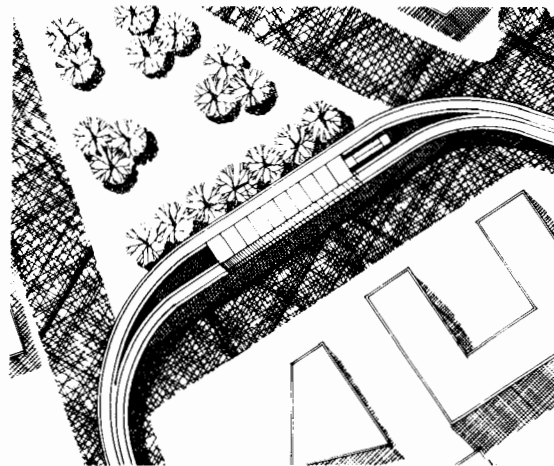
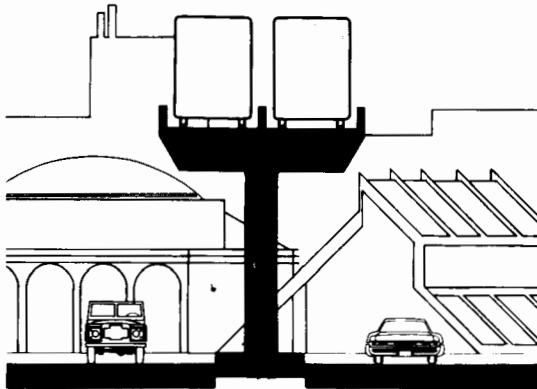
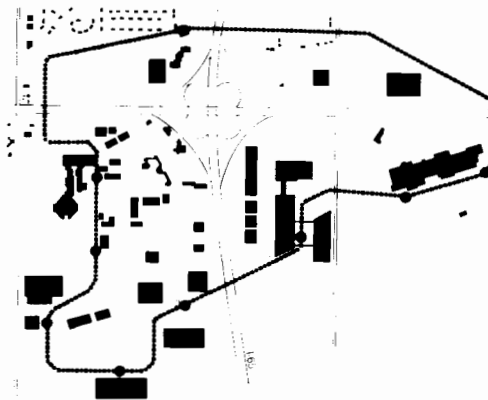
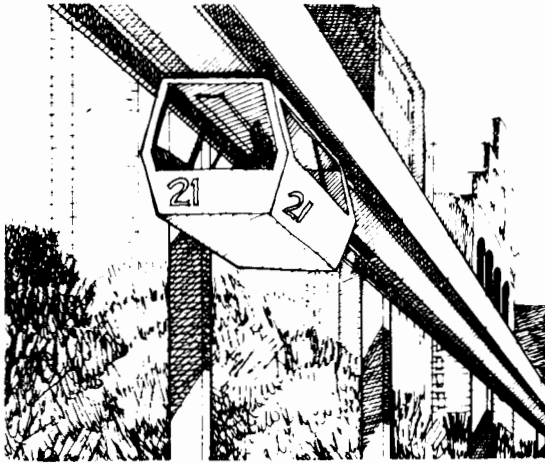




U.S. Department  
of Transportation  
**Urban Mass  
Transportation  
Administration**

# AGT Experience, Status and Prospects: Local Planning and the Supplier Industry

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## UMTA Technical Assistance Program

Prepared for  
Office of Technical  
Assistance

Interim Report  
December 1983

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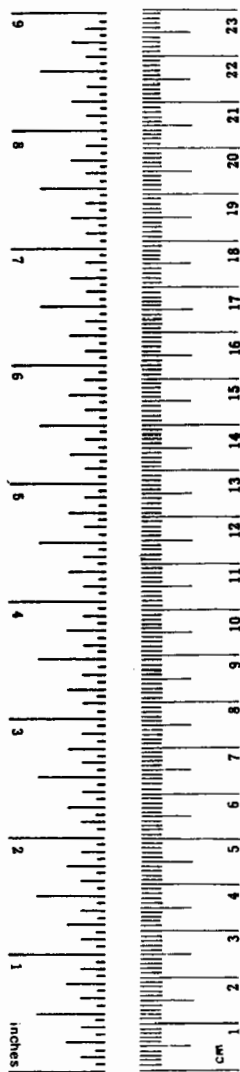
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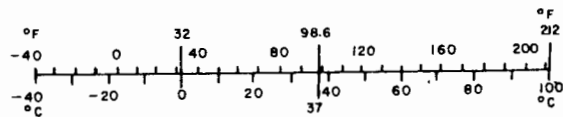
Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
<b>VOLUME</b>				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

\*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10:286.



### Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	
<b>MASS (weight)</b>				
g	grams	0.035	ounces	
kg	kilograms	2.2	pounds	
t	tonnes (1000 kg)	1.1	short tons	
<b>VOLUME</b>				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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PREFACE

Detailed information on the local AGT planning process in Cleveland, Houston, Los Angeles, and St. Paul was obtained in interviews held with a large number of participants and observers of this process in each city. Similarly, meetings were held with representatives of each of the following firms which are potential, past, or present participants in the North American AGT industry:

Boeing Aerospace Company  
Bombardier, Incorporated  
Ford Motor Company  
Otis Elevator Company  
PRT Systems Corporation  
Urban Transportation Development Corporation, Limited  
Vought Corporation  
VSL Corporation  
Westinghouse Electric Corporation

We wish to thank each of the more than 75 individuals who were interviewed for their helpful assistance in the preparation of this report.



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## INTRODUCTION

This report is one of a series prepared in the Automated Transportation Appraisal Project to evaluate the impacts of the implementation of automated guideway transportation (AGT) systems on their local areas and on the industry which supplies them. The two foci of this report are:

- o the lessons which can be learned from the local experiences in carrying out AGT planning activities as part of the Downtown People Mover (DPM) Demonstration Program from 1975 to 1981.
- o the changing status of the firms supplying AGT systems in the United States--the AGT industry--and the future prospects of this industry.

These foci form the subject matter of the two major sections of this report. The first section presents general conclusions based on extensive interviews held with participants and observers of the planning process in Cleveland, Houston, Los Angeles, and St. Paul. City-specific reports on the planning contexts, histories, and evaluations appear in Appendices A through D.

The second major section represents an assessment of the AGT industry at the present time in the light of interviews held with representatives of nine potential, past, and/or present firms participating in this industry; as well as on information available from corporate annual reports and from the business and financial press. Reports on the specific firms interviewed and their involvement in AGT and related industries are included as Appendices E through K.



## SUMMARY OF LOCAL AGT PLANNING EXPERIENCE

### Introduction

In 1976, UMTA selected six cities to participate in the Downtown People Mover Demonstration Program. Two of these cities--Detroit and Miami--were encouraged to consider the use of previously-committed UMTA funds for fixed guideway systems to build downtown circulator systems. Four other cities--Cleveland, Houston, Los Angeles, and St. Paul--were declared eligible for newly-committed Federal funds to cover 80 percent of the cost of designing and implementing automated circulation systems in their downtowns. Early in the program, both Cleveland and Houston decided to withdraw. Subsequently, St. Paul also chose to withdraw from the program and Los Angeles stopped its plans for an automated downtown circulator when Federal funding of the DPM Program was suspended. Although no longer part of a demonstration program, planning and construction of automated downtown circulators is continuing in both Miami and Detroit with Federal participation.

In an effort to understand the local factors and circumstances that led to the departure of four cities from the program, extensive case studies were conducted in each of these cities. The purpose of the case studies was to document in detail the specific institutional, political, economic or technical factors which led to each city's decision, and to attempt to distinguish which of these factors were unique to a new automated technology and which factors might have confronted any large capital project. The results of this analysis can be used by UMTA in shaping new initiatives (irrespective of whether they are oriented to new technologies) which may confront a similar set of factors at the local level. At some point in the future, it is anticipated that similar case studies will be conducted in both Miami and Detroit as part of a broader evaluation of the impacts of automated downtown circulators.

The purpose of this summary report is to synthesize the findings from all four case studies. The issues that were common to all cities as they considered participation in the DPM program have been identified as well as unique issues confronted in each city which still may have some significance

at the national level. The full case studies of each city are included as Appendices A-D; each includes:

- o A description of the region and the planned site of the downtown people mover; transportation problems facing the region; potential solutions to those problems, as well as concurrent events which had an impact on the project.
- o A discussion of the relevant political and institutional structure including the agencies involved in transportation, the division of powers between agencies, and the extent and nature of agency interaction over time.
- o A historical narrative describing agency roles and positions throughout the process; institutional, political, and technical barriers which were encountered and their resolution; financial arrangements which were made; and the involvement and influence of the press, the public, and the business community.
- o A summary and assessment of the major sources of support and opposition; the project's public image; the credibility of the concept and the technical work involved; the distribution of costs and benefits associated with the proposed project; and the perception of UMTA's role including project timing, competition and awards, the procurement process, and continuing needs.

The site visits were structured to include not only interviews with representatives from local, regional, state, and Federal agencies but also local and state elected officials, representatives of the business community, journalists assigned to cover the project and various community groups who were effective in supporting or opposing the project.

To integrate the major site-specific issues into a set of general conclusions concerning the institutional and political barriers to the implementation of AGT systems in urban areas and the design of Federal programs which will minimize the impacts of these barriers, the site-specific issues have been grouped to reflect the following aspects of the DPM Program:

- o The construction of large-scale capital projects with Federal funding in specific urban areas.
- o The focus on local downtowns, their transportation needs and facilities.
- o The emphasis on new transportation technologies
- o The design of the program as a demonstration of the effectiveness of automated technologies in urban settings.

These issues progress from those which generally apply to many Federal programs to those which were highly unique to the DPM Program. The issues related to each of these aspects of the program are discussed in the sections which follow.

## Large-Scale Capital Project Issues

In each of the four cities, the fact that a DPM system was a large public sector-funded capital project lead to a number of issues including:

- o Difficulties in estimating capital and operating costs.
- o Long lead times required for project completion.
- o Conflicts in cost/effectiveness criteria.
- o Decision-making in a complex institutional environment.

Cost Estimating--Fluctuating estimates of capital and operating costs caused problems as DPM planning progressed in each of the four cities, but the extent to which this issue was a significant problem varied directly with the amount of progress made before withdrawal from the program. Where active planning continued over a period of years, cost estimates were raised periodically, creating a problem for project supporters that was very difficult to avoid. While this problem faces all large-scale capital projects, it was reinforced in the DPM program by the high rates of inflation in the years from 1976 to 1981 and by the uncertainties associated with the DPM technology. Cost estimates were relatively minor issues in both Houston and Cleveland mainly because they were overshadowed by other factors which led to the early withdrawals of these cities. In St. Paul, increasing cost estimates exacerbated the difficulties in arranging for funding the local share of capital costs. In Los Angeles, increasing costs did not become a factor until system supplier bids were received, but then the earlier under-estimates became evident, leading to revised estimates which were so high that they were a significant factor in the increasing local disillusionment with the project which became evident just prior to the final withdrawal of Federal commitments.

Lead Times--In each of the cities, the time required for DPM planning and engineering was sufficiently long to allow related political and/or institutional trends to change significantly, always to the detriment of the DPM project. In each case, the project itself was not the source or basis for these changes, instead the project was negatively impacted by broader trends. In St. Paul and Cleveland, these changes were basically political--the composition of the state legislature and the city administration,



respectively. In Houston and Los Angeles, the changes were institutional--the formation of new entities responsible for transit planning and development. In each case, the DPM project suffered almost inadvertently due to the shifts in priorities and interests which accompanied these broader changes. By carefully positioning itself with respect to these changes, only the Los Angeles project team was successful in avoiding being overcome by related local events, but even in Los Angeles this was becoming increasingly difficult in the final months. In each of the other cities, the project teams were not able to prevent delays caused by these broader political and institutional trends.

Cost/Effectiveness Criteria--In each city, the controversy over whether or not a DPM system should be built focused partially on differing definitions of cost/effectiveness. In each case, system proponents claimed that only the local share of total costs was relevant--that the Federal share would go elsewhere if a DPM system were not built. Opponents, on the other hand, saw Federal funding for the DPM system in competition with UMTA funds for regional transit systems. Their cost/effectiveness criterion was therefore based on total system costs. In spite of whatever proponents or UMTA said about the independence of Federal funding decisions for DPMs and regional systems, many would not believe that complete independence existed.

Complex Institutional Environments--In each of the DPM cities, as in all US metropolitan regions, transportation decision-making takes place within a complex environment of statewide, regional, county, and municipal agencies with varying responsibilities for the planning, implementation, operation, and regulation of transportation facilities and services. The DPM Program could not avoid these environments, but it could have sought out an existing Federal/local structure rather than allowing the areas to set up what were essentially new structures for the DPM program. For example, if UMTA had required the local metropolitan planning organization (MPO) and the agency which would be responsible for system operation (usually the regional transit operator) to jointly propose as DPM grant recipients in each area, the agencies usually responsible for transit planning and operations would have been encouraged to work together on the DPM project as they must in other areas of transit development. Without organizational requirements such as these, a number of ad hoc institutional arrangements were set up which

severely hampered DPM planning progress because, even though they may have been ultimately workable, they required new and different institutional relationships to be defined. The results of these problems were especially evident in Cleveland and St. Paul, where municipal agencies found themselves in a new and uncharted role. Los Angeles found itself in a similar situation but set up a new agency and carefully established workable relationships with existing agencies. By avoiding the question of who ultimately would be responsible for system operation, Los Angeles was able to avoid the pitfalls discussed above, but not without significant effort. Houston's grant recipient, the transit operator, came closest to the model suggested above. The transfer from a municipal to a regional agency during the DPM program, however, hampered the potential effectiveness of this choice of lead local actor.

### Downtown Circulation Issues

In each local area, many of the questions debated as the DPM decision-making process unfolded were related to the context in which the systems were to operate--the downtowns. In each city, the downtown area traditionally had been the center and highest concentration of retail and commercial activities. The types of issues falling into this category include the following:

- o The extent to which problems were perceived to exist in the downtown that could be alleviated by building a DPM system.
- o The relative effectiveness of the proposed DPM system as a means of meeting the downtown's needs.
- o The limited groups of beneficiaries of a DPM system, in relation to the entire region's population and economic community.
- o The problems of integrating the relatively limited DPM system with the much broader regional transportation system.

Perception of Downtown Problems--In each of the cities, there were individuals and groups who questioned whether "downtown circulation" per se was a real problem or a high enough priority issue to warrant an expensive capital solution. The importance of the opposition of these individuals and groups to the DPMs, however, varied quite significantly from city to city.

In Cleveland, this issue was a minor one, because for a number of years many in the city had recognized the need for a better way to distribute rail transit users to and from the single CBD station. It was also commonly agreed that a faster pace of new CBD development, as well as a revitalization of existing activities, was a real need. DPM proponents in Los Angeles emphasized the impending lack of parking facilities where they were most needed and the need to link separate activity centers within the CBD. Due to the downtown's rapid growth at the time, as well as its long walking distances, few disagreed with these statements of need. A number of opponents did, however, fail to accept the need for the DPM as an incentive to future development and revitalization when they observed that the parts of the CBD to be best served by the system were already developing rapidly, and that the parts most in need of revitalization would be poorly served.

In both Houston and St. Paul, proponents placed a significant emphasis on future transportation needs--the higher levels of congestion and parking scarcity expected in the future. In both cases, however, the consensus of the general public reflected their inability to accept these problems as real, in the face of the minor degree to which they existed at the time. The relatively high levels of development then going on in each of these areas inhibited the perception of an urgent need to use the DPM to promote more future development. The result of these failures to perceive the stated future needs in Houston and St. Paul were significant factors in these areas' decisions to withdraw from the DPM Program.

Relative Effectiveness of DPM Solutions--DPM opponents in each city were able to cite alternative systems which were considered to provide more effective means of addressing the downtowns' transportation needs: skyways in St. Paul, loop buses in Cleveland, a Bus Priority System in Houston, and the downtown portion of a regional rail transit line in Los Angeles. In the first three cases, these alternatives would be significantly less expensive than a DPM system. In Los Angeles, this would probably not be true, but the regional rail system was felt by many DPM opponents to meet additional, higher priority transportation needs not addressed by the DPM.

No arguments were made in any of the cities that improved bus or walkway systems would have a significant impact on CBD development or revitalization, but many doubted the claims of the effectiveness of the DPM systems in this respect. In general, the DPM systems were viewed as having very high costs in relation to their expected benefits.

Limited Groups of Beneficiaries--Public sector investments in CBDs tend to provide direct benefits to a segment of the total regional population which fails to represent many socioeconomic groups. The prototypical beneficiaries are generally thought to be high-income business and professional people who work downtown, CBD property owners, and large firms having their offices located downtown. Building a regionwide constituency in favor of added travel and development benefits for these groups is often very difficult. Care must be taken to convince a broader constituency that investments designed to improve the health of the CBD will provide the entire region with valuable indirect benefits. Alternatively, trade-offs can be packaged which broaden the number of those directly benefited; this was one

of the motivations for Los Angeles' Four Part Transportation Program, which included the DPM. None of the local DPM projects were able to completely overcome the difficulties of building an effective and stable regionwide constituency, and yet each needed regionwide financial (and hence political) support to provide the local share of capital costs and/or operating costs.

DPM/Regional System Integration--To be effective downtown distributors, DPM systems must be tied in closely with regional transit systems. For a number of reasons, this integration proved to be difficult to accomplish in three cities, and was not fully addressed in the fourth, Houston, before that city withdrew from the program.

