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Volume No. 6 - December 1979

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16. Abstract

This is the sixth edition of the Urban Mass Transportation Abstracts--a compilation of abstracts of all reports published in 1979 describing results of various research, development, and demonstration activities of the Urban Mass Transportation Administration (UMTA). This document reflects UMTA's continuing commitment to the dissemination of technical report information to government, state, and local transportation agencies; private industry; and the general public.

This general reference document is intended to serve as an index to reports generated under contract to UMTA. All reports abstracted in this document can be obtained from the National Technical Information Service (NTIS) as described on page 167 of this publication. Each abstract contains an NTIS order number and a price code for paper copy. Most reports are also available on microfiche. The NTIS order numbers and price codes of previous editions of the Urban Mass Transportation Abstracts are as follows: Volume 1 (October 1972), PB 213-212, A23; Volume 2 (September 1973), PB 225-368, A11; Volume 3 (July 1976), PB 264-904, A16; Volume 4 (December 1977), PB 277-290, A16; and Volume 5 (December 1978), PB 297-355, A10.

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VOLUME NO. 6 - DECEMBER 1979

U. S. Department of Transportation
Urban Mass Transportation Administration
Office of Transportation Management
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DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION
WASHINGTON, D.C. 20590

THE ADMINISTRATOR

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We have instituted a subject classification scheme for the grouping of abstracts. They have been organized according to seventeen subject areas listed on page iv of this edition. The subject classification should assist in the organization, indexing, and referencing of the materials and will provide for a faster retrieval of information as well as presenting a clearer view of the research activities within the various facets of urban mass transportation.

Future editions of this publication will be expanded to include not only UMTA-sponsored research results, but also research abstracts and resumes of urban mass transportation activities regardless of source, including international results. A contract is being negotiated with the Transportation Research Board (TRB) which will create an Urban Mass Transportation Research Information Service (UMTRIS) as part of the Transportation Research Information Service (TRIS). The publication of cumulative UMTRIS abstracts and resumes as well as other informational brochures and publications will become the responsibility of TRB upon contract award.

Questions and comments concerning this publication or the reports cited should be addressed to UMTA's Transit Research Information Center, Office of Transportation Management, 400 Seventh Street S. W., Washington, D. C. 20590 - telephone (202) 426-9157.

Theodore C. Lutz

CONTENTS

01. CONVENTIONAL TRANSPORTATION SERVICES

Comparative Analysis of Results from Three Recent Non-Separated Concurrent-Flow High Occupancy Freeway Lane Projects: Boston, Santa Monica, and Miami.

Simkowitz, H.J. Transportation Systems Center. UMTA-MA-06-0049-78-2, June 1978, 52p.

In order to move more people in fewer vehicles with limited capital investment, priorities for High Occupancy Vehicles (HOV) have been developed and implemented over the past several years. This study focuses on one of the options of HOV: non-separated concurrent-flow high occupancy lanes on freeways. Through a comparative analysis of results of the three most recent concurrent-flow projects (Southeast Expressway in Boston, I-95 in Miami, and Santa Monica Freeway in Los Angeles), this paper attempts to develop a better understanding of the issues that surround the reserved lane concept. The issues addressed herein are: changes in travel times on the freeways and in transit level of service; modal shift to carpooling and transit; capital and operating costs; changes in accidents and incidents, violation rates, and enforcement; public attitude towards the reserved lane concept, the effect of advertising and media, and the role of politics; and the design and operating environment appropriate to the concept. The three projects met with differing degrees of success and failure; those in Boston and Los Angeles have been terminated. There were several weaknesses in the concept, which are discussed in this report.

NTIS No. PB 289-278 Price A04

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-1: Evaluation of the NW 7th Avenue Express Bus and Bus Priority Systems. Phase I.

Wattleworth, J.A., et al. University of Florida. UMTA-FL-06-0006-78-1, September 1978, 127p. (9 rpts).

This report presents a summary of the evaluation of Phase I of the I-95/NW 7th Avenue Bus/Carpool Systems Demonstration Project in Miami, Florida. The twenty-six month Phase I evaluates several techniques for providing express buses with a priority service on an urban arterial street. Four bus priority systems were implemented and evaluated on NW 7th Avenue in Miami. These systems were: buses with traffic signal preemption capability in mixed mode operation; buses in the exclusive lane with traffic signal progression; and buses with traffic signal preemption capability in the exclusive lane with traffic signal progression. For the traffic pattern and geometric configuration on NW 7th Avenue, it was found that the travel times for both buses and autos were reduced under each of the priority treatments. Auto accident rates were unaffected, but the provision of the exclusive bus lane introduced some problems with bus accidents. Buses moved up to 25% of the passengers and represented less than 2% of the vehicles in the traffic stream. The express bus system achieved a modal split of 8.6% of the potential trips. Several inefficiencies in the transit system reduced the economic viability of the transit service. The report presents

summaries of all of the studies that were conducted and presents a comprehensive economic viability analysis.
NTIS No. PB-291-137 Price A07

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-2: Effects of NW 7th Avenue Bus Priority Systems on Bus Travel Times and Schedule Variability. Phase I.

Wattleworth, J.A., et al. University of Florida. UMTA-06-0006-78-2, September 1978, 78p. (9 rpts).

This report describes a new automated technique for data recording and analysis developed and applied to a demonstration project in Miami, Florida, in which two schemes were evaluated. The first involved preemption of thirty-five traffic signals along an arterial route. In the second, an exclusive bus lane was added to the system, with the signal preemption features retained. The measures of effectiveness used to evaluate the two bus priority techniques include speed, delay, travel, time, fuel consumption, and comfort measures such as speed noise, number of stops, and speed changes. It was found that both priority techniques resulted in significant improvement in all of the measures of effectiveness. The most dramatic improvement occurred in the number of unscheduled stops, which were reduced by 87%. The relationships between the measures of effectiveness were also explored. It was observed that a strong correlation exists between several of the individual measures of effectiveness. The average speed of the bus was strongly correlated with all of the other measures. Other comparisons suggest that speed noise provides the most satisfactory indication of the degree of comfort. The measurement technique may be useful for general application.
NTIS No. PB 291-138 Price: A04

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-3: Changes in Transit Operational Characteristics on the NW 7th Avenue Express Bus System. Phase I.

Wolfe, R.S., et al. University of Florida. UMTA-FL-06-0006-78-3, September 1978, 143p. (9 rpts).

This report was written to present the evaluation of the operational characteristics of the Orange Streaker express bus system. The evaluation was conducted by collecting data needed to develop primary and secondary measures of system performance for determination of system operating, ridership, and revenue characteristics of the Orange Streaker system. The analysis showed that one-way peak period express service resulted in large portions of non-productive (deadhead) time and miles. Ridership generally increased, although some routes experienced low levels of utilization. The fare structure provided revenue-generating characteristics that were inadequate to support the quality of service provided. Service modifications to improve the efficiency of operations and fare increases are necessary to reduce deficit operations.
NTIS No. PB-291-139 Price A07

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-4: Modal Shift Achieved on the NW 7th Avenue Express Bus System. Phase I.

Wattleworth, J.A., et al. University of Florida. UMTA-FL-06-0006-78-4, September 1978, 71p. (9 rpts).

The purpose of this report was to evaluate the modal split achieved by the Orange Streaker express bus system. Screenline studies and a home interview were conducted to obtain the data necessary to establish a proportional relationship producing modal split of project trips. The project modal split increased with early ridership increases, but leveled off with a leveling trend in ridership. The significant increases in modal split achieved in the early months of the study period could not be directly attributed to the attractiveness of the Orange Streaker service due to the impact of other factors, such as the energy crisis. The fact that modal split did not decline at the end of the energy crisis indicates patron satisfaction and suggests that the service provided represented a viable alternative to the automobile to make project trips.

NTIS No. PB 291-140 Price A04

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-5: Effect of the Park'n'Ride Facility on Usage of the NW 7th Avenue Express Bus System. Phase I.

Wattleworth, J.A., et al. University of Florida. UMTA-FL-06-0006-78-5, September 1978, 57p. (9 rpts).

This report presents a description of the Golden Glades Park'n'Ride Facility and an assessment of the impact of the facility on usage of the I-95/NW 7th Avenue Express Bus/Carpool Systems Demonstration Project during Phase I. The Golden Glades Facility is an intermodal transfer facility which provides parking for persons transferring from the auto mode to the express bus or carpool mode. The facility serves as a staging area for Orange Streaker buses and car pools with provisions for kiss'n'ride and local bus transfers, as well as the park'n'ride transfers. Covering 8.1 acres and providing 967 parking spaces, the facility is located at the southern end of the project market area with access to the project corridor via NW 7th Avenue. This report represents an analysis of data from daily MTA starter counts input/output studies, air photo studies, and system user and intermodal transfer studies, which were used to determine the type of use, growth, and distribution of vehicles as they arrived and left the facility. The analysis showed that the number of AM peak period bus passengers at the end of Phase I was about 800 per day, having grown at a rate of roughly 10 passengers per month during Phase I. A maximum of about 450 vehicles parked in the facility each day at the end of Phase I, represented a growth of about 10 daily cars per month. The number of daily carpool formations in the facility averaged about 44, and was expected to increase when a flyover connection was opened between the park and ride facility and the freeway.

NTIS No. PB 291-141 Price: A04

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-6: Effects of NW 7th Avenue Bus Priority Systems On NW 7th Avenue Traffic Stream Flow and Passenger Movements. Phase I.

Wattleworth, J.A., et al. University of Florida. UMTA -FL-06-0006-78-6, September 1978, 205p. (9 rpts).

The purpose of this report was to document the effects of several bus priority systems implemented on NW 7th Avenue in Miami, Florida, on traffic stream flow and passenger movement characteristics. Data were collected regarding traffic volume, vehicle occupancy, system delay (air photos), violations of the reserved lane, auto travel time, and accidents. Analyses were conducted to determine the effects of each bus priority system on the operational characteristics of automobile traffic and passenger movements on NW 7th Avenue. Some of the general conclusions were that: none of the implemented bus priority systems produced an adverse effect on auto traffic and, in fact, the auto traffic was generally improved under all bus priority systems; the bus priority system consisting of a reversible, exclusive bus lane and traffic signal progression produced better operation for the automobile traffic than did the systems which used the exclusive bus lane and traffic signal preemption; the initiation of the exclusive lane was associated with a significant increase in bus accident rate before the initiation of the bus lane; and there was an indication that the violation rate decreased with time, as drivers learned of the reserved lane and left turn restrictions.

NTIS No. PB 291-142/AS Price A10

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-7: Evaluation of the Characteristics of Users and Non-Users of the NW 7th Avenue Express Bus/Car Pool System. Phase I.

Reaves, D.P., et al. University of Florida. UMTA-FL-06-0006-78-7, September 1978, 143p. (9 rpts).

This report presents the findings of three surveys performed during Phase I of the I-95/NW 7th Avenue Express Bus/Carpool Systems Demonstration Project. The surveys were administered to obtain data on the socioeconomic, travel, and attitudinal characteristics of two types of transit users, which were express bus passengers and Golden Glades carpool patrons, and similar data from a representative sample of non-users from among the target market population. The user surveys were self-administered questionnaires distributed to the respondents at the Golden Glades Terminal while the non-user survey consisted of telephone interviews conducted by a market research firm. An analysis of the data indicated that the users differed from the non-users with respect to the distribution of several socioeconomic traits within each group. Users had a disproportionately larger percentage of females while the non-users had a greater concentration of males. This difference carried over to other socioeconomic traits as well. In addition, it was evident that there were some differences between the two groups with respect to travel characteristics, generaly indicating a tendency for transit users to be slightly more "captive" to the express bus service than the non-users. The reaction of the users to the project was overwhelmingly positive. The non-users were aware of the facilities, but their reasons for non-use were indicative of a lack of familiarity with the actual

routing and scheduling and other aspects of the project. Though the analysis indicated there were differences between users and non-users, the differences were not extreme. Given sufficient motivation, more commuters could be encouraged to become patrons.

NTIS No. PB 291-143 Price A07

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-8: Effect of Bus Priority Systems Operation on Performance of Traffic Signal Control Equipment on NW 7th Avenue. Phase I.

Courage, K.G. University of Florida. UMTA-FL-06-0006-78-8, September 1978, 65p. (9 rpts).

This report deals with the effects of a bus preemption system on the traffic control system operation on NW 7th Avenue in Miami, Florida. The quantities examined in detail were the operating parameters of the signal system, i.e., cycle length, bus phase length, non-bus phase length, etc. Substantial variation in these parameters was found throughout the course of the project. However, most of the variation was attributable to misoperation of detectors and other signal equipment and to changes in the design parameters which were necessary throughout the course of the project. The bus preemption system performed satisfactorily from a reliability point of view. No difficulties were experienced either with the failure to recognize buses or with false alarms. Preemption equipment problems accounted for only three percent of the maintenance calls. The traffic control system presented a maintenance problem. The rate of maintenance calls for this system was approximately double the county-wide average. The introduction of the computerized signal system on NW 7th Avenue compounded the general maintenance problem.

NTIS No. PB 291-144 Price A04

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report I-9: Economic Viability of the NW 7th Avenue Express Bus Operation. Phase I.

Wallace, C.E., et al. University of Florida. UMTA-FL-06-0006-78-9, September 1978, 272p. (9 rpts).

This report describes economic analyses that were conducted to determine the economic viability of the transit service, the cost trade-off for express transit users, and the total system cost effectiveness. The transit service was of very high quality and as a result of low utilization of buses in terms of trips/bus and in terms of load factor, the operating deficit was quite high. All indications were that a higher fare was justified, as users realized substantial savings. From the total system perspective, three alternative systems were found to be cost effective: progression of signals to favor express buses in mixed mode; preemption of signals by express buses in mixed mode; and progression of signals to favor buses operating in an exclusive, reversible lane.

NTIS No. PB 291-145 Price A13

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report II-1: Evaluation of the I-95 Express Bus and High Occupancy Vehicle Priority System. Phase II: Summary Report.

Wattleworth, J.A., et al. University of Florida. UMTA-FL-06-0006-78-10, September 1978, 140p. (4 rpts).

This report presents a summary of the evaluation of Phase II of the I-95/NW 7th Avenue Bus/Carpool Systems Demonstration Project in Miami, Florida. Phase II consisted of the evaluation of the effects of the exclusive bus/carpool lanes on I-95, the Golden Glades Park'n'Ride Facility, and a direct flyover connector between the facility and the reserved lanes on I-95. The bus ridership at the end of Phase II was about 900 passengers per day in each direction. This ridership and the existing fare stucture was sufficient to generate enough revenue to cover about half of the cost of operation of the express bus system. A higher revenue, cutbacks in the feeder routes, elimination of the less profitable routes, and off-peak direction service were suggested as possible means to accomplish a reduction in operating deficit. The addition of the reserved lanes on I-95 produced a reduction in all travel times on I-95.

NTIS No. PB 291-146 Price A07

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report II-2: Evaluation of the Effects of the I-95 Exclusive Bus/Car Pool Lane Priority System on Vehicular and Passenger Movement. Phase II.

Wattleworth, J.A., et al. University of Florida. UMTA-FL-06-0006-78-11, September 1978, 74p. (4 rpts).

This report presents the effects on vehicular and passenger movements of Phase II of the I-95/NW 7th Avenue Bus/Carpool Demonstration Project in Miami, Florida. In Phase II, bus and carpools were allowed to use reserved lanes which had been constructed for them on I-95. When the reserved lanes were opened on I-95, all travel times were reduced; when the minimum occupancy requirement for carpools in the reserved lanes was three persons, the reserved lanes were highly under-utilized; and when the minimum occupancy requirements in the reserved lanes was reduced to two persons, the reserved lanes carried about as many persons as the general lanes, but the reserved lanes had a much lower volume to capacity ratio. The violation rate was 63% when the minimum carpool occupancy in the reserved lane was three persons and dropped to about 37% when the minimum carpool occupancy was reduced to two persons. The addition of the lanes on I-95 significantly decreased the accident rate on I-95 on a daily basis. The peak period accident rate remained unchanged when the reserved lane was opened to buses and three-person carpools. When the minimum occupancy requirement for carpools in the reserved lane was reduced to two persons, the peak period accident rate decreased significantly.

NTIS No. PB 291-147 Price A04

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report II-3: Evaluation of the Effects of the I-95 Exclusive Bus/Car Pool Priority System on the Express Bus System. Phase II.

Wattleworth, J.A., et al. University of Florida. UMTA-FL-06-0006-78-12, September 1978, 150p. (4 rpts).

This report presents the evaluation of the effects of Phase II of the I-95/NW 7th Avenue Bus/Carpool Demonstration Project in Miami on the express bus and carpool operation. In addition, the effect of the Park'n'Ride Facility and flyover ramp on the utilization of the I-95 bus/carpool priority system is presented along with the effect of the marketing program. The economic viability of the I-95/NW 7th Avenue bus/carpool priority system is also presented. Several factors detracting from the solvent operation of the express bus system in Phase I continued to contribute to the operating deficit of the Orange Streaker System in Phase II. These factors included the high percentage of deadhead operation, routes with low ridership, and an inadequate fare structure. About 900 passengers each way used the Orange Streaker at the end of Phase II and about 550 autos were parked daily in the Park'n'Ride Facility. In Miami, at least 75% of the bus passengers used an auto to access the Orange Streaker at the Park'n'Ride Facility. In Phase II, the average Orange Streaker passenger saved about $3.44 per day by using the service. The provision of priority lanes on I-95 for use by express buses and carpools with two or more persons was the most cost effective alternative on I-95.

NTIS No. PB 291-148 Price A07

I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project. Report II-4: Evaluation of Characteristics of Users and Non-Users of the I-95 Express Bus/Car Pool System. Phase II.

Long, G., et al. University of Florida. UMTA-FL-06-0006-78-13, September 1978, 147p. (4 rpts).

This report presents the findings of three surveys performed during Phase II of the I-95/NW 7th Avenue Express Bus/Car Pool Systems Demonstration Project. The surveys obtained data on the socioeconomic, travel, and attitudinal characteristics of express bus passengers and non-users from the target market population. User surveys were self-administered questionnaires distributed to the respondents at the Golden Glades Terminal; the non-user survey consisted of telephone interviews conducted by a market research firm. An analysis of the data indicated that the users differed from the non-users with respect to the distribution of several socioeconomic traits. Users had a disproportionately larger percentage of females; non-users had a greater concentration of males. This difference carried over to other socioeconomic traits as well. There were differences between the two groups with respect to travel characteristics, generally indicating a tendency for transit users to be slightly more "captive" to the express bus service than the non-users. The reaction of the users to the project was overwhelmingly positive. The non-users were aware of the facilities, but their reasons for non-use were indicative of a lack of familiarity with the actual routing and scheduling and other aspects of the project. Both users and non-users wanted the exclusive lanes to be retained on I-95. Many respondents favored exclusive lanes on all urban

freeways. NTIS No. PB 291-149 Price A07

Preferential Bus Lanes on Urban Arterials:
Selected Studies on Their Feasibility and Performance.
Final Report.

Crowell, W.H. Polytechnic Institute of New York. UMTA-NY-11-0014-79-2, December 1978, 80p.

This study seeks to identify possible impacts of priority techniques for buses on the different interest groups that may be affected. The discussion herein deals not only with those auto and transit users who directly use the road, but also with such groups as adjacent commercial interests and other land uses which may be affected by High Occupancy Vehicle Lanes (HOVL). The use of preferential bus lanes within urbanized areas has expanded over the past ten years under the combined focus of environmental concern, energy conservation, TSM requirements, and related transportation factors. To assist in the evaluation of such schemes and associated transit decisions, three separate studies (reported herein), each of which deals with either some general aspect of HOVL operations or with the potential implementation of a preferential lane in a specific location, were performed: 1) a survey of North American cities to determine methods used to assess the need for and the effectiveness and impacts of preferential bus lanes; 2) an analysis of a with-flow curb bus lane on Forty-Second Street in Midtown Manhattan; and 3) a study of the causes of traffic delays for express buses in Midtown Manhattan, and the effectiveness of various methods (including existing and proposed bus lanes) in alleviating these problems. The city survey highlights the lack of analyses performed, especially in economic impact areas. The Manhattan Studies show how some delays are unavoidable, but the combination of revised parking policies, bus lane identification systems, and related actions could improve the situation considerably.

NTIS No. PB 294-673 Price A05

Priority Treatment for High Occupancy Vehicles in the United States: A Review of Recent and Forthcoming Projects.
Final Report.

Fisher, R.J., and H.J. Simkowitz. Transportation Systems Center. UMTA-MA-06-0049-78-11, August 1978, 36p.

The purposes of this report are to: 1) describe recent High Occupancy Vehicle (HOV) preferential projects in the United States; 2) summarize the results of these projects and draw up implications; and 3) outline projects which are to be implemented over the next few years. The report describes each of the following approaches to preferential treatment: non-separated concurrent-flow freeway HOV lanes; contra-flow freeway lanes; metered-ramp bypass lanes and exclusive ramps; physically separated priority lanes; express bus service and park'n'ride lots; lanes on arterials and Central Business District (CBD) streets reserved for buses; bus priority signal systems on arterials and CBD streets; transit malls; and auto-restricted zones. Except for the non-separated concurrent-flow projects, other non-capital intensive priority treatments on freeways have fared well. Nearly every HOV priority treatment on freeways has involved the use of new or expanded express

bus service and the opening of new park'n'ride lots. Arterial and CBD street bus lanes have been implemented in many cities, transit malls have grown in popularity, and four auto-restricted zones are to be built during the next few years.

NTIS No PB 294-511 Price A03

Transit Service Reliability.
Final Report.

Abkowitz, M., and L. Englisher, et al. Transportation Systems Center, and Multisystems, Inc. UMTA-MA-06-0049-78-1, December 1978, 194p.

This report presents a comprehensive overview of the subject of transit service reliability and provides a framework for a program of demonstrations and research studies. Major subject areas include the impact of service reliability from the operator's perspective, empirical measures of service reliability, causes of service reliability problems, techniques for improving service reliability, and recommendations for further research. Numerous causes of reliability problems are identified, some of which appear to be inherent in the concept of transit service, and others which are more environmental in nature. A review of previous and current analyses reveals inconclusive findings in determining the relative importance and magnitude of each cause. Several strategies are considered to improve service reliability of fixed-route and demand-responsive transit systems.

NTIS No. PB 292-152 Price A09

The Trolley Coach Development and State of the Art: Task I Report for the Electric Trolley Bus Feasibility Study.
Final Report.

Wilkins, J.D., A. Schwartz, and T.E. Parkinson. Chase, Rosen & Wallace, Inc., UMTA-IT-06-0193-79-1, October 1979, 268p.

Trolley coaches achieved their greatest level of use in the early 1950s when over 6500 vehicles were employed on 54 systems in North America. However, by 1975 only ten systems in North America still retained trolley coach (TC) operations. In the U.S., these included Boston, Philadelphia, Dayton, Seattle, and San Francisco; in Canada, Toronto, Hamilton, Edmonton, and Vancouver; and in Mexico, Mexico City. These systems are discussed herein, as well as the reasons for the TC demise. This report presents a brief history of TC operation in North America and a description of currently operating TC systems. TC technology is described and illustrated, including vehicles, propulsion and control systems, and overhead wire and fittings. Operational characteristics of the TC are also described, including its suitability for application in various situations and requirements for TC system design. Environmental effects of TC operation are analyzed, as are user impacts. This report describes and contrasts trolley coaches and TC facilities now in use in North America and Europe. The report concludes that although the TC is a proven form of public transportation, there are several areas where research is needed for certain components of a TC system, namely: off-wire capability; current collection for high-speed operation; power control systems; routing control; and passenger preferences.

NTIS No. PB 80-104870 Price A12

Auto-Use Disincentives.
Final Report.
Dunlay, W.J., and T.J. Soyk. University of Pennsylvania.
UMTA-PA-11-0016-79-2, October 1978, 174p.

This study attempts to identify and provide guidelines for politically feasible measures termed auto-use disincentives. The objective of such measures is not to ban people from using private cars but to persuade them to more efficient and less environmentally-detrimental forms of transport whenever possible. In this report, a select group of disincentive measures, which have either experienced the most success or shown great potential are analyzed. The group includes: exclusive lanes (transit, carpool); other preferential treatment (including ramp metering, toll treatment, and signal preemption); traffic redirection; auto-free zones and streets; and pricing incentives. In each area of disincentives, planning and design guidelines for the included measures are outlined and explained. Case study reviews for the five major topics are also presented herein. Applications of these auto-use disincentive measures are also presented, evaluated; their applicability to different conditions and coordination with other Transportation System Management measures are also discussed.

NTIS No. PB 299-597 Price A08

Central Area Auto Restraint: A Boston Case Study.
Fauth, G.R., et al. Harvard University. UMTA-MA-11-0007-79-1, November 1978, 263p.

Convenience, travel patterns, and transportation facilities of the Boston metropolitan area served to elect Boston as a case study for auto restraint schemes. This report analyzes the benefits and costs, and political and administrative feasibility of several measures designed to restrain auto use and reduce traffic congestion in the central area. Specific restraint policies examined herein include: increases in central area parking charges, special area licenses, and a small auto-free zone. The highest net benefits were generated by parking surcharges and area license schemes, with estimated gains of $15 to $24 million in 1975 and perhaps a doubling of annual benefits over 10 to 20 years. Parking surcharge or license fee is in the range of $0.50 to $1.00 per vehicle, which reduces the number of autos entering Boston's central area by 15 to 35 percent. This report not only provides a summary of the results of both the cost/benefit and travel impact analysis and the political analysis, but also presents recommendations for restraint measures that are both socially beneficial and easily implemented. The difficulty of developing a supportive constituency, the problem of securing agreement among various policymakers and agencies, and the complexity of implementation tasks are among the most troublesome obstacles to the adoption and implementation of auto restraint measures.

NTIS No. PB 290-913 Price A12

02. CENTER CITY/TRAFFIC RESTRAINTS

Streets for Pedestrians and Transit: An Evaluation of Three Transit Malls in the United States. Final Report.

Edminister, R., and D. Koffman. Crain and Associates.
UMTA-MA-06-0049-79-1, February 1979, 255p.

This report represents the second phase of a two-phase project designed to acquaint the planning community with the concept of transit malls and to provide information about three of the most important and interesting transit mall projects to a wider audience. The first phase of the study consisted of a site report (Streets for Pedestrians and Transit: Examples of Transit Malls in the United States, PB 278-487) which described the characteristics and histories of six transit malls. This second evaluation phase is more analytic in nature and quantifies the benefits and non-benefits of the three major transit malls in Philadelphia, Pennsylvania; in Minneapolis, Minnesota; and in Portland, Oregon. The transit malls in each of these cities were first reviewed in the site report mentioned above. This evaluation is concerned with the impact of three malls on pedestrians, on transit service, on excluded or restricted general traffic, and on economic conditions, particularly on retail sales in the immediate vicinity of the mall. This report contains the results of analysis on the following topics: maintenance and construction costs; transit service improvement including bus speed, reliability, coverage, capacity, ridership, productivity, and system understanding; the level of service provided pedestrians and waiting transit patrons; environmental impacts; pedestrian and bicyclist safety; traffic diversion; parking; goods delivery; and economic impacts. This report also documents fifteen major conclusions regarding the transit malls.

NTIS No. PB 295-728 Price A12

03. ENERGY AND ENVIRONMENT

Bus Maintenance Facility Environmental Analysis. Final Report.

Rice Center. UMTA-TX-09-0089-79-1, November 1978, 294p.

This report documents work conducted for the City of Houston, Texas, under the Houston-Galveston Area Council's 1977-1978 Unified Work Programs. The objective of these studies was to meet the need for environmental analysis of sites selected for the development of additional bus maintenance facilities. The analysis task included cursory examinations of potential sites and detailed analysis of those sites selected for development. The sites chosen for detailed analysis are included in this volume. Where appropriate, environmental concerns were modeled to estimate more precisely the consequences of locating a bus facility on the subject site. This document contains three reports with appendixes concerning three sites: The Polk Street Bus Facility, the South Main Street Bus Facility, and the Market Street Bus Facility.

NTIS No. PB 299-837 Price A13

A Computer Program (POWREQ) for Power Requirements of Mass Transit Vehicles. Final Report.

Spenny, C.H., and J.M. Clarke. Transportation Systems Center. UMTA-MA-06-0044-77-2, August 1977, 111p.

This project was conducted by the Power and Propulsion Branch of the Transportation Systems Center under the sponsorsip of the Office of Technology Development and Deployment of UMTA. The objective was to develop a computer program suitable for use in systematic analyses requiring estimates of the energy requirements of mass transit vehicles as a function of driving schedules and vehicle size, shape, and gross weight. The Power Requirements (POWREQ) Simulation Model is a computer program that simulates the energy requirements of a transit vehicle during its execution of a given driving schedule, and was designed to operate on the TSC DEC-10 Operating System either in batch mode or in time-sharing mode via remote terminals. The POWREQ program was programmed in Fortran IV compiler language. The user is provided the capability of analyzing the effects of various types of driving schedules and road profiles on energy requirements. A CALCOMP plotting routine is provided so that the user can request graphs depicting the time variation of parameters. A logic flow diagram and typical commands using the time-sharing mode are illustrated in this report.

NTIS No. PB 301-083 Price A04

Path Energy Conservation Study. Final Report.

The Port Authority of New York and New Jersey. UMTA-IT-09-0069-79-2, November 1978, 169p.

The national policy on conservation of energy and related resources brought about by the energy crisis of 1973 prompted the Port Authority Trans-Hudson Corporation (PATH) to develop an energy conservation program. In order to evaluate such a program and determine that all possible factors were investigated, a study was proposed to determine long range plans. In the accomplishment of the technical study, PATH was to review and evaluate current energy conservation practices instituted on the PATH system and to perform extensive operational planning and comparative analysis required for the implementation of additional potential energy savings measures. The factors considered when PATH established its energy conservation program were programs to increase ridership, especially those which drew riders from the less efficient automobile. Other factors considered were those that reduce train service and affect passenger traffic and thus, in the long run, would be counter productive. This final report discusses in detail the five tasks that were used in carrying out the work required in the project: 1) investigation of current practices; 2) potential service modifications; 3) rail car power investigation; 4) potential long-range improvements; and 5) preparation of final report describing the work accomplished during the project.

NTIS No. PB 299-143 Price A08

04. FARES/PRICING AND SERVICE INNOVATIONS

Amherst, Massachusetts Fare-Free Bus Research and Demonstration Project. Final Report.

Goss, W.P., et al. University of Massachusetts. UMTA-MA-06-0006-79-1, April 1978, 312 p.

This final report on the Amherst project reviews the background and scope, details the conduct and data collection and analysis, presents findings and conclusions, and discusses the transferability of these findings and conclusions to other urban areas. The major objective of the project was to determine to what extent that providing a fare-free bus service, and later, increasing restrictions on intra-campus automobile use, would have in a shift away from commuting by automobile to commuting by bus. There was also concern as to how changes in transportation services would affect community attitudes toward public transportation. Significant findings were that: 1) introducing high frequency, fare-free transit services attracts high levels of ridership of low income groups, while only slightly reducing automobile usage and traffic congestion; 2) increased parking fees are not as effective a deterrent to automobile use as are reduced parking availability and strict parking regulations enforcement; 3) increases in parking fees that are perceived as relatively large, will be met with strong opposition from lower income workers for whom the automobile is the only available mode; and 4) fare-free transit will have a significantly positive impact on the demand for multi-family housing and sales volumes of retail establishments, depending upon their relative proximity to transit bus stops.

NTIS No. PB 295-097 Price: A14

The Consequences of Short-Range Transit Improvements: An Overview of a Research Program. Final Report.

Kemp, M.A. The Urban Institute. UMTA-DC-52-0002-78-1, May 1978, 140 p.

