the city suffers from very high cost).

Nature .of Potential Demonstration Project

The LACTC would prefer to initiate any demonstration activity in the Pomona Valley. An UMTA demonstration project would have two important Phase I components. First, an integrated computerized dispatch operation, would be developed, using the existing PVTA software as the platform for development. This integrated system would link the PVTA-operated service with other local services, the local taxi company and the 5 providers (two of whom are private for-profit companies) for the largest human service agency system (the Regional Center) in the area. Both hardware and software linkages would be established. An important element would, be the development of operational procedures to effectively link these providers together for responding to trip requests. Second, the software to run the entire operation--the information and referral system, the integrated computer dispatch, the automated financial transactions--would be developed from the separate software modules used for each component. Although the starting point for this integration would be off-the-shelf software, the final product would be tailored to the precise needs, of the overall system. Consequently, this component of the project will require significant software customization and development.

Once the fully integrated system had been successfully tested in the Pomona Valley, it would be expanded to cover the entire San Gabriel Valley, with a population of 1.2 million (the Pomona Valley has a population of about 400,000). This would provided a definitive test of the capabilities of the electronic technologies to accomplish the service integration and cost-efficiency objectives of the LACTC.

A Phase II project would begin 9 to 12 months after the initiation of Phase I, and would involve the creation of 6 or 7 regional dispatch. centers, using the electronic technology capabilities which had been successfully demonstrated in the Pomona Valley. This would also make possible the creation of a County-wide system, albeit one which existed primarily in the form of software which provided access to the actual transportation resources (which themselves would have a sub-regional focus). A Phase II project would also feature more extensive use of electronic fare collection systems; these might not be implemented in Phase I.

PORTLAND MOBILITY MANAGER FORUM

The Mobility Manager Forum in Portland, OR was organized and hosted by Tri-Met, the regional transit agency. The forum was very well-attended: over 50 individuals participated, representing several local public agencies, the State of Oregon, and the private sector, including transportation providers, technology vendors, and non-profit consumers of transportation service.

There is a conviction among many participants in Portland's transportation planning system that future transportation development in the region is likely to be more "software" intensive than "hardware" intensive, using these terms as metaphors for a general orientation towards transportation development. While some additional investments in both the transit and highway networks were needed, more "hardware" would still leave important situations in which the transportation system did not perform well. The most notable areas of problematic performance are providing service to the transit dependent (including the elderly and disabled), providing transit alternatives in suburban areas, and providing high quality alternatives to the single occupant auto outside of established travel corridors. In these areas, the problem was viewed as not so much one of the absence of transportation resources per se as the difficulty in connecting available resources with the trip making needs of individuals in widely varying circumstances. This was perceived to be a problem that was most . amenable to solution through "software" approaches, in particular more intelligent utilization and management of information flows.

Several activities are now underway by Tri-Met and Metro to improve the transportation system's information infrastructure, with the ultimate objective of improving level of service to the travelling public.

- A major activity is the development of two Geographic Information Systems (GIS) by Metro; these database systems will be of fundamental importance for both Metro and Tri-Met planning and Tri-Met operations.

- Tri-Met will shortly, be undertaking the development of a trip planning database system, using both the GIS and Tri-Met bus routing and scheduling information. The carp001 matching system will also be part of this information system. This trip planning database, with appropriate software interfaces to the trip planning operators, is expected to be on-line sometime in 1991.

- Tri-Met is developing a computerized scheduling and dispatching system (CSDS) for its paratransit operations. Tri-Met and its contractor, Comsis, are currently in the final stages of implementing the CSDS for the agency's elderly

and disabled service. The CSDS, once fully operational, will provide Tri-Met with a platform for full automation of both operational and financial elements of its elderly and disabled service, including coordination with participating human service agencies, The GIS will be used by this system for street and address information purposes.

- Tri-Met Operations Department has a strong interest in linking all its modes together electronically at the control room level, using automatic vehicle locator (AVL) technology and computers. When this occurs (possibly in two to three years), all schedule information in the downtown transit mall and on the telephone information system can be real-time.

- Tri-Met is also positioning itself for future use of electronic fare media by acquiring a new generation of fare collection devices which can accept such alternatives to cash. Ticket dispensers at the LRT stations already have several automated fare capabilities.