Even in Cleveland, where a clear-cut need for a downtown circulator was generally acknowledged, no easy way to integrate the system directly with the downtown rail transit station was found before the project was terminated. In both St. Paul and Los Angeles, the DPM Project staff wished to eliminate duplication of transit service by having many regional buses stop at DPM terminal stations, with most bus riders thereby forced to transfer to the DPM to reach their CBD destinations. These plans were not well received; both the public and the transit operators saw these plans as reducing the level of service for the entire transit trip to the CBD, thus tending to reduce bus system usage. In Los Angeles, rail transit planning and DPM planning was taking place concurrently, but the two involved agencies failed to develop a plan which avoided a high level of duplication of service. In the CBD, the two systems had a number of stations within a block of each other. Clearly, the DPM would provide a level of CBD distribution with only marginal advantages over using only the regional system.

## Innovative Transportation Technology Issues

Due to the strong focus in the DPM Demonstration Program on innovative transportation technologies, local decisions to withdraw from the program tended to be interpreted immediately as repudiations of these technologies. More careful analysis reveals that issues related to the technology to be implemented did enter into the decisions made, but that these were not the overriding concerns. Instead, as reflected in the structure of this summary, they merely represented one category of a broader range of issues. The types of issues falling into the innovative technology category include the following:

- o The degree of local familiarity with AGT systems prior to the DPM program, and the changes in this factor which occurred as the program continued.
- o Concerns about the risks and uncertainties of implementing these systems in CBD settings.
- o The credibility of patronage and induced development forecasts for the new systems.

Local Familiarity with AGT Systems--Of the four demonstration cities, only Houston failed to have a significant level of prior planning which had considered the application of new technologies in the CBD. This lack of prior planning was a contributing factor in Houston's subsequent lack of interest in remaining part of the DPM Program. The prior planning which had taken place in each of the other cities--since the early 70's in each case--was important not only in providing a basis for the DPM proposals to UMTA, but also in providing a core group of system advocates.

As planning progressed, familiarity with the DPM concept increased in each local area, but the reputation of AGTs generally declined both nationally and locally due to the well-publicized high initial costs and operational difficulties of the Morgantown system. Additional negative impacts occurred in both Los Angeles and St. Paul. In both cities, nearby systems at recreational facilities provided many with the perception that some of the candidate systems were either "toys", "toonerville trolleys", or too unreliable for DPM settings. The unwillingness of both the local project staffs and UMTA to state that such systems would not be chosen further fueled negative reactions to the systems in both of these cities.

The deterioration of the general perception of DPM systems continued throughout the planning process in Cleveland, Los Angeles, and St. Paul, resulting finally in them being likened more to elevated railroads than to modern innovative systems. This occurred especially in Cleveland and Los Angeles, where opponents questioned why elevated DPMS should be constructed when other cities had been tearing their elevated transit lines down for years because of their negative impact on the communities through which they passed.

In each city, project staffs failed to create a sufficiently positive familiarity with the potential of AGT systems among the general population to provide the required level of support for implementation. It is not clear if this could have been done in the light of the reputations and operational difficulties of some automated systems at that time.

It will be important in future new transit technology programs, however, to develop a more effective means of making local area constituencies familiar with the new technologies and their advantages over alternative solutions to local transportation and/or development needs. UMTA's continuing program to evaluate the Detroit and Miami circulator systems will provide a portion of the "data base" for such future efforts. This data base will consist of impact studies, assessments, costs, and reliability experience for the systems as implemented in urban settings.

Risks and Uncertainties of DPM Systems--UMTA's original design of the DPM program emphasized the reduction of technological risks by limiting the range of appropriate systems to those which had proven themselves to be feasible in other regular passenger service settings--airports, recreational parks, or non-CBD activity centers. This requirement was later relaxed when suppliers were successful in obtaining UMTA's agreement that prior passenger service was not required; only successful operation on a test track would be required. In spite of this change, however, concerns about the technical feasibility of the systems under normal operating conditions were only a minor negative factor in any of the local areas.

Other concerns did exist, however, related to the lack of previous experience with automated systems in the CBD settings and under winter climate conditions. These concerns focused on doubts about the systems with respect

to the levels of safety and personal security which could be assured without operators on board; and on their visual, noise, and dirt impacts for occupants of nearby buildings as well as for pedestrians, auto, and bus users along their rights-of-way; and their impacts on traffic flow and on-street parking in locations where existing street rights-of-way would be required. These types of concerns continued to be critical in each of the local areas, in spite of the project staffs' efforts to address them. These efforts varied in intensity from city to city, but the basic lack of existing examples to point to prevented even the best efforts from succeeding.

Credibility of Forecasts--The two major types of forecasts required in the DPM planning process were the future system ridership and the level of system-induced development. The preparation of these forecasts was made very difficult both by the CBD setting and by the uncertainty on how travelers and developers would react to a new technology. The CBD setting made it difficult to use existing models and procedures oriented to the regional scale, but new approaches could be based on observations of existing travel and development behavior. The need to focus on a new technology provided a more complex forecasting problem. There were no existing AGT systems operating in downtown settings and thus there was no actual experience with how travellers might react to and use these systems in the DPM cities. Planners found it necessary to project new patterns of traveler and developer behavior based on previous responses to systems, such as BART and the Washington Metro, which lacked the same uniqueness of function and advanced technology. In general terms, an enhanced "modal image" was assumed to reflect these system differences. The resulting forecasts of future DPM ridership at times called for as much as ten times the existing usage of bus routes providing downtown circulation, in addition to significant levels of system-induced development.

In each area, the local population found these forecasts hard to believe, first of all because of their magnitude. Where more detailed study of the ridership forecasting procedures was carried out, in Los Angeles and St. Paul, credibility was further weakened as assumptions of "modal images", high rates of diversion of bus users to DPMS at transfer stations, and limitations of future increases in parking capacities to fringe locations served



by DPMs were identified and reviewed publicly. Similar investigations of DPM-induced development potentials called into question the effectiveness, over and above existing trends, of the systems in this area.

### Issues Related to the Structure of the DPM Demonstration Program

The final category of issues which affected the local DPM projects are those which arose from the specific structure of the DPM Demonstration Program. While these issues are unlikely to confront other Federal programs, they provide valuable guidance for new technology demonstration programs which might be devised in the future. By learning from the problems which became evident in the local areas during the DPM Program, UMTA can significantly enhance the effectiveness of these future programs.

Four types of issues have been identified in this category:

- o Conflicts and inconsistencies caused by the sequence of local activities.
- o Conflicting program objectives at the Federal and local levels.
- o Issues related to the acceptance of ad hoc local institutional arrangements.
- o The lack of effective program commitments at both the Federal and local levels.

Local Activity Sequencing Issues--The history of the local DPM projects strongly suggests that there were two major problems with the Federally-defined sequence of local planning and engineering activities:

- o The final selection of demonstration cities based on hastily-prepared proposals.
- o The selection of system suppliers only after completion of preliminary engineering.

UMTA made a final selection of the cities to be included in the program based on proposals which had to be developed in just three months. Events proved that this provided the local areas with far too little time to reach a consensus on whether or not they should build a DPM system and who should be responsible for leading the planning and implementation effort. By being forced into making these decisions in a very short time, three of the four local areas later found it necessary to reverse themselves. In both the Cleveland and St. Paul cases, this happened in spite of the significant levels of prior new technology planning which had taken place.

The choice of the DPM technology at this stage was also inconsistent with the subsequent need for an objective look at alternative systems as Environmental Impact Statements were developed. Houston, the one city which fulfilled this requirement, later felt too constrained looking at a single technology and ultimately had to withdraw because they concluded that a bus system was preferable to a fixed guideway system. The program structure should have been set up to accommodate Houston's approach to preliminary engineering and alternatives analysis without the problems generated, at both the local and Federal levels, of Houston's having to withdraw from the program.

Before its departure from the program, Cleveland found itself in a tug-of-war between those who wished to see an unbiased feasibility study carried out, and those who hoped to move directly to the preliminary engineering of a DPM system. To a lesser extent, this same conflict existed in St. Paul and Los Angeles. In the latter city, the conflict did not surface fully until after the draft EIS was completed and commented upon in public hearings.

The timing of the selection of system suppliers only after the completion of preliminary engineering also created problems. This sequence of events was appropriate in providing the areas an opportunity to carefully specify desired system performance, thereby ensuring that local needs would be met. It was also consistent with the sequence of activities carried on in conventional transit system implementation programs. However, the use of these procedures for a new technology with more widely varying specific systems caused both technical and public relations problems. At the technical level, the local areas were required to keep such aspects as turning radii, support spacing, and guideway width limitations general enough to avoid disqualifying too many systems and limiting the number of suppliers which would be able to bid.

Public relations during preliminary engineering also were also made more difficult by this aspect of the program's required implementation sequence. The local project staffs could not say with authority that specific existing systems, having received bad reputations due to operational difficulties or cost overruns elsewhere, would not be eligible as the local DPM. As a result, the local staffs were hampered in their ability to effectively address

an important area of concern of the local population before it generated additional opposition to a DPM system. If federal procurement regulations would have allowed UMTA to foster the early formation of "joint ventures", each consisting of a system supplier and a local area, these types of problems could either have been reduced or limited only to those "joint ventures" which involved a system supplier which had experienced problems with their previously implemented systems.

Conflicting Program Objectives--In the DPM Demonstration Program, the primary Federal objective was to demonstrate that automated transportation technologies could effectively serve local transportation needs and promote downtown development and/or revitalization. In the local areas, however, there was a greater focus on serving transportation needs and promoting CBD growth, and a reduced focus on new technology. There was no inherent conflict in these varying emphases in system objectives, but experience shows that a strong potential for conflict did exist. After being selected as "DPM cities", there were varying degrees of sentiment in each local area to carry out feasibility studies or alternatives analyses to determine what transportation systems should exist downtown, rather than to proceed immediately to DPM preliminary engineering. Many wished to determine the most cost-effective way to meet future CBD needs after considering all alternatives, not just DPM systems. In each city, being a laboratory for what was seen as a Federal experiment was more likely to be a negative factor than a positive one. Thus, for example, UMTA's requirement that three different system suppliers should be selected by the first three DPM cities was seen as conflicting with each city's desire to obtain what it considered to be the best system for its needs.

Local Institutional Arrangements--Both the short time available for the local areas to prepare their DPM proposals and the systems' limited service areas resulted in local selection of lead DPM agencies who were inexperienced in working with UMTA and who had to develop new sets of working arrangements with other transportation planning and operating groups in their regions. This was especially true in Cleveland, where the mayor's office was the proposer, and in Los Angeles, where the Community Redevelopment Agency proposed. In St. Paul, the joint City-Metropolitan Transit Commission proposal included the regional transit operator, but required it and

the city to work out the terms by which they would cooperate. Subsequently, the State Legislature failed to provide the funding required for MTC to continue its involvement in the project. Houston's proposal by the transit operating agency within the city government initially prevented the type of problem confronted in the other cities, but the subsequent transfer of DPM planning activities to a new regional transit authority resulted in significant time and effort devoted to organizational issues.

It is not completely clear if UMTA could have adopted program guidelines which would have significantly reduced potential local organizational and political conflicts, but a requirement that both the regional MPO, or a designated representative agency, and the intended DPM system operator should be parties to the planning and implementation process would appear to have merit. Also, in future programs of this sort, UMTA should be very careful to evaluate both the present and expected future organizational and political support for a local project before selecting the local areas to be funded. Cities proposing to use institutional arrangements which have proven to work well in the past for system planning, implementation, and operation should be favored over those defining completely new relationships.

As the DPM Program progressed, it became increasingly clear that the private sector--downtown employers and property owners--had a significant stake in the local projects. The innovative public-private arrangements partially worked out in St. Paul and Los Angeles represented important firsts for UMTA-funded projects. In both cities, however, the private sector involvement can be classed as too late and/or too indefinite. This suggests the desirability in future DPM-like projects of requiring a plan for private-sector involvement to be outlined in the original proposal or application, and requiring that it be finalized early in the planning process. This would allow UMTA to select cities after considering the likelihood of successful private-sector participation, and also would help the local areas to tie down this participation as early as possible in the planning and implementation process.

Lack of Program Commitments--At both the local and Federal levels, the DPM Program suffered from lack of commitments which were strong enough and long term enough to bring the local projects to completion. At the local

level, some of these commitments involved multiple agencies, but the more critical lack was in getting commitments of financial participation from the private sector. St. Paul was the most successful in arranging such commitments, but there the commitments did not come in time to avoid the defeat of local DPM funding at the polls. In Los Angeles, tacit agreement of the private sector's willingness to participate in tax increment financing was obtained, but the details were never completely worked out. The Cleveland business community contributed toward DPM planning costs, but resisted making commitments to provide funds for capital or operating costs. In each of these cases, the planning process would have proceeded more smoothly if firmer commitments could have been obtained, even if the ultimate no-build decision could not have been changed.

As the only originally-chosen city in the DPM Program at the time of its cessation, Los Angeles was the only city affected by the Federal government's difficulty in making multi-year commitments. The local area's understanding that UMTA was committed to a Los Angeles DPM was proven wrong by Congress' elimination of program funding. They discovered that all multi-year government commitments are contingent on annual approvals of the required funding levels by Congress. Because this reality previously had not been stressed, it was extremely difficult for proponents of a DPM system in Los Angeles to understand how this system had been so quickly halted.

Changes in Federal initiatives like the DPM Program which would address the need for stronger commitments earlier at both the local and Federal levels may be difficult to achieve. The private sector can be expected to propose contributing at low levels, or not at all, until they are convinced by events that more support will be required. Future programs are likely to benefit, however, from the precedents for private sector funding via mechanisms such as tax increment financing districts and joint development which are now more common in transit projects. At the Federal level, the maintenance of very strong support for specific systems over long periods of time will be required.

A final program-structuring strategy which would address many of the problems identified throughout this section would be to integrate a program like the DPM Demonstration as much as possible into the standard transit planning and funding process. As applied in the DPM context, this would

call for UMTA to provide a high level of staff support and information to local areas considering alternatives involving automated technologies in high-activity urban areas. Also, UMTA would clearly state to local area transit and CBD planners, using various means, that if innovative technologies were found by the region to be preferred for the region's CBD as its normal planning procedures were carried out, then UMTA would consider funding such a system under one of its normal discretionary capital grant programs. Upon UMTA approval of such a grant, the local area could form a "joint venture" with a system supplier for final engineering, construction, and initial operation. By predicating such a grant upon an acceptable and impartial consideration of a full range of alternatives, UMTA could minimize the likelihood of system suppliers prematurely overselling their particular technology. The local area would also be encouraged to formalize private sector funding arrangements at this stage. UMTA would provide specialized help, as required, to the local area in all aspects of planning and implementation related to the use of innovative and therefore unfamiliar technologies. To further encourage the acceptance of new technologies, UMTA would also provide 100 percent funding for any costs above and beyond those required for planning and engineering a conventional system, as well as the full costs of evaluating the innovative systems to provide guidelines for other local areas. Federal grants toward construction costs, however, would be subject to the same local share requirements as for conventional systems.

By integrating new technology demonstrations in this way into well-established transit planning and funding programs, and at the same time encouraging local areas to consider these technologies as potentially viable alternatives, UMTA could improve its encouragement of applying new technologies in urban settings in the following ways:

- o As much as possible, existing planning and implementation procedures, and the local institutional arrangements used to carry them out, would be retained.
- o Enough time would be provided for the local areas to be relatively sure that they had a sufficiently strong commitment to an innovative technology alternative before UMTA would be asked to contribute to the project.
- o System suppliers could be selected early enough in a project to minimize costly unnecessary engineering work. UMTA could decide on whether or not to fund a system in a given city based partially

on which system supplier was involved, or could withhold final approval until a "joint venture" was formed. (Note that revisions in the Federal Procurement Regulations may be necessary to allow such "joint ventures" to be formed.)

- o Federal demonstration objectives would be "added to" local objectives only after the local area had selected a new technology, and their added costs would be fully paid by Federal grants. This should prevent conflicts due to differing Federal and local objectives.
- o Private sector involvement would be sought and finalized as early as possible in the planning and implementation process.

While all of these factors should be considered in designing any new Federal initiatives, it should be stressed that no one overriding factor led to the decision by any of the four cities to withdraw from the DPM program. The one exception to this, of course, is Los Angeles where the decision not to proceed with DPM planning was clearly forced by the suspension of Federal funds.