Because of Congressional interest evidenced in 1974 legislation, special emphasis is placed on the evaluation of fare-free transit services. This paper presents an overview of a research program designed to improve understanding of the costs and consequences of various transit fares and service level policies, and focuses particularly on objectives and methods. The principal questions for research concern the existence and magnitude of various possible outcomes from short range improvements. Broadly categorized, these outcomes relate to: 1) the demand for transit service; 2) the quality of service experienced by the user; 3) operating costs; 4) the transit industry; 5) broader urban transportation; 6) the incidence of impacts; and 7) other longer-term considerations. Forty-seven different types of potential consequences are discussed, and priorities are suggested for their investigation. The paper explores the appropriateness of four different general research activities in appraising the most important of the potential outcomes. These four activities are the analysis of existing transit operating experience, with and without the collection of new data, and the mounting of social experiments, either in a "real world" operating environment, or in a simulated setting. In each of the general categories, research studies are suggested, and their advantages and disadvantages are discussed.

NTIS No. PB 294-438 Price A07

Denver Off-Peak Free Fare Public Transit Experiment. Interim Report.

Swan, S., and R. McKnight. DeLeuw, Cather & Company.
UMTA-CO-06-0010-79-1, May 1979, 59p.

This report presents an initial evaluation of the Denver, Colorado, systemwide off-peak free-fare transit demonstration project. The demonstration began in February 1978 with "Transit Awareness Month," sponsored by the Denver, Colorado, Regional Transportation District (RTD). In March 1978, UMTA provided assistance to continue the program for an additional eleven months. The Denver project investigates the effects of the elimination of off-peak fares on transit operations and costs, ridership, public attitudes, and regional travel patterns. This study relies solely on data available from RTD, which includes operations management reports, two on-board surveys done in February and July by the RTD, and various routine systemwide ridership counts. The Denver experiment indicates that a systemwide free-fare program can be implemented with fairly minimal disruption and attract new riders during low-productivity hours. The report states that if further study in Denver supports early indications, temporary free-fare programs may be more successful in increasing the permanent ridership base than any other strategy attempted. The limited scope and quality of these data make possible only the most general findings. A major UMTA/TSC evaluation now in progress will include the development of more complete and reliable data, and may produce results which differ significantly from these early observations. (see also NJ-52-0001-79-1).

NTIS No. PB 298-793 Price A04

Development of a Time-Calibrated, Self-Cancelling Ticket Initial Feasibility Determination. Final Report.

Tratnyek, J.P., J.D. Birkett, and M.R. Schlemm. Arthur D. Little, Inc.
UMTA-IT-06-0125-77-1, July 1977, 92p.

The concept of a time-calibrated, self-cancelling ticket is proposed as a means of reducing vehicular traffic congestion in urban areas. This ticket, purchased by the driver and affixed to a vehicle, would provide a time-limited identification system to control road and highway use, as well as on-street and off-street parking. In effect, it would provide a means of implementing road-pricing strategies designed to improve transit efficiency by reducing urban travel congestion. The objective of this study was to develop a practical, reliable, safe, easily produced ticket for the intended purpose. The ticket would be required to operate over a temperature range of 0 to 150 F for periods of 2, 4, or 10 hours. Several chemical mechanisms for timekeeping are investigated; emphasis is on development of a preferred electrochemical approach. (This study addresses functional parts of the ticket, criteria, proposed routes of development, chemical and electrochemical development, and suggestions for future development.) Although the ticket is in the experimental stage, it meets most of the objectives set forth in this program. The study recommends that relaxed criteria for ticket operation would simplify and accelerate this development.

NTIS No. PB 289-133 Price A05

Findings of Preliminary Analyses of the Trenton, New Jersey Off-Peak Fare-Free Transit Demonstration. Interim Report.

Connor, D.L. DeLeuw, Cather & Company. UMTA-NJ-52-0001-79-1, January 1979, 58p.

The Mercer County Fare-Free Transit Demonstration is one of two tests of the effects of eliminating systemwide off-peak fares. (The other demonstration was run concurrently in Denver, Colorado, CO-06-0010-79-1). The demonstration is being conducted on the Mercer Metro bus system in Mercer County, New Jersey. This report was prepared as an interim information summary of the progress of the demonstration, and presents findings of interim analyses regarding ridership impacts, passenger profiles and trip characteristics, and transportation supply and cost impacts. Given the limitation of this report, it can be useful as an interim informational summary pending completion of the full evaluation and preparation of the final report.

NTIS No. PB 298-893 Price: A04

Trenton Free-Fare Demonstration Project: Evaluation Plan.

Knight, R. DeLeuw, Cather & Company. UMTA-NJ-52-0001-78-1, December 1978, 100p.

The Trenton Free-Fare Demonstration is the first large-scale test of free transit in the U.S. The New Jersey Department of Transportation, in cooperation with UMTA, Mercer County, and Mercer County Improvement Authority, is administering an Off-Peak Free-Fare Demonstration Project on the Mercer Metro bus system. The demonstration involves the implementation of a fare-free service on all intra-county routes from 10 am to 2 pm and after 6 pm Monday through Saturday, and all day on Sundays and holidays. The free-fare operation is planned for one year beginning March 1978. The demonstration is intended as a model for possible use elsewhere across the country as well as for further policy and program development in Mercer County. This document presents a plan for evaluating the impacts of a free-fare off-peak transit demonstration in Mercer County, New Jersey. The plan describes the demonstration setting, the details of the project, the evaluation issues (travel behavior, transportation supply and costs, secondary effects, and implementation process), the evaluation strategy, the data collection plan, and the techniques to be used in analyzing the results. The central concern is ridership impact.

NTIS No. PB 291-455 Price A05

Fare Policy and Structure.
Final Report.

Habib, P., et al. Polytechnic Institute of New York.
UMTA-NY-11-0014-78-1, September 1978, 70p.

The overall objective of this research effort is to relate transit fare policies and fare structures to passenger demand characteristics as well as to operating expenses and to determine appropriate methods of addressing fare in transit financing. This report presents the findings of a three-year research effort and includes the findings of a nation-wide literature survey presented in three sections: Fare Structures; Effect of Fares on Ridership; and Alternate Transit Financing Schemes. The search was conducted with the aid of the Transportation Research Information Service (TRIS), and the National Technical Information Service (NTIS). The American Public Transit Association (APTA) has produced summary reports that were used in this literature survey. In addition, this report presents the findings of a nation-wide survey of transit properties and deals with fares, ridership, financing, and policy-making. The report puts forth arguments for the study of time-varied fares as the most beneficial policy for reducing the financial problems of transit properties while still increasing ridership and also shows that using fare policy structures to reduce peak vehicles can result in operating cost savings. There are tables herein that show the 1975-76 fare structure for 25 selected transit properties, rail rapid transit and bus operating costs, data collection systems, and a list of survey-responding properties.

NTIS No. PB 289-194 Price A04

The Feasibility of State-Level Multi-Modal Transportation Trust Funds.
Final Report.

Crowell, W. Polytechnic Institute of New York. UMTA-NY-11-0014-79-1, November 1978, 34p.

This study analyzes the question of multi-modal trust funds in some detail. It presents and discusses the methodology and results of a survey of State Departments of Transportation regarding their present financial position and policy stances on both the concept of a multi-modal trust fund and a variety of other State and Federal proposals for revising transportation financing and planning methods. Based on the thirty-six responses, the concept of such a trust fund was viewed favorably, but the problems that it might raise and the political battles that such a plan would face made its enactment in most states highly unlikely. The respondents' views expressed strong support for the continuation of the Highway Trust Fund, but also that (1) a rapid completion of the Interstate Highway System was not a high priority in many states; (2) greater flexibility in the use of federal transportation assistance was needed; and (3) a stable, dependable source of federal mass transit assistance received a strong mandate.

NTIS No. PB 292-396 Price A03

Impacts of Transit Subsidies on Modal Efficiency. Final Report.

Lee, D.B., Jr. The University of Iowa. UMTA-IA-11-0001-79-1, October 1978, 105p.

This research examines the effects of Federal Transportation programs on small urban areas. The research analyzed the impacts of financing procedures and constraints on the transportation systems of small urban areas, examined the effectiveness of public transportation planning, and developed an allocation procedure for state transit assistance programs. A case study methodology was employed. Three cities (small-to-medium sized areas) in the state of Iowa were selected: namely, Cedar Rapids, Davenport, and Iowa City. The author concludes that elimination of transit subsidies would have a large percentage impact on transit ridership but small impact on total travel; further increases in transit subsidy are likely to have only miniscule impacts on aggregate travel patterns and modal balance; and elimination of the highway subsidy would result in very large percentage increases in transit usage as well as significant reductions in vehicle miles of auto travel. See also IA-11-0001-79-2 and IA-11-0001-79-3.

NTIS NO. PB 300-416 Price A06

The Implications of Transit Investment on Urban Development, Southeastern Michigan. Final Report.

Grefe, R. Richard Grefe Associates. UMTA-MI-09-0030-79-1, February 1979, 133p.

This study of the implications of transit-induced patterns was intended to synthesize available information on the proposed transit alternatives for Southeastern Michigan. An investment in additional transit capacity would accomplish a number of regional objectives: namely, stimulate the economy of the region; improve accessibility; reduce traffic congestion; maintain air quality; provide for energy conservation; and slow urban sprawl. A major issue in public discussion has been the magnitude of the development which would be stimulated within the region's urban core as a result of an investment in transit. This report discusses and analyzes the need for transit improvements, land use and urban development impacts, public service implications, financial and fiscal impacts, and equity considerations.

NTIS No. PB 300-307 Price A07

An Analysis of Joint Development Projects: Final Report on First Year Tasks.

Paaswell, R.E., and J. Berechman, et al. State University of New York at Buffalo. UMTA-NY-11-0020-79-1, May 1979, 140p.

This report presents the results of the first year of study into a number of characteristics of an urban area in which joint development is taking place. The objectives are: to investigate the economic and population trends influencing economic/location decisions within the region; to investigate ways in which transit serves as a catalyst for development; to determine the attractiveness of downtown as a retail attractor vis-a-vis suburbia; and to investigate analytic techniques that delineate the success of particular joint development projects. Results of tasks accomplished during the first year of analysis are discussed herein and brief summaries of discussions with local planners are presented.

NTIS No. PB 300-414 Price: A07

The Effect of the Washington Metro on Urban Property Values. Final Report.

Lerman, S.R., et al. Massachusetts Institute of Technology. UMTA-MA-11-0004-79-1, July 1978, 135p.

This report describes a series of econometric models of real estate values estimated for parcels in Washington, D.C., over the period of the Metro system's development. Separate models are estimated for single family dwellings, multi-family structures and retail stores. Access to the transit system and the implementation schedule of Metro are both found to be significant determinants of parcel transaction prices. Studies of five separate transit stations are described herein. For each case study, base case results and forecasts of property value changes under different conditions are given. Chapter I of this report provides a general overview and summary of conclusions and can be read independently of the remainder of the report. Appendix A is a self-contained review of the state-of-the-art in understanding the effect of transportation investments on property values.

NTIS No. PB 293-730 Price: A07

Feasibility Analysis of Joint Development for Transit Stations in the Detroit Area. Final Report.

Khasnabis, S., K.S. Opiela, and R.G. Arbogast. Wayne State University. UMTA-MI-11-0003-79-1, November 1978, 266 p.

The concept of Joint Development (JD) embodies various forms of public/private sector coordination relative to physical, fiscal, and institutional aspects of transit station development. The objective of this study is to analyze the feasibility of JD in conjunction with transit station area planning in the Detroit area where the planning of a high-level transit system is underway. This report is organized in three parts: 1) Basic JD concepts are presented with a brief state-of-the-art review and a discussion of opportunities, incentives, and constraints; 2) Feasibility of JD in the Detroit area is examined as

well as an analytic technique for prioritizing station locations; and 3) Conclusions, recommendations, and guidelines for planning JD are provided. The report concludes that it is feasible to implement JD projects at transit station areas in Detroit area.

NTIS No. PB 295-347 Price: A12

07. NON-URBAN AND LOW DENSITY AREA TRANSPORTATION

Analyzing Transit Options for Small Urban Communities.
Volume I: Transit Service Objectives and Options.

James, D.H. Peat, Marwick, Mitchell and Company. UMTA-IT-06-9020-78-1, January 1978, 109p. (3 vols).

The information and analytical techniques contained in this manual are presented in three volumes. The manual is designed to assist in the planning of new or improved transit services in small urban communities, and it is intended for use by planners and decision-makers in communities with less than 200,000 residents. The manual presents planning techniques for both conventional bus transit and paratransit alternatives, and for estimating the demand, cost, and revenue implications of various transit service alternatives. Opportunities for Federal and State financial assistance are summarized and Federal requirements are described. This report, Volume One, contains Chapters 1-4 of the manual, and it presents a generalized process for planning conventional transit and paratransit options in small urban communities.

NTIS No. PB 291-450 Price A06
SET (3) PB 291-449 Price E10

Analyzing Transit Options for Small Urban Communities.
Volume II: Analysis Methods.

James, D.H. Peat, Marwick, Mitchell and Company. UMTA-IT-06-9020-78-2, January 1978, 181p. (3 vols).

The information and analytical techniques contained in this manual are presented in three volumes. This report, Volume Two, contains Chapter 5 of the manual. An evaluation approach is described and detailed techniques are presented with which one can estimate the patronage, cost, and revenue implications of a transit service operation, which are the key elements in evaluating transit service alternatives. References are also contained herein.

NTIS No. PB 291-451 Price A09

Analyzing Transit Options for Small Urban Communities.
Volume III: Summary of Management and Operations Experience.

James, D.H. Peat, Marwick, Mitchell and Company. UMTA-IT-06-9020-78-3, January 1978, 142p. (3 vols).

The information and analytical techniques contained in this manual are presented in three volumes. This report, Volume Three, contains the last chapters of the manual, namely, six and seven. Volume Three describes the activities of a transit operation, explores the relationships between these activities, identifies arguments for and against local control of transit organizations, provides estimates of staff requirements of various-sized transit systems, and describes the

desired characteristics of a transit manager. Numerous data and statistics are given on the financial and operating performance of existing conventional transit and paratransit services in small urban communities. References are provided herein.

NTIS No. PB 291-452 Price A07

Peninsula Transit Study: Simplified Transit System Planning and Assessment Processing for Low Density, Small to Medium Sized Cities.

Hall, J., III, and D. Aichbhaumik. Hampton Institute.

UMTA-VA-11-0007-79-1, October 1978, 197p.

The objectives of this research project are to develop simplified processes for relating land use and transit operations, and develop simplified processes for assessing the transportation needs of transit-dependent consumers for low density, small to medium-sized cities of 50,000 to 300,000 population. This project was conducted in four phases: (1) Background data collection and mapping; (2) Bus ridership and household surveys; (3) Application of alternative planning and assessment processes; and (4) Use of simplified processes and procedures for producing an effective public transit system for low density, small to medium-sized cities. The study restricts itself to the examination of particular local problems faced by Peninsula Transportation District Commission (Penntran) and its service area (cities of Hampton and Newport News, Virginia). The report states that within the Penntran service area, transit ridership depends upon density variation of residential land use; zero and one car households; and low income populations.

NTIS No. PB 291-879 Price A09

Public Transportation Needs of Rural and Small Urban Areas. Final Report.

Millikin, N.H. California Department of Transportation.

UMTA-CA-09-8001-79-3, October 1978, 87p.

This study describes the development of a model to predict potential patronage for transit in rural and small urban areas of less than 50,000. Patronage was developed through a home interview survey. Information was related to their socioeconomic characteristics and desire to make trips. A procedure was then developed to match the representative sites to similar areas (known as a site-pairing technique). The methodology developed a uniform approach to transit needs and to public transportation for effectively utilizing resources. The study concludes that the site-pairing technique has potential to save a considerable amount of effort when analyzing many locations.

NTIS No. PB 295-093 Price A05

Public Transportation Planning Effectiveness: Case Studies. Final Report.

Dueker, K.J., J.C. Barbaresso, and J.W. Stoner. The University of Iowa. UMTA-IA-11-0001-79-3, December 1978, 152p.

This research examined the effectiveness of federal transportation planning requirements and programs on small urban areas. It analyzed the impacts of financing procedures and constraints on the transportation systems of small urban areas, examined the effectiveness of public transportation planning, and developed an allocation procedure for state transit assistance programs. Three cities in the State of Iowa were selected: Cedar Rapids, Davenport, and Iowa City. The report concludes that UMTA technical study grants have resulted in realistic short-range transit plans in all three case study cities and that UMTA capital and operating assistance has led to the implementation of many improvements recommended in the short-range plans.

NTIS No. PB 300-418 Price A08

Transit Problems in Small Cities and Non-Urbanized Areas: Inventory of Transportation Services in Places Less than Ten Thousand Population Outside of Urbanized Areas.

Jackson, A.F., and D.J. McKelvey. North Carolina A&T State University. UMTA-NC-11-0004-79-1, April 1978, 99p.

This report summarizes the type and level of transportation services (taxi, specialized transportation services, intracity and intercity buses) available in places between 2,500 and 10,000 population outside of urbanized areas in 48 contiguous states and the number of such services serving these communities. It also includes a section summarizing information on places under 2,500 population. In places between 2,500-10,000, the inventory highlights the following unexpected results: Taxi - 75% of taxi companies served 3 or 4 places, 18% had contracts with agencies, and State is second most common regulator and City government is the least common; Specialized Transportation Services - 13% of all vehicles were equipped for non-ambulatory, 9% of the places had more than one specialized service, 50% provided demand-responsive service, and local governments operated 23% of the systems; Intercity Bus Service - service was provided to only 42% of places sampled, and 7% had contracts or received a subsidy; Intracity Bus Service - 5% of the systems were large metropolitan systems, 52% were privately owned, and only 21% were countywide. Of the 291 sample places with population between 100 and 2,500, 27 sample places were served by 40 taxi systems; 47 were served by 54 specialized transportation systems; and 32 had intercity bus service. Four of the 31 systems (13%) stated that they had passenger service contracts or subsidies from state or local governments.

NTIS No. PB 291-402 Price A05

Transit Service and Organizational Alternatives for a Low Density Suburban-Rural Area: A Study of Public Transit Options for Albemarle County, Virginia. Final Report.

Hoel, L.A., et al. University of Virginia. UMTA-VA-11-0006-79-1, May 1979, 182p.

The intent of this study is to provide planning options for public transportation in Albemarle County and the City of Charlottesville, Virginia. The results are intended to provide a range of planning options for community service, but not a comprehensive plan for implementation. The options are intended for review in a future study by citizens and officials of the Charlottesville-Albemarle area to be refined according to local opinion as an aid to developing a plan for implementation. This study approaches the basic problem of transportation in low density areas from the institutional perspective of an operating organization. This approach is reflected in the study objectives: to define the public transportation needs and demands in the Charlottesville-Albemarle area; to design alternative transit and paratransit services for the Charlottesville-Albemarle area; and to define and evaluate alternatives to coordinate transit services. The findings of the study are based on local transit and demographic data, state-of-the-art transit and paratransit information, and Commonwealth of Virginia laws and regulations. The report provides conclusions and suggestions for community action.

NTIS NO. PB 299-475 Price A09

The Xenia, Ohio, Model Transit Service Demonstration Project: Transit and Paratransit Services for a Small Urban Area. Final Report.

Laube, M.M., and G.A. Kocur. Cambridge Systematics, Inc. UMTA-OH-06-0022-79-1, April 1979, 265p.

Xenia is a city of approximately 28,600 people located 13 miles east of Dayton, Ohio. The Xenia Model Transit Service Demonstration began regular operations in July 1974, assuming the operation of an emergency fixed-route transit system instituted with funding from the Federal Disaster Assistance Administration in April 1974, after Xenia was struck by a tornado. Overall, the system evolved in stages from the original relief measure of a free-fare fixed-route bus system, to a flat-fare fixed-route system, a jitney system, and dial-a-ride service; and culminated in a mix of differentially-priced paratransit services operated with taxi vehicles. The system was operated by a public agency (Phase One) and later by a private contractor (Phase Two). The demonstration served as a test of several alternative transit services operated in a small city setting. Several fare structure alternatives were also implemented. Additional issues considered in the evaluation are the impact of transit services on the pattern and the rate of city redevelopment, the effect on competing private taxi services, and the relative merits of private and public operation of transit services. The data herein indicates that in terms of total travel time, reliability, and schedule flexibility, the two services were roughly comparable in quality.

NTIS No. PB 300-385 Price A12

Colonial Taxi Company of Bethel Park, Pennsylvania: Private Enterprise in Paratransit. Paratransit Case Studies.

The University of Oklahoma. UMTA-OK-11-0001-79-3, June 1978, 60p. (6 case studies).

The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. This curriculum material consists of 6 separate documents--a guide and 5 paratransit case studies. Colonial Taxi is a family owned taxi and paratransit company in the Pittsburgh, Pennsylvania, area providing exclusive and shared-ride service to local governments, school districts and human service agencies. Colonial is a nationally recognized leader in demonstrating taxi opportunities in paratransit. In 1978 it operated 185 vehicles and employed 220 persons. This report includes a background of this taxi industry, a description of Colonial's services and their evolution, company organization, operations and recordkeeping, and a discussion of recent conflict between the company and governmental regulatory agencies and transportation development programs.

NTIS No. PB 80-103252 Price A04

Comparison of Organizational and Operational Aspects of Four Vanpool Demonstration Projects. Final Report.

Heaton, C., J. Jacobson, and J. Poage. Transportation Systems Center. UMTA-MA-06-0049-79-6, April 1979, 114p.

The purpose of this report is to describe in detail the organizational and operational aspects of four projects involving vanpooling. The projects are located in San Francisco, California; Minneapolis, Minnesota; Knoxville, Tennessee; and Norfolk, Virginia; all involve third party providers and multiple employment locations. This report compares the projects with respect to: management and administration; target group focus; marketing procedures; driver and rider application and selection procedures; van acquisition and provision arrangements; and financial aspects such as cost structures, driver lease fees, passenger fares, and project funding. By highlighting the similarities and differences among project designs, the authors state that the information contained within the report is relevant not only to the ongoing evaluations of these projects, but also to organizers of similar vanpooling in other locales. Appendix A contains a table summarizing the project characteristics; and Appendices B and C contain driver, passenger, and other types of agreements used in the four demonstrations.

NTIS No. PB 299-720 Price A06

The Dial-A-Bat Paratransit Service of Brockton, Massachusetts, Area Transit: Public Transit in Coordinated Human Services Transportation. Paratransit Case Studies.

Cook, A.R. The University of Oklahoma. UMTA-OK-11-0001-79-5, June 1978, 53p. (6 case studies).

The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. This curriculum material consists of 6 separate documents--a guide and 5 paratransit

case studies. Brockton Area Transit (BAT) was one of the first public transit properties in the United States to tackle the problem of coordinating the transportation services of local human service agencies. Dial-A-Bat, paratransit element of BAT, is a demand-responsive service for agency clients and the elderly and handicapped public. Operations began in 1977; by 1978 it was transporting over 10,000 patrons per month. This report provides background information on Brockton and BAT; reviews Dial-A-Bat operations in 1978; documents' planning and implementation of the service; reviews current management and operating practices; and concludes with a commentary on the local and national significance of Dial-A-Bat. (See also CK-11-0001-79-1 through 79-6.)

NTIS No. PB 80-103278 Price A04

Fare Elasticities for Exclusive-Ride Taxi Services. Final Report.

Fravel, F.D., and G. Gilbert. University of North Carolina.
UMTA-NC-11-0006-79-1, October 1978, 70p.

The awareness of taxicabs as an important public transportation mode has increased the need to know how taxi usage changes in response to fare increases. In this research, a unique data set was assembled to test eight hypotheses regarding variations in taxi fare elasticities. Operating data were collected from 24 taxi operators in different cities across the United States. Data were also collected in the socioeconomic, demographic, and transit service characteristics of these cities. The hypothesis tests showed that demand for taxi service is primarily inelastic with respect to fare increases, and that higher fare levels produce more elastic responses to fare increases. The data did not support the hypothesis that demand is more sensitive to drop charges changes than to changes in mileage rates. Nor did the data support the hypothesis that time of the year influences the effect of a fare increase. The authors concluded that taxi demand is inelastic with respect to fare changes, and that fare changes are not very important in explaining ridership changes.

NTIS No. PB 296-201 Price A04

Golden Gate Vanpool Demonstration Project. Interim Report.

Dorosin, E., P. Fitzgerald, and B. Richard. Crain & Associates.
UMTA-CA-06-0095-79-1, July 1979, 310p.

This interim report evaluates the Golden Gate Vanpool Demonstration Project begun in October 1977. The project was designed to test the feasibility of a public sector agency's (Golden Gate) promotion of the formation of vanpool groups which would be operated and administered after a six-month introductory period on a private basis. The objective of the demonstration was to successfully promote commuter ridesharing through vanpools. This report describes operating characteristics and documents planning implementation stages. Analyses of service levels, demand, productivity, marketing strategies, and vanpooler demographics are also presented. The point made herein is that the Golden Gate Project clearly demonstrates that a public transit authority can facilitate vanpool formation and that issues once viewed as constraints,

namely, 13 (c) agreements and reasonable insurance coverage, can be negotiated.

NTIS No. PB 300-685 Price A14

Impacts of Regulations on the Use of Taxicabs for Paratransit Service. Final Report.

Sen, L., and J. Benjamin. North Carolina A&T State University. UMTA-NC-11-0007-79-1, June 1978, 131p.

The objectives of this study are: to document the nature and extents of the regulations affecting paratransit services (emphasis on taxi and taxi-transit systems at both state and local levels); to examine a sample of innovative paratransit services provided by taxicabs and to review the local regulations affecting their services; to select, out of this sample, an example of each of four major types of taxi-transit; and to develop a list of service requirements for each of the categories of service and a set of guidelines for modification of existing regulations. From information gathered from taxi operators, planners, and state and local regulatory agencies, this report presents an overview of current state and local ordinances and regulations pertaining to taxicabs. The service characteristics of 23 taxicab systems and the taxicab regulations of the cities in the sample are tabulated. Case studies of four systems, representing shared-ride service to the elderly and handicapped (Dade County, Florida) and to the general public (Raleigh, N.C.), feeder service (St. Bernard Parish, Louisiana), and transit replacement service (Chapel Hill, N.C.), are presented. The authors conclude that existing regulations need not impede the provision of taxi-transit services. Recommendations for public policy encouraging taxi-transit are included herein.

NTIS No. PB 300-510 Price A07

Implementing the Rochester Community Transit Service Demonstration. Interim Report.

Holoszyc, M., and D.A. Newman. SYSTAN, Inc. UMTA-NY-06-0048-79-1, May 1979, 140p.

This report describes the implementation process and the early impacts of the Rochester Community Transit Service demonstration in four suburbs of Rochester, New York. The features described herein are the culmination of a five-year evolutionary search for the most effective way to supply demand-responsive transit services. The demonstration is an outgrowth of an earlier demonstration that ended in October 1977. In the first demonstration, a variety of demand-responsive services were operated in two Rochester suburbs--Greece and Irondequoit. In the new demonstration, the door-to-door dial-a-ride service was expanded to two additional suburbs--Brighton and Henrietta. In addition, all four dial-a-ride service areas will eventually have computerized scheduling and dispatching . The new demonstration is largely concerned with two institutional innovations developed by the Rochester-Genesee Regional Transportation Authority, to deal with the problems of high operating costs and the insufficient local funding availability. These innovations are the use of a competitively selected private operator and the shifting of the funding responsibility to the suburban towns served by dial-a-ride. This report describes the events leading to these

innovations, their implementation, and their results and implications thus far.

NTIS No. PB 298-979 Price A07

Integrated Para-Transit Transportation Planning for Off-Peak Low Density Travel.
Report 1: Off-Peak Trip Characteristics.

Cardoso, A., et al. University of Illinois at Chicago Circle.
UMTA-IL-11-0023-79-1, September 1978, 65p. (3 rpts).

This three-volume report provides guidelines for planning paratransit for off-peak and/or non-work travel. As a summary of off-peak trip characteristics, this report provides the background for Reports 2 and 3. Most of the data in this report are based on the Chicago area. Report 1 presents the characteristics of each of the principal types of non-work trips (shopping, social/recreational, and evening trips). Information is provided on user, origin, and destination characteristics; temporal and spatial distribution of trips; and user attitudes toward paratransit modes for these trips. A survey of modal preference is also presented.

NTIS No. PB 295-464 Price A04
SET (3) PB 295-463 Price E08

Integrated Para-Transit Transportation Planning for Off-Peak Low Density Travel.
Report 2: Elderly and Handicapped Transportation.

McKnight, C., et al. University of Illinois at Chicago Circle.
UMTA-IL-11-0023-79-2, September 1978, 114p. (3 rpts).

This three-volume report provides guidelines for planning paratransit for off-peak and/or non-work travel. This volume is concerned with information and discussion on transportation planning for the elderly and handicapped. This report is designed as a comprehensive pre-implementation planning manual to aid planners in: 1) identifying the transportation needs of the local elderly and handicapped population; 2) estimating demand and system costs and benefits; 3) identifying sources of funding; and 4) identifying and evaluating various service combination options. Some of the areas covered herein are: Federal legislation; sources for funding; issues affecting transportation planning; travel behavior; major transportation alternatives; the coordination of existing transportation services provided by social service agencies; the accessibility of existing bus or rail systems; separate fixed-route bus system; demand responsive transit; ridesharing; and solutions to problems presented.

NTIS No. PB 295-465 Price A06

Integrated Para-Transit Transportation Planning for Off-Peak Low Density Travel.
Report 3: Planning Methodology.

Baker, D., et al. University of Illinois at Chicago Circle.
UMTA-IL-11-0023-79-3, September 1978, 78p. (3 rpts).

This three-volume report provides guidelines for planning paratransit for off-peak and/or non-work travel. Volume 3 considers the cost-effectiveness of implementing separate demand responsive systems and

using a traditional fixed-route system for serving off-peak trips. It also presents a series of models for estimating user and supplier costs of various types of midday fixed-route bus and Dial-A-Ride service. The models are then applied under a set of assumptions (which the planner may vary to suit his or her local conditions) to delineate the circumstances, i.e., demand density, service area size, level of service, etc., under which either Dial-A-Ride or fixed route service would be more cost-effective in providing off-peak transportation.

NTIS No. PB 295-466 Price A05

Interim Evaluation of the Minneapolis Ridesharing Commuter Services Demonstration. Interim Report.

Sherman, L. Cambridge Systematics, Inc. UMTA-MN-06-0008-79-1, March 1979, 153p.

This report presents an interim evaluation of the impacts of ridesharing brokerage project at three multi-employer work sites in the Minneapolis metropolitan area. In this demonstration, the Metropolitan Transit Commission is coordinating a variety of brokerage functions that are designed to encourage increased ridership in high occupancy vehicles to non-CBD work sites. The modes promoted are carpooling, vanpooling, subscription and regular bus. This interim evaluation focuses on an analysis of pre-demonstration survey data. Site characteristics and work conditions are described in detail, including parking availability, observed variance in start-end times, worker overtime requirements and business need for a car. It is shown that these work conditions and the short commute distances to the demonstration site impose major barriers to successful results. A series of market penetration measures are presented to evaluate the effectiveness of the broker's marketing efforts. The results show that formal employee presentations are more effective than passive marketing tools in attracting commuter interest in ridesharing. This evaluation is based on project events up to September 1, 1978. As such, conclusions drawn herein are strictly preliminary.

NTIS No. PB 295-189 Price A08

Knoxville Commuter Pool: Annual Report 1977-1978.

Beeson, J.D. Knoxville Commuter Pool. UMTA-TN-06-0006-78-2, November 1978, 80p.

