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BY THE COMPTROLLER GENERAL

# Report To The Congress

OF THE UNITED STATES

## Better Justifications Needed For Automated People Mover Demonstration Projects

The Urban Mass Transportation Administration has established a program to demonstrate whether automated people mover systems are workable solutions to downtown transit problems. These systems are driverless vehicles operating on fixed guideways.

The program includes nine projects with a potential cost to the Federal Government of nearly \$675 million. Four of these projects were added at congressional direction. The Federal agency states that four of the five projects that were not congressionally directed are needed to meet program objectives. However, it has not adequately clarified the unique contributions each project will make toward meeting the objectives or why fewer projects and existing information are not sufficient. In addition, the planned evaluation of these projects should be strengthened.



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COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

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To the President of the Senate and the  
Speaker of the House of Representatives

*CW 04/24/84*

This report discusses the need for the Department of Transportation's Urban Mass Transportation Administration to justify the need for each of the projects planned under its downtown people mover demonstration program and to improve its planned evaluation of these projects.

Copies of this report are being sent to the Director, Office of Management and Budget; the Secretary of Transportation; interested congressional committees; and other parties.

*James R. Stacks*  
Comptroller General  
of the United States

*AGC00079  
DLG 04/15/85*



D I G E S T

NEED TO JUSTIFY EACH PROJECT PLANNED

The Urban Mass Transportation Administration (UMTA) needs to justify why each planned people mover demonstration project is needed to achieve downtown people mover demonstration program objectives. Projects presently planned could cost the Federal Government about \$675 million. UMTA believes that people movers--driverless vehicles operating on fixed guideways--can be reliable and economic solutions to downtown transit problems.

In 1976 UMTA selected four cities--Los Angeles, California; St. Paul, Minnesota; Cleveland, Ohio; and Houston, Texas--for people mover projects and said that three other cities--Miami, Florida; Detroit, Michigan; and Baltimore, Maryland--would be permitted to develop people movers if they could do so with existing grant commitments. In 1977 the House-Senate Appropriations Conference Committee told UMTA to consider ~~Baltimore~~, Indianapolis, Indiana; Jacksonville, Florida; and St. Louis, Missouri, as part of the program. UMTA also added Norfolk, Virginia, to the program. Cleveland and Houston later withdrew. (See p. 4.)

The May 1980 estimated Federal share of the nine remaining projects was \$675 million. UMTA had spent about \$14.4 million on these projects through fiscal year 1979. (See p. 8.)

UMTA has not adequately shown why each of the presently planned projects is needed to meet program objectives. UMTA program officials believe that multiple projects are necessary to: (1) assure that at least

one project is implemented, (2) test different technologies (even though only technologies successfully operating elsewhere are to be used), (3) minimize the risk of failure to meet project expectations (for example, if a lone project failed to meet expectations, the people mover concept for downtown use could be discredited), and (4) reflect local differences such as climate and economic conditions which might affect project results. (See p. 10.)

These arguments do not justify the potential \$675 million Federal investment in nine people mover demonstration projects. An UMTA official acknowledged that perhaps three to five projects would be enough to show fundamental differences. If only the three most expensive projects were built, the Federal share would be reduced by about \$332 million.

GAO believes UMTA should justify why each project is necessary to meet program objectives. If this analysis affects congressionally directed projects, UMTA should seek further guidance from the Congress. (See p. 13.)

#### PROJECT EVALUATION PLAN NEEDS IMPROVEMENT

UMTA intends to compare people mover performances and impacts with selected alternatives such as bus and rail. These comparisons may not be conclusive because:

--The operating data of the transit alternatives will not reflect potential actions to improve their effectiveness and efficiency. For example, a downtown circulation bus system would operate more effectively and efficiently on one-way or bus-only streets than in mixed traffic. Comparing people movers with transit alternatives which are operating at less than optimum performance will not yield valid information about their relative cost effectiveness.

--UMTA's selection criteria do not assure that all potentially competitive alternatives are compared with each people mover project.

--Provisions have not been made to obtain data on alternatives. As a result, those alternatives might not be compared with people movers. Data could be developed by conducting studies of these alternatives where they are in operation. (See p. 18.)

The evaluation process also should determine why changes occur in such factors as ridership and congestion in people mover project areas. For example, an increase in transit riders may be caused by the attributes of the people mover itself or by a local decision to terminate commuter bus routes at people mover stations, or both. Failure to identify causes could lead to wrong conclusions about the potential effects of people mover projects in other cities. (See p. 21.)

The planned economic evaluation needs to be broadened to include regional as well as downtown impacts. Most transit operators and planning agencies are regional in scope. Further, regional funding is an important source of transit operating subsidies. The economic impacts of transit alternatives also need to be evaluated for comparison with people mover impacts. (See p. 22.)

Improving the evaluation process may cost more, but GAO believes such costs are warranted. The program's purpose is to develop decisionmaking information, and an improved evaluation process could affect the development of such information. (See p. 22.)

#### RECOMMENDATIONS

GAO recommends that the Secretary of Transportation direct UMTA to:

--Justify the need for each of the presently planned projects and seek guidance from the

Congress if congressionally directed projects are affected by this justification process.

- Strengthen the planned comparisons between people movers and transit alternatives.
- Strengthen the evaluation process by identifying causes of changes in project areas and expanding economic evaluations. (See pp. 14 and 23.)

#### AGENCY COMMENTS

The Department of Transportation said (see app. I) that four of the projects were added at congressional direction and are not necessary to meet demonstration program objectives. The Department said that four of the other five projects not congressionally directed are necessary to meet program objectives and that each will make a unique contribution toward meeting those objectives. The Department did not show, however, how each of these projects is unique and therefore necessary to meet program objectives.

Further, the estimated cost of the projects still in the program has increased by over \$308 million since 1976. GAO, recognizing the increased concern about Federal budget deficits, believes that the Department needs to (1) clarify what each planned project, whatever the number, will contribute to meeting program objectives and (2) seek the advice of the Congress about the future direction of the program.

The Department said that its planned evaluation is adequate but indicated that certain actions will be taken and that its evaluation plan is being revised.

GAO believes that if the Department incorporates the planned actions in its revised evaluation plan and carries them out in the analysis, the information derived from the demonstration program will be more meaningful. GAO believes that these actions will generally respond to its recommendations.



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ABBREVIATIONS

AGT	automated guideway transit
GAO	General Accounting Office
OTA	Office of Technology Assessment
UMTA	Urban Mass Transportation Administration

## CHAPTER 1

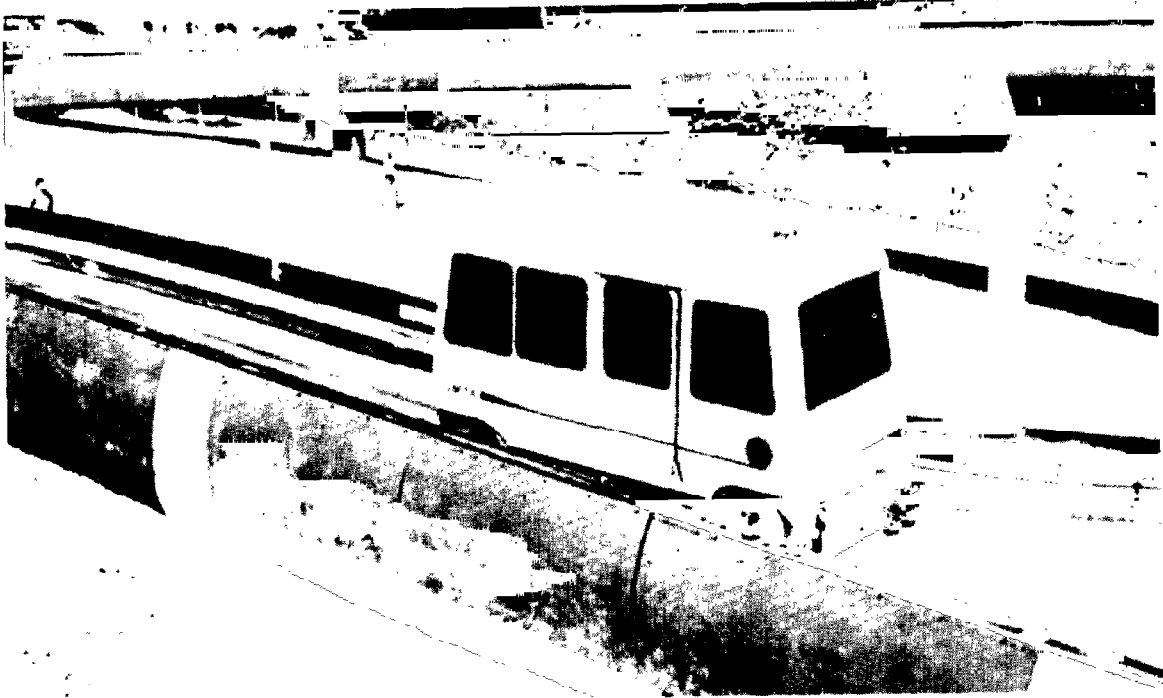
### INTRODUCTION

Increasing transit operating deficits, traffic congestion, and associated air pollution are among the problems facing major cities. The Department of Transportation's Urban Mass Transportation Administration (UMTA), which provides financial and technical aid to develop and improve urban mass transportation, believes that downtown people movers could help solve these problems.