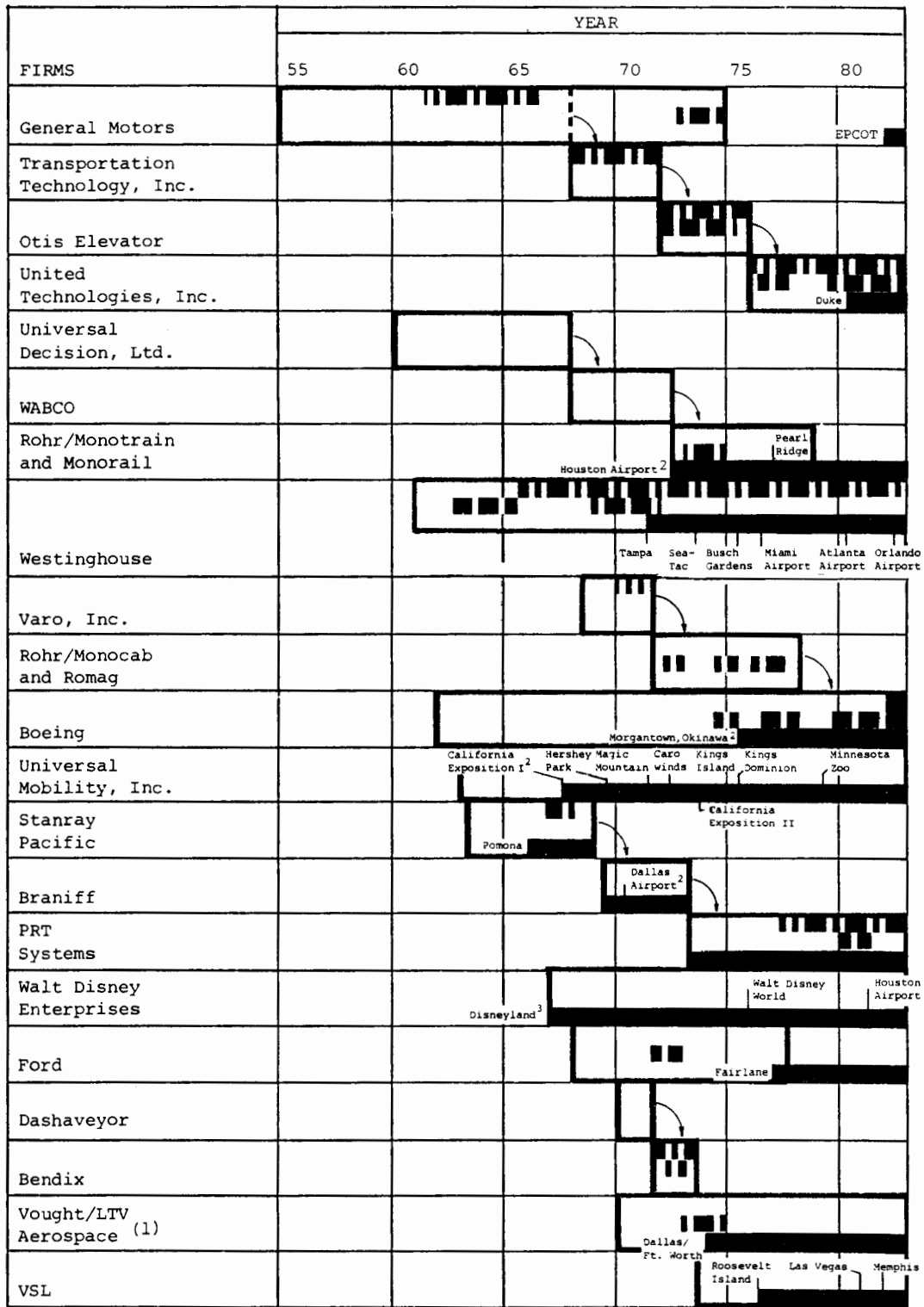
## THE AGT INDUSTRY

### History of the AGT Industry

The present status of the United States automated guideway transportation (AGT) industry is strongly dependent on a history of activities which goes back at least a quarter century, when General Motors was conducting in-house research on automated highways and a number of other firms were beginning to think about systems involving driverless vehicles on separate guideways. As shown in Figure 1, at least six of these firms had committed significant resources to the AGT area by 1965 and two firms--GM and Westinghouse--were operating test or demonstration systems. By 1970, the number of firms involved had almost doubled and three systems were in regular use at recreation centers--Disneyland in California, Sacramento's California Exposition, and the Hershey Park in Pennsylvania.

As shown in Figure 2, Federal involvement in supporting AGT systems began in a significant way in 1963, when UMTA's predecessor agency provided a grant to Westinghouse to assist in the construction of the South Park test facility in Pennsylvania. Soon thereafter, this agency, now within the Department of Housing and Urban Development (HUD), funded a series of studies, culminating in the report Tomorrow's Transportation, New Systems for the Urban Future, which was submitted by the President to Congress in 1968. This report contained conceptual studies of a number of automated passenger systems and provided significant impetus to both industry and government throughout the 1970's.

Since the establishment of UMTA within the new Department of Transportation in 1968, UMTA's role in supporting advanced technologies has had three major foci: research and development, demonstration, and implementation. The research and development component has emphasized advanced systems design and testing, including the dual mode feasibility studies carried out in 1973-75 and what began as the High Performance Personal Rapid Transit (HPPRT) program in 1974. Preliminary studies of dual mode transit system feasibility were carried out by General Motors, Otis, and Rohr. Each proposed to continue development of systems which would be under driver control for passenger pick-up and distribution functions, and under automated



(1) Inactive since 1980. Has not withdrawn.  
(2) Subsequently removed from service.  
(3) Not completely automated.

KEY:

- ■ ■ ■ ■ Test track in operation
- ■ ■ ■ ■ UMTA-funded R&D and/or demonstration
- start-up dates
- AGT system(s) in regular operation
- Overall period of activity in the AGT industry
- Sale or other transfer of AGT activities from one firm to another

FIGURE 1. SUMMARY OF MAJOR INVOLVEMENTS BY US FIRMS IN THE AGT INDUSTRY

PROGRAMS	YEAR					
	55	60	65	70	75	80
Transit Expressway						
Systems Studies						
Dallas/Ft. Worth						
Morgantown						
Transpo '72						
Dual Mode						
Automated Group Rapid Transit						
Automated Guideway Transit Technology						
Socioeconomic Research						
Downtown People Mover Demonstration						
Downtown Circulators (Miami, Detroit)						





-  Non-hardware Oriented Research
-  Research and Development and/or Test Track Implementation
-  Demonstrations
-  System Implementations for Normal "Revenue" Usage

FIGURE 2. SUMMARY OF MAJOR HUD AND UMTA AGT PROGRAMS

guideway control for the line-haul portion of their routes. Due to a lack of DOT funds, however, the dual mode program was halted at the conclusion of the preliminary studies.

In the HPPRT program, later renamed Advanced Group Rapid Transit (AGRT), three firms (Boeing, Otis, and Rohr) were funded, beginning in 1974, to develop a third generation of automated systems which would go beyond the sophistication and flexibility of the existing systems. This program has continued, with some significant funding gaps and changes in focus, to the present. Test track experimentation by the two firms remaining in the program (Rohr discontinued its involvement both in the AGRT program and in automated systems development in 1978) is currently funded through 1984, with the emphasis now being placed on advanced control subsystems rather than on complete vehicle-control-guideway systems.

UMTA's involvement in programs structured to demonstrate AGT systems in various environments began with its funding of TRANSPO '72, an exhibition of America's transportation capabilities held at Washington's Dulles Airport. In the AGT area, funds were provided to four firms (Bendix, Ford, Otis, and Rohr) to implement systems which operated during the exhibition, and to continue their testing following its close.

A much more ambitious demonstration program began in 1975, when US cities were invited to submit proposals for Downtown People Mover systems which would demonstrate available AGT systems in dense urban environments. In 1976, six cities were authorized to carry out system planning activities. Cleveland, Houston, Los Angeles, and St. Paul also received new promise of construction funds if the planning results showed automated circulators to be warranted. Detroit and Miami were encouraged to use previously-committed fixed guideway funding from UMTA for DPMS. As local planning activities were carried out, three cities--Cleveland, Houston, and St. Paul--decided not to continue in the program. In 1981, when the DPM Program was suspended by UMTA, Los Angeles halted the planning for their system. Partially because both Detroit and Miami were not dependent on commitments originating in the DPM program and partially due to strong Congressional support, they were able to proceed toward system implementation. These cities have selected UTDC (a Canadian firm) and Westinghouse, respectively, as their system suppliers and have proceeded with final engineering and construction

activities. Thus, effectively, what began as the DPM Demonstration Program is continuing as an UMTA-funded automated system implementation activity in both Detroit and Miami.

UMTA's previous involvements in AGT implementation activities were mainly through their support of the Dallas-Fort Worth Airport system (Airtrans, developed by LTV Aerospace) and the Morgantown PRT system for which Boeing had system management responsibilities. The construction of both systems began in 1970; UMTA's role was quite small in the Airtrans system implementation effort, while the agency was the major funding source for the Morgantown system.

UMTA's major support of AGT activities since 1970 has not been the only impetus to progress in this technological area. During the same period, significant progress has been made in implementing systems in restricted-environments such as airports, recreation centers, and other private high-activity locations. As of 1983, there were at least 25 systems in normal operation, and additional ones are being built. At least five others were built but never placed in normal service, replaced by more advanced systems, or otherwise removed from service. The number of firms continuing to offer such systems, however, has declined significantly. Three firms--Disney, UMI, and VSL--continue to offer airport or recreation center systems, but only one US firm, Westinghouse, is now actively involved in supplying systems for public transportation services.\* Two firms--Boeing and Otis--continue to be involved in AGRT research and development activities. Both have plans for future marketing of the control subsystems they are now beginning to test under more realistic conditions than the laboratory tests to date have allowed. Two other firms retain marginal levels of AGT market activity--Budd as a marketer for a foreign magnetic levitation system manufacturer, and LTV which retains the option to again become active if future market conditions warrant it.

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\*UTDC, a Canadian firm, is currently the only foreign firm which has sold a system in the US--the Detroit People Mover. We have thus included UTDC in our survey of firms involved in the US AGT market. A number of other foreign firms also have an interest in the US market, but have not been considered in our analysis except as potential competitors to the US firms.

This "settling out" of the AGT supplier market is a phenomenon common to many technological areas (for example, auto manufacturers in the period from 1920 to the present), but it has been highly dramatized by the speed of the process in the AGT case. Two other factors have further highlighted this rapid narrowing of the number of suppliers:

- o The Federal government, through UMTA, has itself invested more than \$200 million in AGT-related research, demonstration and implementation. One explicit goal of this funding has been to support enough firms to allow a competitive AGT market to exist.
- o Foreign suppliers in France, Germany, Japan and Canada have taken the lead in implementing AGT systems to the extent that they are now often considered to have a competitive advantage over US firms in spite of the "Buy America" restrictions imposed on UMTA-funded procurements. In some cases, US firms have obtained licenses to market foreign systems in this country, but these arrangements involve much less significant roles for the domestic firms.

The purpose of this section of the report is to provide information required to understand why these rapid changes have occurred in the US AGT system supplier industry, and where the industry is likely to go in the near future. The focus is on the industry as it is viewed by the suppliers themselves, with these views obtained both from published materials and from personal interviews with representatives of nine of the past, present, and potential suppliers. (Appendices E-K contain reports on these interviews.)

This study also draws upon, and provides an update of, two previous studies done by the Office of Technology Assessment in 1975 and 1979.\* The analysis reported here is based heavily on events since 1978, especially as these have been influenced by activities of the DPM Demonstration Program and the AGRT Program. The DPM Program reached its peak of activity, from the system suppliers' viewpoint, in 1980, just prior to the end of the program in early 1981. The AGRT Program has continued since 1975, but with a number of slowdowns and redirected activities.

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\*Automated Guideway Transit: An Assessment of PRT and Other New Systems, OTA, June 1975; Impact of Advanced Group Rapid Transit Technology, OTA, undated (1979?).

The remainder of this report is organized into four sections. In the first, the nature of the AGT market is discussed, since, as in all sectors of the economy, this has a major impact on the supplier industry. The second section identifies the types of industries likely to become involved in the public AGT market. The next section discusses the dynamics of entry to and exit from the AGT industry. The final section draws upon the findings of the previous sections to identify the prospects for the future of the industry.

## The Nature of the AGT Market

The market for AGT systems bears little similarity to the classical many producer--many buyer markets considered in introductory economics courses. Even at the peak of AGT involvement by US firms, only about twelve producers were active. To date, buyers and potential buyers are similarly limited--a few airport authorities, recreational park developers, and cities or transit agencies. Furthermore, when the AGT products available from the US firms are carefully classified, it becomes clear that there are really two AGT markets--one in which the US DOT is not directly involved and one in which it has been the primary system buyer, either directly or by providing the funds to be used by other entities to purchase systems.

The first AGT market may be termed the non-federal market; it is represented by all but one of the AGT systems now existing in the US--those at airports, hotels, shopping and medical center complexes, amusement and recreational parks.\* With just two exceptions (Westinghouse and Otis), the suppliers of these systems have not been involved in both the first and second AGT markets. None of the firms involved solely in the non-federal market--UMI, VSL, and Walt Disney Enterprises--appear to be interested in extending their involvement to the second AGT market. None chose to bid to provide the DPM systems in Los Angeles, Detroit, and Miami, for example, although each has been a source of two or more non-federal systems successfully operating on a continuing basis.

Our primary focus in this report is on the second AGT market, the market in which the US government, specifically UMTA, is the sole direct or indirect system buyer. This market has many similarities to the markets for military and space equipment, and, in recent years, those for public transportation vehicles, both bus and rail. This market includes applications of AGT technology for public transportation outside of activity centers and is currently represented by only one operating system--Morgantown.

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\*This market could be further subdivided into the amusement/recreational market served by and selling to private firms in the recreation ride industry, and the other non-federal market served by some of the firms who are also involved in the federal market. This latter market includes airport systems which are typically locally funded via airport revenue bonds and thus require no federal support.



There are a number of implications of the government's dominance in this market which are highly relevant to the present status and future prospects of the AGT industry. These implications include:

- o business development costs
- o program continuity
- o local decision-making
- o foreign competition

These areas are discussed in the subsections which follow.

Business Development Costs--In order to protect taxpayers' interests and to promote healthy competition, the Federal government has developed complex procurement procedures which significantly affect the costs of obtaining government contracts. By establishing allowable overhead rates designed to cover these (and other) costs, firms which are successful in obtaining contracts are able to recover many of these costs. However, firms must pay the costs "up front," and must be prepared to incur the additional costs required so that their accounting and record-keeping will meet government-specified standards. Furthermore, no allowances are made to cover any of these costs incurred by firms who unsuccessfully compete for Federal contracts.

Clearly, firms which have not previously carried out government contracts are at a distinct disadvantage with respect to their ability to enter the Federal AGT market. As discussed in the next section, realization of this disadvantage has kept many firms not previously involved in government work out of the AGT market. Conversely, many firms active in the military and/or aerospace industries found it relatively easy to enter the market.

Program Continuity--The maturation of a high-technology market involving large costs per system must take place over a long time period--decades rather than years. This time scale is hard to reconcile with that of the Federal government, in which Congress changes to some extent every two years, and the Executive branch, including the major policy makers within the Department of Transportation, have changed at least every four years in recent times.

The impacts of these varying time scales have been major discontinuities in government AGT programs--funding gaps in the AGRT program and the curtailment of the DPM Demonstration Program are two examples of this. As

in many other areas of government, the UMTA technical staff has found it impossible to keep the development of the AGT market on a sufficiently fixed course in the face of conflicting Congressional mandates and Administrative intentions. This aspect of the AGT market is a more severe manifestation of similar problems in the military and space areas. Clearly, the latter areas enjoy a greater consensus concerning their desirability and importance than the AGT area does.

From the suppliers' viewpoints, these discontinuities and redirections represent added risks and higher potential costs. Only when these factors can be minimized by being relatively unimportant components within a large total volume of business are firms likely to remain involved in the AGT market.

Local Decision-Making--During the abbreviated life of the DPM Demonstration Program, a new feature of the AGT market became increasingly evident the importance of local area decision-making. In spite of UMTA's continuing importance as a supplier of funds for AGT systems, plans to implement DPMs had to be approved by the local areas involved. In this regard, the AGT market is quite different from the markets for military and aerospace systems. Between the announcement of new funding for DPMs in four cities in 1976 and the end of the program in 1981, three of the local areas had decided to drop out and an elected official from the fourth was instrumental in getting its DPM funds suspended at the Federal level. Clearly, new standards of public participation for all transportation projects and current limitations on local funds, when added to long-standing characteristics of local area governments such as avoidance of risk and uncertainty and preferences for tried and true approaches, indicated important newly-revealed limits on the size of the AGT market. These indications were rapidly understood by the firms active or potentially active in the AGT market.

Foreign Competition\*--A final factor related to the government's important role in the AGT market is the impact of foreign competition on the US industry. In recent years, it has become clear that foreign firms in

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\*Both the impacts of foreign competition and the advantages of alternative public-private institutional arrangements for research and development are discussed in greater detail in the two OTA reports referenced on page 27.

Canada, Germany, France, and Japan have reached levels of AGT technological advancement equal to, or greater than, those of the US industry. It also is generally accepted that the high rate of foreign progress is closely related to the extent to which foreign governments support both AGT research and development and AGT sales in the US. Foreign governmental support appears to be more heavily concentrated on fewer firms per country (except in the case of Japan), to emphasize implementation assistance more than in the US, and in many cases to provide funding specifically to aid export financing.

The US government's different approach originates, to a large extent, in a basic difference in philosophy concerning the relationship of government and individual firms, and in the level of support which should be provided to a given market. From the perspective of AGT firms, however, the result is seen as a worldwide market in which nearly all non-US firms have significant advantages not available to domestic firms. This is true even though "Buy America" legislation penalizes foreign suppliers bidding on US-funded transportation systems. Experience has shown that the ten percent cost advantage given to US firms competing with vehicles or systems which represent less than fifty percent of domestic materials or costs is often more than offset by lower bids from foreign firms. In the case of the DPM system procurements, US firms obtained no advantage from "Buy America" provisions, because the value of guideways and other "civil construction" components could be counted toward the 50 percent domestically-originated requirement. As a result, foreign firms could import complete or nearly complete vehicle and control systems, to be combined with domestic civil construction components and final assembly, thereby avoiding the penalty provisions of the "Buy America" Act.