The Brokerage Bureau, Knoxville Commuter Pool (KCP), came into being on October 23, 1975, through a formal agreement between the Urban Mass Transportation Administration and the City of Knoxville. Currently the KCP is a part of the city government; however, its services actually extend over a region comparable to the East Tennessee Development District. KCP has acted to integrate vanpools into the general ridesharing system which includes carpools, buses, and privately operated express buses. One of the most significant accomplishments of the KCP was the establishment of credibility and awareness among the local business community and the general public concerning ridesharing. This annual report presents a concise description of the background, objectives, organization, and accomplishments of the Knoxville Transportation Brokerage Project. Special attention is given

to details of employer/employee participation, concentrated program efforts in the CBD, and a telephone information and brokerage service. The vanpool program is described in detail, including maintenance, the transition of vans to private ownership, and the formation of an association of private vanpool owner/operators.

NTIS No. PB 295-046 Price A05

Knoxville, Tennessee Commuter Pool: Matching Markets to Modes with Paratransit Brokering. Paratransit Case Studies.

Cook, A.R., and C.E. Barb, Jr. The University of Oklahoma.

UMTA-OK-11-0001-79-6, December 1978, 55p. (6 case studies).

The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. The curriculum consists of 6 separate documents--a guide and 5 paratransit case studies (See OK-11-0001-79-1 through 79-6). The Knoxville Commuter Pool was a significant national experiment in community-wide transportation brokerage, particularly in its broad scale implementation of an owner/operator vanpool program (47 vanpools at the end of 1978), its aggressive promotion of all forms of ridesharing among employers and employees in the area, and in the resolution of barriers (notably state regulations and insurance) to ridesharing brokerage. The Knoxville Pool engaged in limited amounts of human service agency transportation brokerage through 1977. Comparisons are made with the local Tennessee Valley Authority ridesharing program, which is a successful model of an employer-based commuter work trip brokerage.

NTIS No. PB 80-103286 Price A04

The Knoxville Transportation Brokerage Project.
Volume I: Philosophy and Institutional Issues.

Davis, F.W., J.D. Beeson, and F.J. Wegmann. The University of Tennessee.

UMTA-TN-06-0006-78-3, November 1978, 115p.

This report is designed to describe the theoretical concepts behind the Brokerage Project and to describe the institutional problems involved in implementing the concepts. This report discusses the evolution of the brokerage concept, pre-project experience, project activities, planned activities, the availability of alternative suppliers, the transportation markets, institutional barriers, and an overview of the accomplishments and conclusions reached during the first 19 months of the project.

NTIS No. PB 292-592 Price A06

The Knoxville Transportation Brokerage Project.
Volume III: An Eighteen Month Evaluation.

Wegmann, F.J., et al. The University of Tennessee. UMTA-TN-06-0006-78-1, November 1978, 144p.

The transportation brokerage approach has as its basic objective to identify and match transportation demand/supply on an individual basis. The objective of this report is to document the results of the Knoxville Transportation Brokerage Service (KTBS) Project while operated by the University of Tennessee Transportation Center (January 1976-June 1977). This evaluation is restricted to an analysis of KTB's commuter

arm--the Knoxville Commuter Pool (KCP), and the major focus of the KCP effort revolves about vans rather than carpool formations. Higlighted herein is the fact that this demonstration introduced a new mode of commuter transportation--vanpooling. Currently, 47 KCP vans are operating daily serving over 450 commuters working at 12 different firms. With 36 percent of the vanpoolers having formerly driven alone, the broker has served to eliminate 10,056 daily miles of travel. The demonstration's contribution extended beyond the successful deployment of seed vans and the removal of institutional barriers restricting the legal operation of commuter vans in Tennessee. The project demonstrated the ability to survey commuter needs and to match them to the available supply of transportation on a community-wide basis. Over the 18 month project, 234 firms were surveyed and over 18,000 match lists distributed. The project achieved an increased level of rideshare awareness in the community with 67 percent of the general population recognizing the name of the project and 41 percent knowing how to contact KCP.

NTIS No. PB 292-593 Price A07

The Minneapolis Ridesharing Commuter Services Demonstration: Evaluation Plan.

Sherman, L. Cambridge Systematics, Inc. UMTA-MN-06-0008-78-1, May 1978, 139p.

In April 1977, the Metropolitan Transit Commission initiated a two-year ridesharing brokerage demonstration project designed to increase work trip-vehicle occupancy at three large employment sites located outside the Minneapolis/St. Paul Central Business District: namely, South Central Minneapolis, Pentagon Park/Normandale, and Central Bloomington. Key elements differentiating this demonstration from other ridesharing programs are the reliance of a regional transit agency to serve as a broker in marketing, coordinating, and monitoring the program; promotion of a wide range of ridesharing services; and the choice of multi-employer sites. The ridesharing program, Commuter Service, is a comprehensive program offering four different modes (carpooling, vanpooling, subscription bus, and regular bus service) to persons commuting to and from the three sites. A major objective of this evaluation project is to provide a detailed chronological process description of the brokerage service. Another major objective is to provide a statistically sound assessment of the results of the demonstration. While all demonstration elements cited herein should serve to stimulate ridesharing activity, they should be viewed against several off-setting factors discussed in this report.

NTIS No. PB 289-798 Price A07

Paratransit Resource Guide.
Paratransit Case Studies.

Cook, A.R. The University of Oklahoma. UMTA-OK-11-0001-79-1, June 1978, 114p. (6 case studies).

The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. This curriculum material consists of 6 documents--a guide and 5 paratransit case

studies. (See OK-11-0001-79-2 through 79-6.) This Guide is structured to provide the reader with sources of information, including personal contacts, on paratransit development at the federal, state, and local levels, with emphasis on federal and national information sources. The Guide includes definitions of paratransit, pertinent federal policies, annotated introductory overview literature, information sources such as TRISNET and NTIS, UMTA and FHWA regional officers, professional organizations, consulting firms, foreign sources of information, and a paratransit educator resource list.

NTIS No. PB 80-103237 Price A06

The Paratransit Services of the Choanoke Area (North Carolina) Development Association: Rural Transit in Coordinated Human Service Transportation. Paratransit Case Studies.

Cook, A.R. The University of Oklahoma. UMTA-OK-11-0001-79-4, June 1978, 48p. (6 case studies).

This report is one of the paratransit case studies reports (See citation above, OK-11-0001-79-1). This case study gives background information on the Choanoke Area Development Association (CADA) and area, and reviews CADAs paratransit operations in 1978. Over 7,000 patrons use the service each month at a total cost to CADA of $0.60 per vehicle mile, including capital and administrative overhead. The study documents the planning and implementation of new services, reviews current management and operating practices, and concludes with commentary on the local and national significance of the service. CADA has significantly increased the mobility of low income and elderly and handicapped residents of the Choanoke area, and local human service agencies have benefited from the availability of the CADA transportation service. The rural fixed-route bus services with feeder vans have been and should continue to be a model for rural public transportation programs.

NTIS No. PB 80-103260 Price A03

The Rochester New York Integrated Transit Demonstration. Volume I: Executive Summary.

Lave, R.E., and M.A. Holoszyc. SYSTAN, Inc. UMTA-NY-06-0048-78-1, March 1979, 84p. (3 vols).

The Rochester Integrated Transit Demonstration (RITD) study consists of three separate volumes, and it was designed to assess the roles of demand-responsive transit services in a regionwide transit system that includes an extensive fixed-route bus network. The demonstration extended transit service into suburban areas by using integrated mixes of fixed-route and paratransit services. Four types of innovations were demonstrated: service; system integration; equipment; and fares, marketing, and promotion. This report describes the conduct of and the impacts resulting from the implementation of a family of demand-responsive transit services and several related innovations in Greece and Irondequoit, New York (two suburbs of Rochester). The report covers the time period beginning with the implementation of PERT (Personal Transit) services in August 1973 through July 1977. The initial Greece project did not become a Federally-funded demonstration until after many of the innovations had begun. Nevertheless, this pre-demonstration

period has been evaluated to the extent that data were available. The report contains a description of the implementation process and the impact of individual services and innovations on the level of service provided, transit demand, and transit productivity. The implications of the Rochester, New York, experience are summarized for the benefit of other localities considering the implementation of similar services.

NTIS No. PB 296-875 Price A09
SET (3) PB 296-874 Price E12

The Rochester New York Integrated Transit Demonstration.
Volume II: Evaluation Report.

Lave, R.E., and M.A. Holoszyc. SYSTAN, Inc. UMTA-NY-06-0048-78-2, March 1979, 388p. (3 vols).

This volume is one of three volumes of the Rochester Integrated Transit Demonstration (RITD). This report describes the conduct of and the impacts resulting from the implementation of a family of demand-responsive transit services and several related innovations in Greece and Irondequoit, New York. The report covers the time period beginning with the implementation of PERT (Personal Transit) services in August 1973 through July 1977. The initial Greece project did not become a Federally-funded demonstration until after many of the innovations had begun. Neveretheless, this pre-demonstration period has been evaluated to the extent that data were available. The report contains a description of the implementation process and the impacts of individual services and innovation productivity. The implications of the Rochester, New York, experience are summarized for the benefit of other localities considering the implementation of similar services.

NTIS No. PB 296-876 Price: A17

The Rochester New York Integrated Transit Demonstration.
Volume III: Appendices.

Lave, R.E., and M.A. Holoszyc. SYSTAN, Inc. UMTA-NY-06-0048-78-3, March 1979, 234p. (3 vols).

This report is the third and final volume of the Rochester Integrated Transit Demonstration (RITD) study. It contains twenty appendices, including a glossary, copies of measurement instruments, and tabulations of survey results. (See also NY-06-0048-78-1 and 78-2).

NTIS No. PB 296-877 Price A05

The Seattle/King County Commuter Pool Program:
Paratransit and Rush Hour Congestion. Paratransit Case Studies.

Barb, C.E. The University of Oklahoma. UMTA-OK-11-0001-79-2, June 1978, 75p. (6 case studies).

The Seattle/King County Commuter Pool program evolved from a 1973 energy crisis carpool program into a comprehensive metropolitan paratransit development organization; it focuses upon alleviating commuter peak hour traffic congestion. This program involves 22 activities including operating a computer ride-match system/buspool program; development of paratransit incentives including preferential parking, lane access and tools, planning and employer consulting; flexible work hour promotion; and media promotion and educational program development. The program has been promoted by the Seattle Traffic Engineer and is administered

through his office. Program funding has come from the region's Federal Aid Urban Systems funds with local match being claimed in public service announcements.

NTIS No. PB 80-103245 Price: A04

09. PLANNING, POLICY AND PROGRAM DEVELOPMENT

Annual Listing of Research Studies and Reports from the Texas Cooperative Transportation Research Program. Index.

Texas State Department of Highways and Public Transportation. UMTA-TX-09-8003-79-1, January 1979, 140p.

This listing serves to document all research and technical studies performed under the Cooperative Research Program of the Texas State Department of Highways and Public Transportation since 1954. The index report is organized accordingly: Part I lists the Highway Planning and Research (HPR) studies; Part II lists studies of the Federal Coordinated Implementation Program (FCIP), or Demonstration Program of the Federal Highway Administration; Part III lists Technical Studies sponsored by the Urban Mass Transportation Administration; Part IV lists Special Studies; Part V lists experimental projects; and Parts VI-VII lists HPR projects.

NTIS No. PB 291-885 Price A07

Bus Service Evaluation Procedures: A Review. Interim Report No. 1.

Attanucci, J.P., L. Jaeger, and J. Becker. Massachusetts Bay Transportation Authority, and Tidewater Transportation District Commission. UMTA-MA-09-7001-79-1, March 1979, 227p.

This report reflects the strong interests of transit authorities in updating and improving bus service evaluation programs. Such programs include a joint review of the state-of-the-art in bus service evaluation techniques across the country. This report presents the results of a literature review and survey of 71 transit properties in the United States and Canada regarding current evaluation procedures. Three types of evaluation indicators were identified: service design measures, operating performance measures, and productivity measures. Results are presented separately for transit properties owning less than 400 buses/more than 400 buses. Appendixes provide operators and regional transit planners with a compendium of performance measures, a listing of contact persons, and detailed information on available literature.

NTIS No. PB 296-314 Price A11

Characteristics of Urban Transportation Demand: Appendix.

Levinson, H.S. Wilbur Smith and Associates. UMTA-IT-06-0049-79-2 (cross reference to UMTA-IT-06-0049-78-2), January 1979, 213p.

To assist the urban transportation planner, the Urban Mass Transportation Administration's Planning Methods and Support Program researches, develops, and distributes planning tools, including the documentation of novel planning studies, new design and forecasting techniques, and germane research results. This report is an example. Its contents clearly present usable planning concepts and constitute a valuable addition to the growing set of computerized and manual

techniques comprising the UMTA/FHWA Urban Transportation Planning System (UTPS). The report is an appendix to CUTD handbook. It offers detailed data on individual cities, roads, routes, stations, etc. These are not in a form that is comparable from place-to-place, but may be of interest from an historical perspective for the urban areas concerned.

NTIS No. PB 294-989 Price A10

Characteristics of Urban Transportation Demand: A Handbook for Transportation Planners.

Levinson, H.S. Wilbur Smith and Associates. UMTA-IT-06-0049-79-1, April 1978, 129p.

This handbook is intended to guide transportation planners, engineers, and decision-makers in: assessing demands for urban, highway, and transit systems; applying and validating conventional transportation planning techniques; and establishing sound transportation planning decisions. It contains characteristics of urban bus, rail, and highway systems, and urban trip-making. The handbook may be used to compare travel parameters for a given community with those in other cities, thereby providing a basis for cross-checking and refinement. As part of the Urban Transportation Planning System (UTPS) of UMTA and FHWA, it provides basic inputs to the urban transportation planning process as well as ways of checking the results for reasonableness and relevance. This handbook is being distributed to State DOTs, MPOs, and transportation libraries and will be distributed on the UTPS tape in the future. The Appendix (IT-06-0049-78-2) offers detailed data on individual cities, roads, routes, stations, etc.

NTIS No. PB 293-220 Price A07

Characteristics of Urban Transportation Systems: A Handbook for Transportation Planners.

Sanders, D.B., and T.A. Reynen. DeLeuw, Cather & Company. Assistance afforded by K. Bhatt, FHWA/UMTA staff, and The Urban Institute. UMTA-IT-06-0049-79-3, June 1979, 194p.

This report consists of a handbook to be used by transportation planners and urban specialists for estimating system parameters for conventional transportation technology. Three modes were evaluated: rail transit, local bus and bus rapid transit, and highway systems. Each mode contains an assessment of the following seven selected supply parameters: speed, capacity, operating cost, energy consumption, pollutant emissions, capital costs, and accident frequency. Each mode has an analogous appendix section whereby these parameters are evaluated in further detail and for particular geographic areas. Two additional appendix sections contain all references used in the tables/figures and a general bibliography for further information. This report supersedes earlier editions of the same title (IT-06-0049-74-1, and IT-06-0049-75-1).

NTIS No. PB 301-319 Price A09

The Development of an Evaluation Framework for Transportation System Management Strategies. Final Report.

Lima, P.M., P.T. McCoy, and S.R. Jepsen. University of Nebraska. UMTA-NE-11-0001-79-1, August 1978, 177p.

The overall purpose of this project was to develop a framework for the evaluation of Transportation System Management (TSM) strategies. The research intent was to develop a practical framework that could be easily integrated into the current urban transportation planning process and that could also be adapted to previously established institutional arrangements with medium-sized metropolitan areas. For this, a systems analytic approach was used to build the specific components of the framework. Based on this approach, six tasks were undertaken to construct such a framework. To test this framework, a case study of TSM evaluation within the Omaha-Council Bluffs Metropolitan Area was undertaken. Based on the review of other TSM elements and this case study, an implementation program for the framework was proposed. This program includes the identification of the evaluation tasks; identification of the specific roles for each implementing agency and Metropolitan Planning Organization; and a recommended TSM information system that encompassed data generation, data retention and retrieval, and data transmission.

NTIS No. PB 295-023 Price A09

Existing Services Impact Study - Main Report.
Volume I: Appendix C - Workshop 1, and
Appendix D - Workshop 2.

McBrayer, D.B., and M.W. Boyd, et al. Dalton-Dalton-Little-Newport, and Urban Behavioral Research Associates. UMTA-IT-09-0067-79-1, September 1978, 190p. (3 vols).

This three-volume study resulted from questions raised about the quantity of Bi-State Development Agency transit services provided to the transit-dependent and minority population of the St. Louis Metropolitan Area. The project objectives were to evaluate existing service and determine whether or not it provided adequate and equitable service to the transit-dependent and minority population, and to identify any needed corrective steps. The study process, findings, conclusions, and recommendations are discussed. This project included: development of definitions for terms used; identification of criteria for examining adequacy and equity; data gathering (on-board survey of bus riders); analysis of service adequacy and equity; analysis of service standards; and development of a program to remedy deficiencies. The study found that services were generally adequate and equitable. Deficiencies regarding adequacy were found in fianancial assistance, frequency of service, trip speed, and on-time performance. Equity deficiencies were found in the areas of bus loading and bus cleanliness.

NTIS No. PB 295-487 Price A09
SET (3) PB 295-486 Price E11

Existing Services Impact Study.
Volume II: Appendix A - Seventeen Criteria, Analyses and Results.

McBrayer, D.B., and M.W. Boyd, et al. Dalton-Dalton-Little-Newport, and Urban Behavorial Research Associates. UMTA-IT-09-0067-79-2, April 1978, 213p. (3 vols).

See abstract cited earlier, IT-09-0067-79-1.

NTIS No. PB 295-488 Price A10

Existing Services Impact Study.
Volume III: Appendix B - On-Board Ridership Survey.
McBrayer, D.B., and M.W. Boyd, et al. Dalton-Dalton-Little-Newport, and Urban Behavorial Research Associates. UMTA-IT-09-0067-79-3, April 1978, 116p. (3 vols).

See abstract cited earlier, IT-09-0067-79-1.

NTIS No. PB 295-489 Price A06

Experiments to Clarify Priorities in Urban Travel Forecasting Research and Development. Final Report.
Ben-Akiva, M., et al. Massachusetts Institute of Technology. UMTA-URM-02-79-3, 1977, 144p.

This final report summarizes the results of a research project to develop improved urban travel forecasting procedures. The objectives herein are: to investigate recent developments in travel forecasting; to conduct theoretical and empirical comparisons of alternative procedures; and to develop recommendations for further research and development. In this report, the results of a case study that compares alternative forecasting models are presented. The case study indicates empirically significant differences between forecasts from fully specified, consistent travel demand models and forecasts from simplified travel demand models. The simplified travel demand models were structured so as to represent conventional forecasting models. Further case study experiments with market segmentation and equilibration demonstrate the empirical importance of these procedures in terms of forecasting accuracy. Based on these results, a program is suggested which combines immediate implementation of demonstrated improvements with further research on potential new areas of research.

NTIS No. PB 295-051 Price A07

Market Street West Transportation Study.
Final Report.
Simpson & Curtin, Transportation Consulting Division of Booz, Allen, and Hamilton, Inc./prepared with Urban Engineers, Inc., and Wallace, McHarg, Roberts & Todd for the City of Philadelphia, Department of Public Property. UMTA-IT-09-0050-79-1, March 1978, 152p.

The objectives of this study were to define the transit deficiencies of the Market Street West Area, and to thoroughly analyze alternative transit improvement options for solving the existing transit deficiencies. The study's investigations into current transit service and usage patterns revealed the need for improved transit access west of 18th Street. Several alternative transit improvement proposals were developed to meet this need. After a two-stage analysis of the various transit proposals, the study concluded that a new rapid transit station should be built to serve Market Street West on the Market/Frankford Line between the existing stations at 15th and 30th Streets. Various improvements to the subway-surface system, which is the only rail line that now penetrates the portion of the study area west of 18th Street, were also recommended.

NTIS No. PB 298-751 Price A08

Mass Transit Program for the Saint Louis Metropolitan Area. Mass Transit Program. Final Report.

Daniel, Mann, Johnson and Mendenhall. UMTA-IT-09-0067-79-7, October 1978, 143p.

After ten years of serious consideration of some type of steelwheel-steelrail public transit improvements, the conclusion was reached that for the forseeable future, buses operating on existing streets and highways with certain modifications are the most cost-effective means to meet this region's transit needs. This report is Phase I of the Alternatives Analysis Program for the St. Louis Metropolitan Area, and it defines a 1985 Mass Transit Program for the area. The program consists of an expanded all-bus system with the addition of Freeway Bus Service and Park-Ride facilities in eight corridors. The major activities included surveys of community leaders, transit dependents, and areawide surveys. An analysis of transit needs of the region with special emphasis on the transit-dependent was performed. Physical opportunities for transit improvements were identified. Three alternative regional systems were prepared and analyzed for patronage, costs, benefits, and impact. Four refined (composite) systems were prepared and analyzed. Initially, light rail transit was considered worthy of Phase II alternatives analysis, but the final decision was to proceed with an all-bus on local streets system. This study consists of 5 separate reports (See also IT-09-0067-79-4 through 79-8).

NTIS No. PB 295-120 Price A07

Measuring the Achievement of National Urban Transportation Goals and Objectives: The Role of Metropolitan Planning Organizations. Final Report.

Lookingbill, D., and K.J. Dueker. The University of Iowa. UMTA-IA-11-0001-79-2, November 1978, 38p.

The U.S. Department of Transportation has issued a data reporting requirement for Metropolitan Planning Organizations (MPO) to collect general transportation-related data to assess transportation goal achievement in a broad context. This report focuses on the institutionalization of the MPO data reporting requirement. The purpose herein is to assess the extent to which the MPO data reporting requirements can serve both local and national needs for quality data without burdening the MPO. This study analyzed the impacts of financing procedures and constraints on the transportation systems in small urban areas, examined the effectiveness of public transportation planning, and developed an allocation procedure for state transit assistance programs. A case study methodology was employed. Three cities in the state of Iowa were selected: Cedar Rapids, Davenport, and Iowa City. The lack of support for the MPO data reporting program at either the Federal or local level may be attributed to the data itself, which resulted from a compromise between Federal data requirements for national policies and programs, and local requirements for more location-specific data. The success of the program is dependent on MPO acceptance of the notion that data items are useful for their own planning process.

NTIS No. PB 300-417 Price A03

Metrorail Alternatives Analysis.
Final Report.
Peat, Marwick, Mitchell and Company. UMTA-IT-09-0077-78-2, August 1978, 207p.

The Metrorail Alternatives Analysis (MAA) project has been completed with the selection of a preferred regional system by the Joint Policy Steering Committee (JPSC) charged with that responsibility in the Washington Metropolitan area. This report reflects the efforts of local officials to conduct a MAA of various alternatives to completing the full 100-mile Metrorail system. The overall goal throughout the study was to insure that the region be served by an efficient, operational mass transit system while minimizing adverse impacts for local neighborhoods. The MAA study consisted of the evaluation of a full range of rail and non-rail alternatives to the completion of Metrorail in four specific corridors: the "E" Route to Greenbelt; the "F" Route to Branch Avenue; the "J" Route to Franconia; and the "K" Route to Vienna. This report summarizes the issues addressed during the project, and focuses on the final regional alternatives that were developed. Several sections in this report outline the major steps in the process from the original call for MAA in September 1976, through action by JPSC in recommending a preferred regional system in May 1978. The remaining sections deal with analysis of the selected regional alternatives and comparisons among them on a variety of financial and service measures. These sections also document a major sensitivity examination of the financial and other implications of a 20 percent reduction in patronage.

NTIS No. PB 288-580 Price A10

Metrorail Alternatives Analysis: Final Report of the Joint Policy Steering Committee. Final Report.
Metropolitan Washington Council of Governments, Joint Policy Steering Committee. UMTA-IT-09-0077-78-1, June 1978, 37p.

Since 1968 cost estimates for completing the 100-mile Metrorail system within the Washington Metropolitan Area have escalated, and concern has been expressed about financing the full system and whether the full 100-mile system provided the best solution to the transportation problems of the area. This report reflects the efforts of local officials to conduct a Metrorail Alternatives Analysis (MAA) to completing the full system. The study reviewed a full range of rail/non-rail alternatives for the "E" Route to Greenbelt, the "F" Route to Branch Avenue, the "J" Route to Franconia, and the "K" Route to Vienna. The study was designed to analyze the relative costs and effectiveness of each alternative. Of the 1700 possible regional combinations, 72 were analyzed in detail; 5 regional candidates were chosen for final study. After 18 months of study, the JPSC reaffirmed a complete system for the area. Some basic findings were: any major truncations would create lower levels of patronage and adverse impacts on neighborhoods; intermediate cutbacks will mandate expensive station redesign, limit vehicular access to stations, and provide inadequate levels of parking to support the systems; and curtailment of the Metrorail system marks a retrenchment from regional transportation, land use, and environmental goals.

NTIS No. PB 288-579 Price A03

New Mexico Public Transportation Directory.

New Mexico State Highway Department. UMTA-NM-09-8004-79-1, October 1978, 59p.

Public transportation providers in New Mexico are composed mainly of three groups: private companies, non-profit organizations, and publicly-owned systems. The purpose of this directory is to acquaint the general public with the accessibility of transportation by bus, van, taxi, and train. This directory is a comprehensive guide to the transportation services available throughout the state, and it represents an effort to provide social service and governmental agencies with a source of reference to aid in determining future needs, developing programs, and to encourage coordination of existing services. The directory includes urban transit companies, Amtrak intercity rail passenger service, taxi companies, major intercity bus depots, rural and special services, and charter companies. Data presented in this directory has been gathered from individual state and local agencies and is the most accurate information available as of June 1, 1978. Data is arranged according to the State Planning Office Regional Planning Districts; Regional Planning Agencies for each of the seven districts are also listed. Included herein are maps of Regional Planning Districts, of Amtrak and Intercity Bus Routes, and of Taxicab Companies.

NTIS No. PB 291-875 Price A04

On-Board Transit Origin-Destination Survey Data: Expanding their Use via On-Line Data Access and Analysis. Final Report.

Shawcroft, R.G., and C.D. Gehner. University of Washington. UMTA-WA-11-0005-79-1, September 1978, 118p.

The purpose of this research was to explore the potential for enhancing the use of on-board transit origin-destination (O-D) surveys as a means of satisfying some of the evolving needs of transit planning. The study was designed to reveal the importance of detailed ridership data by demonstrating the potential uses of O-D survey data, by both the transit operator and municipal agencies. This research tested three interrelated hypotheses: 1) transit on-board O-D surveys that produce data bases useful in short-range transit planning; 2) unused information contained in disaggregate O-D data that can be extracted and used in short-range planning via on-line interactive analysis and display systems; and 3) a better understanding of the utility and limitations of data collected in an on-board survey. The report presents a set of conclusions and recommendations regarding the future use of O-D studies, the types of data access and analysis tools that might be useful, and the problems related to the effective use of this type of data.

NTIS No. PB 294-967 Price A06

Parking Policy as a Transportation System Management Measure. Final Report.

Vuchic, V.R., and M.S. Hessami. University of Pennsylvania. UMTA-PA-11-0016-79-1, August 1978, 75p.

The main purposes of this study are: to show that parking policy represents a potentially effective tool for regulation of urban transportation under the Transportation System Management (TSM) program;

to define the relationship between the parking policy with other TSM measures; to present and evaluate various aspects of a parking policy and to illustrate these by applications in different cities; and to recommend parking policies that cities can apply as TSM measures. This study presents different types of parking restraints in the forms of regulatory measures, limits on parking supply, and pricing. Applicability and effectiveness of each measure is discussed. Groups affected by such measures are identified. Experiments undertaken in several cities with various parking regulations and pricing are described. The report recommends that parking be included in analyses and planning of urban transportation systems and be used as a tool for traffic regulation, modal split change, and improvements of both urban travel conditions and urban environment in general.

NTIS No. PB 299-515 Price A04

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978.
Volume IX: Urban Transportation Planning Workshop.

American Public Transit Association. UMTA-DC-06-0157-79-9, November 1978, 29p. (9 vols).

This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshop on Urban Transportation Planning. It includes discussions of the needs and problems of the transit operating industry in planning for urban transportation and research in transportation planning methods. This volume also contains three resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants. These proceedings (DC-06-0157-79-1 through 79-9) consist of nine separate volumes/workshops.

NTIS No. PB 300-994 Price A03

Public Acceptance Plan.
Mass Transit Program.

Daniel, Mann, Johnson & Mendenhall. UMTA-IT-09-0067-79-8, October 1978, 10p.

Public transportation in the St. Louis area will be buses on the local streets and highways for the next 10-15 years. The improvements suggested in this Mass Transit Program are modest and designed to strengthen the existing bus service. This report reflects the view that the need for a public acceptance plan is not to try to promote and sell major transit improvement to the public, but to promote and sell public mass transportation and to gain support for the necessary financing. The report identifies and describes five basic themes that comprise the public acceptance effort, namely: public transportation as a public service; efficient operation; improvements in service; environmental improvements; and equity of service. This program consists of 5 separate reports (See IT-09-0067-79-4 through 79-8).

NTIS No. PB 295-116 Price A02

Review of Possible Effects of Some Selected Federal Actions on New Transit Product Introduction. Final Report.

Chin, D.K. The Onyx Corporation. UMTA-MD-06-0032-79-1, July 1979, 111p.

The main concern of this study is to evaluate the feasibility and effectiveness of new concepts and modification of existing concepts by which the Federal government can encourage the deployment of the most appropriate innovation in urban mass transit. The nine members of the transit industry interviewed, identified Federal design and performance guidelines as the single major barrier to new product introduction. Six selected concepts are analyzed herein: standard set of performance guidelines; lowest life-cycle cost procurements; Federal grants; coordination of transit product orders by UMTA; use of Federal capital incentives to influence local authorities to adopt regulations encouraging transit use; and formation of a transit operators and suppliers committee to facilitate greater cooperation in the development cycle. Examples of UMTA programs incorporating recommended concepts are also discussed.

NTIS No. PB 300-965 A06

San Francisco MUNI Transportation Planning Operations and Marketing Study. Summary Report.

Wilbur Smith and Associates, Inc. UMTA-CA-09-0025-78-1, March 1978, 35p.

The main objective of the MUNI Transportation Planning Operations and Marketing (POM) Study was to develop a five-year transit improvement program for MUNI based upon an analysis of existing transit demands and service capability. Additionally, the study was undertaken to provide information needed to plan more detailed investigations relating to transit priority street programs, maintenance facilities, and the street railway system. This document is a summary of a report by Wilbur Smith and Associates on a detailed two-year study of MUNI transit service improvement needs. The recommendations described reflect both the results of an in-depth technical assessment of the existing MUNI system and citizen comments and suggestions provided through a public participation process. This report provides an overview of inventories and evaluation of MUNI services and main features of a recommended short-term improvement plan and program. The main thrust of the recommendations is aimed at more efficient use of existing public transportation resources. The work described herein represents only the first of several phases of a complete planning, operations, and marketing program. Technical materials prepared as part of MUNI POM study, together with all letters and other communications received from public agencies, private organizations, and individuals, are available for review at the MUNI Library (415/558-5441).

NTIS No. PB 288-582 Price A03

Simplified Aids for Transportation Analysis: Annotated Bibliography.

Peat, Marwick, Mitchell and Co. UMTA-IT-06-9020-79-1, January 1979, 112p. (6 rpts).

This study, Simplified Aids for Transportation Analysis, consists of a series of six separate reports (one annotated bibliography and five analytical aids) describing simplified aids to improve transportation

decisions without resorting to computers or extensive data collection. This bibliography report contains the annotated summary of each of the analytical aids submitted for review and consideration. In each case, it identifies the person or agency that submitted the aid, provides a description of the aid, and provides a reference document that describes the technique or application of the technique. These descriptions are intended to assist the analyst in determining which of these analytical aids might be useful in a particular local application, and they also provide a source of reference for obtaining additional information concerning the technique.

NTIS No. PB 299-980 Price A06
SET (6) PB 299-979 Price E11

Simplified Aids for Transportation Analysis: Estimating Parking Accumulation.

Peat, Marwick, Mitchell and Co. UMTA-IT-06-9020-79-5, January 1979, 47p. (6 rpts).