- Tri-Met's overall objective is to integrate its information systems in order to provide comprehensive real-time trip planning information to its customers and to improve the efficiency of its operations.,

In addition, Tri-Met officials have been persuaded by local transportation experts that . they should be assessing the potential for integrated electronic technologies to improve the effectiveness of transit and paratransit service delivery. Tri-Met will shortly be conducting a study of the feasibility of utilizing electronic technologies for integrated customer information, trip scheduling, and fare collection system, with particular emphasis on their application to ridesharing and suburban services.

The forum demonstrated that Tri-Met and the other Portland actors are both knowledgable about and committed to further implementation of electronic technologies for mobility management purposes. Of perhaps even greater significance is that many of the Portland actors appreciated the strategic importance of these technologies. Customer information is one of the key business problems in the collective transportation industry, and a highly evolved trip planning and vehicle scheduling system that interfaces with the customer in a transaction oriented environment is a major strategic advantage.

Nature of Potential Demonstration Project

The key element of any initial demonstration activity in Portland will be information integration and subsequent utilization via electronic technologies. A Phase I demonstration project would consist of some combination of the following activities:

- Implementation of enhanced GIS. This is the basic database for trip planning and vehicle routing and scheduling.

- Implementation of automated Tri-Met trip planning system using "intelligent databases". These intelligent databases would consist of the enhanced GIS, the bus routing and scheduling database, the ridesharing database, and the paratransit routing and scheduling database, with the intelligence provided by software which integrates the information in these databases and which provides trip planning operators with decision making assistance.

- Upgrading the paratransit computerized scheduling and dispatching system with more powerful hardware and a more powerful, flexible operating system.

- Integration of all of these systems (implied in the trip planning system activity), including establishing a link between the paratransit CSDS and taxicab company dispatch operations.

This Phase I project would develop the integrated information infrastructure needed to implement the mobility manager concept at its most fundamental level--user information,' trip planning, travel reservation, and vehicle dispatching. Phase I would be oriented towards the elderly and handicapped paratransit system, although the trip planning system would presumbably be available to the general, public. The objective would be to test information integration in a relatively low visibility environment, in order to evaluate system components and identify problem areas (and determine strategies for their resolution). Then, once a well-functioning system had been devised, it could be extended to the larger urban transportation arena.

A Phase II demonstration activity would focus on using electronic technologies to facilitate and manage financial transactions. Electronic fare media (mag-stripe cards or "smart" cards used with in-vehicle and in-station card readers) would be implemented on the elderly and disabled system and at selected locations on the general public system (the LRT system would be an excellent candidate). Simultaneously, all financial transactions on the elderly and disabled system would become electronic transactions, including all billing and record keeping, and this would be integrated with the vehicle operations function. Phase II would establish the conditions for successful use of electronic fare media.

A Phase III demonstration activity would feature the extension of the mobility manager technologies to the general public side of the' transportation system. This would involve information provision and trip planning for all modes, and the implementation of an operational demonstration of all of the technologies--real-time customer information and trip planning using data for all modes, computerized dispatching, integrated real-time fixed route and paratransit vehicle scheduling, electronic fare collection and financial transactions--in a suburban environment. The intent would be to demonstrate the advantages of the mobility manager approach in providing transportation in the difficult to serve suburban setting.

MEDFORD MOBILITY MANAGER FORUM

The Mobility Manager Forum in Medford, OR was organized and hosted by the Rogue Valley Council of Governments. Approximately 15 local individuals participated in the forum. These included staff members from the COG, the local public transit agency, and several agencies which provide human services (some of which also provide transportation to clients), as well as the president of one of the local taxi companies and a member of the Oregon Transportation Commission.

Medford presents a much different transportation environment than a large metropolitan area. The population of Jackson County, of which Medford is the county seat, is approximately 145,000. The population of Medford itself is about 38,000, and approximately 60,000 residents live in the general Medford area. The. area is decidedly low density, trip distances are often lengthy, and only the poorest households do not possess at least one vehicle. Public transit service in Jackson County is provided by Rogue Valley Transportation District, which operates what is best described as a basic level of service: 23 buses operating on (in most cases) hourly headways, with routes linking the major activity centers in the county and providing intercity service as well. Special transit service for the transportation handicapped--those who cannot use regular fixed route transit without special equipment or services--is provided via a subsidized taxi program which is administered by Rogue Valley COG.