## The Nature of Firms in the AGT Industry

In very general terms, the firms now or previously involved in the AGT industry chose this role based on the resources they have had available for the required research, system development, and business development; on their areas of experience and expertise; and on their expectations for the future of the AGT market. The large levels of funds and facilities required for success in the AGT market, combined with the technological risks and uncertainty of the market, have effectively prevented new or small firms from becoming established in the market using outside or venture capital.\*

Instead, a set of large or unusually cash-rich firms with internal funds available to commit to AGTs have dominated the industry. This is borne out by the second column of Table 1, which indicates that the lowest level of 1980 annual revenues of any of the firms shown which now or previously have been active in the Federal AGT market is \$517 million. In 1980, all had revenues large enough to be ranked with the 500 largest industrial firms in the US. Their range of rankings were from second to 425th. By contrast, some of the firms involved only on the non-federal market are quite small.

Six columns in Table 1 are used to explore the impacts of previous experience and expertise on firms' decisions concerning the AGT market. Four of these columns show the firms' involvement in three areas of expertise which were chosen as potentially relevant for developers of AGT systems:

- o Experience in producing either complete vehicles or major components used in vehicle construction.
- o Experience in developing vehicle control systems involving some degree of automation.
- o Experience in constructing complete transportation systems involving some degree of automation and including vehicles, control systems, and guideways.

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\*In addition to the firms profiled in Table 1, four small firms--Alden, Mobility Systems and Engineering, PRT Systems, and Uniflo--have at various times been active in the AGT market. Alden and Uniflo have withdrawn from the industry; Mobility Systems and PRT Systems both remain somewhat active in AGT system development and marketing, but neither have sold any systems.

The first two areas, along with guideways, represent the three major subsystems of a complete AGT system. Guideways were not a primary area of expertise for any of the firms considered as potential participants in the AGT market, although some of the firms do have divisions dealing with general industrial and/or civil construction activities. Usually, however, these divisions had a very low level of involvement in the AGT development programs of their respective firms.

The development of complete transportation systems is the area of expertise which is the most closely allied with the AGT industry. This area is also a much more common characteristic of the more active AGT firms, as summarized in the last three columns of Table 1. (This table shows firms in increasing order of present involvement in the industry. Similarly, the firms which have withdrawn from the market are shown in increasing order of their previous involvement.) The four firms with experience in developing complete transportation systems in related areas are currently active in the industry. In addition, with the exception of one firm, which is involved to the extent of forming a joint venture for marketing other's systems, each of the remaining active firms has the experience gained in developing previously sold AGT systems. All of the firms which have withdrawn possess related experience in developing vehicle components or (more commonly) complete vehicles and two deal with control systems, but none have related experience in the development of complete systems.

Clearly, previous experience in the "high-tech" aspects of transportation systems has been a bigger factor in firms' successful involvement in the AGT industry than their ability to build vehicles. Furthermore, previous experience in integrating the various subsystems into a complete automated system has been more important than simply having expertise in one or both of the two major subsystems--vehicles and control capabilities.

The fifth column under the general heading of related experience in Table 1 provides a general statement of the major activities of each of the firms. The few representatives of firms whose major activity is vehicle production--either rail or automotive--have had the most limited past role in the AGT industry, and except for Budd's remaining joint venture marketing role, have all now left this area of business. The largest single group of

TABLE 1. SUMMARY OF CHARACTERISTICS OF MAJOR FIRMS WITH PAST AND/OR PRESENT AGT INVOLVEMENT (1 of 2)

Firm	1980 Revenue (\$ x million)	Related Experience						AGT Involvement		
		Vehicles		Control Systems	Complete Transportation Systems	General Classification	Major US Government Contractor	Past Role	Present Role	Major Activities
		Components/Complete Units	Types							
Budd (Thyssen AG)	1,285 (1) (15,493)	Both	Rail pass & freight; highway trailers	--	--	Freight Vehicles	Yes	Joint Venture	Joint Venture	With UMI previously; now with foreign firm to market Maglev systems
Pullman (Wheelabrator-Frye Industries)	3,210 (2)	Complete	Rail pass & freight; highway trailers	--	--	Freight Vehicles	Yes	Joint Venture, R & D	Withdrawn	With Bendix for Las Vegas system; never built
General Motors	57,700	Complete	Autos, trucks buses, locomotives	--	--	Automotive	Yes	R & D	Withdrawn	Air cushion technology, dual mode; constructed system for its own EPCOT display
Bendix	3,895	Components	Autos, aircraft, military, space	Military, space	--	Automotive/Aerospace	Yes	Demonstration system	Withdrawn	TRANSPO '72
Rohr	517	Both	High speed ocean vessels; aircraft & space components	--	--	Aerospace	Yes	Demonstration system, R&D	Withdrawn	TRANSPO '72, dual mode, AGRT
Ford	37,100	Complete	Autos, trucks	Military, space	--	Automotive	Yes	Demonstration systems, non-federal market systems	Withdrawn	TRANSPO '72, two systems built
LTV	8,010	Both	Aircraft, military & space vehicles; aircraft components	--	--	Steel/Shipping/Aerospace	Yes	Non-federal market system, DPM bidder	Inactive, re-entry a possibility	AIRTRANS; Los Angeles DPM bid
Boeing	9,426	Complete	Aircraft, military, space	--	Military	Aircraft/Aerospace	Yes	Federal market system	R&D	Morgantown, AGRT
Otis (United Technologies, Inc.)	1,183 (3) (12,399)	Complete	Elevators (Auto components, aircraft)	Military	Elevators, escalators	Elevators/Aerospace	Yes	Demonstration system, DPM bidder in joint venture, non-federal market system	R&D, some activity in non-federal market	TRANSPO '72, DPM bids with MATRA, Duke University system, AGRT

TABLE 1. SUMMARY CHARACTERISTICS OF MAJOR FIRMS WITH PAST AND/OR PRESENT AGT INVOLVEMENT (2 of 2)

Firm	1980 Revenue (\$ x million)	Related Experience						AGT Involvement		
		Vehicles		Control Systems	Complete Transportation Systems	General Classification	Major US Government Contractor	Past Role	Present Role	Major Activities
		Components/Complete Units	Types							
UTDC	--(4)	Complete	Rail Transit	--	--	Passenger Transportation	No(5)	Federal market (DPM) system sale	Active in US federal and Canadian markets	Detroit DPM
Disney	915	--	--	--	--	Entertainment	No	Non-federal market systems	Active in non-federal market	1 airport, 2 recreation area systems
VSL (Losinger, Ltd.)	--(6) (22)	--	--	--	Cable/ materials handling	Cable Transportation	No	Non-federal market systems	Active in non-federal market	3 private cable systems
Universal Mobility	--(4)	--	--	--	--	Recreation Transportation	No(7)	Non-federal market systems	Active in non-federal market	8 recreation area systems
Westinghouse	8,514	Both	Elevators, escalators; rail (inter-city & transit); military, space components	--	Elevators, escalators	Electrical Machinery	Yes	Non-federal market systems, federal market system (DPM) sale	Active in federal and non-federal markets	1 recreation area, 5 airport systems; Miami DPM

- (1) Revenue shown for 1977, last year of independent operations. The 1980 revenue of the parent firm, converted to US dollars using average 1980 exchange rates, is shown in parenthesis.
- (2) Revenue shown for 1979, last year of independent operations.
- (3) Revenue shown for 1975, last year of independent operations. The 1980 revenue of the parent firm is shown in parenthesis.
- (4) No information on revenue available.
- (5) UTDC does have extensive experience as a contractor with Canadian governmental units.
- (6) No information available on VSL revenue. The 1979 revenue of the parent firm, converted to US dollars using average 1979 exchange rates, is shown in parenthesis.
- (7) Limited US Government contracts for AGT R&D.

firms which has been involved are those in the aerospace industry, but only one of these now remains. Other firms remaining in the industry represent a very "mixed bag" of major activities from entertainment/recreational parks (Disney) to materials transportation and heavy construction (VSL). Two specialize in passenger transportation systems; one of these is based in Canada (UTDC) and one operates exclusively in the private recreational park AGT market (UMI). The only US firm currently active in the public market (Westinghouse) is a large electrical equipment firm which has also dominated the airport systems segment of the non-federal market.

The levels of involvement of the firms remaining in the AGT market are strongly related to the relative sizes of their resources, as indicated by their annual revenues. The smaller firms have limited their involvement to the non-federal market. Only the large firms have become involved in a major way in UMTA-funded research and development and in selling systems in the federal market. Of course, this correlation is not entirely due to management decisions: a number of firms have bid on AGT work, including system construction in the public AGT market and participation in UMTA-funded R&D, but with very limited success.

A final important factor in a firm's decision concerning participation in the federal AGT market is summarized in the last column in the "related experience" section of Table 1. This column shows the extent of each firm's prior experience in bidding for and carrying out major US government procurements, or local procurements which are partially funded by UMTA. The only firms without such prior experience are UTDC, a corporation with major funding by the Province of Ontario and with the major share of its activities involving public sector markets in Canada; VSL and Disney, which have also not participated in the federal AGT market. A fourth firm, UMI, has had some involvement in UMTA-funded R&D, but has not become active in the federal AGT market. The correlation between prior experience in federal procurements and past or present involvement in the federal AGT market is clearly very strong.

This section can be summarized by giving profiles of the typical firms with past or present involvement in the AGT industry. When all such firms are considered, the typical characteristics are a large Fortune 500 aero-



space firm with prior experience in government procurements which involve developing and constructing vehicles and/or complete automated transportation systems. In nearly every case, the firm's involvement in the AGT market represents a very small fraction of total revenues and resources. When only those firms remaining involved in the federal AGT market are considered, the typical characteristics continue to be a large firm with prior government experience, but probably not an aerospace firm and more likely to have prior experience in developing and constructing complete systems. Finally, the typical firm now involved in the non-federal AGT market is a smaller firm without prior experience in either major transportation systems or components, or in government procurements.

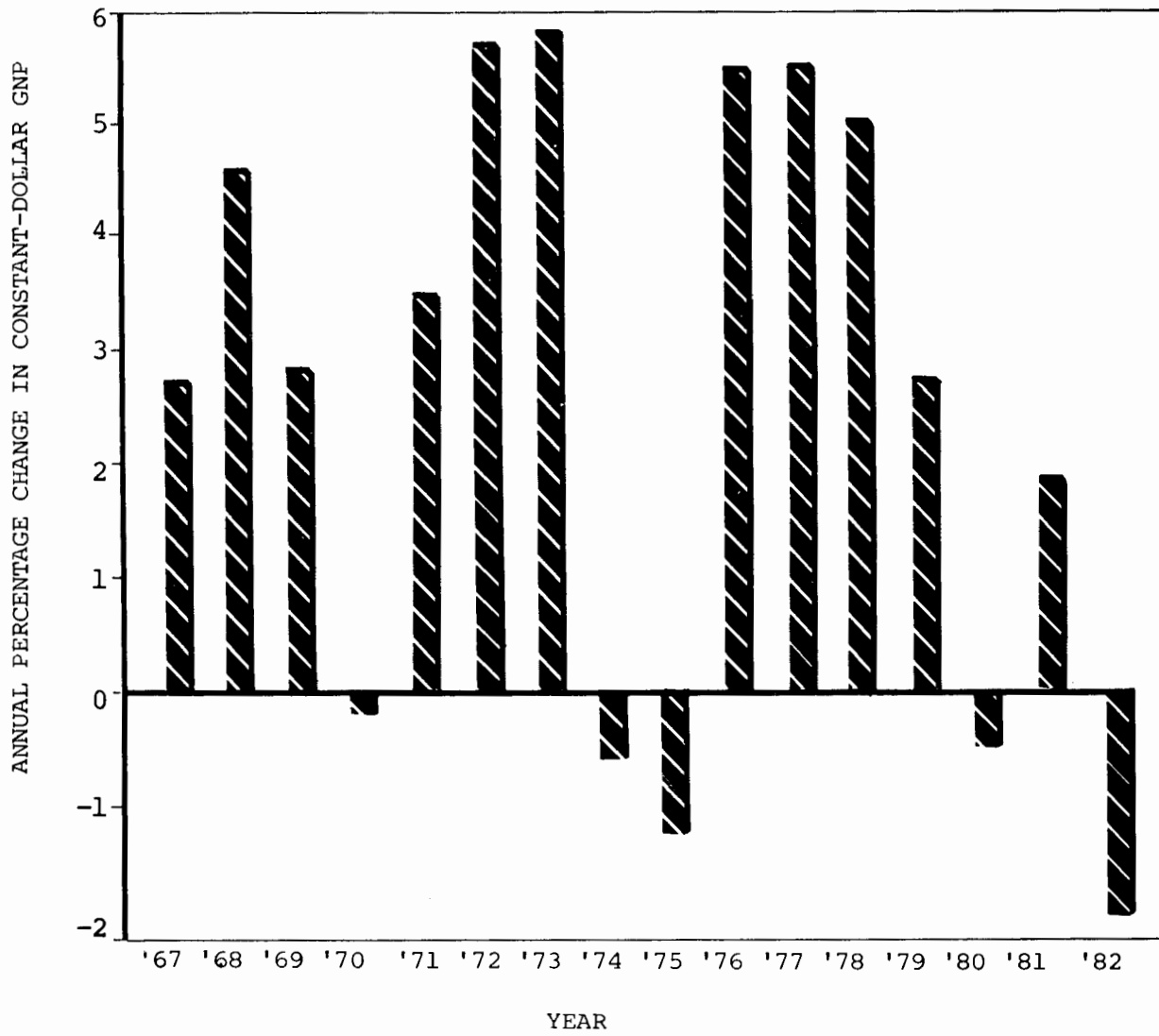
## The Dynamics of Entry and Exit in the AGT Industry

To explain why a large number of firms became active in the AGT industry in the period from 1965-1970, and why many of these withdrew over the past five years, both the characteristics of the firms and the environment in which they found themselves over the past 15 years must be considered. Figure 3 shows the rate of change, in constant dollars, of the US economy as a whole for the period from 1967 to 1982. Growth rate peaks occurred roughly every four years, in 1968, 73, 77, and 81. The range of peak GNP growth rates during these years was +1.9 to +5.8 percent, with the average peak rate equal to +4.5 percent. In each case, the intervening low points involved periods of real declines in total economic activity. The range of low growth rates was -1.8 to -0.2 percent, with the average equal to -0.9 percent.

A time series analysis of total revenues by individual firm reveals generally similar patterns. The more consumer- and private sector-oriented firms (Westinghouse, Otis, GM, and Ford) tend to have highs and lows in the same years as GNP's extreme points. The public sector-oriented (aerospace) firms and others involved in the AGT market tend to have wider and more frequent fluctuations in revenue growth, less likely to match the timing of the GNP pattern. In the 1968-75 period, however, most firms were passing through the same low-high-low growth sequence shown for GNP in Figure 3. Conversely, in the 1980-82 period, most of the AGT firms were passing through low growth periods without the slight improvement in 1981 experienced by the economy in general.

A second important external factor for the public sector-oriented AGT firms was the pattern of government expenditures for their products during the 1968-82 period. At the beginning of the period, with the end of the Vietnam war and the completion of the US program to put men on the moon, aerospace and military supplier firms were experiencing significant reductions in the scale of their government work. Significant growth in this source of revenues was not to occur until 1981-82, when the government's military spending levels greatly increased.

The decisions of the individual firms now or previously in the AGT industry, especially the public sector portion of the industry, can be readily



Source: Economic Report of the President, Transmitted to the Congress, February, 1983.

FIGURE 3. GROSS NATIONAL PRODUCT ANNUAL GROWTH RATES, 1967-1982

understood in the light of these firms' past experience and of the trends in the general economy and in government spending for "high-tech" systems over the past 15 years. In the years 1968-1972, many of these firms were looking back on a decade of above-average growth which provided ample funds for new ventures as well as for research and development. At the same time, they were experiencing the prospects of reduced revenues in their aerospace and military systems activities. As they looked for new market areas, it was natural for them to choose AGT systems for a number of reasons:

- o They expected their experience in developing and building complete transportation systems for aerospace and military applications to be highly transferable to AGT systems.
- o Their experience gained operating in the arena of government procurements provided them with a base of administrative support which also could be easily transferred to the new area.
- o Following the work done on the 1968 report Tomorrow's Transportation: New Systems for the Urban Future and the creation of UMTA in the same year, this new agency was highly receptive to the idea of developing AGT systems. During this period, this receptiveness was expressed, among other ways, in a steadily increasing level of funding for AGT research, development, and demonstration activities. Firms considering entry into the AGT industry were thus likely to have a high level of expectations for continuing future government support.

Although not all firms which entered the AGT industry during this period fit exactly into this pattern, many did, including LTV Aerospace, Rohr, Bendix, and Boeing. Other firms, which had some of the characteristics described above, became interested in what appeared to be a new and promising industry. These firms included several large consumer-oriented transportation-supplying firms with resources available for internal investment (GM, Ford, Westinghouse, and Disney) and, in limited ways, rail vehicle suppliers (Budd and Pullman). Even a number of new ventures were formed specifically to enter the new market, often as spin-offs of AGT activities in larger firms: Transportation Technology (later purchased by Otis), Universal Mobility, PRT Systems, Uniflo Systems, Alden Self Transit Systems, and Mobility Systems and Equipment.