This is one of a series of six reports describing simplified aids to improve transportation decisions. The analytical aid described herein provides a method for estimating the accumulation of parked vehicles within a study area over the course of a typical weekday. The primary use of the parking accumulation estimation method is to analyze the adequacy of available parking supply in relation to expected parking demand. The method may also be used to monitor/suggest revisions to automobile travel impedance values used in transportation planning models.

NTIS No. PB 299-984 Price A03

Simplified Aids for Transportation Analysis: Estimating Ridership and Cost.

Peat, Marwick, Mitchell and Co. UMTA-IT-06-9020-79-3, January 1979, 29p. (6 rpts).

This is one of a series of six reports describing simplified aids to improve transportation decisions. The analytical aid presented herein provides a simple method for estimating the annual ridership and operating expenses of fixed-route bus system alternatives in urban areas with population of less than 300,000. The method is based on regression equations generated principally from 1974 operating data for 55 U.S. fixed-route bus systems. These equations can be used to develop preliminary estimates of the annual ridership and public financial operating assistance required for such systems in small urban areas. The equations can be solved using a hand calculator and readily available data inputs.

NTIS No. PB 299-982 Price A03

Simplified Aids for Transportation Analysis: Forecasting Auto Availability and Travel.

Peat, Marwick, Mitchell and Co. UMTA-IT-06-9020-79-2, January 1979, 35p. (6 rpts).

This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. This report describes auto availability per

household as a function of the product of the two variables--the average market price of homes and the percentage of home ownership. Estimates of auto availability derived from this function can be applied to trip generation and modal split analysis in transit system studies, route patronage estimation, and sketch planning in urban areas of any size. Examples of trip generation and modal split applications of the variable are also presented.

NTIS No. PB 299-981 Price A03

Simplified Aids for Transportation Analysis: Fringe Parking Site Requirements.

Peat, Marwick, Mitchell and Co. UMTA-IT-06-9020-79-6, January 1979, 64p. (6 rpts).

This is one of a series of six reports describing simplified aids to improve transportation decisions. The analytical aid described herein provides a method to: identify candidate sites for change-of-mode fringe parking facilities; estimate specific parking facility requirements at these candidate sites; and estimate highway access requirements for the sites. Modifications, embellishments, and improvements to the suggested procedures and models are encouraged should local data or previous analyses suggest a more appropriate method.

NTIS No. PB 299-985 Price A04

Simplified Aids for Transportation Analysis: Transit Route Evaluation.

Peat, Marwick, Mitchell and Co. UMTA-IT-06-9020-79-4, January 1979, 35p. (6 rpts).

This is one of a series of six reports describing simplified aids to improve transportation decisions. The analytical aid presented herein provides one method for evaluating individual transit routes for a fixed-route, fixed-schedule urban transit system. Individual transit system routes are evaluated semiannually, based on a comparison of nine performance factors with established route standards set for each factor. Input data used are recorded on a semiannual basis, and scores are computed for each of the nine performance factors for each route according to an evaluation score algorithm. Scores are then added for each route, and routes are ranked by their total evaluation score. The results of the evaluation are used as the basis for route refinement/modification decisions. The report states that the evaluation procedure is best applied in systems whose overall ridership is growing.

NTIS No. PB 299-983 Price A03

A Study of Transit Rider Characteristics. Final Report.

Gilroy, J., et al. Polytechnic Institute of New York. UMTA-NY-11-0014-79-3, November 1978, 157p.

This report presents the results of a set of transit rider surveys conducted in a well-served, intense transit environment. The bus surveys conducted used an on-board, mailback questionnaire consisting of the following information: basic trip data; alternatives; demographics;

and other characteristics. The surveys covered four fixed-route bus routes (two in Queens and two in Brooklyn), and one rail rapid transit line on Staten Island. Origin-destination information was obtained from forms distributed at individual stations. The intent of the bus surveys was to relate the ridership observed to both the source population and the ridership of other services, and to deduce differences which might be specific to the mode or might be useful in planning services. The survey of the rail rapid transit line was generally comparable. Results from other studies were integrated to provide a systematic view of the range of transport alternatives available to the individual in the environments studied. The ridership studies were complemented by an extensive origin-destination study on rail rapid transit service. The results are reported herein. This report also discusses basic ridership characteristics, frequency and time, and articulation with other modes.

NTIS No. PB 295-107 Price A08

Transit Corridor Analysis: A Manual Sketch Planning Technique. Final Report.

Carter, M.M., and R.H. Watkins, et al. COMSIS Corporation; DeLeuw, Cather & Company; Alan M. Voorhees and Associates, Inc; and R.H. Pratt Associates, Inc. UMTA-MD-06-0046-79-1, April 1979, 207p.

The development of the manual sketch planning technique was undertaken for UMTA as part of its Software Systems Development Program (SSDP). This handbook is a revised version of the May 1976 draft final report. Modifications have been made to the transit impedance of nomographs based on experience gained through testing of the procedures. This manual is organized into four sections. The introduction describes the purposes and uses of the technique. Section two, an overview, discusses general parameters and assumptions and identifies those situations in which the technique can be applied. Section three describes the method and computation procedures and gives examples of each step of the procedures as applied to a sample problem. The appendixes contain nomographs and blank work sheets that can, at user's discretion, be used to make some of the calculations.

NTIS No. PB 301-378 Price A10

Transit Needs Analysis. Volume I: Transit Needs Assessment. Mass Transit Program.

W.V. Rouse & Co., A Division of Barton-Aschman Associates, Inc. UMTA-IT-09-0067-79-4, November 1977, 66p. (5 rpts).

The St. Louis Mass Transit Program was undertaken to determine if an improved regional transit system was needed; it was directed at the mobility requirements of the total population. Special emphasis was given to travel characteristics and needs of transit-dependent persons. Public transportation, as stated herein, in the St. Louis area will be buses on local streets and highways for the next 10-15 years. Volume I, this report, consists of three major sections: an analysis of regional transit service needs; an analysis of transit-dependent service needs; and a description of methods to evaluate alternative regional transit systems. In addition, seven appendices to Volume I are included as a separate report (IT-09-0067-79-5); It provides a detailed

description of the methodology employed in the analysis. Volume II: Procedure Manual (IT-09-0067-79-6), consists of procedures used in: 1) analysis of existing data sources; 2) transit-dependent surveys; and 3) key person community surveys. Other reports in this program are: Mass Transit Program for the Saint Louis Metropolitan Area (IT-09-0067-79-7), which defines a 1985 Mass Transit Program for the St. Louis area and consists of an expanded all-bus system with the addition of freeway bus service and park-ride facilities in eight corridors; and Public Acceptance Plan (IT-09-0067-79-8), which basically describes the need to promote and sell public transportation with modest improvements and to gain support for the necessary financing.

NTIS No. PB 295-117 Price: A04

Transit Needs Analysis.
Volume I: Transit Needs Assessment - Appendices.
Mass Transit Program.

W. V. Rouse & Co. UMTA-IT-09-0067-79-5, November 1977, 133p. (5 rpts).
This report, Volume I, provides a detailed description of the methodology employed in the analysis. The Appendices are as follows: Appendix A - Definition of Terms; Appendix B - Review of Nationwide Research on Latent Demand and Transit-Dependency; Appendix C - Detailed Analysis of Existing St. Louis Travel Data with Regard to Identifying Regional Transit Service Needs; Appendix D - Key Person Community Survey Results; Appendix E - Results of Transit-Dependent Survey; Appendix F - Estimates of Persons in Autoless Households for 1985 and Supplemental Tables; and Appendix G - Summary of Literature Review of Annotated Bibliography.

NTIS No. PB 295-119 Price: A07

Transit Needs Analysis.
Volume II: Procedure Manual.
Mass Transit Program.

W. V. Rouse & Co. UMTA-IT-09-0067-79-6, December 1976, 96p. (5 rpts).
After ten years of serious consideration of some type of steelwheel-steelrail public transit improvements, the conclusion was reached that for the forseeable future, buses operating on existing streets and highways, with certain modifications, are the most cost-effective means to meet the St. Louis region's transit needs. Attention is focused herein on financing and improving existing transit service. This volume provides a description and methodology utilized in the analysis, and provides guidelines for other urban areas. This volume consists of procedures employed in the transit dependent survey, in transit analysis of existing data sources, and in the key person community survey. In addition, it includes four appendices. The first two appendices present the survey instruments used in both the transit-dependent and the key person community surveys. Appendix C details the survey manual used to train interviewers, and Appendix D describes the community participation program.

NTIS No. PB 295-118 Price A05

The Transportation Corridor in Northwest Indiana.
Final Report.

Shlay, D., H. Gil, and C.J. Mullins. Indiana University.
UMTA-IT-09-0062-79-1, July 1978, 232p.

This report describes a study of passenger transportation service in Northwestern Indiana South Bend to Chicago. The objective of the study was to determine the appropriate transportation service that would meet the travel needs of the residents of Northwestern Indiana including St. Joseph, La Porte, Porter, and Lake counties. The transportation corridor is defined by existing public transportation and highway facilities in the area from South Bend, Indiana, to Chicago, Illinois. A summary of the history of commuter transportation in the corridor is presented. Estimates of the number of railroad and other trips that would be made in the corridor in 1980, 1990, and 2000 are made. Nine options for providing commuter transportation in the corridor are presented and evaluated in terms of environmental criteria, quality of service, economic and financial factors, and special factors. The study recommends that the Chicago, South Shore, and South Bend passenger service be continued.

NTIS No. PB 295-994 Price A11

Transportation Systems Management: An Assessment of Impacts.
Interim Report.

Wagner, F.A., and K. Gilbert. Alan M. Voorhees, Inc., prepared for UMTA, FHWA, in cooperation with the Environmental Protection Agency.
UMTA-VA-06-0047-79-1, November 1978, 118p.

This report summarizes interim results of research designed to quantify the impacts that Transportation Systems Management (TSM) actions have on the transportation system. The research methodology divided all TSM actions into four classes: Class A - Demand Reduced; Class B - Supply Increased; Class C - Demand Reduced and Supply Reduced; and Class D - Demand Reduced and Supply Increased. For each class, computations were performed to determine how a major multi-year program applying these actions would affect the area's vehicle miles traveled and vehicle hours traveled. Results may serve to help local areas in developing appropriate transportation measures for use in local TSM plans as required by DOT regulations and State Implementation Plans, as mandated by EPA pursuant to the Clean Air Act. Working papers herein describe experience with and impacts of TSM actions, such as ridesharing, routes/scheduling, park-and-ride and express bus, work rescheduling, and auto restricted zones.

NTIS No. PB 294-986 Price A09

Transportation Systems Management Element.
Final Report.

Sterman, L., S. Schold, and B. Ferris. East-West Gateway Coordinating Council. UMTA-MO-09-0014-79-1, March 1979, 112p.

Transportation Systems Management (TSM) denotes not only fiscal economy, but also the steps to be taken toward attaining broader local and national goals such as: energy conservation; environmental improvement; equity for transit-dependents; and urban preservation. This report documents the TSM planning process in the St. Louis, Missouri, region

and includes TSM goals and objectives, planning programs, projects and concepts, and project monitoring. A section of this report sets the stage and direction for future TSM planning for this area.
NTIS No. PB 295-349 Price A06

10. POLITICAL PROCESSES AND LEGAL AFFAIRS

An Assessment of Institutional Barriers which Prohibit Participation and the Projected Cost Assistance Necessary to Provide Equal Opportunity to Competitive and Negotiated Contracts in UMTA Federally-Assisted Projects. Final Report.

TRAVENCA Development Corporation. UMTA-DC-06-0218-79-1, March 1979, 103p.

This report provides an assessment of and recommendations for the removal of barriers to Minority Business Enterprise (MBE) participation in transit construction. Institutional barriers to MBE participation were reviewed in seven cities/sites (Houston, Albequerque, Cleveland, Chicago, Detroit, Los Angeles, and Pueblo Test Center), and assistance mechanisms were identified and assessed in terms of their effectiveness in providing MBE access to transit construction projects. In addition, the report outlines a goal setting process that UMTA can apply to construction oriented projects. Access to the heavy construction industry was perceived as the most crucial barrier by MBEs, majority contractors, assistance mechanisms, and financial institutions. The author recommends the establishment of a Demonstration MBE Construction Unit as an UMTA-funded assistance mechanism that will have the responsibility of fully utilizing all of the administrative and programmatic tools available within UMTA, to achieve a goal of twelve percent of the transit construction award dollars on an annual basis.
NTIS No. PB 300-354 Price A06

Trends in California Transit Labor Contract Settlements. Final Report.

Rae, J.W., and M.A. Grob. California Department of Transportation. UMTA-CA-09-8001-79-2, February 1978, 52p.

This report reviews trends in transit labor contract settlements nationwide and documents transit operator wage rate increases in California between 1970-1976 vis-a-vis consumers price index (CPI) increases. It concludes that operator wage rates in California follow national trends and are increasing faster than CPI. It documents the findings resulting from a literature review pertaining to the transit labor contract settlement process, trends in transit wage rates, and possible government roles in the process. Details of these findings and references to the author's publications are included in the annotated bibliography (Appendix D). The report recommends that all involved parties should note the serious upward trend in transit wage rate increases in relation to the CPI and the implication this has on future public financial assistance. It further recommends that the California Department of Transportation should continue its present limited monitoring role until there is a clearer legislative mandate for active labor contract settlement process.
NTIS No. PB 294-956 Price A04

11. SAFETY/PRODUCT QUALIFICATION AND SECURITY

Assessment of Current U.S. Department of Transportation Fire Safety Efforts. Final Report.

Hathaway, W.T., and I. Litant. Transportation Systems Center. UMTA-MA-06-0051-79-4, July 1979, 144p.

The Urban Mass Transportation Administration (UMTA) has undertaken the task of assessing the entire area of fire research to determine how to provide means to reduce the fire threat in transit systems, and thus, to provide a safer means of transportation for the traveling and commuting public. This report presents the results of that assessment by the Transportation Systems Center (TSC). The study identifies and recommends suitable remedial actions and reflects the present state of transportation fire safety efforts. Emphasis has been placed on Federal Government efforts, namely, those of the Department of Transportation. Although the task is directed at fire safety in transit systems, the assessment encompasses all transportation-related fire safety. The intent has been to emphasize the similarities existing among the problems and programs of the modes. In conducting this assessment, TSC has reviewed and incorporated into this report the pertinent information resulting from the following efforts: 1) a search and review of public/private sector programs; 2) identification and review of existing data banks (materials and accident statistics); and 3) identification and review of existing regulations, standards, specifications, and guidelines.

NTIS No. PB 299-110 Price A07

Electrical Insulation Fire Characteristics. Volume I: Flammability Tests.

Meyer, L.E., A.M. Taylor, and J.A. York. Boeing Commercial Airplane Company. UMTA-MA-06-0025-79-1, December 1978, 247p. (2 vols).

This report discusses the need to adopt test standards and guidelines for wire and cable used in rapid transit vehicles in a system that is organized and well-coordinated. As a result of this need, standard flammability, smoke emission, and circuit integrity tests were developed for electrical wire/cable insulating materials used in rapid transit vehicles and wayside/track installations. The objective of the program was to determine if currently used materials can provide a fire-safe environment in terms of low flame propagation, smoke emission, and gas evolution, and to determine whether any of these can meet criteria that will be established by taking into account the fire hazards inherent in transit systems. Currently used wire and cable insulating materials and new polymetric materials were requested from manufacturers, and samples were tested and ranked with respect to their performance during the tests. The study concludes that the objectives of the program have been achieved.

NTIS No. PB 294-840 Price A11

Electrical Insulation Fire Characteristics. Volume II: Toxicity.

Crane, C.R., et al. FAA Civil Aeromedical Institute. UMTA-MA-06-0025-79-2, December 1978, 102p. (2 vols).

The research purpose was to determine the relative inhalation toxicity

of thermal degradation products or gaseous pyrolysis of selected types of electrical wiring insulations. Materials to be evaluated were supplied by the Boeing Commercial Airplane Company. The toxicities of the combustion products of 14 electrical wiring insulations were evaluated using animal incapacitation as a measure of toxicity. One gram insulation samples were pyrolyzed in a quartz combustion tube connected in-line with a 12.6-L-exposure chamber by an air re-circulation assembly to form a closed exposure system. Each material was pyrolyzed under three thermal degradation conditions and the time-to-incapacitation for the shortest time condition was used to rank the materials in order of their potential toxicity. A rank order for all 14 materials is presented. Techniques are suggested for converting measured toxicity of an insulation on wire of one size to the equivalent toxicity of the same insulation on wire of a different size. This report presents cautions and limitations on the discipline of combustion toxicology and presents suggestions for future research.

NTIS No. PB 294-841 Price A06

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978.
Volume V: UMTA Special Technology Programs Workshops.

American Pubic Transit Association. UMTA-DC-06-0157-79-5, November 1978, 75p. (9 vols).

This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on UMTA Special Technology Programs. Part I of this volume deals with safety, qualification, and life-cycle costing, and includes discussions of rail transit safety and product qualification. Part II of this volume includes discussions of consumer need for information on transit availability, the National Cooperative Transit R&D Program, the Technology Sharing Program, and transit marketing. This volume contains 6 resource papers that can be found summarized in Volume I (general sessions and summarized reports).

NTIS No. PB 300-990 Price A04

Safety and System Assurance Study.
Final Report.

Booz, Allen and Hamilton, Inc., under contract to Chicago Transit Authority. UMTA-IL-09-0033-79-1, September 1978, 72p.

This report contains the results of a study of safety and systems assurance-related technical management practices and processes of the Chicago Transit Authority (CTA). It involved an evaluation of technical management practices associated with system safety, equipment reliability/maintainability, system availability/dependability, and quality assurance. Special studies of human factors and train protection were performed. The primary objective of this study was to develop and recommend improvements in safety and systems assurance technical management process and practices. Specific recommendations are also provided in this study to improve technical management practices and processes in all areas presented.

NTIS No. PB 295-523 Price A04

11. SAFETY/PRODUCT QUALIFICATION AND SECURITY

Safety During Special Transportation Service Trips.
Volume I: Transportation in Vehicles Designed for Handicapped.

Aldman, B., S.O. Brattgard, and S. Hansson. California Department of Transportation. UMTA-CA-06-0098-78-2, October 1974, 122p. (2 vols).

In Sweden, special transportation is provided for those who have difficulty in using regular public transportation systems. Vehicles used for such services are generally small buses; all are equipped with a ramp or a small elevator. Inside the vehicle, seats have been removed and special fastening equipment for wheelchairs has been installed. The University of Goteborg conducted studies on the safety aspect of loading and securing wheelchairs in this type of service. This report covers the wheelchair-securing portion of the study. This report discusses the six different types of chairs tested. The report concludes that satisfactory securement can be provided for forward and rearward-facing wheelchair users on the special transportation vehicles. However, side-facing is not advisable because of the low tolerance of the human body to side stresses.

NTIS No. PB 294-969 Price A06

Safety During Special Transportation Service Trips.
Volume II: Movement In and Out of Special Transportation Service Vehicles.

Aldman, B., S.O. Brattgard, and S. Hansson. California Department of Transportation. UMTA-CA-06-0098-78-1, October 1974, 83p. (2 vols).

Special Transportation Services (STS) is a form of transportation in Sweden which provides for persons who cannot use existing public transportation. Special Service Vehicles (SSV) are designed to accommodate wheelchairs, and are driven by personnel who pick up handicapped persons at home or work. This report deals with the safety factors during movement into and out of SSV. Its intent is to lay a foundation for increased safety from personal injury. Attention is placed upon the comparative risks of ramps and hydraulic lifts for users of wheelchairs. Manual lifting of passenger/wheelchair is not analyzed in this study. This report also relates to a study conducted by the Universiy of Goteborg regarding this subject area.

NTIS No. PB 289-132 Price A05

System Safety Program Plan for the Chicago Transit Authority.
Program Plan.

Booz, Allen and Hamilton, Inc., under contract to Chicago Transit Authority. UMTA-IL-09-0033-79-2, August 1978, 63p. (This report is Appendix A to IL-09-0033-79-1.)

This report contains a recommended System Safety Program Plan for the Chicago Transit Authority (CTA) rail system. It contains a recommended policy statement; recommendations for specific actions to improve CTA

system safety management practices and processes; and recommendations for a process of updating and re-evaluating the program plan. Suggestions herein build upon the substantial foundation established earlier by CTA. The plan is divided into four sections: Safety Policy Statement; Current CTA Safety Activities; Recommendations to strengthen current CTA Safety Management Practices and Processes; and Recommendations for re-evaluation and modification of the System Safety Program. These recommendations are tailored mainly to the specific facilities, personnel, and philosophy of the organization of CTA; hence, they are not intended to be a set of general guidelines for rail.

NTIS No. PB 294-788 Price A04

12. SOCIOECONOMICS

Analysis of Life-Cycle Costs and Market Application of Flywheel Energy-Storage Transit Vehicles. Final Report.

Goeddel, D.L., and G. Ploetz. Transportation Systems Center.
UMTA-MA-06-0044-78-2, July 1979, 180p.

Flywheel energy storage systems are being proposed as a means of reducing the energy requirements of fixed-route, multi-stop, urban transit vehicles. UMTA has recently completed the Phase I activities of its Flywheel Energy Storage Program involving an analysis of the operational requirements and the conceptual design of flywheel energy storage vehicles for transit service. Phase I studies have paved the way for the succeeding program phase which includes the design, fabrication, test, and evaluation of prototype flywheel vehicle systems for demonstrations in transit service. This report documents the results of assessments made of the life-cycle costs and the potential market applications. It presents a description of the structure, approach, and assumptions of the analysis; defines the design characteristics, system capital costs, and the annual recurring operations/maintenance costs associated with diesel bus, trolley bus, and the three flywheel-powered vehicle systems considered herein; describes the results of the life-cycle analysis and the sensitivity of these results; and discusses the potential demand and the market applications of flywheel energy storage vehicles within transit service operations.

NTIS No. PB 300-289 Price A04

12. SOCIOECONOMICS

Baltimore's Hollins Park Neighborhood:
A Transportation Case Study. Final Report.
University of Maryland. UMTA-MD-11-0003-79-4,
September 1978, 46p. (4 rpts).

The revitalization of central cities has been recognized by both Federal and State governments as an important national objective. Earlier programs that centered on central business districts are now being joined by programs that reflect the government's increasing concern with various subareas of the central city. This study is a small but comprehensive analysis of the transportation facilities that serve the Hollins Park neighborhood and identifies the transportation problems that residents face. Information herein was obtained from various city agencies, and from visits to the neighborhood to collect data on parking regulations, location of vacant lots and parking lots, and other information (Appendix A). A home survey was conducted and 151 families were interviewed. An analysis of streets, public transit, and alternative transportation services was also undertaken. Information obtained concerned the residents' travel patterns, automobile ownership and usage, bus and taxi usage, as well as other information concerning the quality of life. Transportation problems identified herein are: parking; bus scheduling; transportation for elderly and handicapped; and noise on Lombard Street. It is suggested that City government work with neighborhood organizations in order to solve these problems.

NTIS No. PB 290-592 Price A04

The Development of Measures of Service Availability.
Volume I: Summary Report.
Leis, R.D. Battelle Columbus Laboratories. UMTA-MA-06-0048-78-2,
June 1978, 18p. (3 vols).

This three-volume set collectively constitutes the final report of a project conducted as part of UMTA's Automated Guideway Transit Technology (AGIT) program. The project objective was to develop passenger-oriented measures of service availability that could be used to control the failure characteristics of AGT systems throughout their life-cycle. This volume contains a summary of the research, results, and recommendations. This report points out that the transit industry views various forms of passenger delay potential to be the appropriate parameters of service availability, and that system-induced delays is a complex function of R/M and operational characteristics. A methodology is presented herein to compute these relationships for simple loop and/or shuttle systems.

NTIS No. PB 294-804 Price A02
SET (3) PB 294-803 Price E08

The Development of Measures of Service Availability.
Volume II: Task Technical Reports.
Leis, R.D. Battelle Columbus Laboratories. UMTA-MA-06-0048-78-3,
June 1978, 190p. (3 vols).

The objective of this project was to develop passenger-oriented measures of service availability that could be used to control the failure characteristics of Automated Guideway Transit (AGT) systems.

Equally important was the need to develop a methodology for utilizing these measures during this control process. This volume is a compilation of all interim reports submitted during the project. It contains details of the research.
NTIS No. PB 294-805 Price A09

The Development of Measures of Service Availability. Volume III: Application Guideline Manual.
Leis, R.D. Battelle Columbus Laboratories. UMTA-MA-06-0048-78-4, June 1978, 87p. (3 vols).
This three-volume set collectively constitutes the final report of a project conducted as part of UMTA's Automated Guideway Transit Technology (AGTT) program. This volume presents guidelines for the establishment and control of service availability during the planning, procurement, and operational phases of an AGT system.
NTIS No. PB 294-806 Price A05

Future Directions for Public Transportation: A Basis for Decision. Final Report.
Wiener, A.J., et al. Polytechnic Institute of New York.
UMTA-NY-11-0017-79-1, December 1978, 87p
This report is a long-range planning study aimed to assist UMTA in its planning to meet the mobility needs of the American population in the coming decades. The authors have identified a number of societal forces and considered reasonable scenarios based upon those forces, with particular attention to the implications for the mobility of people in the public sector. Based upon considerations of population growth and dispersion, energy costs and availability, technological advances, and economic conditions, the report concludes that urban decentralization is likely to continue through the year 2000. Therefore, UMTA must accept and support innovative uses of the automobile and paratransit modes as the most efficient mode for most urban area trips. At the same time, existing conventional transit systems in dense areas must continue to be supported. However, a major opportunity exists for UMTA to support a total efficient transportation system in a low-density environment. This report provides conclusions and recommendations for future UMTA policy decisions as well as a list of references.
NTIS No. PB 292-781 Price A05

Guidelines for Design and Evaluation of Human Factors Aspects of Automated Guideway Transit Systems. Final Report.
Wichansky, A.M., and E.D. Sussman. Transportation Systems Center.
UMTA-MA-06-0081-79-1, March 1979, 197p.
This document has been compiled to provide guidance in the planning, design, fabrication, and evaluation of human factors aspects of Automated Guideway Transit (AGT) systems, including Downtown People Mover (DPM) systems. It is based on the present state of knowledge in the areas covered and as such it draws on: 1) past and ongoing research; 2) applicable national and international codes and standards; and 3) current practice in transportation construction, law enforcement,

fire safety, and military operations. Design concepts such as passenger safety, security, comfort, and convenience are discussed in relation to various AGT subsystems, including the vehicle, the guideway, the command and control center, and the terminal. Potential interactions between AGT systems and the surrounding community are discussed. The guidelines also address such issues as accommodation of the elderly and handicapped passengers, design for emergency evacuation, determination of levels of ride quality, and the optimal assignment of command and control tasks to humans and machines. The appendix summarizes the major guidelines in a convenient checklist format; it is intended for use in planning and evaluation of existing and proposed AGT systems. The bibliograhy provides references.

NTIS No. PB 294-817 Price A09

Guidelines for Undertaking a Neighborhood Transportation Needs Assessment. Final Report.

Mulinazzi, T.E., J.A. Smailes, and R.L. Bish. University of Maryland. UMTA-MD-11-0003-79-1, November 1978, 124p. (4 rpts).

The purpose of this Manual is to present guidelines by which a neighborhood organization or individual citizens can analyze their transportation needs and present their problems to the proper agency so that they will get that agency's attention and a serious evaluation of their problem. The Manual provides instructions, information, sources, and guidelines which may be used by neighborhood organizations to undertake analysis of transportation problems in their area. The main body of this report consists of three major areas: transit projects, parking projects, and traffic projects. Typical problems and a suggested format to solve the problems are contained in each of these sections. Based on a literature review, results from a national questionnaire, and two case studies (Baltimore and Pittsburgh), the report concludes that the problems discussed herein appear to be the major transportation problems now affecting the neighborhoods in the U.S.

NTIS No. PB 290-589 Price A06

Life Cycle Costs and Application Analysis for New Systems. Conference Paper.

Lenard, M. The MITRE Corporation, Metrek Division.
UMTA-VA-06-0041-78-2, May 1978, 28p.

This paper was presented at the Conference on Automated Guideway Transit (AGT) Technology Development, sponsored by UMTA, in Boston, Massachusetts, February 28-March 2, 1978. It reflects the view that both the accelerating walkway (AW) and the automated mixed traffic vehicle (AMTV) system can provide service for short urban trips. In this paper, estimated life-cycle costs of two promising feeder and local circulation systems (AW and AMTV) are examined. Cost functions for the AW and the AMTV are described; their sensitivity to design, operating and cost parameters are examined. The two systems are placed in the context of hypothetical applications to identify typical user costs. The AW system costs, as stated herein, are dominated by the cost of

building the system. Economic success, therefore, is dependent on a large and continuing flow of users between two particular locations. The AMTV system cost characteristics are dominated by the vehicle capital and operating costs. For short trips in busy areas, where the use of the automobile is not practical or even possible, the advantage of AMTV over automobiles is obvious.

NTIS No. PB 299-586 Price A03

Pittsburgh's Central Northside Neighborhood: A Transportation Case Study. Final Report.

Mollerstrom, W.W., J.A. Smailes, and C.F. Weichert. University of Maryland. UMTA-MD-11-0003-79-3, September 1978, 34p. (4 rpts).

Pittsburgh's Central Northside neighborhood is typical of inner-city neighborhoods with established neighborhood stabilization and preservation programs. This study provides an analysis of the transportation system and transportation problems in the neighborhood. The results are useful for understanding transportation problems in the Central Northside neighborhood as well as contributing to a larger study of the relationship between neighborhood preservation and transportation underway at the University of Maryland. This report concludes that the residents of the Central Northside neighborhood do not seem to face any severe problems even though parking is a definite problem in the Mexican War Streets areas. Most survey respondents felt satisfied with the neighborhood and only a few felt that transportation problems contributed significantly to their dissatisfaction with the neighborhood's living conditions.

NTIS No. PB 290-591 Price A03

Review of Local Alternatives Analyses Involving Automated Guideway Transit (AGT). Final Report.

Lee, R.B., et al. Urbitran Associates, Inc. UMTA-NY-06-0057-78-1, February 1978, 100p.

The UMTA Office of Technology Development and Deployment is studying the attributes of Automated Guideway Transit (AGT) vis-a-vis conventional urban transportation alternatives in order to determine whether a need for AGT systems exists within U.S. urban areas. The objectives herein are to define the locally perceived role of AGT, to determine the impediments to its adoption, and to identify needed improvements to current and future generations of AGT systems. This research involved a review of 12 existing case studies; inquiries of 99 local officials (46 cities); and interviews with 27 officials and others. Summaries and analyses of the responses are presented herein. Findings herein state that most of the critical issues in the decision-making process are not AGT-specific, but they include costs, overhead structures, federal and local funding, technical risks, and public/political support.

NTIS No. PB 291-334 Price A01

12. SOCIOECONOMICS

Sample Design for Discrete Choice Analysis of Travel Behavior. Final Report.

Lerman, S.R., and C.F. Manski. Cambridge Systematics, Inc. UMTA-MA-06-0049-78-8, July 1978, 70p.

Discrete choice models represent the choices of individuals among alternatives such as modes of travel, auto, auto types and destinations. This paper presents a review of the state-of-the-art in designing samples for discrete choice analysis of traveler behavior. The objective is to provide a general framework for analyzing existing data and designing new samples. This paper focuses on discrete choice analysis of travelers' decisions. It incorporates recent published/unpublished theoretical findings as well as some new results. In addition, it addresses the practical concerns that arise in designing and using data samples in travel demand analysis. Stratified sampling, i.e., the analyst partitions the population and then selects the fraction of observations taken within each stratum and the toal sample size, is also discussed. Two related problems - namely, determining the distribution of attributes in the population, and estimating the choice probabilities conditional on the attributes, are explored. Future research is recommended regarding the attribute distribution, the choice model estimation, and the field of experimentation.