Medford area actors have been attracted to the Mobility Manager concept because of its potential application to the area's needs for transportation for elderly, disabled, and low income individuals. There is a widespread belief that the existing taxi subsidy program for the elderly and disabled provides a high level of service to the target clientele; there is also a perception that the needs of this group are much greater than the currently available transportation resources. One agency has just acquired a

16(b),(2) van that will be used for an inter-agency group ride program, 'but this is viewed as merely the first step in closing the gap between transportation needs and resources. All of the local participants believe, however, that the coordination and integration of resources is of critical importance in closing this gap, and there appears to be a genuine commitment to work cooperatively to achieve this result. The Mobility Manager is believed by the local actors to be the organizing schema which will best facilitate this integration of resources.

The existing resources upon which a Mobility Manager system could be built consist of the following:

- **RVCOG taxi subsidy program, and local taxi industry**
  The existing taxi subsidy program represents the single most important resource for transportation for the transportation handicapped in the Medford area. Currently, about $140,000 per year is expended on this program. The two largest taxi companies in the area are involved in the program. Collectively, the three. taxi companies in Jackson County operate 20 vehicles, a major public transportation resource in an area of this size.

- **RVTD bus service**
  RVTD's fixed route operations represent the basic public transportation lifeline in the Medford region. The fixed route service links all of the communities of significant size in the area, as well as providing some intra-community service within Medford and Ashland. With only 23 vehicles, and service expansion dependent upon obtaining additional resources, RVTD cannot provide comprehensive services.

- **RVTD operated carpool matching system**
  RVTD also maintains the carpool matching database for Jackson County, and provides matchlists to commuters upon request.

- **Call-A-Ride-retired senior volunteer program**
  This program is aimed at the frail elderly, primarily for medical trips. Currently, the program has 70 volunteer drivers who in 1989 provided approximately 5000 rides (a total of 40,000 vehicle miles). Using a 24 hour advance notice requirement, ride requests are matched with the individuals registered with the progem. Local participants believe significant growth in this program is possible.

- **Human service agency transportation providers**
  These include ACCESS, Inc., which has developed an inter-agency group ride program; several retirement homes which own a van and provide transportation to their residents; two hospitals which operate vans for medical appointments; the Senior Center in Ashland, which operates a small bus; and van services operated in a rural area and by workshops for the mentally handicapped.

- **Transportation databases**
  These include the GIS database being developed by RVCOG, RVTD's route and schedule data, and the existing client database for the taxi subsidy program.

Nature of Potential Demonstration Project

A demonstration project in Medford would focus on using the Mobility Manager concept to integrate and coordinate elderly and disabled and human service agency transportation. Given the limited market for public transportation in the Medford area, this is an appropriate focus: the only group other than the elderly and disabled likely to benefit directly from the Mobility Manager are low income individuals without vehicles. The project would probably consist of the following elements.

(1) Implementation of a centralized information and referral system for all collective transportation.

(2) Development of a computerized central dispatch operation, including linkages to other providers' dispatch centers.

(3) Electronic fare collection using mag-stripe or smart cards.

(4) Automated financial transactions for all participants in the system.

(5) Operation‘ of all human service transportation through this system.

PINELLAS COUNTY MOBILITY MANAGER FORUM

The Mobility Manager Forum in Pinellas County was hosted by the Pinellas County Office of Planning, which has overall responsibility for transportation planning in the County. Approximately 20 individuals attended the forum, including representatives from the County, the Florida DOT, the local transit operator, and local taxi operators. The purpose of the forum was to clearly define a project concept, to discuss project alternatives, and attempt to reach a consensus on a specific project. The general

interest of participants was in projects that could establish alternative services to attract commuters out of their cars.