By 1979, changes had taken place in each of the factors discussed above. Most of the firms with some AGT involvement were then looking back on more than six years of significant fluctuations in revenues, profits and costs,

many related to the 1973-74 and 1979 energy crises. Corporate funds for research and development and for new ventures were much scarcer than they had been in the earlier period. The level of Federal funding available for the AGT industry was significantly reduced from that expected in 1968-72, and was frequently only available on an intermittent basis. The only major Federally-funded completed AGT system implementation was Morgantown, and the DPM program had not reached the stage of selecting system suppliers. Two of the originally-selected DPM cities, Houston and Cleveland, had decided to withdraw from the program, and local opposition was causing delays in two others, Los Angeles and St. Paul. Detroit and Miami remained in the program, but in these cities also the preliminary engineering phase (to be completed prior to selection of a system supplier) was a lengthy process. It became clear to each of the firms involved that the growth of the public AGT market would continue to be much slower, and that its ultimate potential would probably be much lower, than they had previously hoped.

Another negative factor arose at about this time--the emergence of significant levels of foreign competition. System development, demonstration, and implementation activities in France, Germany, Japan, and Canada were accelerating, in many cases with more significant levels of government support than was available in the US. Based on the successes of foreign firms in winning US contracts to supply rail transit vehicles, US firms could expect tough foreign competition for the few public AGT systems which would be built.

The AGT industry was also affected by the "bad press" associated with the significant start-up problems and higher-than-expected costs of such systems as AIRTRANS and Morgantown. In both cases, the start-up problems were eventually overcome, but the damage to each system's reputation was hard to repair. These damages spilled over to the entire industry and clearly had a significant impact on decision-making both at the local level and in Congress.

For a number of firms, the potential market for their systems appeared to be further reduced: the specifications being developed for the DPM systems called for large vehicles and the ability to form multi-vehicle trains. A number of existing systems could not meet these specifications without

major levels of new development work. Neither the funds nor the time required for this work was available.

As these many negative factors became clear to the firms in the AGT industry, a number of them decided to withdraw from the public AGT market. These withdrawals began to occur before 1975; by 1979, each of the five firms which have withdrawn from the market to date had done so.

While the status of the AGT market presented a discouraging picture in 1979, there were some positive elements which existed then and have subsequently been strengthened. The firms remaining solely in the non-federal AGT market--Disney, UMI, and VSL--have shown no signs of withdrawing, and indeed have continued to sell and implement systems for airports, recreation parks, and hotel complexes. The two firms active in both federal and non-federal markets--Otis and Westinghouse--both have sold private systems recently and have continued their involvement in UMTA-funded R&D, downtown circulation development, and system marketing. In addition, Boeing continues to be active in AGRT R&D and LTV, although presently inactive, retains the option of returning to an active role. As of mid-1983, in fact, the AGT market outlook was brighter than it had been for the past few years. The initial uncertainty associated with changing federal priorities has been reduced as federal funding has been continued for the Detroit and Miami downtown circulator systems and for a significant portion of the AGRT R&D program. Firms which were suggesting at the end of 1981 that their withdrawal from the industry was a significant possibility are now planning to actively market control subsystems which represent spin-offs of their UMTA-funded R&D. It has become clear, however, that at least one foreign firm, UTDC, will continue to be an active competitor in the US market--its contract to build the Detroit circulator plus its sales of two systems in Canada virtually assure this.

## Future Prospects for the AGT Industry

It would be a mistake to assume that the present relatively stable, if significantly reduced, level of involvement of firms in the AGT industry will continue indefinitely. The rapid rates of change observed in the past 15 years may not continue into the future, but further changes are sure to occur. Predicting whether the overall effects will be a stronger or a weaker industry, with more or fewer firms involved, is difficult under any circumstances. If likely trends in the various relevant factors discussed above are considered, however, educated guesses can be made with increased chances that they will be borne out by future events. Thus, before reaching conclusions on the future of the AGT industry, these various trends will be reviewed.

On the positive side, the GNP growth rate is currently moving upward, and is expected to continue to do so for more than a year. This growth is likely to be reflected also in the revenues and profits of the firms in the AGT industry. These trends can be expected to strengthen the AGT industry in two ways: the firms now involved will be less likely to withdraw in response to the need to "tighten belts" and consolidate operations within their own corporate structure, and the level of system sales activity in the non-federal AGT market is also likely to increase. Another positive trend is the improvement in the general public reputation of AGT systems as the early start-up problems tend to be forgotten and the continuing successful operations of the existing systems become more generally known. A final positive trend is the realization by AGT firms that the control subsystems and other AGT components they are now developing and testing may represent significant spin-offs into potentially large related transportation markets, such as electric motor speed controls for conventional rail systems.

The existing trend in the demand for AGT systems represents a factor which can have mixed impacts on the AGT industry. Interest in building non-federally funded systems appears to be increasing slowly as the general economy improves. In the federal market, the attitude is likely to be "wait-and-see" until the systems now being constructed in Miami and Detroit have proven themselves. If these systems are implemented without major operational or financial setbacks, and are well-accepted by the local residents, the demand for similar systems in other areas will begin to materialize.

Any setbacks which do occur will undoubtedly be highly publicized even if they are subsequently overcome, thereby inhibiting the demand elsewhere.

On the negative side, the generally low levels of corporate profits over the past two or three years mean that there are now reduced levels of internal funds available for research and development. As a result, firms will continue to be very cautious about expanding their investment in AGT systems, and new firms will be highly unlikely to consider entering the industry.

The prospects for major increases in federal funding for AGT programs are generally recognized to be quite unlikely. Congress has kept the existing R&D and implementation activities going at reduced levels, but high federal deficits and many competing programs are likely to keep AGT funding levels from growing significantly.

Trends in government policies are also likely to be negative factors in the foreseeable future. Fiscal constraints will be hard to overcome, even if the current administration, or a future one, were to change its policy on funding new transportation technologies. Also, the levels of government funding in the industry's competing areas of aerospace and military systems are not likely to decrease drastically.

A final negative factor is the reality of continued strong foreign competition. While the present demand for AGT systems remains lower in all countries due to the recent world-wide economic recession, foreign firms have been successful in the US rail transit vehicle market and in competition for the Detroit downtown circulator. As a result, foreign firms can be expected to continue to compete actively for both federally and non-federally funded US systems in the future.

When all of these positive and negative trends are considered together, they suggest that the AGT industry will remain at its current reduced level for the foreseeable future. The market for non-federally funded systems may grow slowly, but probably not enough to attract new firms to this part of the industry. The uncertainties of the continuation of a market for federally funded systems will surely keep new firms from entering this market, but the existing firms are likely to remain to compete for any new work which does materialize because they will continue to be involved in the larger closely-related non-federal and/or foreign markets. The firms now



involved in the AGRT R&D program will continue this role as long as federal funding is available, and will also be looking for opportunities to expand into sales of related products. However, since the objectives of the present R&D activities are control subsystems rather than complete AGT systems, these firms are not likely to return to the complete-system market. Also, they will be seeking to broaden their product applications to include conventional rail transit vehicles, aerospace systems, etc.

There are likely to be both positive and negative impacts on the US AGT industry due to the expansion of activity in the market by foreign firms. The number of system sales by US firms may be reduced, but many of the components of these systems will be produced in the US, often by the same firms marketing US systems. In addition, the formation of multi-national joint ventures to assemble and/or market foreign systems in the US is likely to continue, providing a way for both present and new US firms to keep involved in the AGT industry, if at a reduced scale.

It must be emphasized that the expectations discussed above apply to the foreseeable future, based on observed trends in each of the factors believed to be important to those deciding on corporate strategies in the AGT industry. It is only possible to speculate on what might occur in the more distant future. Cycles of general economic growth and decline are sure to continue but their timing will always be highly uncertain. If the current growth pattern is sustained for a number of years, potential US AGT firms will again have the resources required to invest in the industry. Whether or not they will do so, and the extent to which they will focus on the federally funded portion of the market, will depend strongly on their perception of whether the demand for AGT systems is growing, on how the related markets for aerospace and military systems are changing, on stated federal policies concerning support for AGT development and implementation, and on the continuing and stable existence of programs funded by UMTA in these areas. Clearly, significant changes from current trends in many of these areas will be required if the AGT industry is to experience a major expansion. Furthermore, it is clear that the Federal government, and UMTA in particular, will have a high level of influence on any changes which do occur in these trends, and thus in the AGT industry, in the coming years.



## APPENDIX A. CLEVELAND SITE VISIT

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## A.1 Description of the Region and System Site

Cleveland is located on the south shore of Lake Erie and is linked to national and international markets by six interstate highways, six U.S. highways, three major railroad trunk lines and the St. Lawrence Seaway (Figure A-1). The Cleveland metropolitan area encompasses Cuyahoga, Geauga, Lake and Medina Counties and has a population of nearly 2,000,000. Employment in the region, totalling 900,000, is diverse; 334 of the 452 standard industrial categories are represented. Thirty-one percent of the jobs are in manufacturing with a growing portion of the labor force employed in professional services. The City of Cleveland has a population of 572,000 and is located within Cuyahoga County. Cleveland ranks third in the U.S. in the number of corporate headquarters located there. From 1970-80 the metropolitan area's population declined by approximately 8 percent with the City of Cleveland showing the greatest loss.

Downtown Cleveland is bounded on the north by Lake Erie, on the south and east by the Innerbelt (I-90) and on the west by the Cuyahoga River (Figure A-2). The downtown area is large (2 square miles) with most activity taking place within one-quarter of the area at dispersed retail, government, and office centers (Figure A-3). Employment in the CBD totalled 138,000 in 1976, of which approximately 105,000 worked in the one-half square mile center of the CBD. The proposed alignment of the DPM system is also shown in Figures A-2 and A-3.

Regional transportation services are provided by the Greater Cleveland Regional Transit Authority (RTA). The system consists of 90 bus routes and three rapid transit lines and carries an average of 450,000 passengers per day. RTA currently has 868 buses in active service. The Public Square terminal area is the focal point of public transportation activity in the City of Cleveland. Located on the edge of the downtown, it is the terminus

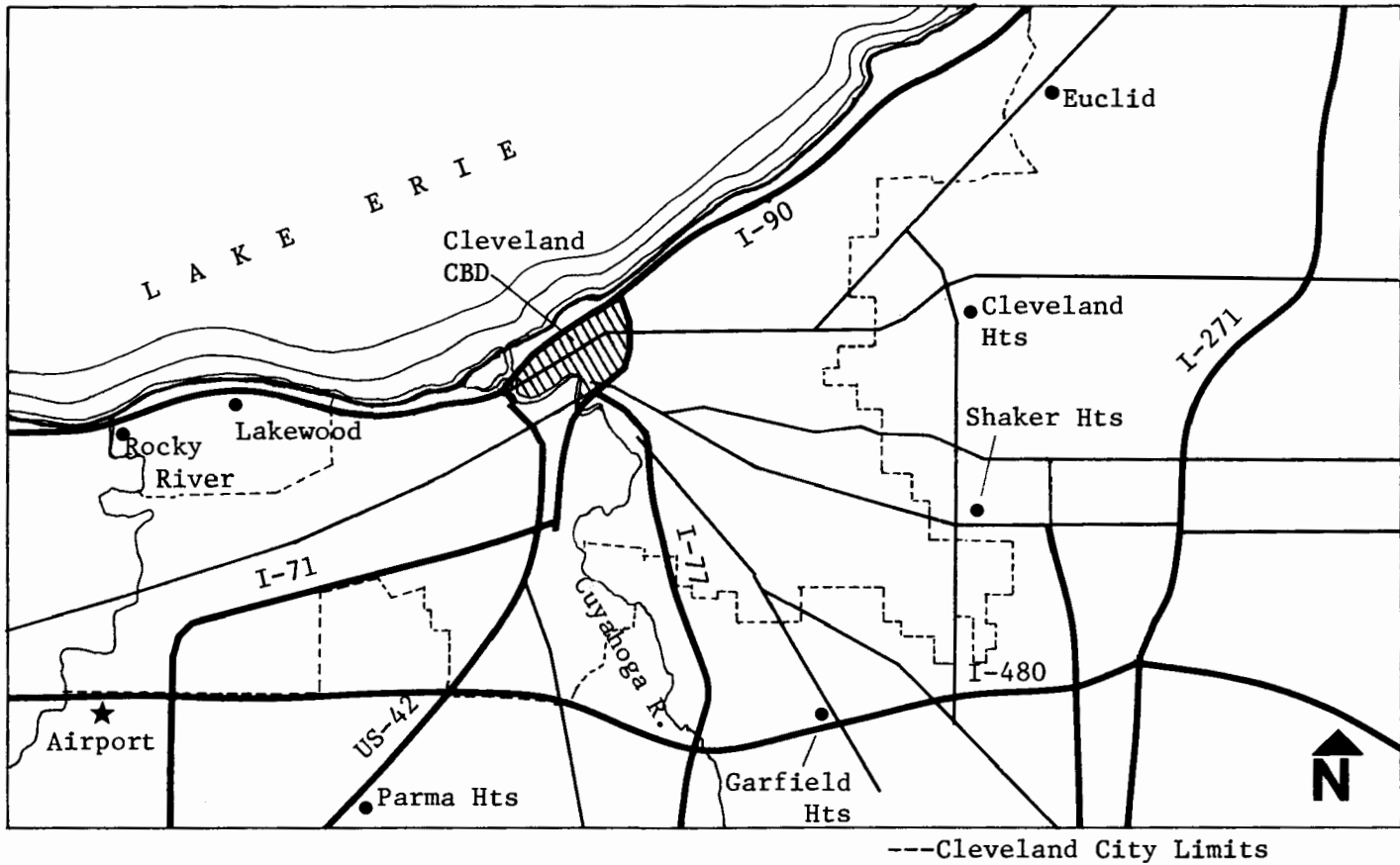


FIGURE A-1

Cleveland Metropolitan Area

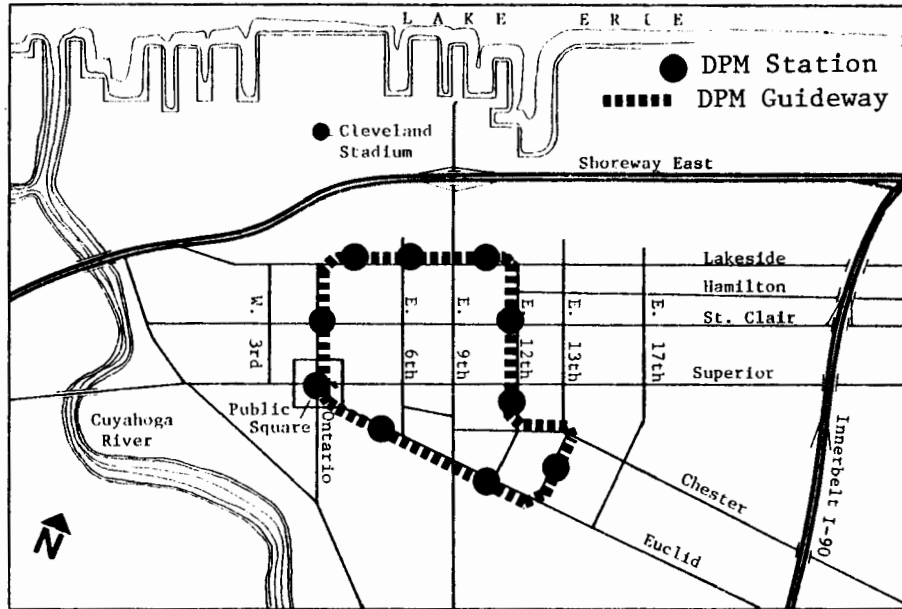


FIGURE A-2 Cleveland CBD

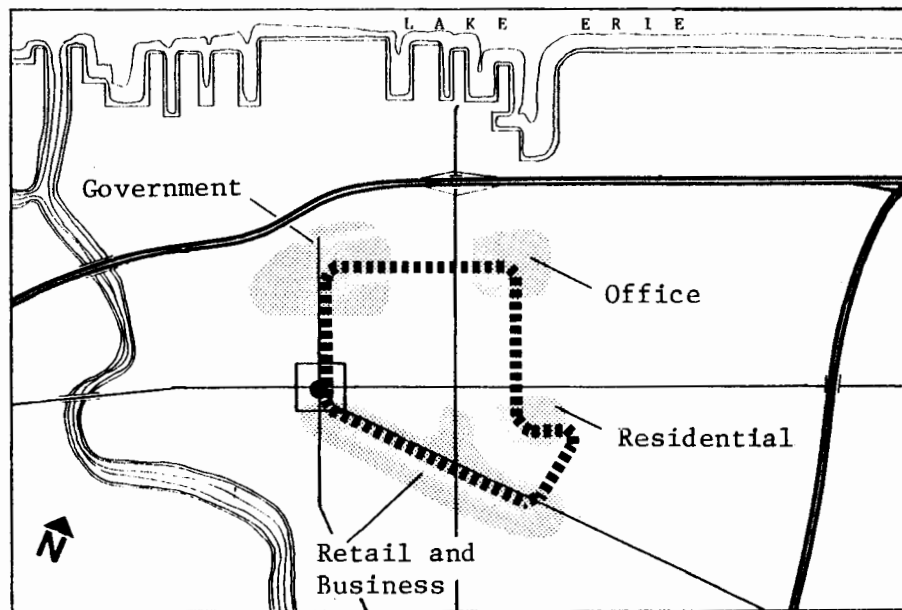


FIGURE A-3 Cleveland CBD Activity Centers

of many of the major bus routes and all three rapid transit lines. Although major regional bus routes provide crosstown and downtown service, they provide direct service to only a small portion of the downtown. An extensive network of downtown loop bus routes connects with the rapid transit lines and major bus lines at Public Square and provides transit service within the CBD. Thus many CBD-bound transit trips require a transfer from the major bus and rapid transit lines to the loop bus system.