NTIS No. PB 295-049 Price A04

Summary of Capital and Operations and Maintenance Cost Experience of Automated Guideway Transit Systems. Summary Cost Report.

Cooke, F.A.F., et al. N.D. Lea & Associates, Inc. UMTA-IT-06-0157-78-2, June 1978, 76p.

This report presents the cost data developed from recent assessments of ten Automated Guideway Transit (AGT) systems. The AGT systems discussed are: 1) Morgantown People Mover, Morgantown, West Virginia; 2) AIRTRANS, Dallas-Fort Worth Airport, Texas; 3) JETRAIL, Love Field, Dallas, Texas; 4) Cabinlift, Ziegenhain Hospital, West Germany; 5) Passenger Shuttle, Tampa Airport, Florida; 6) Satellite Transit, Seattle-Tacoma Airport, Washington; 7) Tunnel Train, Houston Airport, Texas; 8) ACT, Fairlane Town Center, Dearborn, Michigan; 9) WEDway People Mover, Disney World, Florida; and 10) UMI Tourister, King's Dominion, Ashland, Virginia. Both capital and operations and maintenance costs are examined in each system. Descriptive information on each system together with a summary of performance measures is also included. The report presents unit cost data and cost trends, and discusses the initial phase of an ongoing program to provide useful information to cities and other interested parties. The report also compares cost data for AGT systems with cost data for conventional transit modes.

NTIS No. PB 294-306 Price A05

12. SOCIOECONOMICS

Thinking Small: Transportation's Role in Neighborhood Revitalization. Conference Proceedings.

Myers, P., and G. Binder. Conservation Foundation. UMTA-DC-06-0188-79-1, May 1979, 166p. Cross reference UMTA-UPP-78-7.

A relatively new concept for transportation planning for citizens, and professionals alike is "Thinking Small." This document is based on a national conference on transportation's role in neighborhood revitalization sponsored by UMTA in order to seek advice from citizen leaders and state and local officials. The report presents proceedings of a conference held in Baltimore, Maryland, in February 1978 to discuss small-scale transportation solutions as a means of revitalizing urban neighborhoods. The report is organized into two sections. Section 1 discusses major issues involved in planning for these improvements, including citizen involvement, the role of local governments, and the many forms of pedestrian, paratransit, parking, and street-improvement strategies available to the transportation planner. Section 2 consists of three case studies discussed at the conference. Successful projects involving different techniques--in Boston, St. Louis, and Seattle--are described in detail. The appendixes contain a list of participants and a bibliography related to citizen participation and transportation planning.

NTIS No. PB 296-979 Price A08

Urban Transportation and Neighborhood Preservation. Final Report.

Bish, R.L. University of Maryland. UMTA-MD-11-0003-79-2, September 1978, 26p. (4 rpts).

The purpose of this report/analysis is to increase the understanding of the relationship between transportation and neighborhood preservation. The materials upon which this study is based include general literature on transportation, the history of cities, and three specific studies undertaken as part of this project. Two of the studies are detailed transportation studies of neighborhoods in Baltimore and Pittsburgh--neighborhoods typical of those with stabilization and preservation programs. The third study is a national survey of neighborhood-oriented organizations, regarding transportation related problems and their identification and resolution. Major problems identified herein are: streets in poor repair, insufficient parking; excessive through traffic; and a lack of transportation for the elderly and autoless. Questionnaire returns of 104 leaders of neighborhood organizations revealed that the most common problems encountered included: streets not repaired (49%); not enough off-street parking (49%); traffic passing through neighborhood (41%); streets not cleaned (41%); parking for residents (40%); and transportation for elderly (39%).

NTIS No. PB 290-590 Price A03

13. TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

13A. BUS AND PARATRANSIT VEHICLE TECHNOLOGY.

Comparison of Fuel Economy and Emissions for Diesel and Gasoline Powered Taxicabs. Final Report.

Hergenrother, K.M. Transportation Systems Center.
UMTA-MA-06-0066-79-1, July 1979, 30p.

The objective of this study was to assess potential improvements in fuel economy and exhaust emissions by dieselization of the taxi fleet in a large urban area. Sixty-six diesel powered taxicabs and an equal number of gasoline powered cabs were operated for 120,000 miles each in three taxicab fleets in New York City. Identical cabs were powered with either 198 CID diesel engines or 225 CID gasoline engines. Test results from all cabs were used to determine fuel economy and exhaust emissions. On the road, the diesel cabs had 50 percent better fuel economy than the gasoline cabs. The diesel exhaust emissions (HC, CO, NOx) were lower than the gasoline exhaust emissions over the life of the test. Emission from the diesels did not appreciably degrade with vehicle age; and emission from the gasoline cabs increased appreciably.

NTIS No. PB 298-609 Price A03

Diesel Bus Performance Simulation Program. Final Report.

Larson, G., and H. Zuckerberg. Transportation Systems Center.
UMTA-MA-06-0044-79-1, April 1979, 204p.

This report presents the technical basis of a diesel bus computer simulation program that provides information on acceleration, velocity, horsepower, distance traveled, and fuel consumption as a function of time from the originating station. The program was written for diesel engine operation although heat engines other than diesel may be substituted. Fuel economy calculations, using the program, agree well with measurements on urban buses and may be considered as representative of a baseline urban bus. Component submodels and vehicle coefficients used in the program have been carefully structured to represent current urban buses. Basically, this report is divided into two sections: Section 2 presents a description of the computer simulation model; and Section 3 gives the information necessary to operate the program. This report includes a general description of the simulation program and the type of input data required, along with the results obtained by simulating a typical transit bus.

NTIS No. PB 295-524 Price A10

Flywheel/Diesel Hybrid Power Drive: Urban Bus Vehicle Simulation. Final Report.

Larson, G.S., and H. Zuckerberg. Transportation Systems Center.
UMTA-MA-06-0044-78-1, May 1978, 224p.

This report describes the results of an investigation of the practicality of a flywheel/diesel hybrid power drive for urban transit bus propulsion. The program is based on a systems approach to develop propulsion design concepts consistent with environmental, safety, operational, and economic objectives. A simulation model, developed in the program, was the major tool used in the investigation

and is described in detail herein. This model should be useful in further studies of flywheel/heat engine analyses for vehicle propulsion application over various drive cycles. The study recommends that a systems design of a flywheel/diesel power drive should be conducted encompassing all the system elements in order to optimize the power transfer from power source to drive wheels with respect to minimizing fuel consumption within the constraints of safety, environmental effects, and acceptable drivability.

NTIS No. PB 294-778 Price A10

Impact of Fare Collection on Bus Design.
Final Report.

Holcombe, H., W. Magro, and J. Mateyka. Booz, Allen & Hamilton, Inc. UMTA-IT-06-0132-79-1, April 1979, 54p. (2 rpts).

The primary objectives of this study are: to investigate and evaluate the nature of new bus designs if on-board, driver monitored, fare collection were removed; to postulate and assess new off-board fare collection methods that complement such bus designs; and to assess the potential synergistic effects of new buses/new fare collection systems that serve to improve transit efficiency and productivity, and overall service to the riding public. The design concept effort focused on the standard 40-foot transit bus. This report examines the potential impact on transit bus design of freeing the bus designer from the constraint that fares must be collected and monitored on-board the bus by the drivers. Conceptual bus designs are developed, and current U.S. fare collection costs and total bus operating costs are assessed and compared to those possible with new buses and compatible off-board fare collection systems. The report contains considerable information on both bus design and fare collection system trends in the U.S. and Western Europe. Although this study focused on the standard 40-foot transit bus, results herein indicate that operational benefits of off-board fare collection become greater on high capacity vehicles rather than on 40-foot transit buses.

NTIS No. PB 300-663 Price A04

Impact of Fare Collection on Bus Design: Appendices A through G.
Final Report.

Magro, W., J. Mateyka, and S. Mundle. Booz, Allen & Hamilton, Inc. UMTA-IT-06-0132-79-2, April 1979, 359p. (2 rpts).

The appendixes in this report contain detailed information on transit bus fare collection systems operations and costs in the United States. Also included is an examination of Swiss experience with total off-board fare collection systems. European transit bus design trends and fare collection systems are surveyed. Drawings of a number of new bus design concepts compatible with off-board fare collection systems are presented. A discussion of technical, design, and operating cost issues related to bus design and off-board fare collection is presented. An extensive bibliography on fare collection and transit bus design trends is included in this report.

NTIS No. PB 300-664 Price A16

13. TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

13A. BUS AND PARATRANSIT VEHICLE TECHNOLOGY.

Innovation in Public Transportation: A Directory of Research, Development and Demonstration Projects. Annual Report, FY 1977.

Technology Sharing Program Office of the Transportation Systems Center. UMTA-TSC-79-1, FY 1977, 172p.

This annual publication contains descriptions of current Research, Development, and Demonstration (RD&D) projects sponsored by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation. The purpose of UMTA's RD&D program is to provide information about a wide spectrum of possible improvements to urban mass transportation systems that communities can use in selecting the best way to deal with their particular transportation requirements. For other annual supplements that comprise UMTA's RD&D projects, see NTIS numbers: PB 213-228, 1972; PB 285-427, 1973; PB 285-244, 1974; PB 285-245, 1975; and PB 285-246, 1976.

NTIS No. PB 295-536 Price A08

Low Life Cycle Cost Design Study for Paratransit Vehicles. Final Report.

Bartol, J.A., and J.G. Bishop. ASL Engineering, Inc. UMTA-MA-06-0052-78-6, July 1978, 204p.

The Low Life Cycle Cost (LLCC) paratransit vehicle program was structured to provide a design of a vehicle suitable for taxi paratransit usage and optimized for LLCC to the end user. This report includes cost estimates that were prepared for the major elements of life cycle costing including manufacturing, maintenance, and repair costs. The objectives of the LLCC design study were: to review the current designs; to identify features that impact the life cycle cost for taxi applications; to design a ridesharing paratransit vehicle for taxi application; to consider volume production; and to consider maintainability, reliability, safety, and other important features to assure wide acceptance in paratransit and related use. It was concluded that a paratransit vehicle could be acquired and utilized over its extended service life at a net cost to the operator that would be less than that of a conventional taxicab. (See also MA-06-0052-78-7).

NTIS No. PB 295-080 Price A10

Modification and Evaluation of a Small Station Wagon Designed for Transportation of the Handicapped. Translation.

Forest, J., and C.A. Versailles. Minibus Forest Inc., prepared for Centre de Recherche et de Developpement. UMTA-MA-06-0025-79-12, June 1978, 40p. (Translated from French to English language under the Technology Sharing Program of U.S. Department of Transportation.)

This Minibus report discusses the modification and evaluation of a small stationwagon designed for transportation of the handicapped. On October 1, 1976, the Research and Development Center-Canada Transportation (CDT) awarded a $23,500 contract to Minibus Forest, Inc. for the modification and evaluation of a small stationwagon designed for the transportation of the handicapped in a door-to-door service with a 1.7 passenger occupancy rate per trip. The project made it possible to determine

specific data (summarized therein) in terms of future modifications. The report concludes that: 1) a small modified stationwagon can transport handicapped people and provide a useful and viable service; 2) the prototype evaluated has the required size, capacity, comfort, and versatility; and 3) the cost of modification, weight, and gas consumption could be reduced if these vehicles were modified en masse, because that would justify using a fiberglass body rather than steel.

NTIS No. PB 295-106 Price A03

Paratransit Vehicle Test and Evaluation.
Volume I: Ride Comfort and Quality Tests.

Wesson, L., C. Culley, and R.L. Anderson. Dynamic Science, Inc., a subsidiary of Talley Industries. UMTA-MA-06-0052-78-1, June 1978, 216p. (5 vols).

This study presents an independent series of tests and evaluations of two prototype paratransit vehicles manufactured separately by ASL Engineering and Dutcher Industries. The intent of the program was to provide performance data on the prototypes compared to a baseline vehicle that will be used to upgrade future redesigns. The project consisted of 5 separate test series; the results of the program are documented in a five-volume technical report, and each volume corresponds to one of the individual test series. This volume presents the test procedures and results of the ride comfort and quality test series. The tests measured the ride characteristics of the two prototype vehicles and a baseline passenger car as they were driven at controlled speeds over a specially constructed ride course. Vibratory motions impacted to the driver/passengers were evaluated vis-a-vis International Standard ISO 2631 for driver fatigue and passenger comfort.

NTIS No. PB 295-475 Price A10
SET (5) PB 295-474 Price E19

Paratransit Vehicle Test and Evaluation.
Volume II: Acceleration and Interior Measurement Tests.

Wesson, L., C. Culley, and R.L. Anderson. Dynamic Science, Inc., a subsidiary of Talley Industries. UMTA-MA-06-0052-78-2, June 1978, 189p. (5 vols).

This report, Volume II, presents the test procedures and results of the acceleration and interior measurement test series. The tests determined the acceleration characteristics of the vehicles, the effects of vehicle acceleration/deceleration on vehicle passengers, the effectiveness of wheelchair restraint systems, and the available interior space for the driver and passengers. Performance data of the two prototypes are compared with those of two baseline test vehicles.

NTIS No. PB 295-476 Price A09

13. TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

13A. BUS AND PARATRANSIT VEHICLE TECHNOLOGY.

Paratransit Vehicle Test and Evaluation.
Volume III: Handling Tests.
Wesson, L., C. Culley, and R.L. Anderson. Dynamic Science, Inc., subsidiary of Talley Industries. UMTA-MA-06-0052-78-3, June 1978, 94p. (5 vols).

Volume III presents the test procedures and results of the handling test series. The test determined the steering and handling characteristics of the two paratransit prototypes and a production baseline vehicle. The tests assessed each vehicle's understeer/oversteer characteristics during cornering, turning, lateral accelerations, maneuvering near its lateral traction limits, and during rapid control reversals.

NTIS No. PB 295-477 Price A05

Paratransit Vehicle Test and Evaluation.
Volume IV: Fuel Economy Tests.
Wesson, L., C. Culley, and R.L. Anderson. Dynamic Science, Inc., a subsidiary of Talley Industries. UMTA- MA-06-0052-78-4, June 1978, 51p. (5 vols).

Volume IV presents the test procedures and results of the fuel economy tests conducted on the two paratransit prototypes and the baseline test vehicle. The test series determined the fuel economy of the vehicles as they were driven through simulated urban and suburban driving cycles. The relationship between fuel consumption and vehicle speeds was determined and maximum fuel economies were established.

NTIS No. PB 295-478 Price A04

Paratransit Vehicle Test and Evaluation.
Volume V: Noise Tests.
Wesson, L., C. Culley, and R.L. Anderson. Dynamic Science, Inc., a subsidiary of Talley Industries. UMTA-MA-06-0052-78-5, June 1978, 57p. (5 vols).

Volume V presents the test procedures and results of the noise tests conducted on the two paratransit prototype vehicles and the baseline test vehicle. The test series measured external vehicle noise during acceleration, constant speed, and stationary/idle conditions. Interior noise at each of the passenger locations and in the driver's compartment was also measured.

NTIS No. PB 295-479 Price A04

13. TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

13A. BUS AND PARATRANSIT VEHICLE TECHNOLOGY

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978.
Volume II: Bus and Paratransit Technology Workshops.

American Public Transit Association. UMTA-DC-06-0157-79-2, November 1978, 67p. (9 vols).

This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Bus and Paratransit Technology. Part I of this volume deals with paratransit integration and includes discussion of operational technologies, experiences of the City of Cincinnati with their Urban Transportation Laboratory Program, the Logan Airport (Boston) Share-A-Cab Program, and the Rochester Dial-A-Ride Program. Part II of this voulume, namely, Bus Technology, Paratransit Vehicle Development, and Flywheel Energy Storage Systems, contains discussions of the vehicles themselves and the Flywheel Energy Storage Program. This volume contains six resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I (DC-06-0157-79-1) includes the proceedings of the general sessions and a listing of conference participants.

NTIS No. PB 300-987 Price A04

Prototype Paratransit Vehicle as Designed by Steam Power Systems, Inc. Final Report.

Schneider, P.H., and D.D. Norton. Steam Power Systems, Inc. UMTA-CA-06-0079-78-1, August 1976, 92p.

This report discusses a prototype low pollution paratransit vehicle (PTV) designed and constructed for evaluation by the U.S. Department of Transportation. Special features of this PTV include: a large comfortable interior which would accommodate five passengers, an automated door and ramp system that would provide convenient ingress/egress for a wheelchair passenger, and a low pollution Ranking cycle (steam) engine. This type of vehicle aims to provide transportation for the infirm, handicapped, and elderly in either a Dial-A-Ride, jitney, or taxicab service. The PTV was completed, acceptance tested, and delivered to the U.S. Department of Transportation in June 1976. The report concludes that the steam engine propulsion system has the potential for low exhaust emissions, but needs considerable improvement in both efficiency and reliability before it is ready for installation in motor vehicles, and the PTV vehicle concept should be further pursued.

NTIS No. PB 291-277 Price A05

Simulation of an Urban Battery Bus Vehicle. Final Report.

Stickler, J. Transportation Systems Center. UMTA-MA-06-0093-79-1, July1979, 89p.

This report describes the computer simulation of a battery-powered bus as it traverses an arbitrary mission profile of specified acceleration, roadway grade, and headwind. The battery-bus system components consist of a DC shunt motor, solid-state power conditioning unit with regeneration capability, and a battery source consisting of a multi-unit lead acid battery. The computer model determines vehicle tractive effort and power consumption and computes actual vehicle speed for a given mission profile. The program output data is tabulated in a form that allows easy recognition of the operational modes and power-limited

13A. BUS AND PARATRANSIT VEHICLE TECHNOLOGY

regimes. The computer model uses a "modularization" format that facilitates the simulation of alternate propulsion systems. The model is applied to simulate the propulsion characteristics of a typical bus operating over a specified drive cycle. The results of this study demonstrate the applicability of the battery bus model for predicting bus propulsion characteristics under simulated drive conditions. This report provides charts depicting the plotting program, input data required by the Battery Bus Performance Program, Fortran, source listings and data files, as well as a Glossary of Program Constants and Variables.

NTIS No. PB 300-306 Price A05

13B. BUS AND PARTRANSIT OPERATIONAL TECHNOLOGY

Evaluation of the Cincinnati Transit Information System (TIS).
Final Report.

Bevilacqua, O., J. Schmidt, and W. Wade, et al. DeLeuw, Cather & Company, SAGE Management Consultants, Inc., and Transportation Systems Center.
UMTA-MA-06-0060-79-1, August 1979, 123p.

This document describes an evaluation of an automated transit information system (TIS), a variant of the automatic vehicle monitoring (AVM) concept. With TIS, bus transit patron boardings and exits are recorded and transmitted by radio, along with information on time and bus location, to a central mini-computer for storage and later off-line use in service evaluation and planning. This TIS evaluation is based on a General Motors prototype in operation in Cincinnati on selected Queen City Metro routes. It covers the prototype system's operations to date as well as a potential updating and expansion of such a system to all routes. Although the General Motors prototype provides the data used in this evaluation, findings are applicable to similar TIS systems which might be offered by other suppliers. This evaluation emphasizes the economic feasibility of the TIS concept through a cost-benefit approach. Technological feasibility and institutional considerations are discussed.

NTIS No. PB 300-355 Price A06

Evaluation of Passenger Counter System for an AVM Experiment.
Volume I: Technical Report.

Balaram, A., G. Gruver, and H. Thomas. Gould Information Identification Inc.
UMTA-MA-06-0041-79-1, February 1979, 168p. (2 vols).

Passenger count information is needed by transportation planners and transit management to determine total transportation requirements based on projected passenger movement throughout the transit network. The sole objective herein is the evaluation of a Multi-User Automatic Vehicle Monitoring (AVM) system for transit and paratransit users. An AVM system will be deployed on six test routes and 200 buses of the Southern California Rapid Transit District and evaluated over a one-year period. This report contains the results of three commercial transit-line passenger counter systems for use in transit buses, namely: Dynamic Controls, Inc.; Dyniman, Inc.; and International Pro-data Corporation. (One counter used treadle mats at each door step, and two counters used infrared beams located across each doorway.) The evaluation results indicated that the passenger counter system manufactured by Dynamic Controls, Inc. (treadle mats) exhibited slightly superior counting performance under all test conditions.

NTIS No. PB 294-199 Price A05

13B. BUS AND PARATRANSIT OPERATIONAL TECHNOLOGY

Evaluation of Passenger Counter System for an AVM Experiment.
Volume II: Test Data.

Balaram, A., G. Gruver, and H. Thomas. Gould Information Identification, Inc. UMTA-MA-06-0041-79-2, February 1979, 168p. (2 vols).

This evaluation involved environmental and laboratory testing, as well as field testing on a City transit (CITRAN) bus of Fort Worth, Texas. This report contains the test data of the evaluation of passenger counter sensors (PCS) used in transit buses. It also contains laboratory/field test data sheets that describe each specific test conducted, the number of samples involved, and the conditions related to test performance. Evaluation results indicated that the passenger counter system manufactured by Dynamic Controls, Inc., exhibited slightly superior counting performance under test conditions.

NTIS No. PB 294-200 Price A08

Field Testing of a Pulse Trilateration Automatic Vehicle Monitoring System in Philadelphia.
Volume I: Executive Summary.

O'Connor, J.F., and A.H. Riccio. Hazeltine Corporation. UMTA-MA-06-0041-77-4, August 1978, 29p. (4 vols).

Automatic Vehicle Monitoring (AVM) is an important part of an overall command and control system for vehicle fleet management as it automatically provides the system operator/dispatcher with timely information on the location and status of all vehicles to be controlled. This report describes the Pulse Trilateration AVM System developed by Hazeltine Corporation and presents results of Phase I test program in Philadelphia. Volume I is an executive summary of the Philadelphia test results. The system covers fixed-route, random route, and special-case situations in both low and high regions and provides time-of-departure data for fixed-route bus. Data acquisition is automatic. Evaluation of the system's performance is provided by off-line simulation.

NTIS No. PB 295-610 Price A03

Field Testing of a Pulse Trilateration Automatic Vehicle Monitoring System in Philadelphia.
Volume II: Test Results and Data.

O'Connor, J.F., and A.H. Riccio. Hazeltine Corporation. UMTA-MA-06-0041-77-5, August 1978, 266p. (4 vols).

Volume II of the Pulse Trilateration Automatic Vehicle Monitoring (AVM) System presents the test results and data. It describes the Hazeltine AVM system and the test configuration in detail, explains the data analysis and reduction techniques used, and proposes changes.

NTIS No. PB 295-611 Price A12

Field Testing of a Pulse Trilateration Automatic Vehicle Monitoring System in Philadelphia.
Volume III: Test Histograms.

O'Connor, J.F., and A.H. Riccio. Hazeltine Corporation. UMTA-MA-06-0041-77-6, August 1978. (Vol. III is not available at NTIS. Limited copies available from UMTA/Transit Research Information Center. 4 vols).

Volume III contains time point and location accuracy histograms for the fixed-route, random route, and special case tests that are discussed in Volume II.

13. TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

13B. BUS AND PARATRANSIT OPERATIONAL TECHNOLOGY.

Field Testing of a Pulse Trilateration Automatic Vehicle Monitoring System in Philadelphia.
Volume IV: Test Log Sheets.

O'Connor, J.F., and A.H. Riccio. Hazeltine Corporation. UMTA-MA-06-0041-77-7, August 1978. (Vol. IV is not available at NTIS. Limited copies available from UMTA/Transit Research Information Center. 4 vols).

Volume IV presents the aborted and excluded tests and reproduces vehicle log sheets for all tests. (See also MA-06-0041-77-2).

800 MHz Communication Survey of the Los Angeles Area.
Final Report.

Balaram, A., R. Hajovsky, and F. Heathcock. Gould Information Identification Inc. UMTA-MA-06-0041-79-5, March 1979, 108p.

During 1978, as part of the Multi-User Automatic Vehicle Monitoring (AVM) Program, a survey was conducted to determine the suitability of utilizing the 800-900 MHz band as the primary carrier of digital communication data pertaining to the Multi-User AVM Program. Testing was conducted on six routes of the Southern California Rapid Transit District (SCRTD) and specified area segments in the city of Los Angeles. The field testing involved usage of a test vehicle, communication equipment, and data acquisition equipment. Results were obtained on the area coverage, large and small scale signal variations, message error mechanisms, antenna polarizations, usage of different base station sites, usage of different band rates, and comparison with model prediction. The study also involved taking field measurements of such parameters as the noise level, signal level, signal/noise ration, throughput, and message errors. Results of the survey indicate that: 1) multiple base stations will be required to provide the coverage of the six selected SCRTD bus routes; 2) the use of a circular polarized antenna system does not reduce the effects of fast fades compared to a vertical polarized antenna system; and 3) baud rates between 1000 and 1800 BPS can be used effectively for the transmission of digital data using commercial 800 MHz mobile radios.

NTIS No. PB 295-043 Price A06

The Shared-Ride Taxi System Requirements Study.
Final Report.

Fielding, G.J., et al. DAVE Systems, Inc. UMTA-MA-06-0054-79-4, May 1979, 167 p.

Shared-ride taxi (SRT) is different from the exclusive-ride taxi (ERT) in that the taxi may be shared by unrelated passengers with different origins/destinations. By simultaneously serving more than one passenger, SRT may improve vehicle productivity, permit fare reductions, and increase taxicab ridership. SRT may serve as an integrated-transit feeder to conventional transit in suburban communities. The major objective herein is to develop the system requirements and perform a functional design of the computer control system (CCS) for an automated shared-ride taxi system. Another objective is to identify the environmental and system context in which these requirements are applicable. This study provides substantial evidence that the SRT-CCS concept is technically feasible and within the present state-of-the-art, and economically attractive for SRT fleets of 50 vehicles or more. It is recommended that a developmental experiment, followed by several exemplary experiments, should be implemented.

NTIS No. PB 299-231 Price A08

13B. BUS AND PARATRANSIT OPERATIONAL TECHNOLOGY

Vibration Tests on Transit Buses.
Final Report.

Anderson, J., and H. Thomas. Gould Information Identification, Inc.
UMTA-MA-06-0041-79-6, March 1979, 56p.

The objective of this vibration measurement program was to quantify the vibration environment which would be experienced by Automatic Vehicle Monitoring (AVM) equipment when installed on buses during regular city route service operations. Two buses were utilized: 1) a General Motors Corporation Model 3100 provided by the Southern California Rapid Transit District, and 2) a Flxible Corporation Model 207 provided by the City Transit of Fort Worth, Texas. The approach involved instrumenting the buses and electronic hardware on the buses with calibrated accelerometers and recording the output of these accelerometers while driving the buses over test routes at specified speeds. In general, the tests provided a definition of the vibration environment typical of transit buses used in city route service. Vibration amplitudes of the levels measured in the program do not pose a threat to the satisfactory operation of equipment produced according to industrial equipment design practice and fabrication methods. (See also MA-06-0041-79-1/79-2.)

NTIS No. PB 295-091 Price A04

13C. NEW SYSTEMS AND AUTOMATION

Accelerating Moving Walkway Systems:
Executive Summary.

Fruin, J., and R. Marshall. Port Authority of New York & New Jersey.
UMTA-IT-06-0126-78-1, November 1978, 31p.

Accelerating Moving Walkway (AMW) Systems permit passengers to travel at higher speeds than conventional walkways. This report summarizes the results of a series of feasibility studies (6) conducted as the first phase of a program leading to the public demonstration of AMW systems. The general conclusion of the studies is that there are currently 5 AMW systems developed sufficiently to be considered as candidates for a public demonstration of the technology. Evaluation of safety indicates that these systems would be capable of operating at levels of safety acceptable to the general population. Potential applications for the technology include a wide variety of prospective uses as a pedestrian assist system for airports and urban activity centers. Additionally, the systems offer a lower life-cycle cost and reduced energy alternative to vehicular systems under certain conditions. The systems are shown to be cost effective in high volume pedestrian corridors. (See IT-06-0126-78-2/78-7.)

NTIS No. PB 290-682 Price A03

AGT Guideway and Station Technology.
Volume 1: Executive Summary.

Stevens, R.D. De Leuw, Cather & Company, and ABAM Engineers, Inc.
UMTA-IT-06-0152-79-8, August 1979, 141p. (8 vols).

This summary report is one volume of an eight-volume final report associated with the Automated Guideway Transit (AGT) Guideway and Station Technology Program. The main objective of the program is to develop guideway, station, and weather protection concepts that will reduce the cost and implementation time associated with AGT systems. The outputs are intended to aid planners, designers,

administrators, and others considering the application of AGT systems. AGT describes a class of transportation systems in which unmanned vehicles are operated on fixed guideways in exclusive rights-of-way. This volume presents a summary of the work accomplished under this program. This summary reflects the work reported in the other seven volumes and includes the following topics: weather protection review; guideway and station review; design guidelines; evaluation models; dynamic model; guideway and station concepts; and weather protection concepts. This volume includes a brief introduction and a statement of the overall results of the project. Potential savings of up to 20 percent over costs associated with existing AGT systems are identified. The summary also provides a description of the state-of-the-art as evidenced by existing guideways, stations, and weather protection methods; models and guidelines to assist planners and designers of AGT systems; and approaches that will reduce the cost of guideways, stations, and weather protection.

NTIS No. PB 299-553 Price A07

AGT Guideway and Station Technology.
Volume 4: Design Guidelines.

Stevens, R.D., et al. De Leuw, Cather & Company, and ABAM Engineers, Inc. UMTA-IT-06-0152-79-3, March 1979, 330p. (8 vols).

This report addresses only the design guidelines portion of the guideway and station work. The purpose herein is to provide guidelines for AGT planners and designers that will assist them in providing safe and reliable guideways and stations at the lowest possible life-cycle costs. Guidelines are also provided for AGT system sponsors to indicate the type of information that should be provided to the designers prior to preliminary engineering activities. Guidelines were prepared following a review of the guideways and stations associated with 30 AGT and related systems. The guidelines, which represent the current state-of-the-art in the design of AGT guideways and stations, focus on AGT systems with bottom-supported, rubber-tired vehicles at-grade or above-grade guideway and station placement. They cover guideway and design integration and the guideway/vehicle interface, in addition to guideway and station design.

NTIS No. PB 295-613 Price A15

AGT Guideway and Station Technology.
Volume 5: Evaluation Models.

Stevens, R.D., et al. De Leuw, Cather & Company, and ABAM Engineers, Inc. UMTA-IT-06-0152-79-4, June 1979, 269p. (8 vols).

Evaluation models are presented in this study which set forth methodologies for the development and evaluation of guideways and stations for AGT systems. The models include concept development/evaluation methodologies for both guideways and stations, a cost model and an implementation time model. The concept development methodology outlines a step-by-step procedure and describes the work involved in developing guideway and station concepts. The evaluation methodology includes the establishment of evaluation measures and goals including cost and time, and a procedure for evaluating concepts in both the schematic design stage and the preliminary design stage. A computerized life-cycle cost model is included. The implementation time model is presented in the form of bar graphs and network diagrams.

NTIS No. PB 299-034 Price A12

13C. NEW SYSTEMS AND AUTOMATION

AGT Guideway and Station Technology.
Volume 6: Dynamic Model.

Stevens, R.D., and J.G. Silletto, et al. De Leuw Cather & Company, and ABAM Engineers, Inc. UMTA-IT-06-0152-79-5, July 1979, 97p. (8 vols).

This volume complements Volume 4; it focuses upon guideway dynamics and includes consideration of vehicle/guideway interactions in terms of vehicle ride quality and guideway surface profiles at the Fairlane system in Dearborn, Michigan, and the Morgantown system in Morgantown, West Virginia. Data reviewed for all AGT systems and measured directly on these two systems include vertical, lateral, and longitudinal motions as well as limited data on roll, pitch, and yaw. The measured ride quality data are compared with results for the AIRTRANS system at Dallas-Fort Worth Airport and with results for other modes including automobiles, buses, and trains. The report concludes that the model ride quality predictions agree reasonably well with the data measured at Morgantown and Dearborn.