People movers are driverless vehicles on fixed guideways. Vehicle capacities range up to 100 passengers and may be operated as single units or as trains up to 30 miles per hour. Headways (the time interval between vehicles moving along a main route) vary from 15 seconds to a minute. Examples of people movers are shown on pages 2 and 3.

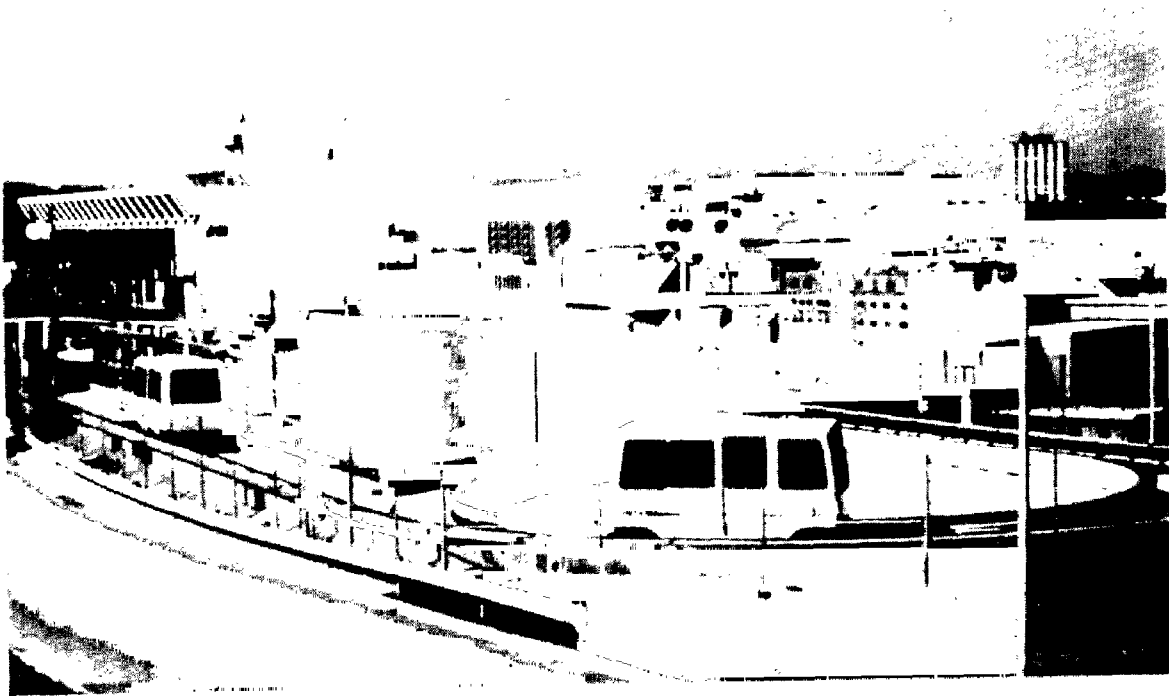
In September 1974 the Transportation Appropriations Subcommittee of the Senate Committee on Appropriations, recognizing local communities' increased interest in new types of fixed guideway systems, asked the Office of Technology Assessment (OTA) to investigate the value of personal rapid transit systems, a type of people mover. In May 1975 OTA reported on the social acceptability, economics, operations, and technology of automated guideway transit (AGT) systems in the United States and abroad. The OTA report stated that an urban demonstration project appeared justified and should concentrate on gathering economic and public acceptance data and on improving the system's technical operation.

In April 1976, in response to the OTA study, congressional and local interest, and ever-increasing transit operating deficits, UMTA announced its program to demonstrate the benefits of people mover systems in urban downtown areas. The objectives of the people mover demonstration program are to test the operating cost savings AGTs might deliver and to assess their economic impacts on the central cities. UMTA recognized that various people-mover-type systems had proven effective in airports, recreation parks, hospitals, and universities and wanted to test their feasibility and public acceptance in a city environment.



**MORGANTOWN SYSTEM, UNIVERSITY OF WEST VIRGINIA, MORGANTOWN.  
MANUFACTURER: BOEING COMPANY.**

SOURCE: URBAN MASS TRANSPORTATION ADMINISTRATION

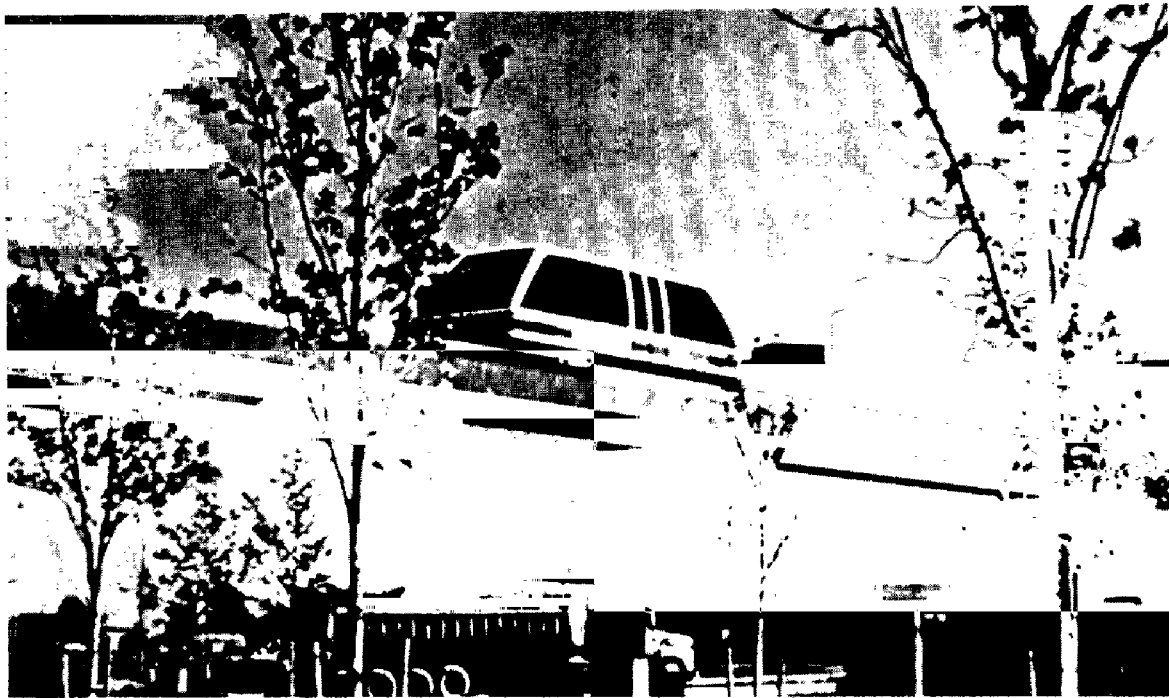


**MORGANTOWN SYSTEM.**

SOURCE: URBAN MASS TRANSPORTATION ADMINISTRATION.