In 1976, it was estimated that 35 to 40 percent of all trips entering the CBD were made by transit. The freeway system and arterial street network provide good auto access to the downtown, and ample off-street public parking is convenient for most downtown destinations. The dispersed development pattern has resulted in a relatively high availability of land for parking lots.

The major transportation issues facing downtown Cleveland have remained the same over the past twenty years:

- o improved circulation and distribution of people in the downtown area;
- o integration of downtown transit services with the regional transit system;
- o connection of the dispersed downtown activity centers;
- o improved transit services as a stimulus to residential and commercial development in the downtown.

While the loop bus system routes provide good coverage of the downtown, there is widespread agreement that improvements are needed. The system consists of five overlapping routes which many find difficult to understand and use. Also, many feel that Cleveland's climate, particularly in the harsh winter months, inhibits trip-making due to the unpleasantness associated with waiting for buses.



## A.2 Cleveland's Institutional Structure

The agencies and institutions in Cleveland that participated in the DPM planning process had a relatively straightforward and uncomplicated institutional structure. The agencies which influence the region's transportation decision-making process are outlined in Figure A-4 and are described in the remainder of this section.

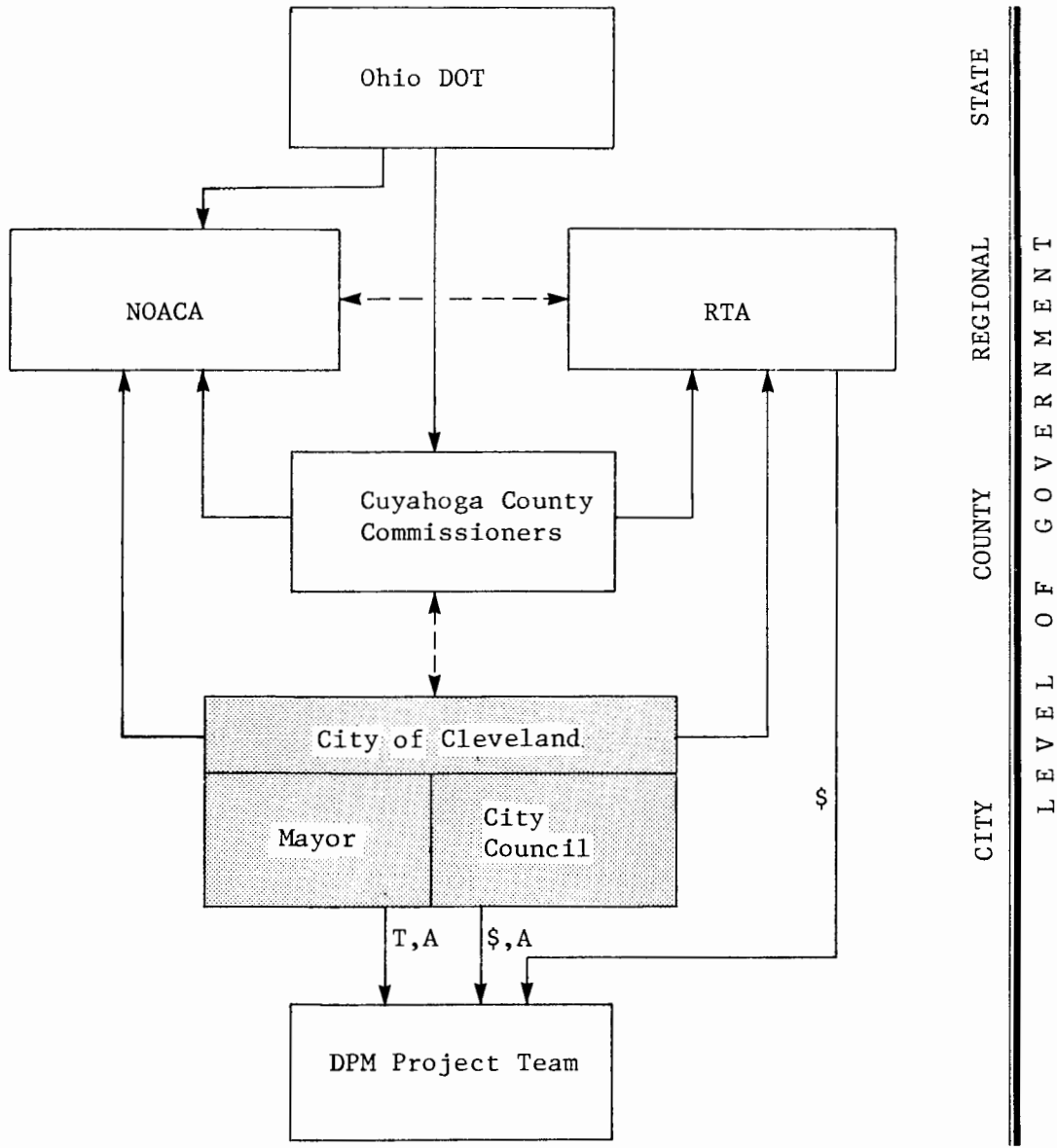
### A.2.1 City Government

In the City of Cleveland political power is balanced between the Mayor and the City Council. In the 1970's this balance was reinforced by a two-year term for the Mayor and the long tenure of the President of the City Council. While mayors typically served more than one term, the pressure of re-election was always close at hand. Until November 1981,<sup>1</sup> Cleveland's mayor and 33 City Councillors were elected at large for two-year terms. The City Council President is elected by the Council. With the exception of the Council President, who has served for 18 years (nine of them as president), Councillors are not typically long-tenured, with few serving more than six years. Throughout most of the 1970's, both the Mayor and the President of the City Council were active in pursuit of federal monies and programs to benefit the City of Cleveland.

Historically, transportation planning issues have not played a prominent role in city government. The only transportation functions which are institutionalized are those related to roads and bridge maintenance and

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<sup>1</sup>In November, 1981, voters approved a change from 2 years to 4 years for the terms of City Councillors and the Mayor, a decrease in the size of the City Council from 33 to 21 members, and the establishment of districts for City Councillors.



\$ - Projected Sources of DPM Capital Funds  
 T - Technical Review Responsibilities  
 A - Approval Responsibilities (control, financial, etc.)  
 [Shaded Box] - DPM Grant Recipient  
 ← - Direct Relationship  
 ←--- - Indirect Relationship

FIGURE A-4 The Transportation Decision-Making Agencies Relevant to the DPM Planning Process

repair, traffic engineering, and safety. These are the responsibility of the City Engineer, a civil service position, and the Commissioner of Traffic Engineering within the Police Department, respectively. As other transportation issues emerge, they are typically dealt with on an ad hoc basis by a member of the Mayor's staff and/or the City Planning Department.

From 1970-1977, the Mayor's office was primarily interested in large projects that would provide as much in the way of jobs and money to the City as possible, while the City Planning Department saw its role as being an activist in airing the concerns of the neighborhoods. Consequently, there is a feeling among some that during this period the only planning being done was initiated by the business community, and that this lack of municipal involvement caused Cleveland to fall behind in its planning activities.

#### A.2.2 County Government

Cuyahoga County has a population of 1,495,000 and includes the City of Cleveland. County government occupies a strong position in the State of Ohio with responsibility for welfare, social services, sanitation, sewage and highway transportation programs. (In 1981, the Cuyahoga County budget was \$600 million compared to \$116 million for the City of Cleveland.) The County is governed by three Commissioners, a County Engineer, and a County Auditor, each of whom is elected by County voters at large. Typically these elected County officials are as likely to be residents of the City as of the suburban areas.

Transportation planning at the county level is the responsibility of the County Engineer and focuses primarily on highway issues. County government was active, however, in the formation of the Regional Transit

Authority (RTA) and maintains an oversight function in the transportation planning activities of the region through its membership on the Boards of Directors of the Northeast Ohio Areawide Coordinating Agency (NOACA) and the RTA. All three county commissioners are on both the NOACA and RTA Boards, and the County Engineer is on the NOACA Board as well.

#### A.2.3 Northeast Ohio Areawide Coordinating Agency

NOACA was formed in 1968 to coordinate comprehensive planning activities within Cuyahoga, Geauga, Lake, Lorain and Medina counties. NOACA is governed by a 44-member Board of local elected officials representing a population of approximately 2.2 million persons and 170 units of local government. Approximately 20 percent of its staff are involved in transportation planning activities. NOACA is the region's A-95 review agency and designated MPO as required by UMTA and FHWA urban planning regulations.

Ever since its inception, NOACA has been active in regional transportation planning. NOACA was responsible for the Five County Transit Study completed in 1974, which resulted in the preparation of a Ten Year Transit Development Program for the Cleveland region. From time to time conflicts have occurred between NOACA and RTA about the appropriate roles of the respective agencies in the planning process, particularly as they relate to long term transit planning.

#### A.2.4 Greater Cleveland Regional Transit Authority

RTA was created as the regional transit operator for the Cleveland metropolitan area in December 1974, by agreement between the City of Cleveland, the Transit Board of the City of Cleveland, the Board of County

Commissioners of Cuyahoga County, and the Cuyahoga County Mayors and City Managers Association. Prior to RTA's formation, the Cleveland Transit System (CTS) and a variety of other municipal and private bus operators provided transit service in the area. Cleveland was one of the last major cities to create a public regional agency to operate its transit service and thus become eligible for federal assistance, ending its complete reliance on the farebox for revenues.

In May 1975, a Memorandum of Agreement was executed by all of RTA's convenors to more clearly define the terms and conditions of the transfer of assets and continuation of services from the CTS to RTA. Important points of this agreement include:

- o the call for a special election within Cuyahoga County to ask the voters' approval of a sales tax of not less than one percent to be used for public mass transit purposes;
- o for a period of five years, no funds obtained from fares or sales tax revenues, or federal operating or capital funds would be expended on the planning or construction of a subway or elevated transit facility in downtown Cleveland;
- o the designation of RTA as the region's recipient and dispenser of federal mass transportation funds;
- o procedures to be followed to determine service levels and fares to ensure an equitable distribution of services throughout RTA's service area.

RTA is governed by a ten-member Board appointed as follows: two members by the Mayor of the City of Cleveland, two members by the Cleveland City Council, three members by the Cuyahoga County Commissioners, and three members by the regional Mayors and Managers Association. One-half of the Board Members must be residents of the City of Cleveland.

RTA is financed by UMTA Section 5 funds, revenues from a one percent County sales tax passed by the voters in 1975, and fare box revenues. RTA

coordinates its transportation planning activities with NOACA, and conflicts between the two agencies have generally been in the area of long-range transit planning.

The long-term priorities of RTA include extension of the rail rapid transit lines and an improved circulation/distribution system for the downtown. RTA management maintains close ties with the business community and views transit as an essential tool for downtown development. Community responsive transit has been a major concern of certain segments of the City's population. Although RTA has provided some community responsive service, there is a feeling, particularly among the elderly, that RTA is not committed enough to give this service the priority it merits.

#### A.2.5 Business Community

Cleveland's business community has historically been a strong force in the City. Although the perception that "business gets exactly what it wants," is probably an exaggeration, the business community is, in general, successful in getting its concerns aired and some resolution achieved. The business community sees itself as working in concert with the City's political decision-makers.

The Greater Cleveland Growth Association (GCGA) is the nation's largest, fastest growing chamber of commerce. It has a staff of 65, a budget of \$2.6 million and 7,700 members. Although many small businesses are members, most of these are manufacturers. The \$250 minimum fee probably inhibits "mom and pop" type retail operators from joining; however, GCGA does not limit its mailings to members and also is willing to provide information to non-members as well. GCGA has a division to focus on

downtown concerns and has supported improvement in the area's transportation services. GCGA helped to fund the local share of the Five County Transportation study conducted by NOACA and took an active interest in the creation of a regional transit system.

Cleveland's business community has been an active participant in efforts to develop and revitalize the downtown. In 1974, the City of Cleveland, the Greater Cleveland Growth Association, and the Cleveland Foundation (a non-profit public interest corporation) funded a consultant study to develop an overall plan for the downtown area. The consultant included workshops with private citizens and business groups to broaden community input into the process. This study resulted in the Concept Plan for Cleveland. The Downtown Cleveland Corporation (DCC) was then formed under GCGA's umbrella to implement the recommendations of the Concept Plan. DCC funded additional studies to follow up on the plan's recommendations; these studies included planning for an auto loop on West 6th Street and Superior Avenue, Euclid Avenue street improvements, and Public Square redevelopment. Unfortunately, renovation of a portion of Public Square was the only tangible accomplishment of DCC, which suffered from a lack of effective leadership and a lack of clearly defined objectives. Consequently, the activities of DCC were rolled back into GCGA in 1979.

### A.3 The DPM Experience in Cleveland

#### A.3.1 DPM Planning in Cleveland: Historical Context

The concept of a downtown people mover is, in many ways, quite a familiar one to the citizens of Cleveland. The problem of downtown circulation and distribution has long been acknowledged in Cleveland, and major transportation studies conducted over the past 20 years have all included recommendations that such a system be built. The only subway stop in the downtown is located at Public Square on the edge of the downtown, and over the years much discussion has been devoted to extending subway service into the area. The need for a downtown circulation system has always been discussed in conjunction with the extension of rapid transit lines, either directly as part of a rapid transit line extension or as a secondary system.

A loop bus service has been operating continuously in downtown Cleveland since 1936, when it was introduced to serve the Great Lakes Exhibition. In 1954, the voters of Cuyahoga County approved a bond issue to finance the construction of a downtown subway; however, in 1957 the County Commissioners voted against issuing subway bonds in favor of highway projects.

From 1965-69, the Cleveland Seven County Transportation/Land Use Study, which was created by the counties of Cuyahoga, Geauga, Lake, Lorain, Medina, Portage and Summit, developed a major long-range transportation plan for the region. This study recommended a staged approach to the construction of regional transit system improvements, and listed the construction of a downtown distribution system as the number one priority, due to its importance in generating increased transit ridership in other corridors and its importance in stimulating development of the downtown area.



In 1974, NOACA completed the Five County Transit Study (Cuhahoga, Geauga, Lake, Lorain, and Medina Counties). The result was a 10-year transit development program for the region which again detailed the need for a downtown distribution system. The study recommended that the system be either an extension of an existing rapid transit line or a secondary system utilizing a different technology.

In 1974-75, a collaborative effort by the City, GCGA and the Cleveland Foundation resulted in the Concept Plan for Cleveland which again raised the issue of improved transit service within the downtown. In late 1975, as a result of a consultant study funded by the City, the Mayor announced a plan for a monorail system to serve the downtown. Less than six months later, in April 1976, UMTA announced the DPM program. The Mayor was understandably pleased--the potential availability of federal funds would no doubt enhance the prospects for success of the monorail plan.

#### A.3.2 Submission of Cleveland's DPM Proposal

Despite the City's interest in a downtown circulation system, RTA had decided not to pursue the DPM Program. The Memorandum of Agreement, which set RTA's direction, had been strongly motivated by a concern that, for the first five years, RTA concentrate on rehabilitating the existing system before taking any action to expand it. The prohibition on expending any funds on a subway or elevated transit facility in the downtown was explicit; therefore RTA did not consider itself to be in a position to actively pursue a project that was seen as being in violation of the agreement. The Mayor and his advisors felt that the DPM was one of the "most exciting projects to come out of Washington in a long time" and that the problem presented by the

Memo of Agreement could be overcome if Cleveland was selected as a demonstration city by UMTA. Therefore the City, not RTA, proposed to take the lead in making Cleveland's application. The Mayor notified UMTA of Cleveland's intention to participate in the DPM Program and called in the consultant who had developed the monorail plan to prepare the City's DPM proposal. He also named an Assistant Law Director of the City as his representative to work with the consultant.

The City had less than three months to pull together the DPM proposal and set about eliciting support as quickly as possible from the local agencies and authorities (RTA, NOACA, County, business community) that would be requested to provide the local share of the system's cost. The City's team directed the proposal effort, involving others only to the extent required to gain support and provide the necessary technical inputs. The resulting proposal was viewed as the work of the City and not as a collaborative effort among participating agencies. Consequently, the level of commitment to it varied greatly, from the City's unqualified enthusiasm for constructing the DPM to the County's lukewarm support for proceeding as far as the first step--proposal submission. The City (Mayor and City Council), RTA, NOACA, the County, and the business community (as represented by GCGA and DCC) all endorsed the proposal,<sup>1</sup> and it was submitted in June, 1976. However, these endorsements represented more a consensus on what the problem was (downtown transit service) than on a solution (a DPM system).

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<sup>1</sup>While the City's proposal identified the State of Ohio as a possible financial resource for the project, the State had not been an active participant. This would continue to be the case throughout the DPM project.