NTIS No. PB 299-153 Price A05

AGT Guideway and Station Technology.
Volume 7: Guideway and Station Concepts.

Stevens, R.D., et al. De Leuw, Cather & Company, and ABAM Engineers Incorporated. UMTA-IT-06-0152-79-6, July 1979, 418p. (8 vols).

The guideway concepts work in this study includes a discussion of various materials and construction techniques and assesses their applicability to AGT. Selected existing AGT guideway designs are examined and modified to reduce costs. New guideway concepts are developed based on the use of both conventional and innovative materials and construction techniques. Four baseline station concepts are developed, costed, and examined. A selected number of the developed guideway and station concepts are evaluated and illustrated through photomontages and models.

NTIS No. PB 299-411 Price A18

AGT Guideway and Station Technology.
Volume 8: Weather Protection Concepts.

Stevens, R.D., et al. De Leuw, Cather & Company, and ABAM Engineers Inc.
UMTA-IT-06-0152-79-7, August 1979, 249p. (8 vols).

In this volume, weather protection concepts are presented for guideways associated with AGT systems; emphasis is on minimizing costs and energy consumption and maximizing system operability/reliability during winter weather. Concepts include a comparison of embedded pipe and electric heating systems. The report discusses: the effect of insulation on energy consumption and overall system costs; the efficiency of internally/externally placed insulation; the feasibility of reducing electric heating energy costs by utilizing residual guideway heat; the costs of beam modification to minimize snow accumulation on guideway; and the effect of system operating and physical characteristics upon heating energy costs for pavement and rail heating. AGT physical characteristics are analyzed to indicate the overall sensitivity of different AGT configurations to winter weather and the resulting countermeasures warranted.

NTIS No. PB 299-746 Price A11

13C. NEW SYSTEMS AND AUTOMATION

AIRTRANS Urban Technology Program.
Phase I: Final Design Report.
Albach, W.C., et al. Vought Corporation. UMTA-TX-06-0020-78-1, January 1978, 289p.

AIRTRANS is an Automated Guideway Transit (AGT) system that provides interterminal transit service for passengers at the Dallas/Ft. Worth Airport. The successful deployment of this system prompted the investigation of the extension of AGT technology into the urban areas to relieve congestion and pollution caused by auto and bus traffic. Phase I of the AIRTRANS Urban Technology Program (AUTP) covers the activities of the Vought Corporation, which tested the system for urban application. Independent assessments were made by the Transportation Systems Center. Recommendations made were: higher operating speeds; better passenger acceptance; reduced capital and operating costs; increased reliability; better all-weather capability; and increased energy efficiency. The overall conclusion reached in Phase I of the AUTP was that the existing AIRTRANS AGT system can be improved for urban deployments.

NTIS No. PB 291-128 Price A13

AIRTRANS Urban Technology Program.
Phase II: Inspect, Repair as Necessary (IRAN)
Program on the AIRTRANS AGT Vehicle.
Hawkes, D.L. Vought Corporation. UMTA-TX-06-0020-79-1, August 1978, 64p.

The main objective of this research was to critically evaluate the condition of an Automated Guideway Transit (AGT) vehicle after 268,000 miles and five years of operation, and to provide a guide for the establishment of IRAN plans for future AGT systems as they are deployed in an urban environment. A program plan was developed to systematically inspect the structural and other subsystems of the vehicle in operation at the Dallas/Ft. Worth Airport. The approach included nondestructive tests (NDT) procedures, including radiograph, and dye penetration. A high-powered magnifying lens with bright lighting conditions was also employed in the inspection. The detailed inspection revealed a sound frame and chassis construction with no evidence of cracking in the welded structure. The other subsystems inspected, such as the suspension and drivetrain, displayed normal wear patterns. Repairs were made on acrylic/fiberglass exterior body panels. Subsequent followup revealed these repairs generally failed. The result of the project indicates that the maintenance procedures developed for this system are excellent. With the exception of the exterior body panels, the vehicle appears capable of attaining the 20-year service life. A five-year IRAN program is recommended to assure continued high performance.

NTIS No. PB 294-784 Price A04

Assessment of the Tunnel Train System at Houston Intercontinental Airport. Final Report.
Yen, A.M., et al. SRI International. UMTA- IT-06-0135-77-3, December 1977, 106p. (6 rpts).

SRI is under contract to assess the systems at Seattle-Tacoma International Airport, Fairlane Town Center, Tampa International Airport, Walt Disney World, and King's Dominion Amusement Park. The purpose is to provide a uniformly documented presentation of Automated Guideway Transit (AGT) installations for UMTA's AGT program, and to establish the state-of-the-art for AGT systems for

ultimate use in planning, evaluating, and deploying future systems. This report describes and assesses the Tunnel Train System at Houston Intercontinental Airport, which was installed in 1972 as a replacement of an earlier battery-powered tug system. Information and data were collected through surveys of technical literature; formal site visits; interviews with operators, management, and engineering personnel; and a visit to the system manufacturer. In the proposed extension of the terminal, the airport will have to decide whether to upgrade or extend the tunnel train or to install a new system. In terms of current demand, the system serves its purpose adequately.

NTIS No. PB 286-641 Price A05

Automated Guideway Transit Technical Data. Compendium.

Chambliss, A., et al. The MITRE Corporation.

UMTA-VA-06-0041-79-4, April 1979, 124p.

The intent of this compendium is to provide background data for general management-level discussions of Automated Guideway Transit (AGT) programs, systems, and other urban transportation modes. Data are presented on generals sytem characteristics, cost, energy, and environmental issues for AGT, rapid rail, light rail, and transit bus systems. In addition, a summary of 19 Downtown People Mover (DPM) proposals is provided. Raw data and assumptions are supplied in the appendix to provide a base for additional study. Data are divided into four main sections: 1) AGT Overview; 2) Transportation System Economics; 3) Energy and Environmental Issues; and 4) Downtown People Mover Summary. The information includes city estimates of DPM capital cost, operating and maintenance costs, ridership, and operating hours.

NTIS No. PB 295-095 Price A06

Entrainment and Platooning Analysis and Design. Appendix B: TRAINSIM Simulation Program User's Guide.

Lorenz, D., C. Lindgren, and J. Mahaffy. Otis Elevator Company.

UMTA-IT-06-0148-79-6, February 1979, 184p.

This document describes TRAINSIM, a Fortran simulation program developed to support the Vehicle Longitudinal Control and Reliability (VLCR) Entrainment studies. The program is capable of simulating the operation of a single "master" vehicle, a low-speed collision of the master vehicle into a stopped "slave" vehicle to effect coupling, and the operation of a coupled two-vehicle train. Longitudinal control is provided on the master vehicle only. This volume documents the study work done on entrainment and platooning analysis and design as related to vehicle longitudinal control. Entrainment concept analysis, entrainment control studies, automatic coupler alignment and hardware concepts, entrainment cost analysis, and platooning studies are also included. With over 400 simulations logged, TRAINSIM has been well exercised. A good deal of this exercise has been directed toward testing and validating, with the result that the authors consider the current version of the program operational.

NTIS No. PB 297-129 Price A09

13C. NEW SYSTEMS AND AUTOMATION

Morgantown People Mover Inductive Communications System Design Summary. Final Report.

Johnstone, T.N. Boeing Aerospace Company. UMTA-MA-06-0048-78-6, September 1978, 187p.

This report documents the experience obtained during the design and development of the Inductive Communication System (ICS) used on the Morgantown People Mover (MPM). The ICS system design evolution, problems encountered and the rationale for their solution, supporting analytical modeling, and recommendations are presented herein so that future system designers can benefit from this experience. The Morgantown project, which began in 1969, is an UMTA demonstration program that provides a personal rapid transit system between the CBD in Morgantown, West Virginia, and the widely separated campuses of West Virginia University. The MPM system is an automated, two-mode transit system that consists of a fleet of electrically powered, rubber-tired, passenger-carrying vehicles, operating on a dedicated guideway network under computer control. The scope of the ICS is that set of wayside and vehicle electronics for uplink and downlink signaling that implements collision avoidance, vehicle longitudinal control, vehicle door control, and status reporting throughout this report. The system that operated through June 1978 (Phase I) is being used as the system baseline, and the Morgantown expanded system (Phase II)— under contract at the time this report was written—will be presented as changes from this baseline.

NTIS No. PB 295-750 Price A09

Operation of Automated Guideway Transit Vehicles in Dynamically Reconfigured Trains and Platoons: Extended Summary. Final Report.

Shladover, S. Massachusetts Institute of Technology. UMTA-MA-06-0085-79-1, April 1979, 112p.

This project grew out of a conviction that an automated guideway transit (AGT) system had the flexibility of operating either with individual vehicles or with functional multi-vehicle trains, and with the capability of forming (entraining) trains during trips, could offer significant advantages over either single vehicles or fixed train systems for some urban applications. The study serves as a broad-based preliminary evaluation of the potential advantages/disadvantages of entrained AGT. It includes an investigation of the applications for which entrained AGT is well suited, and an assessment of how much capacity improvement it can offer. The study shows that passenger capacity of AGT systems may be increased by operating vehicles in dynamically-reconfigured trains or platoons.

NTIS No. PB 300-513 Price A06

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978. Volume III: AGT and Advanced Systems Workshops.

American Public Transit Association. UMTA-DC-06-0157-79-3, November 1978, 89p (9 vols).

Part I of Volume III deals with AGT socioeconomic research and AGT applications and includes discussions of the AGT Socio-Economic Research Program, the Morgantown and AIRTRANS People Movers, and the Downtown People Mover Program. Part II of this report contains discussions of the AGT R&D Program, the Advanced Group Rapid Transit Program, and the Automated Guideway Transit

Technology Program. This volume contains seven resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions.

NTIS No. PB 300-988 Price A05

PRT Impact Study: The Phase I PRT Impact on Morgantown Travel Traffic and Associated Activities. Final Report.

Elias, S.E.G., and R.E. Ward. West Virginia University.

UMTA-MA-06-0026-79-1, July 1979, 88p. (3 vols).

A new and revolutionary public transportation system, the Morgantown Personal Rapid Transit (PRT) System began regular passenger service operation in Morgantown, West Virginia, in October 1975. This is a study of the impact of Phase I Morgantown PRT, the first fully automated transportation system operational in a city environment. The study was designed to record the effect of the system operation on traffic and associated activities in the areas adjacent to the PRT. The intent of the study was to provide information useful to other areas contemplating the Automated Guideway Transit (AGT) type installations. The PRT system served approximately 38% of the Morgantown residents. During the course of the study, it was concluded that the system was a major force in influencing travel habits, and that residents of the service area used autos for their trips less often than they did prior to the PRT. Compared to the bus system, which it replaced, the PRT is carrying more than the previous share of the total trips of the bus. Basically, this report contains an analysis and a comparison of the travel, traffic, and associated activities in Morgantown before and after the PRT became operational.

NTIS No. PB 300-341 Price A05
SET (3) PB 300-340 Price E08

PRT Impact Study Operational Phase.
Volume I: Travel Analysis. Final Report.

Elias, S.E.G., et al. West Virginia University.

UMTA-MA-06-0026-79-2, July 1979, 98p. (3 vols).

This volume focuses on the analysis of transportation related conditions which existed in the PRT service area in the spring of 1977.

NTIS No. PB 300-342 Price A05

PRT Impact Study Operational Phase.
Volume II: Data Collection Procedure and Coding Manual.
Final Report.

West Virginia University. UMTA-MA-06-0026-79-3, July 1979, 119p. (3 vols).

This volume documents the procedures used in collecting data which describes transportation related conditions following the commencement of passenger service.

NTIS No. PB 300-343 Price A06

13C. NEW SYSTEMS AND AUTOMATION

A Quantitative Evaluation of Service-Dependability Modeling Approaches for Automated Guideway Transit.

Roesler, W.J., S. Haberman, and H.Y. Chiu. The Johns Hopkins University.
UMTA-MD-06-0025-79-1, May 1979, 117p.

Automated Guideway Transit (AGT) systems, intended to operate without vehicle and station personnel, are controlled remotely from a central operations area. The purpose of this study is to provide a quantitative assessment of several different types of models to identify their applicability , data requirements, and computational cost. Three modeling approaches are examined: an analytic network model; a Monte Carlo sample trip model; and a stratified probabilistic failure-sampling model using a detailed operational simulation. A set of evaluation criteria was formulated, and a case study approach was used to apply each model to the same scenario. The modeling approaches were programmed in the PL/I language, and were operated as executable load modules on the IBM 360/91 to obtain cost estimates.

NTIS No. PB 299-584 Price A06

Review of Dual Mode Case Studies. Final Report.

Lenard, M. The MITRE Corporation,
UMTA-VA-06-0041-79-5, April 1979, 40p.

This report presents a summary and comparison of three dual mode case studies, namely: 1) Milwaukee Case Study, 1970; 2) Milwaukee Planning Case Study, 1970; and 3) Orange County Planning Case Study, 1976. These studies investigated bus-sized dual mode transit vehicles, in the context of comprehensive transportation plans for selected metropolitan areas. A description of technologies, operations, and implementation plans form the basis of each of the three dual mode case studies. In this report, the relationship between the three studies is described; the respective methodologies, assumptions and conclusions are summarized and compared to provide a perspective on the present status of dual mode technology. A concluding remark stated herein is that Orange County seems less well suited for a successful application of dual mode technology than Milwaukee. This appears to be due more to Orange County being less well suited to any fixed guideway transit service, than to nature of dual mode technology.

NTIS No. PB 295-442 Price A03

Study on Hydrostatic Drives for Small AGT Vehicles. Final Report.

Adams, G.J., and L. Hoover. Mobility Systems and Equipment Company.
UMTA-CA-06-0089-78-1, October 1978, 121p.

This report presents an analysis of hydrostatic drives applicable as propelling units for Automated Guideway Transit (AGT) small vehicles. The study includes a comprehensive state-of-the-art survey of hydrostatic drive units; the development, design, and performance requirements for a 15 HP hydrostatic drive propulsion system for an AGT system; and a series of testing on a 15 HP unitized hydrostatic unit to evaluate performance characteristics and acoustic noise. This report indicates that acoustical noise in the unitized hydrostatic drive unit can be reduced by acoustical isolation and insulation levels low enough so as not to interfere with conversation outside of the vehicle.

NTIS No. PB 298-805 Price A06

13C. NEW SYSTEMS AND AUTOMATION

Vehicle Longitudinal Control and Reliability Project:
Longitudinal and Lateral Control Cost and Weight Model.
Final Report.

Graver, C.A., and W.C. Womack. Otis Elevator Company.
UMTA-IT-06-0148-79-11, June 1979, 150p.

This document describes an automated cost and weight model for Vehicle Longitudinal and Lateral Control (VLC) systems. The model focuses on system components that vary with lateral control option. The model is used to evaluate the cost and weight of VLC designs for four classes of AGT (GRT) large and small, and Personal Rapid Transit (PRT). The report is organized in three technical sections: 1) Methodology and model description; 2) Model use; and 3) Model growth potential. Conclusions are provided in the last section with model code reproduced in the appendix. The authors state that a usable life-cycle cost and weight model is available for immediate application to AGT nominal designs and control alternatives.

NTIS No. PB 299-526 Price A07

Vehicle Longitudinal Control and Reliability Project:
A Review of Entrainment Technology. Final Report.

Schumacher, P., editor. Otis Elevator Company. UMTA-IT-06-0148-79-1, February 1979, 92p.

This report documents the results of a survey of entrainment technology conducted for the Vehicle Longitudinal Control and Reliability (VLCR) project. The technology review evaluates the state-of-the-art in train formation and identifies those areas requiring special attention for automated guideway transit (AGT) systems. The information summarized herein was derived from: a literature search and review; discussions with coupler manufacturers; a questionnaire to rapid transit operators; and a study of transit authority coupler specifications. The methods and results obtained are described herein. Discussions with coupler manufacturers led to the formation of a list of existing coupling equipment applicable to systems and the assessment of potential difficulties in the adaptation of coupling equipment to AGT vehicles. Areas requiring further development are identified. This report concludes that the lack of information in the area of automatic vehicle longitudinal control means that the formulation of appropriate concepts in this area will require more basic work. This report also presents a number of preliminary conclusions.

NTIS No. PB 300-372 Price A05

Vehicle Longitudinal Control and Reliability Project.
Volume 2: Part C - A Review of AGT Propulsion Conditioning,
Braking and Power Distribution Technology. Final Report.

Schumacher, P., editor. Otis Elevator Company. UMTA-IT-06-0148-79-2, June 1979, 78p. (4 rpts. in Vol. 2).

This report is part of an overall review of AGT longitudinal control technology performed as part of the Vehicle Longitudinal Control and Reliability (VLCR) project. Volume 2 consists of 4 separate parts/reports. The purpose of each of these reviews is to assess the current state-of-the-art in the particular technology and to judge the applicability to automated guideway transit (AGT) systems. This document presents a review of AGT propulsion, power conditioning, braking, and power distribution technology. The review was performed to obtain top level

information that can be used by system designers, specification writers, and regional planners as baseline considerations. The appendix contains an annotated bibliography.

NTIS No. PB 300-373 Price A05

Vehicle Longitudinal Control and Reliability Project.
Volume 3: Longitudinal Control Analysis and Design,
Part A - SLT and GRT Systems. Final Report.

Petrino, E., et al. Otis Elevator Company. UMTA-IT-06-0148-79-7, May 1979, 836p. (2 rpts in Vol 3).

This report documents the analytic design and simulation work performed for shuttle-loop transit (SLT) and group rapid transit (GRT) longitudinal control systems. It describes the activities performed in developing single-thread longitudinal control system designs that permit short-headway operation. This study relates to current systems that operate at headways greater than 20 seconds using fixed-block protection as well as systems that operate at headways in the 5-second regime, using moving-block protection.

NTIS No. PB 298-766 Price $24.00

Vehicle Longitudinal Control and Reliability Project.
Volume 3: Longitudinal Control Analysis and Design,
Part B - PRT Systems. Final Report.

Schumacher, P., editor. Otis Elevator Company. UMTA-IT-06-0148-79-8, May 1979, 178p. (2 rpts in Vol 3).

This report documents the analytic design and simulation work performed for the personal rapid transit (PRT) longitudinal control system. Objective stated herein was to develop and evaluate candidate longitudinal control systems for very-short-headway operation of small transit vehicles. This study included a general view of the state-of-the-art in PRT systems, a detailed evaluation of applicable operating policies, an evaluation of control design techniques, and an assessment of key hardware implementation issues. The author concluded that PRT systems with time headways as low as 0.5 seconds appear to be feasible. This study found that conventional operating policies are not appropriate for such systems, but that alternate policies can be defined which assure safe and efficient system operation. This study also addresses the "safe approach" policy, develops a controller, and analyzes and tests the controller via simulation.

NTIS No. PB 298-767 Price A09

Vehicle Longitudinal Control and Reliability Project.
Volume 4: Reliability Enhancement Analysis and Design
Test Report. Final Report.

Womack, W., et al. Otis Elevator Company. UMTA-IT-06-0148-79-9, May 1979, 321p.

The Vehicle Longitudinal Control and Reliability (VLCR) Program is a part of the Automated Guideway Transit (AGT) Technology Program that provides for reliability improvement as a separate task. This document is the final report of the Reliability Enhancement Studies for the VLCR project. It contains the results of a literature search, the development of reliability enhancement techniques, AGT component enhancement, the use of redundancy, enhanced AGT design, and a detailed implementation of selected VLC systems. The objective of this

13C. NEW SYSTEMS AND AUTOMATION

reliability enhancement task is to develop techniques to enhance the reliability of VLC systems, and it includes an extensive survey of reliability enhancement techniques previously employed by U.S. Government and industry programs.
NTIS No. PB 299-525 Price A14

Vehicle Longitudinal Control and Reliability Project.
Volume 5: VLCR Entrainment and Platooning Analysis and Design - Parts A and B. Final Report.
Lorenz, D., et al. Otis Elevator Company. UMTA-IT-06-0148-79-5, February 1979, 534p.

The Automated Guideway Transit Technology Program (AGTP) is directed towards the development of critical technologies that provide the foundation for the successful deployment of AGT systems. This report addresses longitudinal control aspects of automatic entrainment and platooning concepts. The project objectives were: to develop functional/performance specifications for longitudinal control systems; to perform an analytical and experimental evaluation of an automatic coupling/decoupling system suitable for trained vehicle operation and failed vehicle pulling and pushing; to establish design concepts and specifications for automatic coupling systems; and to perform an assessment of the platooning concept and establish platooned vehicle operation. The report includes review of status of existing technology, specification of design goals and requirements, detailed mathematical modeling, analysis and simulation, development and specification of design concepts and their mechanizations, and some experimental validation of the design.
NTIS No. PB 299-798 Price A23

13D. RAPID RAIL VEHICLES AND SYSTEMS.

Energy Storage Propulsion System for Rapid Transit Cars: Test Results and System Evaluation. Final Report.
Raskin, D. Metropolitan Transportation Authority. UMTA-NY-06-0006-78-1, October 1978, 140p.

The objectives of this test program were to evaluate the ability of the energy storage (ES) system to: reduce propulsion energy usage; reduce propulsion power demands; and reduce tunnel heating caused by propulsion energy use. This report describes the test and evaluation of the ES system for rapid transit cars. Characteristics of the system were investigated by installing novel equipment under two New York City (NYC) subway cars and operating the cars both under test track conditions and in revenue service on several lines of the NYC transit system. Tunnel heating effects, power reduction, gyroscopic forces, and other elements were also investigated. Overall propulsion energy reductions of 14-16%, vis-a-vis conventional equipment, were measured in revenue service operations. The author states that the equipment tested under the two R-32 cars demonstrated that on-board flywheel energy storage is an impressive means for achieving major savings in transit car propulsion energy.
NTIS No. PB 300-918 Price A07

13D. RAPID RAIL VEHICLES AND SYSTEMS

Laboratory Evaluation of Concrete Ties and Fastenings for Transit Use. Final Report.

Hanna, A.N. Construction Technology Laboratory. UMTA-MA-06-0100-79-8, March 1979, 79p.

This report was prepared as part of an ongoing research effort by UMTA to develop standard concrete ties for rapid transit use. The overall objective was to fabricate and evaluate, by laboratory tests, standard ties of different designs intended for transit use. Two tie designs, a pretensioned monoblock and a post-tensioned two-block, together with preliminary specifications for tie manufacture were developed in an earlier study by the Transit Development Corporation. To evaluate the adequacy of these tie designs and specifications, this laboratory investigation was sponsored by UMTA. Objectives of the investigation were to evaluate the adequacy of: 1) each of 3 fastening systems; 2) each of the tie designs; and 3) the assembled track components with ties supported on ballast and subjected to simulated rapid transit loading. This report describes laboratory methods for tie fabrication and present results of tests on ties and fastenings. As a result of the laboratory testing program, preliminary specifications prepared under the earlier contract were modified and presented in a separate report.

NTIS No. PB 297-533 Price A05

Measurement Program for Evaluation of Concrete Ties and Fastenings in Transit Track. Final Report.

Hanna, A.N. Construction Technology Laboratories. UMTA-MA-06-0100-79-2, March 1979, 42p.

This report was prepared as part of an ongoing research effort by UMTA to develop standard concrete ties for rapid transit use. The report outlines a measurement program to obtain data on the performance of standard tie designs and fastening systems under field service conditions. In addition, the program identifies limited data to be obtained from a wood tie track for comparison. Recommendations are presented for a measurement program for monitoring the performance of different cross-tie track systems under typical transit conditions. The following topics are discussed herein: type of data to be collected; type of instrumentation to be installed; type of equipment required for data acquisition; test schedule; and criteria for evaluating test data. The recommendations presented herein are applicable to wood and concrete cross-tie track systems.

NTIS No. PB 297-570 Price A03

Noise Abatement in Rail Rapid Transit: Effect of Some Variations. Final Report.

McShane, W.R., and S. Slutsky. Polytechnic Institute of New York. UMTA-NY-11-0002-79-1, December 1978, 163p.

In this report the noise abatement methodology (accomplished in earlier works) is refined and a number of case studies conducted. This report focuses on changes in the system-wide treatment plan, the program cost, and the net impact due to such factors as: variations in discount rate; changes in abatement target level; introduction of new cars; prohibition of certain treatments such as resilient wheels and steel el barriers; and specification of certain treatments on a categoric basis. A program costing in the order of $5.0 million annual cost for in-train abatement was found to have the greatest abatement per unit cost.

Additional studies on in-community abatement are reported herein.
NTIS No. PB 292-032 Price A08

Noise Degradation over Time in Rail Rapid Transit Cars.
Final Report.

Slutsky, S., W.R. McShane, and J.J. Starace. Polytechnic Institue of New York. UMTA-NY-11-0002-79-2, December 1978, 69p.

The purpose of this effort was to study the degradation of noise quality of selected cars over time, and to relate this degradation to treatment events if possible. Three car types were studied: IRT cars comparable to the R17; IRT cars (R17) with a special design feature—the traction fault detector; and R46 cars. Because of the measurement problems encountered, the project has in fact two sets of major results: 1) those relating to the novel data collection and analysis methods employed; and 2) those relating to wheel-rail interaction and degradation. This program was carried out with the active cooperation of the New York City Transit Authority to determine the length of time after wheel truing operations during which the treatment remains effective from a subway noise suppression point of view. The complicating effects of impact noise due to rail joints were studied and the effect of replacement of three bolted rail connections by welds was studied from the viewpoints of changed noise emission character and system quieting. Deductions from the above measurements, together with a printout of car maintenance records, resulted in estimates of car interior noise degradation of 5dB during the second three months. It was further estimated that the replacement of bolted joints by welded connections would result in a 5 to 10dB system noise decrease.

NTIS No. PB 292-031 Price A04

Noise Rating Criteria for Elevated Rapid Transit Structures.
Interim Report.

Schultz, T.J. Bolt Beranek and Newman, Inc. UMTA-MA-06-0099-79-3, May 1979, 146p.

This report presents the results of the first task of a five-task program dealing with the reduction of noise from elevated structures in use in U.S. rail rapid transit systems. The purpose herein is to recommend criteria for rating the noise radiated from elevated rapid transit structures during train passages, so that different types of structures can be inter-compared with respect to their noise impact on the immediate neighborhood, or alternatively, so that noise abatement programs for elevated structures may be developed on a rational basis. This report reviews studies that have been made to determine the impact of rail transportation noise on the community; compares subjective response to rail noise with that due to road traffic and aircraft noise; and finds these responses to be nearly the same. The report delineates and illustrates application of the Fractional Impact Method to assessment of the community impact of elevated structure noise, based on the results of numerous social surveys on noise, and widely used by Environmental Protection Agencies for environment impact statements.

NTIS No. PB 297-419 Price A07

13D. RAPID RAIL VEHICLES AND SYSTEMS

Prediction and Control of Noise and Vibration in Rail Transit Systems. Final Report.

Kurzweil, L.G., and R. Lotz. Transportation Systems Center.
UMTA-MA-06-0025-78-8, September 1978, 124p.

This report presents a unified and organized compilation of the techniques, procedures, and data currently available for the assessment and control of urban rail noise and vibration. It is intended to serve as a reference source for transit property personnel and their consultants. The noise environments treated include community noise and vibration near rail lines, vehicle interior noise of urban and intercity passenger trains, locomotive cab noise, and noise in stations and tunnels.

NTIS No. PB 294-968 Price A06

Preliminary Specifications for Standard Concrete Ties and Fastenings for Transit Track. Final Report.

Hanna, A.N. Construction Technology Laboratories.
UMTA-MA-06-0100-79-3, March 1979, 50p.

This report was prepared as part of an ongoing research effort to develop standard concrete ties for rapid transit use. The overall objective was to fabricate and evaluate, by laboratory tests, standard ties of different designs intended for transit use. The tie designs, a pretensioned mono-block, a post-tensioned two-block, and preliminary specifications for tie manufacture were developed earlier by the Transit Development Corporation. The revised specifications herein cover requirements for component materials, manufacturing procedures, and handling of mono-block and two-block concrete cross ties, pads, and insulators for rapid transit use. It also includes requirements for rail fastenings for securing running rails, and the inserts for anchoring both the rail fastenings and the traction power contact rail support bracket. These specifications are preliminary and will be modified, as necessary, on the basis of in-track tests.

NTIS No. PB 297-850 Price A03

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978.
Volume VI: Rail and Construction Technology Workshops.

American Public Transit Association. UMTA-DC-06-0157-79-6,
November 1978, 57p. (9 vols).

Part I of this volume deals with railcars and equipment and includes discussions of the Rail Technology R&D Program, the rail system studies of the Congressional Office of Technology Assessment, and the problems connected with technology deployment. Part II of this report includes discussions of construction technologies in this area. This volume contains five resource papers that can be found summarized in Volume I of this report.

NTIS No. PB 300-991 Price A04

13D. RAPID RAIL VEHICLES AND SYSTEMS

Self-Synchronous Propulsion System for Rapid Transit Railcars - Advanced Subsystem Development Program.
Volume I: Program Synopsis.

Delco Electronics. UMTA-IT-06-0026-79-1, February 1978, 82p. (3 vols).

Development of the Self-Synchronous Propulsion System was conducted under the Advanced Subsystem Development Program (ASDP), which is part of the Urban Rapid Rail Vehicle and System Program sponsored by UMTA. This system was one of the advanced subsystems that had been identified during the Advanced Concept Train (ACT) proposal evaluation as showing outstanding merit, and was planned to be developed for evaluation by the transit authorities. The overall objective of the ASDP was to develop advanced subsystems suitable for application in existing or future transit cars. This report summarizes the content of Volume II and essentially follows the same outline.

NTIS No. PB 298-770 Price A05
SET (3) PB 298-769 Price E12

Self-Synchronous Propulsion System for Rapid Transit Railcars - Advanced Subsystem Development Program.
Volume II: Detailed Technical Discussion.

Delco Electronics. UMTA-IT-06-0026-79-2, February 1978, 82p. (3 vols).

This report discusses program technical effort, program scope, objectives, and background; summarizes the design and testing efforts and problem areas; contains conclusions and recommendations; discusses system functional characteristics; train performance characteristics, major component design, interfaces, and product assurance; covers developmental, major component and system level testing; contains a description of the changes made during system testing; discusses the status of the final configuration; and addresses unresolved problems.

NTIS No. PB 298-771 Price A18

Self-Synchronous Propulsion System for Rapid Transit Railcars - Advanced Subsystem Development Program.
Volume III: Appendices.

Delco Electronics. UMTA-IT-06-0026-79-3,
February 1978, 129p. (3 vols).

This report contains appendix material that was considered either too bulky or too detailed to incorporate into Volume II. Appendixes A through G of this volume are: Train Control Electronics Flow Diagrams; Train Performance Analysis Computer Program; List of Drawings and Specifications; Diagnostics Unit RAM Memory Code Identification; Diagnostics Unit Subroutine Flow Diagrams; Motor Power Supply System; and Mapham Inverter and Analytic Model Description, respectively.

NTIS No. PB 298-772 Price A07

13D. RAPID RAIL VEHICLES AND SYSTEMS

The Status of Advanced Propulsion Systems for Urban Rail Vehicles. Final Report.

Nene, V.D. The MITRE Corporation. UMTA-VA-06-0053-79-1, May 1979, 229p.

Rheostatic control of dc traction motors has been in use for several decades. With the advent of power electronics, however, more efficient alternate propulsion systems have been developed, namely: chopper controls, ac drive/induction motors, systems with on-board energy storage, and ac drive/tubular axle motors. This report is a technology review of advanced traction systems. It is based on information and data gathered from propulsion equipment suppliers in Europe, Japan, and the U.S. The report describes in detail the status of all of these propulsion systems. The performance characteristics, the advantages/disadvantages, and the deployment of the hardware in revenue service for all these systems are discussed. The report concludes with a general description of alternate traction motors and power converters.