Pinellas County is a rapidly growing area located across Tampa Bay from Tampa and is connected to that metropolitan area by a series of bridges. The county has a population of 850,000 residents, a significant portion of whom are elderly retirees. This is reflected in a large and politically influential transit dependent population with a myriad of human service agency providers. The transit authority also provides a significant demand responsive service. In addition, the mid-county region has been the site of significant employment growth in recent years, and. businesses in this area are increasingly experiencing difficulty in getting workers to the employment site. The northern portion of the county has experienced substantial residential growth, in a typical pattern of lowdensity single family homes on culde-sacs that is difficult to serve by traditional transit. Transit usage is quite low, and the cost-effectiveness of existing transit service is problematic. This fact, coupled with the large elderly population, has motivated a search for new approaches to local transportation.

Prior to the forum, it was anticipated that project concepts would focus on a demand response feeder service. for the northern suburbs, a coordinated van service for the mid-county workers, or a demand response feeder service to express bus services. At the forum itself, discussion centered on a county-wide Mobility Manager Coordinator. This coordinator would be a centralized information provider to transit consumers as well as a dispatcher of vehicles. Technology issues were not considered to be central to the project as the technology already exists. In fact, Yellow Cab of Tampa already operates a computerized dispatch system which could be the basis for a broader dispatching operation.

The primary issues dealt with at the forum were institutional in nature. These included the roles of different organizations, project objectives, and the like. The most problematic issue concerned the resistance of the transit authority, PSTA, to expanding project concepts beyond the transit dependent community and to including them in any mobility manager system. Several other forum participants challenged PSTA's reluctance to include services aimed at the general commuting public, and to participate in a system which they did not control. This issue was not resolved at the forum.

It was concluded that any Mobility Manager project in Pinellas County should begin with a market analysis to assess consumer receptiveness and insure that any demonstration project was strategically targeted. Only after such a study should resource requirements for a project be formulated.

Subsequent to the forum a follow-up meeting was held and PSTA agreed to become involved in any project. Although the precise nature of a project is still not defined, it would have the potential to involve both the transit dependent community and the general commuting population under one. mobility manager. There appears to be general political support for proceeding to the next phase of development, which would involve preparing specific project specifications and a project application to UMTA. Some technical assistance would probably be required to achieve this objective.

CHAPTER5
SUMMARY OF PROPOSED DEMONSTRATION PROJECTS

I. Overview of Proposed Demonstrations

A central task of this project has been to identify localities with sufficient interest in developing and operating a local transportation system based on Mobility Management concepts that they would be motivated to define and design a potential demonstration activity. During the course of the project, developments in Medford, Portland, and Los Angeles each advanced to the point where the relevant local actors agreed on the basic outlines of a Mobility Manager demonstration project. In each of these cities, this resulted in the subsequent development of a preliminary proposal for a Mobility Management project. This chapter summarizes these project proposals.

It bears emphasizing that these proposals are not necessarily those which UMTA will select for actual funding and implementation. Proposals may subsequently be developed by other localities; in fact, there is a reasonable likelihood that in the Pinellas County will in the near future submit a demonstration project proposal to UMTA. In addition, exploration of Mobility Manager concepts with Prince William County, Virginia indicates the potential for a future demonstration project proposal, probably oriented towards either information centralization or coordination of services for the disabled.

The purpose of evaluating the three proposals prepared to date is simply to provide insight into the features of the Mobility Manager approach which have proved attractive to public agencies, and to identify their objectives in potential demonstration. activities. This does not imply an endorsement of these specific proposed projects, although each has several features which would appear to merit inclusion in any Mobility Manager demonstration program.

II. Proposed Medford Demonstration Project

The proposed Medford demonstration project has as its eventual objective the establishment of a comprehensive Mobility Manager encompassing all local transportation modes. Initially, the system would focus on specialized transportation services for the elderly and disabled. Medford is proposing that its system integrate the transportation services of 8 different public, private, and private non-profit providers. A one-call reservation and information system will be established, with computerized vehicle scheduling and dispatching for selected services. All provider

and consumer agencies would be electronically linked to the Mobility Manager. Electronic fare media--either smart cards or mag stripe cards--would be used from the outset. The Mobility Manager would electronically process all financial transactions involving the participating agencies. All system components will be linked together through a central database system, which will serve as the central data depository for the system. The project would be managed by the Rogue Valley Council of Governments, the regions's MPO. RVCOG would be assisted in project management by an advisory committee of participating providers and consumer agencies.