In December 1976, UMTA notified Cleveland of its selection as a DPM demonstration city. Local reaction was mixed--the Mayor's Office and City Council President were thrilled to have been selected to participate, while others were frankly surprised at Cleveland's success. Many felt that the proposal had not been strong enough and that a local financial commitment was lacking. Some were convinced that Cleveland was selected more on the basis of a reward to a mayor who had been active in national Republican politics than on the merits of its proposal.

Little public opposition had developed prior to Cleveland's selection as a DPM city. This may be partially attributed to the short time period (three months) from announcement of the program to proposal submittal and the feeling among many that Cleveland's application would be rejected anyway. However, as the City started to prepare the preliminary engineering application, opposition began to be voiced.

#### A.3.3 Developing Cleveland's Preliminary Engineering Application

Politically, Cleveland operates on a consensus basis with any given project's chance for success heavily dependent upon the depth of consensus reached by the prevailing powers--City government (Mayor and Council), regional agencies, County government and business community--that have an interest in it. In the case of the DPM, the City needed support from the affected regional agencies (RTA and NOACA), county government and the business community, both to gain approval for the project and to help finance the local share. The City had succeeded in gaining enough support to submit the proposal, but had to work harder to get the level of commitment necessary to move ahead with the project.

The consultant began to develop the City's preliminary engineering application in much the same fashion as it had prepared the proposal--with a minimum of meaningful involvement from all agencies and organizations except the Mayor's office. There seems to have been a lack of awareness that this "exclusivity" had been instrumental in tempering support throughout the proposal preparation period and that continuing in this fashion would, once again, inhibit formation of a strong consensus.

GCGA believed that broad community involvement was essential if the project was to be successful. In a series of letters to the Mayor, the President of GCGA expressed his concern that the City was relying too heavily on the consultant, and his belief that the consultant would fail to involve the community in a meaningful way unless required to do so. He also called for the formation of Steering and Technical Committees to guide the study and the appointment of a transportation professional as the project director. The Mayor's response (through his Assistant Law Director) was to provide assurance that he would keep others fully informed, but made no reference to the request for assurance of meaningful participation.

Lack of meaningful involvement in the DPM process was also an important factor in the County's response to the program. The potential for a county versus city controversy always exists in Cleveland and, therefore, must be anticipated and handled carefully. In the DPM case, the City ignored this reality. From the beginning, the County felt that it was the last to be consulted about the project and only then because the City needed its financial contribution. Politically, this made it easy for the County to oppose the program. In addition, the Mayor of Cleveland had long-standing

antagonisms with two of the three County Commissioners from his days as County Auditor.

The consultant selection process was another factor which hurt project support. An architectural consulting firm considered by some in Cleveland to be the Mayor's favorite was selected without a competitive bidding process. The firm developed the City's proposal at no cost with the understanding that if the City was successful in its bid, this firm would be awarded the resulting contract for preliminary engineering work. Although some felt that the consultant had done very good work in the past and that a competitive procurement was not necessary, others were not at all pleased with the firm's past performance and questioned its qualifications to direct a transportation project. GCGA considered the consultant's estimate of \$2.4 million for the preliminary engineering study to be "excessive," and suggested that the Mayor request bids for the work from the "many competent engineering and architectural consulting firms in our City." Also, while DPM enthusiasts viewed the preliminary engineering study as the first step in system construction, others viewed it as a system feasibility study. By selecting a consultant who would be involved in each successive stage of the project, it was difficult for many to believe that the result would not be biased in favor of a DPM system whether or not it was warranted.

At the same time as questions were being raised about the lack of community involvement and consultant selection, the local financing plan for the project also began to run into difficulty. Although a combination of the City, County, RTA, and business community had agreed in principle to fund the local share of the DPM project, there was a continuing controversy

over the details of this commitment. This debate over financial arrangements provided another indication that the depth of support for the DPM project varied considerably among the agencies and groups involved in the negotiations.

In November 1976, the Mayor wrote a letter to UMTA reaffirming the City's commitment to the DPM project and outlining plans for financing the local share of project costs. He stated that the \$10 million local share would be funded with \$2 million from the State, \$2 million from RTA, \$2 million from the County, \$4 million from the City (\$2 million from a special assessment tax and \$2 million from general funds). In addition, the letter stated that general obligation bonds could be issued, if necessary.

Through January 1977 it appeared that the details of the local share would be worked out. The RTA Board voted approval of its \$2 million contribution, contingent upon amendment of the Memorandum of Agreement, and agreed to operate and maintain the DPM system. The County was also negotiating with the City and offered to put up \$2 million for the DPM if the City would deed over two parcels of land and bring its financial obligations up to date on the Justice Center project, a joint County and City-sponsored project then underway in the CBD. At this point, the County expected that the impact of the DPM on RTA's overall operating expenses would be minimal.

However, by February 1977, agreement on the local share issue was in serious question. Two of the three County Commissioners were vigorously opposing the DPM project, citing the RTA Memorandum of Agreement as legal grounds for their opposition. Furthermore, they said the County could not

contribute its \$2 million share because it was legally prevented from subsidizing transit out of existing funds.

The Mayor's Office responded that RTA could commit to pay its share after five years, with the City advancing RTA's share in the interim and, if necessary, the City could raise the entire local share by selling general obligation bonds. Meanwhile, the City Council President solicited a pledge from the Governor for the State to make up the County's share if it refused to contribute. However, the Speaker of the Ohio House of Representatives doubted that the Governor had the funds, and the State Transportation Director questioned whether the State could legally contribute until the project reached the construction stage.

GCGA, while committing itself to covering 20 percent of the City's share of the preliminary engineering study, took the position that local capital and operating funds should be provided by public sources. A downtown taxing district could be a potential source of funding, but it could not be set up immediately. Also, if it were established, the DPM would be only one of many priorities competing for its use. In addition, GCGA made it clear that before committing itself to supporting construction of a DPM system, its members would "prefer to wait for results of the feasibility study."

In April 1977, the City Council committed \$2.5 million to the DPM project and authorized the Mayor to apply for \$2 million from UMTA for preliminary engineering and to name a project coordinator, subject to Council confirmation. It also approved the \$500,000 local share of preliminary engineering funds. The Council voted 29 to 4 in favor, but

debate was heated. Once again, the strength of the vote seemed to reflect the conviction that it was premature to decide on the merits of a DPM system before completion of a feasibility study.

In May, the County Commissioners filed a lawsuit seeking an injunction to restrain the City from violating the Memorandum of Agreement on the grounds that:

- o under the agreement the City had delegated to RTA, on an exclusive basis, the rights to seek and disperse federal funds for mass transportation;
- o the agreement explicitly restricted RTA from participating in the planning or construction of a downtown transit facility;
- o DPM costs would exceed the downtown's share of systemwide increases permitted under the agreement;
- o the sales tax was passed by county voters with the expectation that RTA would be the sole agency responsible for public mass transportation.

In June, the NOACA Board voted 32 to 8 to approve the City's application for preliminary engineering funds. Again, while the vote was overwhelmingly in favor, it was "hotly contested," with two of the County Commissioners leading the opposition. The Mayor maintained that the Memorandum of Agreement permitted the City to operate a demonstration project like the DPM and that if Cleveland did not use the UMTA funds, another city would. The President of the City Council urged Board members to "run their own towns without being dictated" to by the County Commissioners and to vote in support of the resolution. NOACA staff urged support on the grounds that the preliminary engineering study offered Cleveland the opportunity to perform necessary transportation planning with federal aid while evaluating the feasibility of the DPM. However, DPM



opponents contended that the preliminary engineering study was not intended to consider system feasibility at all, but rather a commitment to construct the system. In a newspaper report, one opponent likened the DPM to a "concrete gorilla" and said that the "only way to kill a gorilla is to strangle it in its crib."

During the debate over whether to proceed with the DPM and apply for funds, the DPM received extensive coverage in the Plain Dealer, the newspaper with the largest circulation. Although its editorial stance favored the DPM project, many perceived that the newspaper opposed the project and that this may have hurt its chances for success. The newspaper's editorial position was in favor of exploring the feasibility of a DPM system for Cleveland due to its potential to "revitalize and stimulate downtown development," to "pull together the disconnected parts of center city," and to provide "excitement" and "civic pride." The newspaper clearly viewed the preliminary engineering study as a feasibility study and urged its approval on the grounds that "informed judgement cannot be made without evaluation" and that it was "silly to reject the DPM until the planning was completed." It criticized DPM opponents who were unwilling to evaluate the project on its merits, particularly the two County Commissioners who, it said, were "acting politically at the City's expense."

In addition to editorial opinion, the newspaper provided extensive coverage in news and feature stories. Feature stories described DPM activities in other cities as well as in Cleveland and discussed issues such as system reliability, aesthetics, and security, and the need for their consideration in planning Cleveland's system. The news stories tended to be

somewhat negative because the DPM opponents were more effective than the system's supporters in using the news media to bring their case before the public. City officials who opposed the project, while not able to voice their opposition publicly, were suspected by some to be providers of negative information to the press. However, the primary reason for the number of negative stories in the paper can most likely be attributed to the high level of activity by the two County Commissioners who opposed the project. Throughout the project, the County Commissioners were "newsworthy." They were busy filing legal challenges; calling for a public referendum; making trips to Washington, D.C. (to lobby their Congressional delegation and the Department of Transportation) and Columbus (to lobby their delegates to the state legislature); challenging the Mayor to debate; and strongly voicing their opposition in their capacity as commissioners and members of various boards.

Accomplishments of City officials were covered in the press as well. Unfortunately, City officials were not particularly effective in countering issues raised by DPM opponents. This can be attributed, in part, to a lack of awareness by certain officials that legitimate issues actually existed and needed to be addressed. However, the primary reason for the City's difficulty in presenting the project in its best possible light was its status as a demonstration project. While City officials were convinced it was a good project that would provide significant benefits to Cleveland, they lacked detailed information based either on other cities' experiences or on extensive planning results for Cleveland. City officials, according to some observers, seemed to expect the public to accept the project's merits on faith. In short, to effectively address the issues raised by

supporters as well as opponents, results of a feasibility and planning study were needed.

There was little organized activity by private citizens throughout the course of the DPM project. According to the President of the City Council, interest in the project was low on the part of the general public because few perceived that it would have much impact on their lives. The general public's interest which did exist was generally positive, however, because of the project's potential for spurring employment and development.

Although the Mayor's office announced plans for a series of seminars for community and business groups and the establishment of a DPM information office, little was accomplished in either direction. In June, 1977, a public hearing was held at City Hall as part of the City's application for preliminary engineering funding. At this hearing, 25 people spoke in favor of the project and 4 spoke against it: two County Commissioners, the Senior Citizens Coalition, and the Communist Party.

The most vocal opposition to the project by private citizens came from the Senior Citizens Coalition who viewed the DPM project as another example of the City being more concerned with downtown business interests than with neighborhood concerns. Controversy had existed for a number of years over the amount of community responsive transit (CRT) provided by RTA in the neighborhoods. The Senior Citizens Coalition accused RTA of having "misplaced priorities" in choosing to provide \$2 million to fund a system with "no indication of its ability to succeed," while only being willing to spend \$1 million on CRT for the entire region. Furthermore, the Coalition was skeptical of RTA's claim that the DPM system would not appreciably add to the costs of running its entire system, and would therefore not adversely

impact other services.<sup>1</sup> The Coalition also charged that the DPM would hurt merchants on its route. It polled 80 shop owners on Euclid Avenue, approximately 75 percent of whom were worried about the DPM's effect on window shoppers and pedestrian traffic.

On June 30, 1977, the City's preliminary engineering application was submitted to UMTA. Although the project team was successful in getting this application approved by local agencies, it had accomplished little in terms of gaining project support or diminishing controversy. Agreement was based on the need for a study to determine the feasibility of a DPM in Cleveland. As in the proposal effort, the team underestimated the importance of consensus building for project success. Some who were frustrated by the project team's resistance to involve others became more restrained in their support of the project, as a result.

On the same day that the preliminary engineering grant application was submitted to UMTA, the consultant was awarded a contract to perform the preliminary engineering study by the City and a Project Coordinator was named. Although the Mayor assured the public that it was a feasibility study, opponents charged that it was really a design study for system construction.

#### A.3.4 Cleveland Withdraws as a DPM City

In September of 1977, Cleveland held a mayoral primary election which resulted in the Republican Mayor being upset by two Democratic

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<sup>1</sup>Based on RTA's analysis, DPM system operating costs would be offset by the additional ridership (and therefore revenue) generated and by a decrease in loop bus service required as a result of DPM operation.

opponents,<sup>1</sup> both of whom were on record as opposed to the DPM project. The Mayor's strongest opponent focused his campaign on the issue of taking control of the City away from business interests and bringing it back to the people in its neighborhoods. At one time the Mayor had enjoyed great popularity, but as the end of his third term approached, many felt that he had shifted the priorities of his administration increasingly away from community to business concerns. While the DPM project was clearly associated with the Mayor, the Mayor's defeat was more the result of the public's desire for a change in city administrations than a rejection of the project. Although the DPM project was a campaign issue, it was but one example cited by the Mayor's opponents of a project which was seen as benefiting the downtown business interests at the expense of the neighborhoods.

Prior to the election, the staunchest supporters of the DPM project were the Mayor's Office and the City Council. With the certainty of election of a new mayor who would oppose the project, the chances for its success were diminishing. From the day of the primary election until the new mayor took office in November, the DPM project was essentially stalled. The City's preliminary engineering application was being held in Washington, pending the outcome of the election. UMTA was understandably hesitant to award the grant until the new city administration took office and established its official position on the project.

The general election resulted in the victory of the "urban populist" candidate, who firmly believed that the DPM project would have a "negative

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<sup>1</sup>Cleveland has an open primary system where the top two vote-getters, regardless of party affiliation, proceed to the general election.

impact upon both the City's neighborhoods and Cleveland's downtown." Three weeks after taking office, the new Mayor fired the DPM consultant and wrote to UMTA withdrawing Cleveland's application for DPM funding. The City Council continued its support for the project and passed a resolution 27 to 6 which directed the Mayor to accept the preliminary engineering funds "now and work out the details later." The Mayor responded that Cleveland did not need a DPM in any event, so there was no point in going any farther. Under the City Charter the Mayor has sole authority to sign for federal funds, and with the Mayor unwilling, there was nothing more the Council could do.

The political climate resulting from the change in city administrations has been characterized as an "aberration" in Cleveland's history. Whereas Cleveland is more typically governed on a consensus basis, the new Mayor embarked on confrontation politics in his desire to change the direction of city government. The demise of the DPM project in Cleveland is seen by most as a direct result of this "unusual" political climate. Although the project lacked the level of commitment required for construction, sufficient support existed for going forward with the preliminary engineering study. Most DPM opponents, while believing that the project would never have been built, agree that the preliminary engineering study would most likely have been completed were it not for the election of this particular mayor.

In Cleveland today, downtown circulation/distribution is still acknowledged to be a problem by many; however, no specific proposals for its solution are currently being considered. For the past three years, RTA and NOACA have been studying long-range transit plans for Cleveland and are currently evaluating the possibility of rerouting the portion of the

existing Airport-Windermere rapid line between University City and the downtown. The addition of rapid transit stops in the downtown area and the rerouting of existing bus routes to minimize competition with the rail system are being analyzed as part of this corridor study. Phase I of the alternatives analysis has been completed and an application for Phase II funding has been filed with UMTA.

#### A.4 Summary and Assessment

The issues which arose during the planning process fall into three distinct categories. These categories are:

- o Institutional issues: Those which result from the structure, roles, and relationships among agencies and elected bodies involved directly in the DPM planning process.
- o Technical issues: Those which revolve around the credibility of the technical work, staff, and decision-making involved in the course of the project.
- o Financial issues: Those which relate directly to the project's costs and methods for financing the local share.

The duration of the DPM project in Cleveland was relatively short--only about 18 months passed between UMTA's announcement of the program and Cleveland's withdrawal--and debate was active for only about half of this period. In addition, the DPM project did not generate a high level of interest on the part of the general public. The controversy surrounding the DPM was primarily fueled by the actions of two County Commissioners who opposed the project on the grounds that it violated provisions of the Memorandum of Agreement and was therefore illegal. Although technical and financial issues of the DPM project were discussed in the media and used by opponents as further proof for their case, institutional issues assumed a more significant role in Cleveland's DPM project. The inability of the City to bring the various institutional actors together to develop a project that each could support resulted in a project with shallow commitments that could easily be affected by a change in political climate. If the project had proceeded through the preliminary engineering phase, technical issues would probably have become increasingly more important. However, due to the limited progress of the DPM planning process in Cleveland, institutional issues played the most significant role in the process.



A.4.1 Institutional Issues

The following institutional issues were most significant throughout the course of the DPM project in Cleveland:

- o The role of political leadership and its circumvention of the "normal" political process
- o The Memorandum of Agreement and the resulting peculiar situation of RTA

The primary institutional issue which created difficulties for the DPM project in Cleveland was the failure of political leadership to develop the project within the usual local decision-making process. In Cleveland, political power is balanced among the various city and regional institutions and agencies. Project success is, therefore, heavily dependent on a careful building of consensus among affected interests. The City seemed to underestimate the importance of regional support and also failed to recognize that certain agencies (i.e., RTA) would be more "natural" supporters of a DPM system than others (i.e., the County). Throughout the course of the DPM project, the City's team failed to recognize or address these realities and, as a result, support for the project declined as time went on.