**TAMPA INTERNATIONAL AIRPORT, TAMPA, FLORIDA.**  
**MANUFACTURER: WESTINGHOUSE ELECTRIC CORPORATION.**  
**SOURCE: URBAN MASS TRANSPORTATION ADMINISTRATION.**



**FAIRLANE SHOPPING CENTER, DEARBORN, MICHIGAN.**  
**MANUFACTURER: FORD MOTOR COMPANY.**  
**SOURCE: URBAN MASS TRANSPORTATION ADMINISTRATION.**

Formal proposals were submitted by 38 urban areas. In December 1976 UMTA selected Cleveland, Ohio; Houston, Texas; Los Angeles, California; and St. Paul, Minnesota, as demonstration cities. UMTA estimated, based on the local estimates, that \$220 million in Federal funds would be required to implement people mover systems in these four cities. In addition, UMTA advised Detroit, Michigan; Baltimore, Maryland; and Miami, Florida, that their proposals were good enough to permit funding from existing Federal transit commitments to these cities, subject to specific conditions established by UMTA for each city.

The House-Senate Appropriations Conference Committee report on the Department of Transportation's fiscal year 1978 appropriations request stated that people mover projects in Jacksonville, Florida; St. Louis, Missouri; Indianapolis, Indiana; and Baltimore should be considered for funding under the regular UMTA capital grant program. UMTA determined that if they applied, Baltimore, Indianapolis, Jacksonville, St. Louis, and Norfolk, Virginia, could be awarded technical study grants to conduct feasibility studies and further refine their proposed projects. UMTA included Norfolk because, after the four cities were added at congressional direction, it was the only one of the 11 finalist cities in UMTA's selection process not in the program.

In November 1977 Cleveland's newly elected mayor decided not to participate because he believed the people mover would have a negative impact on both the city's neighborhoods and downtown area. In August 1979 Houston also withdrew from the program because it concluded that other options were more cost effective than people movers for meeting its downtown transit needs. Detroit and Miami elected to proceed with their respective projects with previously committed funds. As of May 1980, nine cities remained in the demonstration program. (See p. 6.)

Due to congressional consideration, UMTA has separated the people mover cities into two tiers. Tier I cities have been awarded preliminary engineering funds. Tier II cities have been awarded grants to conduct feasibility studies and to further refine their projects.

The following tables show cost and other data from the June 1976 people mover proposals and a May 1980 status report.

Selected Information on 11 Finalist Cities  
from June 1976 Proposals (note a)

<u>Project cities</u>	<u>Tier</u>	<u>Estimate in 1976 dollars</u> (millions)	<u>Shape of structure</u>	<u>Route length</u> (miles)	<u>Number of stations</u>	<u>Estimated annual patronage</u> (millions)
Cleveland (canceled)	-	<u>b/</u> \$52.1	Single-lane loop	2.0	10	13.0
Houston (canceled)	-	39-40	Double-lane shuttle and loop	1.1	8	6.6
Detroit	I	<u>b/</u> 55.4	Single-lane loop	2.3	11	7.5-9.8
Los Angeles	I	<u>c/</u> 167.0	Double-lane shuttle	3.4	11	18.0
Miami	I	83.4	Double-lane shuttle and loop	3.3	15	<u>d/</u> 14.7-20.3
St. Paul	I	48.2	Two-line double-lane shuttle	2.6	10	13.0
Baltimore	II	25.0	Double-lane shuttle	1.7	9	4.2-5.2
Indianapolis	II	50.2	Single-lane loop	3.5	11	7.3
Jacksonville	II	41.1	Double-lane shuttle	1.9	7	14.7
Norfolk	II	30.7	Double-lane shuttle	1.7	6	7.9
St. Louis	II	43.5	Double-lane loop	3.7	12	5.5

a/Data from the proposals varies significantly from one city to another. A contractor-prepared summary of the 38 project proposals pointed out that the level of detail and the accuracy of information depend on each city's past planning activities related to people mover systems and its familiarity with the technology. Cost projections of the various systems are not based on similar dollar years and assumptions and therefore cannot be compared.

b/1978 dollars.      c/1980 dollars (includes \$34 million for auto/bus intercept facilities).

d/Assuming weekday ridership projected in proposal occurs 365 days a year.

Cost Estimates And Status For Nine

Projects In Program As Of May 1980

City	Phase (note a)	Cost		Estimated starting date	Estimated completion date
		Total	Federal		
(millions)					
Tier I (note b):					
Los Angeles	Pre. Eng.	\$ 4.8	\$ 4.1	1/78	4/80
	Constr.	175.0	118.1 c/25.0	6/80	3/84
St. Paul	Pre. Eng.	2.0	1.7	9/77	11/80
	Constr.	115.0	92.0	1/81	10/84
Miami	Pre. Eng.	2.3	1.8	11/78	10/80
	Constr.	76.0	50.6	12/80	9/84
Detroit	Pre. Eng.	1.8	1.4	9/78	9/80
	Constr.	120.0	96.0	11/80	8/84
Total Tier I		<u>\$496.9</u>	<u>\$390.7</u>		
Tier II (note d):					
Baltimore	Feas. Sty.	\$ 0.3	\$ 0.2	3/80	6/81
	Pre. Eng.	1.5	1.2	9/81	9/83
	Constr.	40.0	32.0	11/83	8/87
Indianapolis	Feas. Sty.	0.3	0.2	4/77	7/80
	Pre. Eng.	1.5	1.2	10/80	10/82
	Constr.	75.0	60.0	12/82	9/86
Jacksonville	Feas. Sty.	0.6	0.4	5/78	12/79
	Pre. Eng.	1.9	1.5	5/80	5/82
	Constr.	120.6	96.5	7/82	4/86
Norfolk	Feas. Sty.	0.1	0.1	7/78	6/80
	Pre. Eng.	1.5	1.2	9/80	9/82
	Constr.	46.0	36.8	11/82	8/86
St. Louis	Feas. Sty.	0.2	0.2	11/79	3/81
	Pre. Eng.	1.5	1.2	6/81	6/83
	Constr.	65.0	52.0	8/83	5/87
Total Tier II		<u>\$356.0</u>	<u>\$284.7</u>		
Total		<u>\$852.9</u>	<u>\$675.4</u>		

a/Pre. Eng.--preliminary engineering; Constr.--construction;  
Feas. Sty.--feasibility study.

b/Construction cost estimates for Tier I cities are based  
on preliminary engineering results.

c/Los Angeles anticipates these funds from the Federal Highway  
Administration for parking facilities at people mover  
stations.

d/For Baltimore, Indianapolis, Norfolk, and St. Louis, con-  
struction costs are based on estimates included in 1976  
proposals escalated at 7 percent annually into 1983 dollars.  
For Jacksonville, construction cost estimates are based on  
1979 feasibility study results. Funding for preliminary  
engineering for Tier II cities does not assure commitment  
for project implementation. Also, estimated dates for Tier  
II cities indicate earliest possible occurrence (based on  
present project status) and do not reflect anticipated  
delays.



## CHAPTER 2

### NEED FOR EACH OF THE PRESENTLY

### PLANNED DEMONSTRATION PROJECTS

### HAS NOT BEEN JUSTIFIED

Although UMTA is proceeding with nine demonstration projects, it has not shown why each of the presently planned projects is necessary to achieve program objectives. In addition, some indications are that people movers may not be cost-effective solutions to downtown transit problems. The Federal share for each project averages about \$75.4 million, ranging from \$33.4 million to \$147.2 million. The Federal share for the nine projects totals about \$675 million. UMTA has spent about \$14.4 million on the projects--including the two which were canceled--through fiscal year 1979.

### PROJECTS' COST EFFECTIVENESS HAS NOT BEEN ESTABLISHED

UMTA's people mover program director believes that people movers are the only mass transit technology with the potential for paying operating and maintenance costs from fare-box revenues. However, the cost effectiveness of people movers to solve downtown transit problems has not been established.

Detailed evaluations of the relative cost effectiveness of the nine people mover projects have not been conducted. Under present evaluation plans, such determinations will not be made until after the projects have been built and are operating. UMTA has a policy requiring an analysis of transit alternatives whenever a fixed guideway project is proposed. Federal support will be available only for those alternatives which the analysis has demonstrated to be cost effective.