NTIS No. PB 297-980 Price A11

Transit Car Performance Comparison State-of-the Art Car vs PATCO Transit Car, NYCTA R-46, MBTA Silverbirds. Final Report.

McNeal, C. Boeing Vertol Company. UMTA-MA-06-0025-78-5, February 1978, 112p.

The Rail Programs Branch of UMTA has been conducting programs to improve urban rail transportation—Urban Rapid Rail Vehicle and Systems Program. The first phase of the program authorized the design, development, and demonstration of two State-of-the-Art Cars (SOAC). The objective of the SOAC train was to demonstrate the then-available technology in rail rapid transit car design. This document reports on the gathering of comparative test data on existing in-service transit cars. Three transit cars tested were the PATCO, NYCTA R-46, and MBTA Silverbird transit car. Cars were instrumented and run in simulated revenue service while data was gathered. Results of these tests are reported herein in a comparative format with the SOAC data recorded at each of the properties. SOAC was found to be superior to all three cars in the area of noise reduction. SOAC ride quality was better than the R-46 and the Silverbird, but not as good as the PATCO. The SOAC propulsion system was inefficient while operating on the New York and Boston route structures, and only marginally better than the PATCO transit car in Philadelphia.

NTIS No. PB 294-985 Price A06

Urban Rapid Rail Vehicle and Systems Program: Annual Report, October 1977.

Boeing Vertol Company. UMTA-IT-06-0026-78-1, October 1977, 112p.

This sixth Annual Report reviews the sixth year's efforts of UMTA's Urban Rapid Rail Vehicle and Systems Program. It describes the work accomplished and summarizes pertinent technical and design data. The objective of the program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing transit vehicles that are comfortable, reliable, safe, and economical. Three major hardware tasks were active during this reporting period, namely: State-of-the-Art Cars (SOAC), Advanced Concept Train (ACT-1), and Advanced Subsystem Development Program (ASDP). Accomplishments for the year ending September 1977 included the following: 1) delivery of the first ACT-1 car to the DOT Transportation Test Center; and 2) fabrication and developmental testing of

the components for ASDP including the self-synchronous propulsion system, the monomotor truck, and the synchronous brake system.
NTIS No. PB 295-124 Price A06

Urban Rapid Rail Vehicle and Systems Program:
Annual Report, October 1978.
Boeing Vertol Company. UMTA-IT-06-0026-79-4, October 1978, 98p.
This seventh Annual report reviews the efforts of UMTA's Urban Rail Vehicle and Systems Program, describes the work accomplished, and summarizes pertinent technical and design data. Three major hardware tasks were active during this period, namely: SOAC, ACT-1, and ASDP. Accomplishments for the year ending September 1978 included the following: 1) SOAC vehicles were placed in storage awaiting instructions from DOT regarding their possible use for the ASDP unpowered truck test; ACT-1 vehicles were delivered to the Transportation Test Center, and the engineering and acceptance testing were completed; vehicles were accepted for UMTA by DOT on-site representatives on December 16, 1978; the ASDP program was partially terminated on December 22, 1977; the Budd Company monomotor truck development was redirected to accomplish fatigue and lab performance tests, complete the fabrication of one carset of installation trucks and prepare final reports; and WABCO was redirected to accomplish the remaining lab tests, complete fabrication, and prepare final reports.
NTIS No. PB 301-168 Price A05

WMATA Rapid Transit Vehicle Engineering Tests.
Final Report.
Simmonds, K.J., and F.H. Henderson. Transportation Test Center.
UMTA-MA-06-0025-79-14, May 1979, 122p.
This report presents the results of a series of engineering tests carried out on the Washington Metropolitan Area Transit Authority (WMATA) rapid transit cars from September 1976 to August 1977, at the DOT Transportation Test Center (TTC), Pueblo, Colorado. The Transportation Systems Center (TSC) acted as program directors. TSC has been instrumental in preparing standardized test procedures for evaluation of rail transit vehicles, using the TTC 9.1 mile transit test track, with the objective of providing a common baseline for the comparative evaluation of rapid transit vehicles and vehicle systems. The test program reported herein was carried out by the TTC to the guidelines of these test procedures. The test program data gave a comprehensive evaluation of the WMATA rapid transit car in the categories of performance, power consumption, spin/slide protection, noise, ride roughness, power system interactions, and simulated revenue service.
NTIS No. PB 298-978 A06

13E. COMMUTER RAIL VEHICLES AND SYSTEMS

Proceedings: Seminar on the Use of Composite Third Rail in Electrified Transit and Commuter Rail Systems, Cambridge, Massachusetts, September 14-15, 1977.

Decker, H.D., editor. Ahmed Associates/Pacific Consultants.
UMTA-MA-06-0025-78-13, November 1978, 217p.

This seminar was held at the Transportation Systems Center in Cambridge, Massachusetts, on September 14-15, 1977. It originated at the request of UMTA so as to disseminate accurate information on, and experience with, composite (aluminum and steel) third, or contact rail, in wayside distribution systems of electrified urban rail properties. The seminar provided the opportunity for the exchange of information among the suppliers, using properties, consultants and designers, potential users, and government agencies. This document contains the transcripts of the presentations made to the participants, as well as question-and-answer sessions which followed each presentation and the round table discussion of Thursday, September 15, 1977. Information pertinent to the seminar, but not available in detail at the time of the conference, is presented in a series of four appendices, namely: A—Third Rail - Deicing; B-Welding Composite Rail on BART; C—Maintenance of Rails on BART; and D—Relative Costs of Composite and Steel Third Rail Installations. This document also provides a list of all participants and their addresses as of September 14, 1977, as well as a list of Electrified Transit Properties.

NTIS No. PB 293-317 Price A10

A Study to Accommodate the Elderly and Handicapped on Existing Commuter Rail Coaches. Final Report.

Louis T. Klauder and Associates. UMTA-UTD-30-79-1, December 1977, 76p.

This report examines the feasibility of making the existing Detroit-Pontiac commuter rail service more readily accessible by the elderly and handicapped. It examines three types of railroad coaches (1500, 4800, and 9600 series cars) currently owned by the Southeastern Michigan Transportation Authority (SEMTA) as well as existing rail stations in the overall analysis to provide rail service for the elderly and handicapped. The report is definitive toward the methods required to modify the interiors of these cars to accommodate the onboard handicapped passenger (including bathroom facilities), and the report presents innovative concepts to the problem of boarding/unloading the handicapped. The guidelines used as reference material for this study were the Michigan "General Rules" of the Construction Code Commissions Barrier Free Design Graphics.

NTIS No. PB 292-765 Price A05

13F. LIGHT RAIL VEHICLES AND SYSTEMS.

Cost Savings Potential of Modifications to the Standard Light Rail Vehicle Specification. Final Report.

McGean, T.J., et al. N.D. Lea & Associates, Inc. UMTA-MA-06-0025-79-11, February 1979, 173p.

This report describes an assessment of the Standard Light Rail Vehicle (SLRV) specification to determine whether the relaxation or modification of some requirements could result in a significant reduction in vehicle costs. A technique of assessment by structured interviewing was applied to industry regarding modifications to the specifications that would be acceptable and reduce car costs. A five-stage filtering process was used to select 20 cost reducing modifications from a list of 640 candidate specification modifications. The final set of 20 areas was analyzed quantitatively to estimate cost savings. SLRV cost savings of 16 percent are shown to result by implementing the 15 specification modifications that have acceptable impact upon mission performance. The remaining five modifications have major impact upon mission performance. Cost savings of 25 percent are shown to result from specifying a bi-directional, non-articulated car with simplified friction brakes and no compressed air and which also incorporates the 15 specification modifications with acceptable impact on mission performance.

NTIS No. PB 295-070 Price A08

Light Rail Transit. TRB Special Report 161.

Transportation Research Board of the National Academy of Sciences.

UMTA-UTD-30, June 1975, 183p.

Late in 1974, UMTA requested that the Transportation Research Board (TRB) plan a major national conference on light rail transit (LRT). It was felt that a special effort was needed to expose decision-makers, planners, engineers, operators, and others to the advantages of the LRT mode. The papers contained in the special report were delivered at the first National Conference on LRT held in Philadelphia, Pennsylvania, June 23-25, 1975, and sponsored by UMTA. The TRB Light Rail Committee was responsible for structuring the conference content. The proceedings herein cover a wide range of subjects related to LRT. Included are a description of system concepts, such as performance characteristics of LRT; comparison with other modes; and applications. The technology and operational aspects of LRT are treated in a set of papers that address permanent way requirements, electrification and control systems, and U.S. and foreign vehicle developments. Economic considerations are highlighted. Many papers contained in this Special Report 161 discuss the various costs of construction operation, and maintenance as well as social costs and benefits.

NTIS No. PB 249-150 Price $7.50

13F. LIGHT RAIL VEHICLES AND SYSTEMS.

Light Rail Transit: Planning and Technology.
TRB Special Report 182.
Transportation Research Board of the National Academy of Sciences.
UMTA-UTD-30, July 1977, 183p.

A second National Conference on Light Rail Transit (LRT) was organized by UMTA and the TRB Committee on Light Rail Transit, and held in Boston, Massachusetts, July 1977. The purpose of the conference was a need to focus on specific aspects that have been recognized as critical steps in the successful implementation of LRT. The basic issue was how to introduce LRT into a community. The opening session began on a high note by relating LRT success stories from numerous cities. Subsequent papers explored problems and issues that have frustrated significant LRT development in this country. A series of case studies showed where and how real progress has been achieved. The basic dichotomy between socioeconomic and technological issues in the implementation of LRT was reflected in papers on such topics as network planning, joint development opportunities, and the formulation of functional specifications and on fare collection, traffic engineering, and power supply. The final session drew on the past to make a candid examination of the future. A theme running through the papers emphasized the overriding need to inform decision-makers at all levels about the characteristics of LRT.

NTIS No. PB 288-949 Price $11.20

SLRV Engineering Tests at Department of Transportation, Transportation Test Center.
Volume I: Introduction.
The Boeing Vertol Company. UMTA-MA-06-0025-79-3,
February 1979, 74p. (4 vols).

In May 1973, the Boeing Vertol Company was awarded a contract to build light rail transit (LRT) vehicles to a specification sponsored by UMTA; it identified a standard light rail vehicle (SLRV—a 71-foot vehicle, negotiates curves down to 32-foot radius, and operates at speeds up to 50 mph). The objective of the test program was to establish a data baseline for the SLRV obtained in accordance with the General Vehicle Test Plans and to provide further experience in the use of the test plans in testing urban rail vehicles. This study/final report consists of four separate volumes. Volume I contains a description of the SLRV Test Program and the vehicle as well as a summary of test results. This report, together with the additional available data stored in the Transportation Systems Center (TSC) magnetic tape records, provides a baseline of data for LRT vehicles against which later modifications to these vehicles or other new vehicles may be compared. Upon completion of testing, the data tapes and records were forwarded to Boeing Vertol Company where data was reduced, analyzed, and plotted in the GSP-064 format for inclusion in this 4-volume test report.

NTIS No. PB 301-146 Price A04
SET (4) PB 301-145 Price E10

13F. LIGHT RAIL VEHICLES AND SYSTEMS

SLRV Engineering Tests at Department of Transportation, Transportation Test Center.
Volume II: Performance and Power Consumption Tests.
The Boeing Vertol Company. UMTA-MA-06-0025-79-4, February 1979, 66p. (4 vols).

Volume II contains detailed descriptions and discussion of the engineering tests performed on samples of the SLRV. This report, together with the additional data in the TSC magnetic tape records, provides a baseline of data for LRT vehicles against which later modifications may be compared.

NTIS No. PB 301-147 Price A04

SLRV Engineering Tests at Department of Transportation, Transportation Test Center.
Volume III: Ride Quality, Noise, and Radio Frequency Interference Tests.
The Boeing Vertol Company. UMTA-MA-06-0025-79-5, February 1979, 178p. (4 vols).

Volume III contains detailed descriptions and discussion of the engineering tests performed on samples of SLRV. This report, together with additional data in the TSC magnetic tape records, provides a baseline of data for LRT vehicles against which later modifications may be compared.

NTIS No. PB 301-148 Price A09

SLRV Engineering Tests at Department of Transportation, Transportation Test Center.
Volume IV: Data Logs.
The Boeing Vertol Company. UMTA-MA-06-0025-79-6, February 1979, 67p. (4 vols).

Volume IV presents the results of the tests conducted. This report, together with the additional data available in the TSC magnetic tape records, provides a baseline for data for LRT vehicles against which later modifications to these vehicles may be compared.

NTIS No. PB 301-149 Price A04

13G. CONSTRUCTION/TUNNELING TECHNOLOGY

Alleviation of Pressure Pulse Effects for Trains entering Tunnels. Final Report.
Dayman, B., Jr., et al. California Institute of Technology. UMTA-MA-06-0100-79-10, June 1979, 235p.

This study was carried out in order to determine to what degree it is possible to attenuate the effects of pressure pulses on the passengers in trains entering tunnels. Although reasonable modifications to the tunnel entrance portal may not decrease the magnitude of the pressure rise, they are very effective in reducing the discomfort to the human ear by decreasing the rate of pressure rise to what the normal ear can accommodate. A brief qualitative comparison was made of this portal modification approach with other approaches: decreasing the train speed during the tunnel entry and sealing the cars. The optimum approach, which is dependent upon the conditions and requirements of each particular rail system, is likely to be the portal modification one for the subway transit system.

NTIS No. PB 299-155 Price A11

13G. CONSTRUCTION/TUNNELING TECHNOLOGY

Analysis of Ground-Liner Interaction for Tunnels.
Final Report.

Ranken, R.E., J. Ghaboussi, and A.J. Hendron, Jr. University of Illinois at Urbana-Champaign. UMTA-IL-06-0043-78-3, October 1978, 444p.

This report documents the results of a study of ground-liner interaction for tunnels. Main factors considered are the material properties of the ground and liner, tunnel depth, interaction of two parallel tunnels, position of liner installation relative to tunnel face, and the type of loading to which the liner is subjected. Both analytical and numerical solution techniques are used to investigate ground-liner interaction for loading conditions and construction sequences. The relationship between ground and liner material properties and the distributions of liner forces, stresses, and displacement resulting from interaction is illustrated for a circular liner inserted in situ ground mass. The finite element method is used: to analyze tunnels located at shallow depths; to simulate the advancement of a tunnel through a ground mass; to examine the ground-liner interaction. The problem of two adjacent and parallel tunnels is also considered, as well as pillar width and construction sequence.

NTIS No. PB 294-818 Price A19

The Atlanta Research Chamber Applied Research Monographs.
Interim Report/Tunneling Monographs.

Rose, D.C., et al. Metropolitan Atlanta Rapid Transit Authority.
UMTA-GA-06-0007-79-1, June 1979, 361p.

This interim report describes the construction of the Atlanta Research Chamber (Atlanta, Georgia) and the research performed in it from October 1977 - June 1979. In addition, twenty-four monographs on the state-of-the-art of modern tunnel practices are included. The Atlanta Research Chamber was conceived as a team effort of 18 individuals from 12 engineering firms in the United States, Canada, and Austria to study various aspects of tunnel support systems in hard rock. Later, as the team expanded, team members wrote monographs on modern tunnel practices. Finally, to balance the technical monograph emphasis, new team members were recruited to write monographs representing owners, contractors, labor, legal, insurance, overseas practice, and additional technical ideas. The Atlanta Research Chamber is sponsored by UMTA through a Research and Development Grant.

NTIS No. PB 297-574 Price A16

Case Studies of Building Behavior in Response to Adjacent Excavations.
Final Report.

Boscardin, M.D., E.J. Cording, and T.D. O'Rourke. University of Illinois at Urbana-Champaign. UMTA-IL-06-0043-78-2, October 1978, 141p.

This report summarizes one year of field observations and data collection of the ground movement and resultant building distortion and change in response to underground construction. It documents case histories of the distortion and damage to structures adjacent to tunnels and excavations. Measurements of ground movements and building response were made to two test sites in Washington, D.C., namely: 1) a nine-story building adjacent to a 60-foot-deep open cut, and 2) a pair of two-story brick-bearing wall structures near two 21-foot-diameter tunnels. The structures at the test sites were instrumented to measure settlement and tilt of the bearing walls and foundations. Additional data were

gathered at other sites in Washington, D.C., and in Chicago, Illinois, through construction records and field inspections. The ground surface settlement data, building response data, and the progress of the excavation are compared and related.

NTIS No. PB 295-757 Price A07

Development of Design Procedures for Stabilized Soil Support Systems for Soft Ground Tunneling. Volume IV: Case History Studies, Washington Metropolitan Area Transit Authority System.

Clough, G.W., et al. Stanford University. UMTA-MA-06-0025-78-9, October 1978, 170p. (4 vols).

The practice of injecting chemical grouts into permeable soils in order to stabilize them for tunnel construction is a common practice in Great Britain, Europe, and Japan. It is only within the last five-years that this technology has been used in the U.S., namely, in the work for the Washington Metropolitan Area Transit Authority (WMATA) subway construction. This report documents five WMATA case histories where chemical grouting was used; information is provided as to the soil conditions, method for treatment, reason for treatment, and tunnel performance. The document is the fourth in a series directed towards the subject of use of chemical injection technology to stabilize sand soils for ground movement control during tunneling. The chemical grouting was used as an economic alternative to conventional underpinning. Ground movement data show that the settlements in the grouted areas were generally small (less than 50mm) and that no cases of serious ground runs occurred. The best ground control was achieved where the soils in the upper half of the tunnel cross-section and above the crown were uniformly groutable, and good. (See also Vol. I, PB 272-771, and Vol. II, PB 273-064).

NTIS No. PB 295-022 Price A08

Economic Factors in Tunnel Construction. Final Report.

Foster, E.L., and I. Toporoff, et al. Underground Technology Development Corporation, and Singstad, Kehart, November & Hurka. UMTA-MA-06-0025-79-10, February 1979, 310p.

The objective of this study is to develop versatile and accurate techniques for the estimation of tunneling costs, and to draft guidelines for system analyses of tunnel designs based on those techniques. This report describes a new cost estimating system for tunneling. The system is designed to aid planners, engineers, and designers in evaluating the cost impact of decisions they may make during the sequential stages of planning and design of urban transportation tunnels. The techniques herein are based upon an extensive review of cost estimating systems and take account of both construction and non-construction factors. Cost projections are accurate to the level of detail required in each subsequent stage of design. A detailed estimating technique is used in which units of effort are converted to obtain a base cost for a "standard" tunnel constructed in 1976 in Washington, D.C. This report discusses the data base, program verification, and draft guidelines for operation of the TSC model. This report also provides recommendations for future action as well as a list of references.

NTIS No. PB 294-726 Price A14

13G. CONSTRUCTION/TUNNELING TECHNOLOGY

Experimental Verification of a Pneumatic Transport System for the Rapid Excavation of Tunnels. Part I: Installation of the Test Facility.

Martin, J.W., and R.R. Faddick. Colorado School of Mines.
UMTA-MA-06-0025-78-15, March 1976, 112p. (2 rpts).

This report deals with the selection of a test site, the design of a test installation, equipment selection, the installation and start-up of a pneumatic pipeline system for the transportation of tunnel muck. A review of prior pneumatic applications (Appendix A) provided knowledge on the state-of-the-art and a basic background for the design of the test equipment and development of a tentative test program. A suitable site was found 4 miles from the campus, and the site was prepared, equipment ordered, installed, and checked-out. The test unit is a full scale 100 ton per hour pneumatic transport system in a configuration suitable for application in a tunnel and capable of being extended under load to simulate service requirements. The test system developed has the capability to transport 100 tons/per hour of rock through a 10" pipeline approximately 550 feet long with vertical lift of 160 ft.

NTIS No. PB 295-456 Price A06

Experimental Verification of a Pneumatic Transport System for the Rapid Excavation of Tunnels. Part II: Test Program.

Martin, J.W., and R.R. Faddick. Colorado School of Mines.
UMTA-MA-06-0025-78-14, December 1978, 157p. (2 rpts).

This study is the final phase of a muck pipeline program begun in 1973. The objective of the study was to evaluate a pneumatic pipeline system for muck haulage from a tunnel excavated by a tunnel boring machine. The system was comprised of a muck preparation unit, solids feeder and air blower, telescoping pipes and 500 ft. of 10-inch diameter pipe. The system transported up to 100tph of simulated tunnel muck with maximum sizes ranging from 1/2 inch to more than 3 inches. The system components were tested for reliability and flexibility, wear and maintenance requirements, capacity, noise and dust levels, effect of moisture content, extensibility, and power requirements. The system was found to be low in capital cost, easy to operate, and readily extensible.

NTIS No. PB 295-032 Price A08

Materials Handling for Urban Tunneling in Rock. Final Report.

Duncan, J.M., et al. Holmes & Harver, Inc. UMTA-MA-06-0100-79-9,
May 1979, 349p.

An examination of prior forecasts of tunnel construction provides an estimate of 2.4 million feet of rock tunnel to be constructed during the 1976-2000 period. Tunnel projects for the near term (1980+) and far term (1990+) periods are defined for study. The flow and characteristics of materials handled are defined for the tunnel projects. The state-of-the-art and status of R&D programs for materials handling are reviewed. Based on extensive interviews with representatives of tunnel contractors, equipment manufacturers, government agencies, and consultants, the application of various methods of materials handling to tunneling is discussed, including conventional rail haulage, crane and hoist lifting, and horizontal transport and lifting by hydraulic and pneumatic pipeline and by

conveyor. A comparison of results indicates that major cost savings through substitution of alternative material handling modes should not be anticipated.
NTIS No. PB 299-117 Price A15

Pneumatic-Hydraulic Material Transport System for Rapid Excavation of Tunnels. Final Report.
Faddick, R.R., and J.W. Martin. Colorado School of Mines.
UMTA-MA-06-0025-79-13, August 1974, 151p.
The objective of this study is to advance the technology of tunnel excavation by analyzing the application of pneumatic and slurry pipelines for increasing the rate of muck removal from the tunnel face. A computer simulation was used to analyze the cost-performance of the pipeline transportation system. This report discusses the results of a two-phase study on rapid excavation. The first phase aims to model the performance of the proposed transport system so that parametric analyses can be performed to determine the applicability of the system, and the second phase aims to model the cost-performance of the same transport system. The pneumatic pipeline provides the necessary extensibility by telescoping pipe to convey the muck from the advancing tunneling machine to the stationary high capacity slurry pipeline for rapid long distance transportation. The system concept is based entirely on commercially available equipment with minimum modifications necessary to adapt it to tunnel geometry. Unit transportation costs for several system designs are also discussed herein.
NTIS No. PB 295-619 Price A08

A Quantitative Method for Analyzing the Allocation of Risks in Transportation Construction. Final Report.
Levitt, R.E., et al. Massachusetts Institute of Technology.
UMTA-MA-06-0100-79-1, April 1979, 156p.
This report presents a conceptual model of risk that was developed to analyze the impact on owner's cost of alternate allocations of risk among owner and contractor in mass transit construction. A model/analysis procedure is developed, based on decision analysis but extending the standard methodology to include: 1) explicit consideration of risk as an incentive to perform, and 2) the interaction between two decision-makers (owner and contractor) trading risk for price. The model is pilot tested on the decision of how to purchase insurance for a mass transit project. Analysis of this problem, using the owner/contractor on the Baltimore subway system as subjects, reveals an alternative to the usual "wrap-up" insurance arrangement that produces $8 million in expected savings to the owner. Directions for future development of this work are suggested herein. Although the example risk category, discussed herein, involved insurance, the authors state that the technique is broadly applicable to all categories of construction risk.
NTIS No. PB 295-099 Price A08

13G. CONSTRUCTION/TUNNELING TECHNOLOGY

Settlements around Tunnels in Soil: Three Case Histories. Final Report.

MacPherson, H.H., et al. University of Illinois at Urbana-Champaign. UMTA-IL-06-0043-78-1, March 1978, 144p.

This report presents the results of three case histories of field observations of settlements around tunnels in soil. Two of the cases are twin, 20 ft (6 m) diameter, single-track tunnels for the Washington, D.C. Metro System: 1) Section F2a, F Route, is a steel segment lined tunnel in interbedded sands and gravels and clays, typical of downtown Washington; and 2) Section G1, with an expanded rib and lagging lining, is in transition from these deposits to a hard, fissured clay. The third case is a 9 ft (3 m) diameter sewer tunnel with an expanded rib and lagging lining driven in dewatered, dense sands at Rockford, Illinois. Ground surface settlement data are reported for several cross-sections on each tunnel and for points along the tunnel centerlines. The volume of surface settlement was less than the volume of ground loss because the disturbance of tunneling caused a net volume expansion in the dense granular materials. The relationship between ground loss and surface settlement volume, as shown by sand bin model test data is also reported. A procedure for estimating ground loss and surface settlement in advance of tunneling is suggested.

NTIS No. PB 290-856 Price A07

Tunneling for Urban Transportation: A Review of European Construction Practice. Final Report.

O'Rourke, T.D. University of Illinois at Urbana-Champaign. UMTA-IL-06-0041-78-1, August 1978, 225p.

This report deals with technical, financial, and managerial aspects of urban underground construction in Western Europe. An evaluation of the inherent weaknesses and strengths associated with each method is made. The methods under review include grouting in soil, grouting in rock, ground freezing, cast in situ walls, pre-fabricated walls, secant piles, slurry shield tunneling, and the New Austrian Tunneling Method as applied to soft ground conditions. The objectives herein are: to review specific underground technologies—several construction methods are summarized with reference to recent European applications; to study the economics of underground construction— tunneling costs of 6 European metro systems are summarized; and to examine the operation and organization of several European metro authorities—tunneling practice in the United Kingdom is studied and used as a focal point for examining such issues as the apportionment of risk under contract and the resolution of contract disagreements. Comparisons are made herein between urban tunneling costs for rapid transit in the U.S. and Europe. Recommendations for improving tunneling practices are also provided.

NTIS No. PB 296-462 Price A10

14. TRANSPORTATION OF DISADVANTAGED/SPECIAL-USER GROUPS

Assessment of the Inclined Elevator and Its Use in Stockholm.
Final Report.

Hansen, T.B., J.King, and T. O'Brien, et al. DeLeuw, Cather & Company, General Services Administration, and Massachusetts Bay Transportation Authority. UMTA-IT-06-0172-79-1, September 1978, 73p.

This is a study of the inclined elevators installed in the Stockholm mass transit system. The Stockholm experienced, reported herein, with operation of inclined elevators in subway stations is intended to serve as a basis for judgment of the feasibility of inclined elevator applications in the United States mass transit systems. During a two-week inspection of the Stockholm subway system, five specialists studied the inclined elevator and its setting, including planning and architectural aspects, design, construction, maintenance, costs, and actual use. An onsite investigation was conducted by a multidisciplinary team through direct observation of equipment; interviews of personnel concerned with development, operation, and use of the elevators; and review of source material. Inclined elevators are a possible alternative to vertical elevators in U.S. subway systems for new stations where escalator rise is greater than 40 feet, or greater than 25 feet and accompanied by a lateral displacement.

NTIS No. PB 294-854 Price A04

The Call-A-Bus Demonstration Project: Specialized Transportation for the Elderly and Handicapped in Syracuse, New York.
Final Report.

Przeoiora, J., and M. Holoszyc, et al. Central New York Regional Transportation Authority, and Systan, Inc. UMTA- NY-06-0041-77-1, June 1977, 165p.

This report describes, analyzes, and evaluates the results of the Call-A-Bus Demonstration Project that was conducted to improve transit services for the elderly and handicapped (E&H) in Onondaga County in Syracuse, New York. Objectives of the project include: the determination of latent demand of E&H; the acquisition of experience by Central New York Regional Transportation Authority (CNYRTA) in operating special services for E&H; and the coordination of services for the transit-dependent. This demonstration provided reduced fares, demand-responsive services for persons over age 55 and for all handicapped persons, and daily transportation to and from day care centers for disadvantaged children, as well as special transit services that included regular or advance-reservation door-to-door, group trip for organizations, subscription, and summer camp services. The system demonstrated the ability of a transit operator to successfully implement a special service for transit-dependent individuals. The CYNRTA expects to continue to expand and improve transit services for the E&H.

NTIS No. PB 290-857 Price A08

Elderly and Handicapped Transportation: Local Government Approaches.

Public Technology, Inc. UMTA-DC-06-0122-79-1, March 1979, 63p.

The purpose of this publication was to foster improvements in transportation for the elderly and handicapped (E&H) persons through the sharing of local experiences. This report describes how a number of localities have dealt with the

problem of providing transportation to E&H citizens. Some of the systems described herein are Federally funded, and some have developed from local initiatives. Some represent modifications to conventional public transit services and some are a special purpose system designed specifically for a special user group. Other Public Technology , Inc. (PTI) efforts to assist local governments in this field are underway. Case studies, a coordination manual, and a chief executive summary are being developed with the assistance of the Technology Sharing Office of the Office of the Secretary and the UMTA Service and Methods Demonstration Office.

NTIS No. PB 297-289 Price A04

Elderly and Handicapped Transportation Operations Study.
Final Report.

Multisystems, Inc. UMTA-IT-09-0069-79-1, July 1978, 134p.

This study focuses on the coordination and consolidation of transportation services for the elderly and handicapped (E&H) in the New Haven, Connecticut, area. The report discusses areas such as vehicle control, financial control, and system evaluation. The proposed near-term system intends to provide a plan for the integration of services, i.e., services currently offered/planned by 3 local agencies: the City of New Haven Office of Human Services; the Easter Seal Rehabilitation Center; and the Greater New Haven Transit District. A purchase of service agreement based on payment per passenger is also proposed. The vehicles (10 to 12 passenger vans) for the service are to come from a combination of public and private sources. An automated computer-aided scheduling/financial control system is also proposed to improve the management of the system.

NTIS No. PB 295-071 Price A07

Guidelines for the Identification of the Transportation Needs of the Elderly and Handicapped.

Hackett, L.W., Jr. California Department of Transportation.
UMTA-CA-09-8002-79-1, November 1978, 337p.

This report aims to provide assistance to planners, decision-makers, and other interested persons responsible for including the needs of the elderly and handicapped (E&H) in the planning process. The intent of the guidelines is to promote efficiency and effectiveness in supplemental specialized transportation through the application of procedures to identify unmet needs of the E&H population. The procedures herein include: defining the terms "elderly" and "handicapped"; locating/identifying the local populations of E&H; determining mobility styles; examining existing Federal and State laws, rules, regulations, and policies of the E&H; identifying local providers of specialized transportation; and implementing a plan designed to provide for the needs of the E&H and to encourage the coordination of services for maximum use of existing manpower and facilities, as well as maximization of benefits to the E&H population.

NTIS No. PB 291-926 Price A15

The Lift: Special Needs Transportation in Portland, Oregon.
Interim Report.

Cooper, T., P. Bloomfield, and S. Flynn. Crain and Associates.
UMTA-OR-06-0004-78-2, June 1978, 224p.

14. TRANSPORTATION OF DISADVANTAGED/SPECIAL-USER GROUPS

This report presents the first year operation of the Portland, Oregon, Special Needs Transportation (SNT) Project—the Lift. The purposes of this demonstration were to: 1) test a transit operator's ability to provide specialized service to the elderly and handicapped (E&H); 2) test the cost-effectiveness and value to social service agencies and users of the automated fare collection equipment; 3) determine the demonstration's impact on the target group; and 4) assess the service's impact on the social service agencies that contract with the Tri-County Metropolitan Transportation District of Oregon (Tri-Met). Experience with the lift so far suggests that the major issue of the second year of this demonstration is whether or not it is cost-effective for a transit operator to provide transportation to the E&H.

NTIS No. PB 294-711 Price A10

Human Service Agency Transportation Coordination.
Final Report.

Hunter, J.P. California Department of Transportation.
UMTA-CA-09-8001-79-4, June 1979, 101p.