Once the basic system had been developed and adequately tested in the specialized services environment, the Mobility Manager would be extended to general public transportation. The transition would initially involve the extension of electronic fare media to the public transit system. Once this occurred, it would be possible to begin to use public transportation subsidies more flexibly, for example, to provide transit pass holders with an option to purchase a limited number of discounted taxi rides during evening hours when the buses do not operate. This could easily be accomplished through electronic fare media. The overall objective of the project is to demonstrate that a fully integrated public transportation system can be developed through the Mobility Manager, and that this system will improve the cost-effectiveness of and extend the market for public transportation in Medford.

III. Proposed Los Angeles Demonstration Project

The proposed Los Angeles demonstration project will be developed by the Los Angeles County Transportation Commission, which is the transportation planning and financing agency for the county. The demonstration project would be intertwined with the LACTC's Paratransit Network Demonstration Project, which is intended to establish an integrated, multi-modal network of service providers for elderly and disabled transportation throughout the county. These providers will be linked into an electronic network, which consumers can access through a "one-call" information and referral system. The consumer side of the network will feature computerized client registration, a universal fare media, and a brokerage system which will enable trip makers to be matched with an appropriate service provider. The objective of the network is to meet the requirements of the ADA legislation as well as state legislation which mandates coordination among public transit operators and private non-profit agencies serving the human services sector.

The Los Angeles project will demonstrate the core technologies of the Mobility Manager--electronic linkage of users and service providers through a centralized information service, vehicle dispatching when appropriate, electronic processing of

financial transactions, universal fare media, and a central database system to link all the subsystems. Because of the size of the county and the large number of potential providers, the LACTC is planning a layered approach to service delivery. Upon the initial telephone call, an attempt will be made to directly accomodate the user's trip request by linking the user to an appropriate provider. If this is not possible, the trip request will be electronically redirected to a subregional trip broker which will attempt to locate the needed transportation resources in the system under its control. If neither level is able to accomodate the user--perhaps because the trip involves a lengthy journey across subregional boundaries--an overlay system will locate the needed provider.

Longer term objectives of the Los Angeles project include introducing the use of market mechanisms for consumer selection of providers and large-scale use of electronic fare media. The target market is limited in both the short term and long term to the elderly and disabled

IV. Proposed Portland Demonstration Project

The proposed Portland project will be under the direction of Tri-Met, the region's public transportation operator. Tri-Met has three major objectives for the demonstration. First, it wishes to establish a multi-modal information and scheduling system which any resident of the region could readily access. This trip planning system would provide information on all available travel modes, including schedule and cost information. It would eventually be interfaced with the scheduling function of paratransit and taxi providers. In order to achieve this objective, it will first be necessary to implement a comprehensive GIS system for the region which as part of its database includes information on the location of all public transportation routes and stops. The trip planning software will rely upon this geographic database.

The second objective of the demonstration is to evaluate various scheduling software packages to determine which are most effective, and to develop standards for functionality and geographic coding schemes. Because scheduling effectiveness strongly impacts cost-effectiveness, this is an important aspect of overall Mobility Manager development.

The final objective of the demonstration is to transform the system into a real-time operation. This will involve installing automatic vehicle locating equipment on paratransit and fixed route vehicles, providing electronic interfaces for one-time carpool arrangements and/or para-taxis, and upgrading the hardware and software to meet the processing requirements of real-time information and scheduling.

While the Portland systems is not exclusively targeted at the elderly and disabled population, it is anticipated that the service delivery elements will first be implemented in the specialized transportation environment. Once the system's components perform satisfactorily in that environment, they can be transferred to the general public system.

CHAPTER 6
CONCLUSIONS AND FUTURE DIRECTIONS

I. Market-Oriented Local Transportation: The Role of Mobility Management

This project began with a strong policy mandate to work with local actors to develop projects for demonstrating the next generation of consumer choice approaches to public transportation. It is concluding with the identification of potential Mobility Manager projects, which represent the organizational and technological infrastructure upon which market-oriented transportation programs can be built.