The policy specifically exempts from analysis those projects determined by UMTA's Administrator to be demonstrations of advanced technology. People mover demonstration projects are mentioned as an example of such an exemption. However, any people mover project proposed beyond the demonstration program will not be exempt from analysis and will have to be shown to be a cost-effective transit alternative to be eligible for Federal support.

Although detailed analyses of the nine projects' cost effectiveness have not been developed, other studies have

## SCOPE OF REVIEW

We reviewed the people mover program because the announced \$220 million commitment for four similar demonstration projects was to be funded from UMTA's discretionary capital grant resources and because of the probability that the commitment would increase as project cost estimates and the number of projects increased. Further, we believed it was essential that the demonstration program develop meaningful information to assist Federal and local decision-makers in evaluating people movers' potential to be cost-effective solutions to downtown transit problems.

Accordingly, we concentrated our review efforts on UMTA's rationale for the program, the need for multiple projects, program goals, and proposed project evaluations. We did not, however, attempt to evaluate the merits of the individual people mover projects in the program.

We conducted our review at UMTA headquarters in Washington, D.C., and its San Francisco regional office; State transportation agencies in California and Florida; local transit systems in Detroit, Houston, Los Angeles, Miami, and St. Paul; and a local planning agency in Los Angeles. We reviewed the applicable Federal mass transportation laws and regulations and records and reports pertaining to the people mover demonstration program and projects in the 11 cities. We interviewed UMTA, State, and local transportation officials and other persons having an interest in the program or specific projects. We discussed our review with Office of Technology Assessment officials. We also discussed our work with a U.S. Department of Transportation Office of Inspector General official and reviewed the office's audit efforts, but these efforts were not considered germane to our review.

been or are being made. UMTA is conducting a research program on the estimated effects of introducing AGT systems, including people movers, into major activity centers.

As part of its research program, UMTA assessed the cost experiences of people-mover-type AGT systems operating in recreation parks, airports, and similar environments. UMTA concluded from 10 of these assessments that potential AGT applications existed which would be competitive with conventional transit systems. For example, the assessments showed that AGT operating and maintenance cost per vehicle mile was about two-thirds that of bus system cost. AGT operating and maintenance cost per passenger carried was only about one-third that of bus system cost.

While impressive, these figures are of limited use in reaching conclusions about the relative cost effectiveness of downtown people movers. The people movers were compared with urban bus systems rather than with downtown circulation bus operations only. Urban bus systems provide a variety of transit services, while circulation bus operations provide only the kind of service planned for the people mover projects. The cost characteristics of the two types of systems are not necessarily the same because of the differences in these services. For example, Houston's 1976 people mover proposal included a comparison between the city's urban bus and its downtown circulation bus systems. The comparison showed that circulation buses were more productive per hour and per mile of operation than the rest of the system. While this example may not be typical, it does indicate that caution must be used when drawing conclusions from comparisons between people movers and urban bus systems.

In February 1980 UMTA reported the findings of its research program. It concluded through a generic alternatives analysis that, where annual ridership exceeds 20 million passengers, AGT systems appeared to be cost effective compared with bus systems. However, only one of the nine projects still in the demonstration program had 1976 patronage estimates of at least 20 million passengers. UMTA's new systems alternatives program manager explained that people movers were not likely to be cost effective where ridership was less than 5 million and that the cost effectiveness of people movers where annual ridership was between 5-20 million could be determined only through site-specific evaluations.

In addition to UMTA's research, studies were made of the proposed people movers in Los Angeles and Houston. The study by the Houston Metropolitan Transit Authority led the authority's board of directors to conclude that a bus priority system including reserved lanes and transit

malls would be more cost effective than would an automated system. As a result of these findings, Houston withdrew from the people mover demonstration program in August 1979.

The Los Angeles study resulted in the July 1979 draft environmental impact statement on the people mover project. The report, developed by UMTA in cooperation with the city, estimated that the annual operating costs of the Los Angeles people mover alternative, which involved both bus and people mover services, would be about 14 percent more than a bus-only alternative. The study also estimated that the people mover would require three times more capital investment than the bus-only alternative.

ARGUMENTS FOR MULTIPLE PROJECTS  
ARE QUESTIONABLE

UMTA officials have cited the following reasons for planning multiple projects:

- To ensure that at least one project would be implemented.
- To test different technologies.
- To minimize the risk of failure to meet expectations.

These arguments are not sufficient to justify building each of the demonstration projects presently planned.

The first reason, to ensure that at least one project would be built, may have been valid when the program started because two of the four cities originally selected later withdrew from the program. An UMTA official acknowledged that four projects were initially approved because UMTA believed that one or more of those projects would not be built. However, it appears that the Los Angeles project will be built, thus reducing the present meaningfulness of the first argument.

A second reason given for building multiple projects is to test different technologies. However, this reason is not entirely consistent with UMTA's 1976 program plan, which stated that the agency intended the projects to use existing people mover technologies with minimum modifications for urban deployment. Further, the Secretary of Transportation, in announcing the original project selections in 1976, said that "our purpose is not to test technologies."

UMTA's Associate Administrator for Technology Development and Deployment said that UMTA's goal in requiring different technologies--to assure that at least three different system suppliers participate in the program--was business and marketing oriented. To this end, UMTA established a procurement policy requiring that the first three demonstration projects use different technologies. (UMTA had identified eight companies which had already deployed people movers and would therefore be eligible system suppliers.) The procurement policy was designed to ensure that after the projects had been completed, a viable and competitive group of suppliers would remain available for future deployments.

There is no assurance, however, that building nine people mover projects will result in a group of viable and competitive suppliers. Many factors go into a supplier's decision to enter a particular market, including long-term prospects for product demand. Funding nine projects, especially if many or all of the potential eight suppliers are awarded contracts, does not provide such long-term prospects because people mover deployments beyond the demonstration program are not assured.

UMTA's third reason for multiple projects is to minimize the risk of failure to meet project expectations. UMTA was concerned that if only one project were built, for example, and that project failed to meet expectations, the use of people movers in urban areas might be discredited. UMTA's people mover program director said a project would be considered successful if it achieved patronage forecasts and operated reliably.

Achieving patronage forecasts and operating reliably are not the only considerations. Cost effectiveness is the measure by which the success or failure of a people mover project ultimately must be judged. To be eligible for Federal funding under UMTA's policy, projects proposed beyond the demonstration program will have to be shown to be cost effective when compared with alternate solutions to transit problems. Further, there is no assurance that any of the nine presently planned demonstration projects will be cost effective. Therefore, while UMTA's concern about a lone project's possible failure to meet expectations is understandable, we believe this concern does not justify building each of the demonstration projects presently planned.

In addition to the above reasons for funding multiple projects, UMTA's Associate Administrator for Technology Development and Deployment pointed out that no two cities are alike and that results in one city will not necessarily

be the same in others. He said that climate (particularly warm versus cold climates) and general economic conditions (developing, stagnant, or deteriorating economies) are important differences which exist among cities.

We agree. Further, because no two cities are alike, successful people mover projects in several cities give no assurance they will succeed in others. Also, UMTA has not shown what climatic, economic, or other differences exist in each of the cities where projects are planned that would justify each project. UMTA's Associate Administrator for Technology Development and Deployment could not specify how many projects would be appropriate but said that three to five would be sufficient to show fundamental differences.

UMTA's Acting Administrator cited reasons for building multiple people mover demonstration projects during House hearings on UMTA's fiscal year 1978 appropriation request when he stated:

"We initially talked about up to three, because we had in mind that we wanted to see different cities in which different purposes would be served, under different operating conditions, and trying to achieve different services. Also, we had a hope or expectation that we will get deployment of more than one and hopefully three or four different systems manufactured by different companies.

"We will have to put it out for bid and see who wins. We are deploying hopefully the first of the four examples of a new market for these systems. They are intended to be operational and integrated into the operations of each city and they will have to be judged as operational pieces of the total transit system.

"The manufacturers are quite eager to have an opportunity to have their system selected and deployed."

While this statement summarizes UMTA's reasons for including multiple projects in the program, it still does not explain why each of the presently planned projects is necessary to illustrate these differences or to meet program objectives.