The objectives of this study were to compare the costs of independent special purpose transportation services with the costs of combined transportation services and to study the transportation needs of human service agencies in various sized communities. This report contains the California Department of Transportation (Caltrans) study of the feasibility of coordinating human service agency transportation in three areas (District 04, population of 24,000); Fairfield-Suisun City-Vacaville areas (District 10, population of 85,000); and the National City-Chula Vista areas (District 11, population of 156,700). Cost and ridership data were collected from these agencies through inventories, interviews, and questionnaires. The principal finding common to each of the three study areas was that cost and ridership data of these independent special purpose transportation services were difficult, if not virtually impossible to obtain. Cost data gathered were sketchy and unreliable. However, the cost data indicated that combined transportation costs are approximately equal to the average of the costs of independent special purpose transportation. Therefore, combined transportation service may be feasible and desirable even though the resulting service may not appear to be economic at first.

NTIS No. PB 300-891 Price A06

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978.
Volume VIII: Access for Elderly and Handicapped Persons Workshops.

American Public Transit Association. UMTA-DC-06-0157-79-8, November 1978, 50p. (9 vols).

This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on access for the elderly and handicapped (E&H) persons. Part I of this volume deals with planning and regulation and includes discussions of transportation problems of E&H and transportation policies and practices as they affect E&H people. Part II of this report includes discussions of concepts under development in the area of transportation for the E&H hardware research and development to improve transit for E&H travelers, and a critique of research concerning transportation for the E&H. This volume contains 5 resource papers that can be found in Volume I of this report.

NTIS No. PB 300-993 Price A03

14. TRANSPORTATION OF DISADVANTAGED/SPECIAL-USER GROUPS

Statewide Study of the Feasibility of Coordinating or Consolidating Specialized Transportation Services. Final Report.

The Institute for Public Transportation. UMTA-NY-09-8001-79-1, October 1978, 113p.

The objectives of this study are to identify current and latent demands for specialized transportation in New York State; current state and Federal programs applicable to specialized transportation; a methodology to measure the effectiveness of coordination/consolidation in demographic areas; as well as to develop modifications to existing state and Federal legislation and regulations to assist coordination/consolidation efforts. This report outlines a procedure to plan, develop, and implement coordination/consolidation options. The study developed consolidation scenarios for typical locations within an urban (Poughkeepsie, Dutchess County), suburban (Hempstead), and small urban/rural (Tompkins County) setting. This report summarizes the study's findings, conclusions, and recommendations; it states that the conclusions herein should be broadly applicable to all governmental levels in a variety of locations.

NTIS No. PB 291-705 Price A06

Summary Report of the National Survey of Transportation Handicapped People.

Grey Advertising, Inc. UMTA-NY-06-0054-78-2, June 1978, 96p.

This document represents one portion of a major effort undertaken by UMTA in response to Congressional interest in and legislation for the planning and design of mass transportation facilities to meet special needs of the elderly and handicapped (E&H). It involves a number of parallel and interdependent areas of activity ranging from a national survey to a national perspective of the state-of-the-art concerning transportation of the transportation handicapped population (THP). The purpose of this summary report is to present an overview of the major findings from the national survey in order to provide information for decision-makers at all levels. The areas of data and information herein are presented in 5 sections: Composition of the THP; Travel behavior of THP; Transportation barriers of THP; Latent travel demand of THP; and Transportation solutions for the THP. The survey obtained information on 4 alternatives to solving THP problems. Two of these are transit based, evaluated in mass transit areas only: 1) accessible fixed-route systems, including improvements in vehicles and quality of service; and 2) accessible fixed-route systems with shelters and feeder service. The other two approaches are separate and apart from fixed-route systems, evaluated in mass transit and non-mass transit areas: 3) a separate door-to-door service; and 4) individual subsidies for THP to use as they please for better transportation. (See also NY-06-0054-77-1 and 78-1).

NTIS No. PB 291-765 Price A05

Technical Report of the National Survey of Transportation Handicapped People.

Grey Advertising, Inc. UMTA-NY-06-0054-78-1, September 1978, 321p.

The purpose of this technical report is to present complete findings on all information areas covered in the national survey in order to provide specific information for decision-makers at all levels. This national survey is a comprehensive national study using probability techniques and procedures to provide quantified information on the THP in urban areas of the U.S. The

information includes the number of THP (7,440,000), their characteristics, transportation behavior, perceived barriers, and an assessment of solution alternatives designed to improve transportation for the THP. Forty-one in-depth interviews and ten focus group sessions were conducted with leaders and members of groups representing the handicapped. Some of the highlights herein are: 1) of the 7,440,000 THP, 98% (7,276,000) travel—19% (1,405,000) cannot use public transportation at all, 30% (2,175,000) use public transportation with difficulty, and 51% (3,860,000) use public transportation with a little more difficulty; and the average number of bus barriers is 6.9, subway barriers is 6.0, and taxi barriers is 3.7.

NTIS No. PB 290-161 Price A14

Transportation for the Elderly and Handicapped.
Volume I: Inventory and Analysis.

Strains, S.R. Northwestern Indiana Regional Planning Commission.
UMTA-IT-09-0072-79-1, March 1978, 88p. (2 vols)

In August 1976, the Northwestern Indiana Regional Planning Commission (MPO) began a process to develop a plan which would meet the transportation needs of the mobility-limited in Lake and Porter Counties. The first phase of the planning process was an inventory of needs (Volume II). This report describes the first phase of the planning process, namely, the transportation situation of the elderly and handicapped (E&H) people in Northwest Indiana; it also documents the first planning phase—data gathering and analysis, committee organization, alternative evaluation, and initial recommendation. The results of a survey of users of the services reveal that half (32,500) of the 65,000 E&H in the two counties need better transportation or have none at all. Problems include having to rely on other drivers, the cost of transportation, and the lack of public transportation.

NTIS No. PB 290-685 Price A05

Transportation for the Elderly and Handicapped.
Volume II: User Survey Results.

Strains, S.R. Northwestern Indiana Regional Planning Commission.
UMTA-IT-09-0072-79-2, March 1978, 161p. (2 vols)

This report, Volume II, contains the tables of numbers documenting in detail the results of a survey distributed to 3,117 people of which 1,000 were returned. Results are presented in two ways: some tables simply describe questionnaire results, and others present cross-tabulations to many questions. Information is displayed in numerical and literary terms. Survey results show that transportation is too expensive for 32.6 percent of the sample, or 21,196 E&H in the two counties. Over half of the respondents state that they either have need of better transportation or have none at all. Problems stated include having to rely on other drivers and lack of public transportation. Barriers mentioned include having to stand and wait for a ride, and having to walk a few blocks to the bus/train station. About a third of the respondents find curbs hard to climb and buses/trains difficult to board.

NTIS No. PB 290-686 Price A08

14. TRANSPORTATION OF DISADVANTAGED/SPECIAL-USER GROUPS

User-Side Subsidies for Shared Ride Taxi Service in Danville, Illinois: Phase I. Evaluation Report.

Fitzgerald, P.G. Crain & Associates. UMTA-IL-06-0034-77-1, June 1977, 231p.

Phase I of the Danville, Illinois, Service and Methods Demonstration Project has been a successful demonstration of the user-side subsidy concept. The purpose of the demonstration was to test the use of user-side subsidy on a shared-ride taxi service for elderly and handicapped (E&H) persons. This evaluation report presents time series and survey data analysis on the workability, cost-effectiveness and impacts of the project during Phase I. It is based on analysis of data collected by the City of Danville's Department of Planning and three taxicab companies involved in the project. In addition to the data, the observations and opinions of individuals in these and other local organizations have been incorporated herein. The user-side subsidy implied that the user was directly subsidized. Consequently, the operator was required to seek out and serve the needs of the user in order to receive the subsidy. Project levels of service were very good, including the fact that service was available 24 hours a day, seven days a week at an average user discounted payment of $0.31 per trip. UMTA and the project staff are planning an expansion of the demonstration to include a user-side subsidy for all persons on privately operated regularly scheduled fixed-route service.

NTIS No. PB 292-805 Price A11

15. TRANSPORTATION/TRANSIT MANAGEMENT

Basic Market Research Techniques for Transit Systems. Final Report.

Hatfield, N.J., and P. K. Guseman. Texas A&M University.
UMTA-TX-09-8003-79-2, June 1978, 93p.

The material presented in this report is designed to facilitate in-house transit market research activities by providing transit personnel with some basic methodological guidelines and considerations. Three general approaches are discussed herein: sample surveys, field observation, and secondary data analysis. This report also provides guidelines on designing and administering questionnaires, sampling techniques to be used with public surveys, attitudinal scaling devices, field observation techniques, and the use of secondary data analysis. Discussions herein are general in nature to facilitate understanding for persons with no previous experience in the area.

NTIS No. PB 295-079 Price A05

Human Resource Development Study of the Southeastern Pennsylvania Transportation Authority. Final Report.

University of Pennsylvania. UMTA- IT-09-0073-79-2, May 1979, 128p.

The transfer of public transportation systems from private to public ownership brought about some fundamental changes in that industry. The most important change is that the basic goal of these agencies changed from predominantly financial to service-oriented. In this 12-month study, an interdisciplinary research team of the Human Resources Center, comprehensively investigated the existing and projected human resource development needs of the Southeastern Pennsylvania Transportation Authority. The recommendations of the study are discussed and analyzed in this report. (See also IT-09-0073-79-1).

NTIS No. PB 298-405 Price A07

15. TRANSPORTATION/TRANSIT MANAGEMENT

An Introduction to Transit Marketing.

Urban Mass Transportation Administration. UMTA-UPM-40-79-1, May 1975, 16p.

This report presents a general overview of the marketing process as applied to transit, to the value of marketing, and to the marketing plan and its components. It also presents some cautionary remarks about transit marketing. The report contains a selected bibliography of marketing publications as well as a list of marketing assistance sources for transit operators.

NTIS No. PB 294-954 Price A02

A Management Analysis of the City of Anderson Transit System. Final Report.

Demos, E.M. Anderson City Planning Department. UMTA-IN-09-0018-79-1, June 1978, 110p.

The basic purpose of this report is to evaluate the previous management structure of the City of Anderson Transportation System (CATS), and to identify and evaluate any changes that have occurred. The focus is on the status of CATS' past and present management structures. Management problems identified herein are: 1) unclear lines of responsibility and communication; 2) unpredictable service; 3) lack of organizational direction; 4) inefficient utilization of personnel; and 5) lack of input in policy development. CATS' weak management structure plus inefficient policies and procedures in the areas of personnel, maintenance, and inventory control prompted the City of Anderson to hire a professional transit manager. This study analyzes CATS' management reorganization and presents future objectives, recommendations, and conclusions.

NTIS No. PB 295-035 Price A06

Metropolitan Evansville Transit System: Management Performance Audit.

Dodge, S.A., and D.R. Leffers, et al. Indiana University. UMTA-IN-09-8004-79-2, February 1979, 119p.

This document is the management performance audit of the Metropolitan Evansville Transit System (METS), and it evaluates the transit system in the context of its goals and objectives and its resources and constraints. The scope of this performance evaluation report includes: 1) the resources and constraints of METS internal/external environment; 2) the organization's governing body—the Public Transit Department Board; and 3) the functional areas that define METS activities. This study employs the use of statistical indicators, random samples, and interviews with key personnel to identify areas for detailed analysis. Resulting recommendations aim to assist METS management to improve the effectiveness and efficiency of the system.

NTIS No. PB 294-958 Price A06

National Transit Marketing Conference: Proceedings, June 9-11, 1975.

Urban Mass Transportation Administration in cooperation with The American Public Transit Association. UMTA-UPM-40-79-2, September 1975, 207p.

Increasingly marketing is being recognized as a key element in revitalizing urban public transportation, and is clearly a significant transit management tool. In recognition of this, the First National Transit Marketing Conference was sponsored by UMTA in cooperation with the American Public Transit Association (APTA). The singular objective of the conference was to promote the transit industry's awareness, acceptance, understanding, and successful application of

marketing techniques. There were more than 250 participants; they included chief executive officers, board chairmen, senior marketing personnel, and transit executives from Alaska, Hawaii, Puerto Rico, Mexico, and Canada. During the three-day conference, technical sessions centered on an in-depth examination of marketing's tools and components as they apply to transit. Case histories and workshops were among the approaches used to familiarize participants with the marketing concept. This report offers a good resource for those interested in transit marketing. It symbolizes the transit industry's commitment to improving transit management since many transit decision-makers helped develop and actually participated in the presentations.

NTIS No. PB 296-191 Price A10

Paratransit Reporting System: A System for Collecting and Reporting Uniform Paratransit Financial and Operating Statistics.
Final Report.

International Taxicab Association, Wells Research Co., and Control Data Corporation. UMTA-IL-06-0035-78-1, July 1977, 183p.

In July 1976, UMTA contracted to develop and test the implementation of a computerized system for collecting and reporting paratransit financial and operating statistics. The project objectives are: 1) to expand/modify the computerized uniform system of accounts and records developed in project TAXISTATS so that it could be applicable to all paratransit operations; 2) to ensure its compatibility with the FARE system; 3) to satisfy Section 15(a) requirements; and; 4) to test and implement this system in several paratransit operations to provide information for large-scale implementation of the system. This report provides the documentation of the system.

NTIS No. PB 298-155 Price A09

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978.
Volume VII: Transit Management Workshops.

American Public Transit Association. UMTA-DC-06-0157-79-7, November 1978, 122p. (9 vols).

Part I of this volume deals with management systems development and includes discussions of transit operations and maintenance management support, automated scheduling of transit services, and development of skills and techniques required by the transit operating industry. Part II of this report includes discussions of human resources development programs, the national study for the validation of a selection test battery for bus operators, and a report by the AFL-CIO Appalachian Council on their transit employee training project. This volume contains six resource papers that can be found summarized in Volume I.

NTIS No. PB 300-992 Price A06

Service and Methods Demonstration Program: Annual Report, July 1978.

Kendall, D., et al. Transportation Systems Center. UMTA-MA-06-0049-78-6, July 1978, 343p.

UMTA's Service and Methods Demonstration (SMD) Program addresses the national need to improve the quality, quantity, and efficiency of public transportation services of innovative transit operating techniques and services that utilize existing technology. This report contains a description of the SMD program for Fiscal Year 1977. Program activities and accomplishments are

reviewed, including current and future demonstration project descriptions, project findings, and other support activities. Project findings are organized into four program areas: Conventional Transit, Pricing and Service Innovations, Paratransit, and Special User Groups. In this report, results of demonstration projects and studies leading to or in support of demonstrations are summarized.
NTIS No. PB 292-008 Price A15

Service and Methods Demonstration Program: Annual Report, August 1979.

Spear, B.D., et al. Transportation Systems Center. UMTA-MA-06-0049-79-8, August 1979, 314p.

UMTA's Service and Methods Demonstration (SMD) Program was established in 1974 to provide a consistent and comprehensive framework within which innovative transportation management techniques and transit services could be developed, demonstrated and evaluated, and the resultant findings disseminated in a timely manner to transportation planners, policymakers, and transit operators. This report documents the SMD program for Fiscal Year 1978. Program activities and accomplishments are reviewed for each of the following areas: conventional transit service improvements; pricing and service innovation; paratransit; services for special user groups; evaluation methodology; and information dissemination. Results of current demonstration projects and special studies of innovative service concepts are summarized. Future projects are also described.
NTIS No. PB 80-110281 Price A14

Service and Methods Demonstration Program: Annual Report, Executive Summary, August 1979.

Kendall, D., et al. Transportation Systems Center. UMTA-MA-06-0049-79-7, August 1979, 43p.

This report contains a summary of the contents of the Annual Report for Fiscal Year 1978. Program activities and accomplishments are discussed and reviewed, including findings and insights from current demonstration projects, descriptions of future projects, and support activities in the areas of evaluation methodology and information dissemination.
NTIS No. PB 80-106222 Price A03

Staggered Work Hours Study - Design and Implementation of Staggered Work Hours in Manhattan. Volume I: Executive Summary.

The Port Authority of New York and New Jersey, in cooperation with the Tri-State Regional Planning Commission. UMTA-IT-09-0023-79-1, August 1977, 73p. (3 vols).

This three-volume report is the product of a $200,000 grant from the U.S. Department of Transportation to document and further implement staggered work hour programs in Manhattan. Experience has shown that the staggered work hours program in Manhattan has not only reduced congestion on transportation systems, but has improved efficiency in business operations by reducing lobby congestion and improved employee attendance, punctuality and morale. The objective of this study was not only to further the program in the New York-New Jersey region, but also to determine means and methods to assist other communities in establishing their own staggered work hours program. Volume I provides a concise description of the work conducted during the study and includes the principle findings, a comparison of staggered work hours, flexible work hours, four-day work week, and

state-of-the-art programs in the United States and abroad, based on a comprehensive survey of more than 200 cities throughout the world.

NTIS No. PB 298-937 Price A04
SET (3) PB 298-936 Price E10

Staggered Work Hours Study - Design and Implementation of Staggered Work Hours in Manhattan.
Volume II: Technical Report.

The Port Authority of New York and New Jersey, in cooperation with the Tri-State Regional Planning Commission. UMTA-IT-09-0023-79-2, August 1977, 415p. (3 vols).

This report, Volume II, consists of ten chapters that discuss broad categories such as the state-of-the-art survey, criteria for staggered work hours, work schedule surveys, design and implementation procedures, transportation surveys and analysis, attitude surveys, and an evaluation of three different work schedule concepts: staggered work hours, flexible work hours, and the four-day work week.

NTIS No. PB 298-938 Price A18

Staggered Work Hours Study - Design and Implementation of Staggered Work Hours in Manhattan.
Volume III: Staggered Work Hours Manual.

The Port Authority of New York and New Jersey, in cooperation with the Tri-State Regional Planning Commission. UMTA-IT-09-0023-79-3, August 1977, 34p. (3 vols).

This volume is intended to present an overall methodology for designing, implementing, and evaluating a staggered work hours program in an urban area. It is organized to cover the most important considerations involved in setting up a program in order to provide decision-makers with the guidelines and tools necessary to identify the need for a program as well as the procedures to implement and evaluate it.

NTIS No. PB 298-939 Price A03

Urban Mass Transportation Abstracts.
Volume Number 5.

Urban Mass Transportation Administration. UMTA-TRIC-78-1, December 1978, 220p.

This volume is a reference document prepared by UMTA and serves as a guide to 168 reports generated under contract to UMTA. This document reflects UMTA's continuing commitment to the dissemination of technical report information to government, state, and local transportation planning bodies, private industry, and the general public. The types of documents abstracted in this volume are, by section: 1) Research, Development, and Demonstration Project Reports; 2) Technical Studies; and 3) University Research and Training Reports. Section 4 contains indexes to the reports by report title, personal author, corporate author, geographic location, and keywords. Volume I, II, III, and IV of the Urban Mass Transportation Abstracts are also available at NTIS.

NTIS No. PB 297-355 Price A10

User's Guide for the Interactive Scheduling Program: Preliminary Calendar Version. Operational Handbook.

Downey, P.J. Transportation Systems Center. UMTA-MA-06-0074-78-1, August 1978, 30p.

UMTA's Office of Transportation Management in conjunction with the Transportation Systems Center designed and developed the Interactive Scheduling Program (ISP) to assist rail-transit operators in the scheduling of preventive maintenance. ISP was first applied to the scheduling of warranty inspections for the new Light Rail vehicles (LRV) acquired by the Massachusetts Bay Transportation Authority (MBTA). While the ISP is designed for LRVs, its scope could aid any property with equipment whose maintenance is conducted on a calendar basis. This report describes the user's guide for the preliminary calendar version of an ISP. A computerized scheduling system is described that is designed to operate on a real-time or online basis. A scheduling algorithm was developed for this program which incorporates a variable work window whose purpose is to minimize fluctuations in the daily workload. The program operates on a five consecutive year span for the years between 1976-2000.

NTIS No. PB 295-021 Price A03

4th U.S.-German Urban Transportation Workshop (4. Deutsch Amerikanisches Seminar Stadtverkehr), Los Angeles, San Francisco, Chicago, Cambridge, April 17-25, 1978.

Transportation Systems Center, Technology Sharing Office. UMTA-MA-06-0086-78-1, September 1978, 342p.

The Fourth U.S.-German Workshop on urban transportation was held in the United States on April 17-25, 1978. These workshops are held in alternate years in the Federal Republic of Germany and the United States on the basis of international agreements between the Federal Ministry of Transportation, the Federal Ministry of Research and Technology, and the U.S. Department of Transportation. The purpose of the workshops is to share experience and research findings relative to policy, finance, planning, management, operations, and technologies in the field of urban transportation. The visiting group generally represents the Federal government, local government, and transportation industry. This report contains conference papers presented at the Transportation Systems Center, Cambridge, Massachusetts, April 24-25. The conference sessions were preceded by briefings, discussions, and site inspections in Los Angeles, San Francisco, and Chicago (April 17-21). Papers are provided in both English and German in this proceedings report.

NTIS No. PB 294-972 Price A15

16. TRANSPORTATION PRODUCTIVITY AND EFFICIENCY

A Comprehensive Analysis of Urban Bus Transit Efficiency and Productivity: Executive Summary.

Sinha, K.C., et al. Purdue University. UMTA-IN-11-0003-79-1, December 1978, 26p. (4 rpts).

This document presents the executive summary of research conducted on urban transit bus performance. The study consists of this report and three separate reports. A review was first made of the concepts and definitions of efficiency, effectiveness, and productivity in the public transportation sector, and a framework for the development of a set of performance indicators was presented. Several potential uses of performance concepts as policy tools, management tools, and planning tools were examined. Next, driver productivity and operating cost were examined. This was done by examining a group of labor contracts and analyzing available bus transit operation data. Finally, the development and validation of two methodologies to analyze various policies to improve urban transit performance were discussed. The study analyzed options for improving transit performance with particular emphasis upon bus transit systems in small to medium-sized urban areas.

NTIS No. PB 295-220 Price A03
SET (4) PB 295-219 Price E12

A Comprehensive Analysis of Urban Bus Transit Efficiency and Productivity.
Part I: Definition and Measurement of Urban Transit Performance.

Sinha, K.C., and D.P. Jukins. Purdue University. UMTA-IN-11-0003-79-2, December 1978, 170p. (4 rpts).

This document presents a review of the concepts and definitions of efficiency, effectiveness, and productivity in the public transportation sector. It also discusses the development of appropriate performance indicators. The trend of bus transit performance indicators is examined separately for various classes of transit systems. In addition, a scheme of stratification is presented on the premise that many environmental and policy factors outside the control of the transit operator impose constraints on the performance of transit systems. The transit systems considered herein include the entire set of bus systems reporting to the American Public Transit Association (APTA) in 1975. The potential uses of productivity concepts are also presented. Although these concepts are presently being used to allocate funds in some states, there are other uses such as the establishment of clearly defined and measurable goals and objectives for urban transit. This report contains a list of references and a listing of urban bus transit systems as well as numerous tables charting the input/output variables used in trend analyses for 1972 (appendix).

NTIS No. PB 295-221 Price A08

A Comprehensive Analysis of Urban Bus Transit Efficiency and Productivity.
Part II: Labor Aspects of Urban Bus Transit Productivity.

Sinha, K.C., and D.B. Dobry, Jr. Purdue University. UMTA-IN-11-0003-79-3, December 1978, 112p. (4 rpts).

This document is the second report of a three-report study regarding urban bus transit performance. It provides an examination of the driver productivity issues and attempts to identify the factors that may have a critical influence on system productivity and operating cost. A set of labor contracts are reviewed in detail,

and stipulations bearing on driver productivity are analyzed. Three specific productivity measures are considered: vehicle-miles per driver-hour, vehicle-hours per driver, and vehicle-hours per driver hours. Possible actions to improve each of these measures is reviewed. A statistical analysis is performed to examine the financial aspects of driver productivity. This report recommends that a new approach in labor-management relationships be pursued providing increased responsibility for labor, in addition to the concerted efforts for recognizing and rewarding individual and collective performance.

NTIS No. PB 295-222 Price A06

A Comprehensive Analysis of Urban Bus Transit Efficiency and Productivity.
Part III: Analysis of Options to Improve Urban Transit Performance.

Sinha, K.C., and A.S. Bhandari. Purdue University. UMTA-IN-11-0003-79-4, December 1978, 195p. (4 rpts).

This study was undertaken to analyze options for improving transit performance with particular emphasis upon bus transit systems in small to medium-sized urban areas. A methodology is developed to evaluate the impact of small changes in three operational policy variables, namely: frequency, number of bus stops, and fare along a fixed bus route. Analytical expressions are derived that trace the impact of each variable upon various other system variables leading to an assessment of changes in selected measures of efficiency and effectiveness. The application of the methodology is demonstrated with a case study of a selected bus route in a medium-sized Indiana city. The results indicate that significant improvements can be achieved in most of the efficiency and effectiveness measures considered. Finally, the reliability and maintenance aspects of a bus transit system are investigated using repair data from the City of Anderson transportation system, Indiana. This data is used in a simulation model using GASP IV to investigate the effect of increasing the number of mechanics and the number of spare buses upon the overall dependability of the transit system.

NTIS No. PB 295-223 Price A09

The Effect of Organization Size and Structure on Transit Performance and Employee Satisfaction.
Final Report.

Fielding, G.J., et al. University of California. UMTA-CA-11-0016-79-1, December 1978, 182 p.

This report summarizes the objectives and results of research designed to assess the relationships between structural, attitudinal, and performance variables in 16 selected California public mass transit systems representing various sizes and organization types. Data was collected from organizational archives, personal interviews, management surveys, and on-site observation. Statistical tests determined the existing relationship between key structural attitudinal and performance variables. The results were interpreted in the context of organizational behavior and management. Implications for the design of transit organizations are also discussed. The highlight of this analysis is that the impacts of structural variables upon employee attitudes and organizational performance need to be assessed in an interactive framework.

NTIS No. PB 296-629 Price A09

16. TRANSPORTATION PRODUCTIVITY AND EFFICIENCY

Performance Measures for Public Transit Service.
Final Report.

Fuller, E. California Department of Transportation. UMTA-CA-09-8001-79-1, December 1978, 115p.

The objective of this study is to evaluate existing and proposed transit systems. The report identifies definitional, institutional, and technical difficulties associated with developing transit performance measures (TPM) for use in evaluating public transit service. A survey is made of contemporary evaluation processes and is evaluated in terms of their purpose. The procedures used by the California Department of Transportation in developing its list of TPMs is described herein, as well as suggested methods for developing performance standards. The linking of TPMs to funding strategies is also discussed. This report recommends further refinement and verification of the research methodology.

NTIS No. PB 294-955 Price A06

Proceedings of the First National Conference on Transit Performance, Norfolk, Virginia, September 18-21, 1977.

Public Technology, Inc. UMTA-DC-06-0184-78-1, January 1978, 167p.

The first National Conference on Transit Performance was held in Norfolk, Virginia, September 18-21, 1977. This conference reflects a major effort aimed at clarifying the issues related to transit performance and developing recommendations for actions which could be taken to improve transit performance. Two hundred persons broadly representative of local government, transit management and labor, city and regional planning organizations, educational institutions, transportation consulting firms, and State and Federal agencies met in Norfolk to exchange ideas on transit performance. This document contains the proceedings of the conference, namely: the addresses, the issue and resource papers, and summaries of the problems and recommendations developed in workshop sessions. Subject papers include: Trends in transit performance; Concepts and indicators, Revenue policy and pricing; Service characteristics; Labor-management relations; Internal management; Transit performance indicators; Case studies of New York City, Southern California Rapid Transit District, and Seattle Metro; and Effects of fare changes. This report also contains an annotated bibliography and lists of conferees, members of the planning group, and technical advisors.

NTIS No. PB 291-032 Price A08

The Productivity and Efficiency of Inputs in the Provision of Transportation Services of the Southeastern Pennsylvania Transportation Authority.
Final Report.

Allen, W.B. University of Pennsylvania. UMTA-IT-09-0073-79-1, May 1979, 51p.

This project was developed as part of a larger program of research, namely, a study of human resource development in the Southeastern Pennsylvania Transportation Authority (SEPTA). The objective is to provide an elementary theory about productivity, efficiency, and performance standards so that the case study of SEPTA has a basis in accepted theory. This paper empirically examines the performance of SEPTA vis-a-vis other transit operations in the U.S. and Canada on the basis of a number of performance measures deemed

most suitable. A comparison is also made with the measures utilized by the recent Booz, Allen & Hamilton study (1977). Overall, the results stated in this report tend to support the initial impression given by the simple, uncontrolled productivity and cost measures; it is costing more than it has to in order to produce the vehicle miles and vehicle hours of service of SEPTA. (See also IT-09-0073-79-2).

NTIS No. PB 298-161 Price A04

Transit Productivity: Improvement through Management Training and Development Final Report.

Goldberg, J., et al. City University of New York. UMTA-NY-11-0019-79-1, June 1979, 229 p.

The Center for Productive Public Management undertook this project in response to an increased concern for mass transit productivity. This report analyzes transit productivity and discusses the transit management/productivity relationship in detail. It delineates specific transit management problems and discusses the value and validity of management training and development programs as solutions to these problems. Specifically, the report serves as a handbook for the implementation and evaluation of transit management/productivity training programs for both large and small properties. This report is based on independent research and input from managers of transit properties across the country, as well as on input from transit academics, transit users, elected officials, and attendance at transit performance conferences and seminars.

NTIS No. PB 299-369 Price A11

17. URBAN GOODS MOVEMENT

Goods Transportation in Urban Areas - GTUA III: Proceedings of the Third Engineering Foundation Conference, Sea Island, Georgia, December 4-9, 1977.

Fisher, G.P., editor. Engineering Foundation Conference. UMTA-FHWA-PL-78-012, June 1978, 824 p.

A five-day conference to explore contemporary issues in urban goods movement (UGM) was organized by representatives of the Transportation Research Board, American Society of Civil Engineers, Institute of Transportation Engineers, and the Federal Highway Administration. The Third Conference on Goods Transportation in Urban Areas was held at the Cloister, Sea Island, Georgia, December 4-9, 1977, under the auspices of the Engineering Foundation. Five specific topis were probed and reported upon by workteams: traffic engineering and design to facilitate UGM; impact of local government regulations; interface between Federal regulations and UGM; UGM in regional system planning; and locating and servicing major urban freight generators. In addition to probe group reports and recommendations, there are presented 40 keynote, summary and resource papers covering such topics as data requirements, time value of cargo, service trucks, terminal design and location, transportation system management, planning methodology and case studies, intermodal transfer, freight regulation and economics. Two previous conferences having the same title are reported in report FHWA-32-01-23, February 1974, and DOT-OS-60099, May 1976--both reports were published by the U.S. Department of Transportation.

NTIS No. PB 286-105 Price $21.50

Methodology for Determining Urban Goods Consolidation Terminal Investment and Location Decisions: Executive Summary.

Clark, G.M., and W.B. Ashton. The Ohio State University. UMTA-OH-11-0001-78-4, December 1977, 28p.

This report constitutes one of the final reports for a study to develop an urban terminal investment model (UTIM) for use by planners in designing and evaluating a system of urban goods consolidation terminals for small shipments to reduce the cost of picking up and delivering these shipments in the Central Business District (CBD). It is a summary of two related reports: 1) A Methodology for Determining Characteristics of Small Shipments (PB 279-649), and 2) The Location and Sizing of Urban Freight Terminals with Multiple Planning Periods: The Urban Terminal Investment Model (UTIM) (PB 286-490). The study describes a planning methodology for designing the system which is applied in two phases: 1) the data collection phase that involves interviews with shippers and receivers; a simulation of estimate truck travel times; and a sampling study to estimate vehicle loading and queuing time; and 2) the investment phase which involves the application of a UTIM to determine least-cost terminal investment, location, and operation decisions. Results herein indicate that significant savings in pickup and delivery costs could be realized through the use of a consolidation terminal.

NTIS No. PB 288-760 Price A03

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