As the project unfolded, the project team recognized that broadening travel alternatives beyond single occupant automobile travel and facilitating intermodal coordination of local transportation required an integrated system which provided user-friendly access to information on transportation options and their attributes, placed subsidized fare media in the hands of users with minimal effort on their part, and handled all financial transactions in the system with minimal human effort and maximal accuracy. These requirements all involve technology; without a technologically adequate system, consumer choice approaches are limited to small and/or unsophisticated applications.

The refocusing of the project on the Mobility Manager--with its organizational and technological emphasis--thus reflected a recognition that infrastructure development had to accompany serious policy experimentation, and was perhaps a prerequisite. A variety of computer and other electronic technologies are needed to support the development of a'comprehensive market-oriented local transportation system. Having developed the necessary hardware, software, and administrative systems for Mobility Management, the infrastructure for interesting market-oriented initiatives will have been created. Without this organizational-technological platform, simple technological feasibility considerations could block ambitious consumer choice approaches to local transportation service delivery.

Moreover, by initially establishing the feasibility of this integrated organizational-technological system in the less demanding and less publicly visible arena of elderly and disabled transportation--the short term focus of the proposed demonstration projects--implementation in other settings will be perceived as significantly less risky. In addition, the Americans with Disabilities Act has placed greater emphasis on providing a full range of local transportation services for the disabled, and the Mobility Manager is specifically oriented to this need.

The potential benefits of Mobility Management are several-fold:

--reduced service delivery costs through improved resource utilization and lower organizatinal overheads;

--more readily accessible travel alternatives for users;

--greater "user-friendliness" for all participants in the local transportation system;

--better integration of local transit and paratransit services for both the general public and human service agency clients;

--improved productivity for all urban travel modes.

Demonstration projects such as those identified in this study will help clarify the magnitude of the benefits likely to be achieved by the implementation of Mobility Manager systems.

II. Next Steps

It bears noting that many of the technologies which are central to the function of the Mobility Manager are also prominent in the U.S. Department of Transportation's Intelligent Vehicle and Highway System (IVHS) program. Computerized dispatching of vehicles, automatic vehicle locator systems, geographic information systems, intelligent databases, smart cards and other electronic payment media are common to both the Mobility Manager and IVHS. It is apparent that this approach to local transportation service organization and delivery represents an important testing ground for IVHS technologies. As these technologies mature and new ones appear, the prospects for the Mobility Manager are likely to be further enhanced.

The potential demonstration project proposals summarized in this report represent "Phase' I" Mobility Manager demonstrations. That is, they focus on demonstrating the basic organizational and technological feasibility of this approach to local transportation service organization and delivery. As such, they focus on the establishment of organizational models (Los Angeles and Medford), the implementation of component technologies (all three sites), the testing of particular software components (Portland and Los Angeles), and the integration of the various technologies into a workable, user-friendly system (all three sites, with Medford proposing the most rapid development). If these, or similar, projects proceed to the demonstration stage, they will verify the general viability of the Mobility Manager

concept. They will also provide valuable insight into the merits of this approach as a means of meeting the requirements of the ADA legislation.

From this initial demonstration phase, there are two logical directions in which Mobility Management activity can move. The first is to extend the Mobility Manager concept to larger systems; this approach is inherent in the longer term objectives of the proposed Portland and Los Angeles demonstrations. Moreover,. as technological development continues, it may even be possible to improve the functionality of the Mobility Manager by incorporating more elements of real-time information and control into the system, Certainly fully-automated fare payment systems, using smart cards or a similar media, will be cost-effective in future demonstration activities.

The other possible direction is towards grappling with the institutional issues which must be resolved if comprehensive market-oriented local transportation systems are to be built upon the Mobility Manager infrastructure. Such issues as competition among all providers for subsidy, extension of user-side subsidies to the general public, and full integration of subsidies from all sources (including possible extensions to highway congestion pricing) represent significant institutional and policy challenges, and will in large part determine the extent to which market choice mechanism become a major element of the Mobility Manager system. Although these are not simple issues, a local resolution which would permit major market-oriented demonstration activities to proceed would make for fascinating projects which could address long-standing questions about the cost-effectiveness of different approaches to local transportation service delivery.