## FUNDING IMPLICATIONS FOR MULTIPLE PROJECTS

Although UMTA's people mover effort is considered a demonstration program, the Federal share for project implementation will be made available from UMTA's discretionary capital grant program. To the extent UMTA funds people mover projects from its discretionary capital grant resources, funds are not available for other projects within existing program authorizations.

The December 1976 announcement of the four cities selected for the program indicated that \$220 million in UMTA funds would be committed for those projects whose cost estimates made in 1976 totaled \$307.3 million. The May 1980 cost estimate for the nine projects still in the program was about \$853 million, as shown in the table on page 6. The estimated Federal share of this cost is about \$675 million, which represents about 11 percent of UMTA's \$6.1 billion discretionary capital grant funds for fiscal years 1980-1983.

The Federal share of the nine projects' cost averages about \$75.4 million, ranging from \$33.4 million to \$147.2 million. Obviously, if fewer than nine projects are determined to be sufficient to meet program objectives, the Federal share could be reduced substantially. If, for example, only the three most expensive projects were built, the Federal share would be reduced by about \$332 million over the next 8 years, or about \$42 million a year.

## CONCLUSIONS

UMTA has cited a number of reasons for building multiple demonstration projects. It may be that several projects would be required to illustrate the variables UMTA has identified. However, UMTA has not shown why each of the projects presently planned is needed to test these variables or to meet program objectives. The need for this justification is intensified because the cost effectiveness of people movers as solutions to downtown transit problems has not been established. The funding implications of building nine projects are significant because UMTA has estimated that they will require a total Federal capital investment of \$675 million, an average of \$75.4 million per project.

Therefore, UMTA needs to justify why each of the presently planned projects is needed to meet the program objectives and to show what each project will contribute to meeting them.

## RECOMMENDATIONS

We recommend that the Secretary of Transportation direct UMTA's Administrator to:

--Justify the need for each of the presently planned demonstration projects by specifically stating what program objectives are being addressed by each project and why these objectives cannot be met with fewer projects.

--Seek guidance from the Congress if the congressionally directed projects are affected by this justification process.

## AGENCY COMMENTS AND OUR EVALUATION

The Department of Transportation, in a June 24, 1980, letter (see app. I) said that nine projects are not essential to achieve program objectives. It also said it does not plan to fund nine people mover projects to fulfill the program objectives. It said it intends to provide construction funding only for the Tier I cities as part of the demonstration program if preliminary engineering warrants it and if the Congress appropriates sufficient funds.

The Department said that it believed that each of the four Tier I projects--Detroit, Los Angeles, Miami, and St. Paul--is necessary to achieve the people mover demonstration program objectives. The Department said that the Tier II projects in Baltimore, Indianapolis, Jacksonville, and St. Louis were added as a result of congressional direction (through the Department's fiscal year 1978 appropriations conference report) and that these projects were not required to meet program objectives. After the House-Senate Appropriations Conference Committee directed UMTA to include these cities, UMTA added Norfolk to the program.

Our point was not to pass judgment on the need for nine projects as stated by the Department, but to say that UMTA has not clearly stated what unique contribution each project will make toward meeting the program's demonstration objectives. This information is needed whether UMTA considers that it has a nine-project demonstration program, or a four-project demonstration program.

The Department stated that four of the five projects that were not congressionally directed will each make a unique contribution toward meeting the program objectives. The



Department did not show, however, how each of these Tier I projects is so unique that the objectives could not be met with fewer projects. Further, the Department did not explain why Norfolk is still in the program even though it was not congressionally directed and, according to the Department, not necessary to achieve program objectives.

The Department explained that its 1976 decision to proceed with four projects was based on (1) the desire to test the people mover concept under varying circumstances, (2) the recognition that one or more of the projects might not proceed into construction, and (3) the desire to test various technologies to compare their costs and performances and to maintain a viable people mover supplier industry. As we discussed on pages 10 and 11, we do not consider the latter two reasons sufficient to justify multiple projects.

It is still not clear what UMTA intends to accomplish by testing the people mover concept under varying circumstances. It should be noted that these circumstances were not cited as selection criteria in UMTA's 1976 site selection plan. These circumstances, as included in the Department's comments are (1) an expanding versus a decaying downtown, (2) a connector to an existing rail system (in one system); (3) a small versus a large downtown, (4) harsh versus warm climates, and (5) high patronage requiring large people mover vehicles versus lower patronage requiring smaller vehicles.

We believe that UMTA needs to show specifically what contribution each project will make to achieving the demonstration program objectives; i.e., what issues it hopes to address in each project, how this information will help in evaluating the potential of people movers as solutions to downtown transit problems in other cities, and why this information cannot be obtained by funding fewer projects or using existing information. For example, UMTA has not clarified its objectives in (1) determining people mover impacts on growing versus decaying downtowns or on small versus large downtowns or (2) comparing the results of a people mover which connects to an existing rapid rail line with those which do not. UMTA also needs to clarify how those objectives will be measured. Regarding harsh versus warm climates, people-mover-type systems have been operating in both warm and cold climates for some time. One UMTA demonstration project at the University of West Virginia in Morgantown, West Virginia, is an UMTA demonstration project and has been designed to function in both harsh (cold) and warm weather. UMTA officials have told us that the system functions well.

The last variable mentioned in the Department's comments is the need for different-sized vehicles due to different patronage levels. UMTA's people mover program director told us, however, that UMTA will not permit the cities to specify vehicle sizes in construction specifications because this might limit the vendors which could submit proposals.

The Department also took exception to our conclusion that there is no assurance that any of the nine presently planned projects will be cost effective. The Department mentioned a number of studies which it said supports its contention that people movers are likely to be cost effective in terms of transportation and economic impact.

We recognize that some positive transit and economic impacts are indicated in the studies referred to by the Department. However, conclusions drawn from even the most thorough of studies do not assure that a project will be cost effective. Further, the studies cited by the Department also raise questions about the cost effectiveness of people movers. For example, UMTA's generic alternatives analysis study (discussed on p. 9) concluded that people mover deployments where annual ridership exceeds 20 million passengers incur a lower cost per passenger than buses. However, only one of the 1976 people mover proposals indicated an annual ridership exceeding 20 million passengers. Further, cost effectiveness determinations for deployments with annual ridership between 5 and 20 million can be made only through site-specific evaluations. Eight of the nine projects still in the program had 1976 ridership projections in this range.

The Department also said that the draft environmental impact statements for the Tier I cities indicate that significant economic and revitalization benefits will result from people mover systems. These studies, however, also raise questions about people movers' cost effectiveness. For example, the May 1980 Miami draft environmental impact statement concludes that daily people mover patronage will be about 7 percent more than bus patronage at about the same operating cost. However, the people mover will have an \$84 million capital cost compared to \$12 million for the bus alternative. Thus, it will cost an additional \$72 million to increase ridership by 7 percent. Another example was the Los Angeles draft environmental impact statement (discussed on p. 10). That study indicates that a bus alternative is more cost effective than a people mover.

We believe that without conclusive evidence that people movers are cost effective solutions to downtown transit problems, the Department should be cautious about how many projects it funds--particularly since the average cost of the nine projects in May 1980 was about \$95 million. In this regard UMTA's April 1979 policy statement states that construction funding for Tier II cities will start only after some successful experience has been gained in one or more Tier I cities. Even this caution may be inadequate because over a period of time momentum tends to build to complete a project regardless of the results of subsequent information about a project's merits. Further, as illustrated on page 6, this statement seems to contradict UMTA's estimated earliest possible dates for beginning construction in Tier II cities (based on present project status and not reflecting anticipated delays), which precede the earliest completion dates of the Tier I projects.

We are not convinced that the cost effectiveness of people mover projects is assured. Further, we are not satisfied that the Department has shown what it expects to gain from each project and why this information is necessary. In addition, the estimated cost of the projects still in the program has increased by \$308 million since 1976. Considering these factors and the average \$75.4 million Federal investment required for each project ultimately built, we believe the Federal Government should fund only those people mover demonstration projects which will provide information--not obtainable from other projects--needed to evaluate people movers' potential for solving downtown transit problems in other cities. Accordingly, recognizing the increased concern about the Federal budget deficit, we believe UMTA needs to clarify what each project it intends to build, whatever the number, will contribute to meeting program objectives and seek the advice of the Congress on the future direction of the program.

## CHAPTER 3

### PROGRAM EVALUATION PLAN NEEDS IMPROVEMENT

The people mover demonstration program was designed to provide operating data, planning tools, and experience for use by other communities seeking solutions to similar problems of downtown circulation. Accordingly, UMTA developed an evaluation plan. UMTA plans to spend about \$5 million on a national evaluation and evaluations of the four Tier I projects. UMTA plans to evaluate people mover performances and impacts, compare the projects with selected transit alternatives, and establish findings and conclusions which are transferable to other cities.

The proposed evaluation process needs to be strengthened or broadened in three areas: comparing people movers with other solutions to downtown transit problems to determine their relative cost effectiveness; determining the reasons for changes in such things as ridership and traffic congestion in the people mover project areas; and evaluating economic impacts of people movers and other transit alternatives.

UMTA's manager for assessing project impact told us that the evaluation plan is being revised and that the above issues will be considered.

### COMPARISONS OF PEOPLE MOVERS WITH OTHER TRANSIT SOLUTIONS SHOULD BE STRENGTHENED

As discussed in chapter 2, people mover projects proposed beyond the demonstration program will have to be cost-effective solutions to downtown transit problems to be eligible for Federal funding under UMTA's policy. Comparisons of people mover performances and impacts with alternate means for providing downtown transit service are necessary to help Federal and local officials plan the best solutions to local transit problems. To provide meaningful information, however, UMTA's planned comparisons should be strengthened so that

- the operating costs and performances of alternatives are adjusted to reflect potential improvements before comparisons are made,
- each people mover project is compared with all competitive alternatives, and

--data on alternatives is developed if not otherwise available.

UMTA's present evaluation plans do not adequately provide for these factors.

Potential improvements to transit alternatives should be addressed

Potential improvements to increase the operating efficiency and effectiveness of transit alternatives to people mover projects need to be addressed before they are compared. If the effects of these improvements are not accounted for, the comparisons will be biased in favor of the people movers, reducing the value of information obtained from the comparisons.

For example, people movers operate on their own guideways, do not compete with other traffic, and avoid traffic congestion delays. On the other hand, downtown circulation bus systems generally compete with other traffic, resulting in delays and inconsistent service. These local circulation bus systems (often called minibus systems because they frequently operate with small buses) are a common public transit method of moving people in a downtown area. Comparing a people mover with a minibus system operating in mixed traffic does not reflect a minibus system's potential for solving downtown transit problems. Easing minibus movements should improve operating efficiency and effectiveness. Such efforts might include operating buses on one-way streets or in lanes reserved for buses only or by minimizing left turns against traffic.

Another problem with minibus systems is that bus transit operators have expressed dissatisfaction with existing small bus life, durability, and maintenance ease. Comparing a people mover project with a minibus system using buses which experience these problems also biases the comparisons in favor of the people movers. The comparison should be made only after accounting for improved operations resulting from using more reliable vehicles in a local circulation bus system.

Not all competitive alternatives will be compared with people movers

UMTA and the local grantee will jointly select the alternatives to be compared with each people mover project. The alternatives to be considered in each case include standard bus, minibus, light rail, heavy rail, and AGT. One to three alternatives will be chosen.

UMTA's selection criteria are (1) the nature, quality, and assessability of data for each alternative considered, (2) the competitive potential, and (3) potential redundancy where the same alternative is being compared with more than one demonstration project. These criteria will not ensure that all competitive transit alternatives are compared with each people mover project.

For example, the absence of data or the unacceptable nature or quality of data could lead UMTA and the local grantee to reject a particular alternative regardless of its potential for solving local downtown transit problems.

Also, a transit alternative could be eliminated from the comparison process because it is not considered to have realistic competitive potential for providing the necessary transit service. This could occur because, as discussed in the previous section, potential improvements to the alternative to increase its operating effectiveness and efficiency have not been considered.

Finally, a transit alternative could be eliminated from the comparison process in some cities because it is being compared with one or more other people mover projects. The same alternative, however, could be the best solution for solving downtown transit problems in each of the demonstration cities.

#### Need to develop data on alternative transit systems

UMTA officials said that data on some transit alternatives is not readily available. The absence of such information could result in not comparing potentially competitive transportation alternatives with people movers. This data--cost, revenues, patronage, and other information reflecting the alternatives' operational efficiency and effectiveness--is critical if the people mover demonstration program is to generate meaningful decisionmaking information.

UMTA has established precedents for conducting studies to obtain otherwise unavailable information. As noted on page 9, UMTA assessed the costs of a number of AGT systems. Similar assessments of costs and performance experiences of alternatives to people movers would be appropriate if the data on these transportation alternatives is not otherwise available. Data generated from these assessments would permit comparisons to be made based on more complete information and would avoid the need to reject an alternative only because data is not available.

UMTA's manager for assessing project impact said the people mover evaluation process will attempt to identify available information and that if data is not available for alternatives, studies to develop it would be desirable.

CAUSES OF CHANGES IN PROJECT AREAS  
SHOULD BE IDENTIFIED AND EVALUATED

Each of the proposed people mover projects contemplate associated capital improvements and operating procedure changes. These developments will probably affect people mover patronage and other factors such as traffic flow and pollution. For example, central business district fringe parking areas and transfer facilities between commuter bus routes and the people mover are planned for the Los Angeles project. These facilities should make it easier for people who drive their cars or ride commuter buses to leave them at the downtown fringe areas and continue the trip on the people mover. Los Angeles officials also plan to change operating procedures by terminating some commuter bus routes at people mover stations, forcing commuters to use the people mover or find some other way to complete their trip.

UMTA's evaluation plan does not, however, adequately provide for determining whether changes are caused by the people mover or by other capital improvements and operating procedure changes. For example, what would the people mover impacts be if some or all of these associated developments were not implemented? Or, conversely, what would be the impacts of various transportation alternatives if some or all of the people-mover-associated developments were implemented without the people mover?

We believe such questions need to be answered. Otherwise, Federal and local officials might conclude erroneously that the people mover projects caused changes in ridership, congestion, economic development, and so forth, while other factors actually caused or contributed to the changes.

UMTA's people mover impact assessment project manager said that an analysis of causes of changes is very important. He said that the examples cited for Los Angeles were significant. He pointed out that UMTA intends to identify and evaluate causes of changes associated with people movers and that the evaluation plan could be clarified.

## ECONOMIC AND DEVELOPMENT EVALUATION NEEDS TO BE BROADENED

UMTA plans to evaluate the economic impacts of improved downtown circulation systems. This evaluation will be limited to the downtown area and will consider only the economic impacts of the people mover projects. This evaluation needs to be broadened.

Assessing the economic impacts of improved downtown circulation systems will require an evaluation of the impacts of various transit alternatives for making such improvements. A bus system, for example, will not necessarily have the same effect on the economy as a people mover. An evaluation limited to people movers will result only in an assessment of their economic impact rather than the impacts of improved downtown circulation systems.

The regional economic effects of improved downtown circulation systems should also be considered. Otherwise, Federal and local officials will not be able to determine whether any identified economic and development impacts represent regional economic increases or only shifts from the suburbs or other parts of the city to the downtown area. The local decisionmaking process could be influenced by such information because most urban public transit operators and planning organizations are regional in scope. Further, regional funding is an important source of transit operating subsidies.

## CONCLUSIONS

UMTA's planned evaluation of people mover deployments needs to be strengthened in several areas. The people mover demonstration program's reason for being is to develop information about people mover potential for solving downtown transit problems. The evaluation process is the means by which this information is developed from project deployments. If the evaluation process leaves questions unanswered or if program results are inconclusive, transit decisionmakers will have learned little about the merits of people movers as solutions to downtown transit problems.

We recognize that it may cost more to develop additional information and broaden the evaluation but believe such costs are warranted. UMTA plans to spend about \$5 million for a national evaluation and evaluations of the four Tier I projects. This amount represents only about 1.3 percent of the Federal share of those projects. Doubling or even tripling this percentage would not be a material cost in relation to the total proposed investment. On the other hand, because the



demonstration program's reason for being is to develop decisionmaking information, strengthening the evaluation process could determine whether adequate information is developed and consequently whether program objectives are achieved.

#### RECOMMENDATIONS

We recommend that the Secretary of Transportation direct UMTA's Administrator to:

- Compare each people mover project with all potentially competitive transit alternatives.
- Adjust the cost and performance data of transit alternatives for the effects of actions to improve their operating efficiency and effectiveness before comparing them with people mover projects.
- Conduct studies of transit alternatives to develop cost and performance information if it is not readily available. These studies should reflect efforts to improve the alternatives' operating efficiency and effectiveness.
- Clarify the evaluation plan for determining why changes occur in such factors as ridership and congestion in people mover project areas.
- Evaluate economic impacts of transit alternatives as well as people movers.

#### AGENCY COMMENTS AND OUR EVALUATION

The Department disagreed with our conclusion that the planned evaluation is inadequate and needs strengthening. The Department concluded, however, that it essentially agrees with us about what is required to evaluate the demonstration projects, except for a regional economic analysis, of which the Department said that the difference of opinion is probably only about the degree of analysis required. The Department's comments on our recommendations follow.

The Department said it believes the existing evaluation plan already requires that all competitive transit alternatives be considered. However, the plan indicates that as few as one alternative will be chosen for comparison. The plan also states that an alternative could be excluded from comparison with a particular project if that same alternative was being compared with another project. The same alternative,

however, could be the best solution for solving downtown transit problems in each of the project cities. We believe the Department's position to consider all competitive alternatives should be reflected in the revised evaluation plan to eliminate any doubt about the alternatives to be included in the comparison.

The Department said it believes data on transit alternatives is available but if not, additional data will be collected. We believe this is appropriate.

The Department said that identifying the causes of impacts is the essence of impact analysis and that a more elaborate methodology of determining the causes of impacts will be included in the revised evaluation plan. We believe clarifying the plan and including more explicit methodology will strengthen the evaluation process.

In our draft report we suggested that UMTA should expand economic evaluations to regional as well as downtown impacts. We did not include this suggestion as a recommendation in the final report. The Department said it does not plan to do a definitive study of regional economic impacts which might be caused by people mover systems because past regional analyses have proven to be costly and inconclusive. We recognize the problems involved in conducting a broad-based regional economic analysis but believe regional data is important, particularly in determining whether any economic stimulus in a people mover project area represents a net regional increase or only a shift to the downtown area from other parts of the region. The Department said, however, that it would conduct some selective macro-level analyses of regional impacts to identify any intra- or inter-regional trends. We believe these analyses should help the evaluation process.

We believe that if the Department incorporates the above factors into its revised evaluation plan and carries them out in the analysis, the information derived from the demonstration program will be more meaningful.



**U.S. Department of  
Transportation**

Office of the Secretary  
of Transportation

Assistant Secretary  
for Administration

400 Seventh Street, S.W.  
Washington, D.C. 20590

June 24, 1980

Mr. Henry Eschwege  
Director  
Community and Economic  
Development Division  
U.S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Eschwege:

We have enclosed two copies of the Department of Transportation's (DOT) reply to the General Accounting Office (GAO) draft report, "Actions Needed To Improve The Downtown People Mover Demonstration Program," dated May 5, 1980.

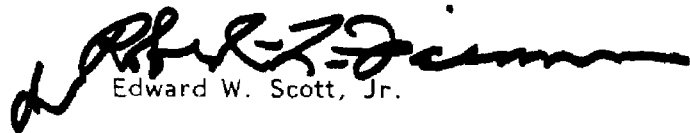
The GAO states that the Urban Mass Transportation Administration (UMTA) Downtown People Mover (DPM) demonstration program consists of nine individual demonstration projects at a potential cost of nearly \$700 million and that UMTA failed to justify a nine city demonstration program. GAO believes that the DPM program objectives could be met with fewer projects. They also believe that the planned evaluation program for these DPM projects should be strengthened

DOT does not plan to fund nine DPM demonstration projects to fulfill the DPM program objectives. The DPM Policy Statement clearly states the Government's intention, namely, to provide construction funding only for the Tier I DPM cities as part of this demonstration program. The Tier I cities include: Los Angeles, St. Paul, Detroit, and Miami. DOT feels that the deployment of people mover system in each of these four Tier I cities is needed to meet the objectives of the DPM demonstration program.

The five Tier II DPM projects (Baltimore, Indianapolis, Jacksonville, Norfolk, and St. Louis) were added to the DPM program as a result of the direction received from the Congressional Appropriations Committees' Conference Report on the DOT FY 1978 Appropriations Bill. DOT feels that the deployment of DPM systems in these Tier II DPM cities are not needed to meet the objectives of the demonstration program. Therefore, DOT is in agreement with the GAO conclusion that nine DPM system deployments are not essential to achieve the DPM demonstration program objectives.

DOT is not in agreement with the GAO contention that the evaluation program for these DPM projects is inadequate and that it needs to be strengthened. Much of the GAO's expressed concerns appears to come from a lack of understanding of the precise methods which will be used in the conduct of the evaluation program. The items the GAO suggests to be added are already part of the DPM evaluation program.

Sincerely,



Edward W. Scott, Jr.

Enclosures

DEPARTMENT OF TRANSPORTATION REPLY  
TO  
GAO DRAFT OF A PROPOSED REPORT  
ON  
ACTIONS NEEDED TO IMPROVE THE  
DOWNTOWN PEOPLE MOVER DEMONSTRATION PROGRAM

SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

The GAO states that the UMTA Downtown People Mover (DPM) demonstration program consists of "...nine individual demonstration projects at a potential cost of nearly \$700 million..." and that UMTA failed to justify a nine city demonstration program. They believe that the DPM program objectives could be met with fewer projects. They also believe that the planned evaluation program for these DPM projects should be strengthened.

SUMMARY OF DEPARTMENT OF TRANSPORTATION POSITION

The Department of Transportation (DOT) does not plan to fund nine DPM demonstration projects to fulfill the DPM program objectives. The DPM Policy Statement (issued on April 22, 1979) clearly states the Government's intention, namely, to provide construction funding only for the Tier I DPM cities as part of this demonstration program, if the results of the preliminary engineering warrant it and if Congress appropriates sufficient funds. The Tier I cities include: Los Angeles and St. Paul (whose project funding will come from the \$220 million commitment made on December 22, 1976 by former Secretary Coleman), and Detroit and Miami (whose project funding will come from the new start category). The DOT feels that the deployment of a people mover system in each of these four Tier I cities is needed to meet the objectives of the DPM demonstration program.

The five Tier II DPM projects (Baltimore, Indianapolis, Jacksonville, Norfolk, and St. Louis) were added to the DPM program as a result of the direction received from the Congressional Appropriations Committees' Conference Report on the DOT FY 1978 Appropriations Bill. The DOT feels that the deployment of DPM systems in these Tier II DPM cities are not needed to meet the objectives of the demonstration program. The inclusion of the Tier II DPM cities was mandated by the Congress over the expressed desires of the DOT to limit the number of projects in the program. Therefore, the DOT is in agreement with the GAO conclusion that nine DPM system deployments are not essential to achieve the DPM demonstration program objectives.

The DOT is not in agreement with the GAO contention that the evaluation program for these DPM projects is inadequate and that it needs to be strengthened. Much of the GAO's expressed concerns appears to come from a lack of understanding of the precise methods which will be used in the conduct of the evaluation program. The items the GAO suggests to be added are already part of the DPM evaluation program.

POSITION STATEMENT

The DPM demonstration program was the result of two independent studies assessing the potential of Automated Guideway Transit (AGT) systems as a new public transit mode. These studies were performed concurrently in late 1974 by the Congressional Office of Technology Assessment (OTA) and by the DOT. As a result of these assessments, Congress, through its FY 1976 Appropriations Bill, directed UMTA to determine the feasibility of performing an urban AGT demonstration. The Department determined that a demonstration project was indeed feasible and announced on April 5, 1976 that it would fund a DPM demonstration program. The cities' response to this announcement was overwhelming; 65 cities sent in letters of interest and 38 submitted project proposals.

As a result of this overwhelming response, and after a very thorough selection process, the Department selected four demonstration projects (Cleveland, Houston, Los Angeles, and Saint Paul) on December 22, 1976 and committed \$220 million. In addition, the cities of Detroit and Miami were advised that they could proceed with their proposed DPM projects from Federal transit funds previously committed to them.

The DOT decided to proceed with four DPM demonstration projects for a number of reasons:

- a. The top four of the eleven DPM finalists provided clear choices where the DPM concept could be tested under varying circumstances, such as in a large expanding city with a growing downtown where the DPM would be central to that growth; in a decaying downtown in need of revitalization; as a connector to an existing rapid rail line; in a small downtown; in an harsh climate; in a warm climate; where patronage would be high and larger DPM vehicles might be needed; and where the patronage might only require the use of smaller DPM vehicles.
- b. The recognition that one or more of these projects might not proceed into the construction phase due to fragmentation of local priorities; inability to raise the local share; environmental concerns; and changes in local commitment. These concerns were soon realized in November of 1977 with the withdrawal of the Cleveland project by the then newly elected Mayor, and later on with the termination of the Houston project when local officials wished to pursue other priorities. Also in a recent action, the Minnesota State Legislature failed to provide the planned State participation in the local share and thus forced the City of St. Paul to provide the entire local share. Of the four original demonstration projects, as of now only Los Angeles has successfully completed its Preliminary Engineering (PE) efforts and is in the very final stages of the environmental review process. St. Paul is resuming its PE efforts after nearly a one year hiatus.

- c. The expressed interest within the DOT and the Congress to have the DPM demonstration program test various AGT technologies to compare their cost and performance differences. Also, by requiring the deployment of three different technologies, the DOT ensures that at the conclusion of the DPM demonstration program other cities wishing to deploy DPMs would have a variety of technologies to choose from as well as a viable DPM supplier industry.

The DOT feels that each of the remaining four Tier I DPM cities, (i.e., Los Angeles, St. Paul, Detroit, and Miami) will make a unique contribution towards meeting the DPM demonstration program objectives and that a DPM deployment in each of these Tier I DPM cities is required to meet these objectives.

The DOT received directions from the Congress, through its Conference Report on the Department's FY 1978 Appropriations, to "...also consider..." projects in Jacksonville, St. Louis, Baltimore and Indianapolis as part of the DPM program. Thus, Tier II was created. The DOT added Norfolk to the Tier II DPM cities since it was the only remaining city which was left out from the eleven finalists. The DOT, however, to assure that these Tier II DPM cities were less than full fledged participants in the DPM demonstration program, authorized only Section 8 funds to conduct feasibility studies. Subsequently, Congressional direction was received through the Senate Report on the Department's FY 1980 Appropriations Bill that "...all Tier I and II cities be allowed to proceed with preliminary engineering upon proper application to UMTA." At present, only Jacksonville has completed its feasibility studies and has submitted a grant application for its PE efforts. When the PE Grant was awarded, Jacksonville was advised that the granting of PE funds does not constitute an UMTA commitment to construct a DPM system in Jacksonville. Further, the Department's DPM Policy Statement (issued on April 22, 1979) states in a clear and unequivocal manner that funding of the construction phase for these Tier II DPM cities "...will commence only upon some successful operational experience having been gained in one or more of the first tier demonstration cities".

It has, therefore, never been DOT's contention that the deployment of nine DPM systems is essential to achieve the objectives of the DPM demonstration program. The Tier II DPM cities were added as a result of Congressional direction. The deployment of DPM systems in these Tier II cities is not required to fulfill the DPM program objectives.

One of the allegations contained in the GAO report is the statement that: "...there is no assurance that any of the nine presently planned demonstration projects will be cost effective...". The DOT takes issue with this allegation. The results of the Tier I DPM cities' preliminary engineering efforts provide substantial evidence to support the contention that these DPM systems are likely to be cost effective from both a transportation cost effectiveness point of view and from an overall economic impact point of view.

The recent "Generic Alternatives Analyses" report (dated June, 1979) performed for UMTA by Barton-Aschman Associates concluded that in the larger CBD applications the total cost per passenger was lower for a DPM system than for a comparable minibus system. The total cost per passenger was found to be 17 cents for a DPM system and 25 cents for a comparable minibus system (this total cost includes both the annualized capital cost and the cost of operations and maintenance). In medium size CBD applications, DPM and minibus were found to have similar values of total cost per passenger, i.e., 23 cents, demonstrating DPMs potential to be cost competitive with minibus from simply a transportation cost point of view.

A review of the completed draft environmental impact statements (DEIS) for the Tier I DPMs readily indicates that the local public officials and planners anticipate significant and numerous economic benefits from a DPM and have specifically targeted urban revitalization and development as primary objectives of a DPM system. Accessibility improvements resulting from the deployment of a DPM can stimulate new development not generally considered or demonstrated to be achievable with bus alternatives. For example, the Detroit DPM DEIS specifically states that a DPM would have significantly greater positive impact than a bus alternative on the potential for development in the CBD including: increased office and hotel space (150,000 square feet per year of office space over a seven year period, and 600 additional hotel rooms); retail sales (\$60 million annual increase); and residential growth (1400 additional residential units); and contribute significantly towards CBD cohesion. Similar projections are contained in the Los Angeles and Miami DPM DEISs. These positive impacts would result in increased public and private revenues and employment opportunities, and promote and support both local and national objectives and goals.

Thus, the cost effectiveness of a DPM system is not only the direct dollar savings obtained in providing a given transportation service, but the effect of the capital investment in an urban area that a DPM would stimulate. The studies performed to date with regard to these DPM demonstration projects indicate that they can have a significant impact towards stimulating urban development and revitalization and can provide a high level of transportation service in a cost effective manner. The purpose of the DPM demonstration program is to test this thesis.

And, finally the GAO recommends that the DOT strengthen the DPM evaluation program in a number of areas. The GAO's recommendations stem apparently from a lack of understanding of the details and precise methods that will be used in the evaluation program as shown in the DPM Experimental Design (ExD) Plan. This plan is presently being revised by Cambridge Systematics, Inc. (CSI), the national level DPM evaluation contractor, and will be provided to the local level DPM evaluation contractors by August 31, 1980. Discussions of and the DOT response to the specific GAO recommendations relating to the question of evaluation are provided below:



- (a) The GAO recommends that comparison of the DPM be made to all competitive transit modes. The DOT feels that the existing ExD discusses at length the need for proper comparison of the DPM to other transit modes, and that the ExD already requires that all competitive modal alternatives be considered. However, the number of real competitive alternatives to a DPM is limited. The GAO also expressed concern that the data on some of the potentially competitive transit modal alternatives may not be readily available. The DOT believes that information on the cost and performance of all competitive alternatives to a DPM can be obtained from the existing transit literature. However, the DOT is having CSI conduct an extensive literature search to compile this data and if this compilation proves unsatisfactory, then additional data will be collected from the transit properties.
- (b) The GAO recommends that the evaluation plan be expanded to ensure that each impact is properly evaluated to discern whether the impact was caused by the DPM or by other capital improvements or operating procedural changes. The determination of the cause of an impact is the essence of these impact assessments. The ExD indicates the many factors which should be considered to separate the impacts caused by the DPM from other external influences. A more elaborate methodology of discerning the cause of an impact will be included in the CSI's revised impact assessment plan.
- (c) The GAO recommends that the evaluation of the DPM economic impacts be broadened to include regional impacts. The DOT does not plan to do a definitive study of regional economic and developmental impacts which might be caused by these DPM systems. In the past, such analyses have proven to be very costly and have not been able to show conclusively the extent of such regional impacts, even when the system was regional in design such as in the case of BART. The DOT intends to focus the economic and developmental impact studies primarily around those facilities which are accessible to the DPM stations. This analysis will be combined with some selective, macro-level analysis of regional impacts to see if any intra or inter-regional trends can be identified. [See GAO note.]

In summary, the DOT feels that it is in essential agreement with the GAO as to what is required in performing an evaluation of these DPM demonstration projects, with the exception of the regional economic analysis where the difference is likely to be only with regard to the degree of analysis required.

GAO note: See p. 24 for a discussion of why this recommendation is not included in the final report.

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