From the beginning the City's team directed the DPM effort, seeking only "moral" and financial support from others. In the case of the County, this strategy was particularly disastrous. The County was not a "natural constituent" of a DPM project and could be expected to be the most difficult of all the agencies to commit financial support to a project which could be viewed as providing benefits only to the downtown. In order to obtain the County Commissioners' support, the City team needed to be particularly sensitive to their concerns. The issue of the regional importance of the

DPM system needed to be explicitly addressed, and the County should have been given a chance to participate in project development. Instead, the County felt that it was the "last consulted" and then only because its financial contribution was desired. While the County may have been inclined to oppose the DPM project in any event, by excluding the County from the process, the City made it politically difficult, if not impossible, for the Commissioners to support the project.

The business community's support for the project was also affected by the City's unwillingness to involve others in the DPM project. The business community was an enthusiastic backer of the DPM project at the beginning, but became increasingly concerned that the Mayor was "relying too heavily" on the consultant to the exclusion of other community interests. The Greater Cleveland Growth Association voiced its concerns to the Mayor in a series of letters. The response it received from City Hall only confirmed its fears that the project team intended to keep others informed, not involved. GCGA was left with the belief "that it will be impossible to move beyond the feasibility study/preliminary engineering phase unless this group, as well as a number of other groups, participate fully in this phase."

In addition, the City did not seem to recognize that support for the DPM project was, in some cases, minimal and that the preliminary engineering study was viewed by some as a feasibility study and by others as the first step toward system construction. The fact that NOACA, RTA, the County, City Council and business community all signed off on the City's proposal did not necessarily signify enthusiastic endorsement of the project by each. At the time the DPM proposal was submitted, the City's team had obtained "in

principle" support of the project from the range of affected interests. This support ranged from enthusiastic on the part of the City Council to restrained on the part of County Government. The inability or unwillingness of the City to explicitly recognize the gradations of support hindered its ability to to turn "in principle" support into "real" commitment.

In summary, the role of political leadership is crucial to project success. The need to understand the basis and level of commitment of each affected interest and to work within the framework of the existing political decision-making process cannot be underestimated. The City team's failure to carefully build a consensus and to recognize the differences in project support on the part of the various interests resulted in a project which lacked in-depth support. As a result, when the City Administration changed, the new Mayor felt little pressure to continue a project that he personally opposed.

The existence of the Memorandum of Agreement created a series of inter-related institutional problems for the DPM project as well as providing a focal point for opposition. Under the Memorandum of Agreement, RTA was named as the exclusive provider of public transportation in the region and the exclusive recipient of federal funds for mass transportation. However, it was also barred, for its first five years, from participating in the planning or construction of mass transit facilities in the downtown. In recognition of this restriction, RTA decided not to apply for DPM consideration. The City, however, was anxious to participate in the program and decided to submit an application with the expectation that the agreement could be amended later.

When the City's application was accepted by UMTA, RTA was placed in a politically awkward situation. Normally, RTA, as the regional transit provider, played a very crucial role in developing and supporting transit projects. However, the existence of the Memorandum of Agreement precluded RTA from playing such a role for the DPM. While RTA supported the DPM project, any public statements had to be carefully worded to avoid charges that it sought to circumvent the Memorandum of Agreement. The RTA Board agreed to contribute \$2 million toward the project's local share and to operate the system. This was, however, contingent on amendment of the agreement.

The Memorandum of Agreement had set out the institutional structure for providing public transportation services in the region, designating RTA as the responsible agency. The City, by applying to be the recipient of federal transportation funds for the DPM project, was going outside what many considered to be the established institutional framework. In some cases, it may be advantageous for a project to be directed outside the existing institutional structure--by the creation of a new authority, for example. In the case of Cleveland, however, consensus on the institutional framework and priorities for transit services in the region had just recently been established through the Memorandum of Agreement. By directing the DPM project, the City attempted to alter the institutional arrangement and, as a result, created additional political difficulties for the project.

In addition, the Memorandum of Agreement created ample grounds for opponents to charge that neither the City nor RTA could legally participate in the project--RTA was prohibited from participating in the construction of

downtown transit facilities, and the City had relinquished its authority to obtain federal funds to support public transit. When RTA was established, the County, in particular, was concerned that regional transportation needs be given priority over those of the downtown. The City's determination to go ahead with the DPM project was therefore viewed by many as a breach of faith on the City's part.

#### A.4.2 Technical Issues

The two most significant technical issues in Cleveland's DPM project were:

- o The credibility of the need for an advanced technology system
- o The credibility of a demonstration technology

The primary technical issue facing DPM proponents in Cleveland was justification of the need for an advanced technology transit system.

Cleveland's downtown bus loop system provides extensive coverage of the area and connects with the regional transit network. Many Clevelanders, including DPM opponents, agreed that the existing bus loop system needed to be improved. DPM proponents, citing the public's poor understanding of the routes and the impact of Cleveland's harsh winter climate on CBD trip-making, argued that the DPM system would provide an easily-understood, convenient and comfortable means for people to take advantage of the wide range of activities available in the dispersed downtown area. Opponents, however, argued that the City didn't need to spend \$50 million to construct a new system when the existing one could be satisfactorily improved at a fraction of the cost. Sophisticated technology was not required; rather, it would be a simple matter for RTA to clarify routes, educate the public and

build more bus shelters--the policy that the City would most likely have followed in the absence of federal funding for an advanced technology system.

DPM opponents also questioned the wisdom of making a commitment to a technology which was basically unproven in an urban environment. Some of the features of the DPM system which were praised by supporters as innovative were the same features that caused opponents to doubt its merits. For example, the fact that the system was automated was viewed by proponents as an innovative way to deal with rising labor costs, while opponents viewed automated vehicles as a threat to personal security. Doubts were raised about the technology's potential reliability, especially in winter months, and its ability to "fit" into the urban fabric. Opponents questioned how Cleveland could be considering constructing an elevated structure when other cities had been tearing them down for years because of their negative impact on communities.

Although the City believed strongly in the merits of the project, it often had difficulty in effectively communicating these merits to the public. In the absence of an existing DPM to point to or the results of the preliminary engineering study, staffers found themselves unable to give definitive answers in response to criticism of the system. Opponents, noting the lack of "hard" data in support of the City's position, complained that the City was asking the public to approve the project on faith and not on its merits. DPM supporters urged the public to reserve judgment on the project until the results of the preliminary engineering study were available. However, opponents, fearing that the conclusions of the preliminary engineering study would support system construction regardless

of the facts, continued to question the credibility of the technology and the project team to the detriment of the DPM project.

The presence of a number of competing system suppliers was a mixed blessing to the City. While the City was able to look to suppliers for information about the various systems, each supplier was understandably motivated by a desire to sell its particular system. Part of selling a system is, naturally, highlighting the strengths of one's own system in comparison with the competition's. By calling attention to the problems of a particular DPM system, the credibility of the DPM technology, in general, was weakened.

#### A.4.3 Financial and Economic Issues

The following financial and economic issues were points of contention in Cleveland:

- o Local funding commitments
- o Cost estimates
- o Economic and development issues

The issue of local funding commitments was a source of confusion throughout the course of the DPM project. While the Mayor maintained that the local share was in place with contributions committed by the State (\$2 million), RTA (\$2 million), the City (\$4 million), and the County (\$2 million), as the project progressed it became clear that these commitments were far from firm. As opposition to the project developed and funding commitments were questioned, the City outlined alternative funding plans. If other local agencies and institutions were unable to fund the local share, the City would issue general obligation bonds. However, the issue of how the local share would be covered was never firmly resolved.

Cleveland was selected by UMTA as a DPM city in November 1976. Three months later, the County reversed its initial approval of the project and notified the City that it would be unable to contribute to the project because it was legally prevented from subsidizing transit out of existing funds. The City responded that it had a pledge from the Governor for the State to cover the County's share; however, other state officials indicated that it was not clear if the State had the money or if it could legally contribute.

The ability of RTA to contribute to the project was also questioned by opponents who cited restrictions in the Memorandum of Agreement which prohibited it from participating for five years in the construction or planning of a downtown transit facility. The Mayor responded that the City could cover RTA's share until the five-year prohibition expired.

The Mayor, in his plan for the City's contribution to the local share, included \$2 million from a special assessment tax on downtown businesses. The business community, while in favor of exploring the possibility of such a tax, noted that it would take a few years for it to be passed.

DPM construction and operating cost estimates were also questioned. The City's proposal estimated that system construction costs would be \$52 million for a one-way loop system. In proposal preparation, the City's strategy was to state a cost that would not reflect more than Cleveland's "proportional share" of total DPM Program funding. Critics charged that the City never intended to build a one-way loop system, but had proposed such a system to keep project costs down and enhance Cleveland's chances for a successful application. The preliminary engineering study would result in a



recommendation for a two-way loop system, and system costs would, therefore, be nearly twice as high as originally estimated.

In addition, critics challenged the City's contention that the DPM system could be operated at no additional cost to RTA. In the proposal, DPM annual operating costs were estimated at \$1,680,000. DPM system operations would enable RTA to run a substantially reduced loop bus service (\$986,000 in savings) and generate additional system revenue (\$764,000 in increased revenues) through increased transit ridership, thereby resulting in a system which could be operated within RTA's previous annual budget. Opponents, however, challenged both premises. They maintained that substantial loop bus service would be needed to supplement the DPM, especially during rush hours. In addition, because DPM riders would not be charged a fare, system revenues would actually decline, forcing RTA to divert resources from other services to cover the costs of DPM operations. This was of particular concern to supporters of community-responsive transit services.

Economic and development issues, while discussed in general, were not the subject of significant debate. The Mayor, City Council President, newspaper editorials, and the business community expressed the view that the DPM could be a vital force in downtown development. While supporters of the DPM system were particularly enthusiastic about its potential to provide employment opportunities and stimulate development in the City, little time was spent describing specific projects or quantifying how the benefits would translate in dollar terms.

Perhaps the primary motivation of the business community in supporting the DPM was its belief that the system would stimulate downtown

development. While the business community agreed to cover 20 percent of the City's share of the preliminary engineering study, it believed that the construction and operation of transit services should be publicly funded. However, the business community was interested in working with the City to develop a special assessment tax district to provide public funds to help finance downtown improvements including transit.

Opponents maintained that downtown development would not really be enhanced by the introduction of a DPM system. If development, not transit, was the primary motivation for building the system, than the public should not be asked to pay for it. Voters, through the approval of an increased sales tax for transit, had agreed to subsidize transit, not development.

## A.5 Conclusions

Local factors played the most important role in the demise of the DPM project in Cleveland. While it is clear that responsibility for halting the DPM project belongs to the newly-elected Mayor, it is also clear that the project lacked the broadly-based, in-depth support necessary to guarantee its success. There seems to be general agreement, even among DPM opponents, that the preliminary engineering phase of the project would have been completed had it not been for the election of this particular mayor. However, whether the preliminary engineering study would have resulted in construction of the DPM system is a matter of conjecture. While some believe that the project would have been completed, the evidence suggests that the City still had much to accomplish before it could change in principle support to firm commitments. The project's ultimate success would have been heavily dependent on the City's ability to more effectively draw others, particularly the County and the business community, into the planning and implementation process.

In summary, a variety of institutional, technical and financial issues contributed to the defeat of the DPM project in Cleveland. Insofar as the project progressed, institutional issues played the most significant role in the project. Had the project progressed into the preliminary engineering phase, the technical and financial issues would most likely have taken on increasing importance. The principal findings of this case study are:

### Institutional

- o Despite initial indications of support for the DPM project from all affected interests, the City's unwillingness to involve others in project development inhibited formation of the consensus necessary

for project success. This resulted in a project with shallow commitments that could easily be affected by a change in political climate.

- o Opposition to the DPM project was based, in large part, on the belief that a DPM system would benefit the downtown at the expense of the rest of the City and the region. In particular, the County was unwilling to commit its funds to a project whose regional benefits had yet to be proved.
- o The preliminary engineering study was viewed by some as a feasibility study and by others as a design study. Project support was therefore divided between those who favored building a DPM system and those who favored evaluating the feasibility of building one. In spite of UMTA's clearly-stated purpose for the study--preliminary engineering--locally, the objective was never clearly understood and agreed upon. Rather, it added to the controversy surrounding the credibility of the DPM project.
- o RTA, as the region's transit provider, typically plays a crucial role in developing and supporting transit projects. However, the Memorandum of Agreement inhibited RTA's ability to be an effective participant in the DPM project and made RTA's role in the project a subject of controversy.
- o The City, by applying to be the recipient of federal transportation funds for the DPM project, stepped outside what many believed to be the established institutional framework for transportation decision-making in Cleveland, and as a result, created additional political difficulties for the project.

#### Technical

- o Many Clevelanders, including DPM opponents, agreed that the existing bus loop system needed to be improved; however, there was a widespread belief that an advanced technology system was not a cost-effective solution to what was basically a bus routing and marketing problem.
- o The very nature of the DPM demonstration program assumed that cities would be willing to serve as case studies for the application of automated technology for which the prospects, while promising, were really unknown. The task of convincing the public of the wisdom of participating in such a program and describing precisely what a DPM system was proved difficult, even with the prospect of significant federal financial support.
- o Competition between various system suppliers pointed out problems of particular systems, and as a result, weakened the credibility of the DPM technology in general.

Financial and Economic Issues

- o Throughout the DPM project, the Mayor maintained that the local share of project costs was in place. However, as the project progressed it became clear that these commitments were far from firm. In fact, the end of the DPM project in Cleveland found the City no closer to resolving the local share issue than when it started. The City's inability to carefully build a consensus for project support no doubt affected its ability to nail down the local share contributions as well.
- o The credibility of the City's cost estimates was questioned by many. First, while the City had proposed to construct a one-way loop DPM system, it was commonly believed that the final design would call for a two-way loop system at nearly twice the cost. Second, while the City maintained that the DPM system would not add to RTA's operating costs, it was difficult for many to understand how a service could be added to the system without either increasing costs or decreasing existing levels of service.
- o Economic and development issues, while discussed in general, were not the subject of much debate. Efforts to describe specific projects or to quantify benefits, particularly in the regional context, would have been useful in enhancing project support.

A.6 Chronology of DPM Planning Events

- 1936 Loop bus service is first organized to serve the Great Lakes Exhibition.
- 1954 Cuyahoga County voters approve a \$35 million bond issue to finance a downtown subway.
- 1957 Cuyahoga County Commissioners vote against issuing bonds for a downtown subway.
- 1968 The Northeast Ohio Areawide Coordinating Agency (NOACA) is created to do comprehensive regional planning for Cuyahoga, Geauga, Lake, Medina, and Lorain Counties.
- 1969 The Seven County Transportation and Land Use Study cites a Cleveland CBD Distribution System as the first priority of recommended transit system improvements to be constructed by 1980.
- 1974 NOACA's Five County Regional Transit Study recommends construction of a downtown distribution loop.
- December The Greater Cleveland Regional Transit Authority (RTA) is created to replace the Cleveland Transit System and to provide public transportation services for the entire metropolitan region.
- 1975-May The Memorandum of Agreement, outlining the terms and conditions of the transfer of assets and continuation of services from CTS to RTA, is executed by the City, County and the Transit Board.
- July Cuyahoga County voters approve a one percent county sales tax to help finance regional public transportation services.
- October The Mayor announces a \$100 million garage and monorail plan for downtown Cleveland.
- 1976-April UMTA announces the DPM Demonstration Program.
- The Mayor informs UMTA of the City's intention to participate in the DPM program.
- June Cleveland submits its proposal to UMTA for a \$52 million, 2.2-mile DPM system.
- October The RTA Board approves a resolution to operate and maintain the DPM system and to contribute 20 percent of the local share of project costs, subject to amendment of the Memorandum of Agreement.

1976-November UMTA selects Cleveland as a DPM city.

In a letter to UMTA, the Mayor and City Council President outline plans for covering Cleveland's local share of DPM project costs which include: \$2 million from Office of Governor; \$2 million from RTA; \$4 million from the City; \$2 million from Cuyahoga County.

December A Plain Dealer editorial supports the DPM project, citing its potential transportation and economic development benefits.

The County explores options for covering its portion of the local share and indicates that it expects the impact of the DPM system on RTA's overall operating costs to be minimal.

A Plain Dealer editorial praises the Mayor's efforts in securing the DPM project for Cleveland.

1977-January Cleveland State University complains that DPM route bypasses 20,000 persons daily at its campus; the Mayor says CSU will be included in Phase II of DPM development.

February The Mayor announces a series of seminars to acquaint business and civic leaders and community organizations with the DPM project.

An aide to the Mayor announces the establishment of a project office where the public can view plans and make suggestions.

Two of the three Cuyahoga County Commissioners actively oppose the DPM project on legal, aesthetic, and economic grounds.

A Plain Dealer editorial criticizes the actions of the County Commissioners.

The President of the City Council asks the Governor to increase the State's contribution to the DPM project to make up for the probable loss of County funds.

The Mayor suggests that the City could advance RTA's share of project costs until the five-year prohibition period in the Memorandum of Agreement expires.

The Governor of Ohio indicates that the State might be able to cover the County's share of project costs.

The County Commissioners threaten legal action to stop the DPM project.

- 1977-February      The Speaker of the Ohio House of Representatives and the State Transportation Director doubt that the State will be able to help finance Cleveland's DPM project.
- A County Commissioner challenges the Mayor to debate the DPM project. The Mayor responds that it was too early to debate.
- The Mayor challenges opponents of the DPM project to put the issue on the ballot.
- The business community indicates that support for DPM system construction depends upon results of a feasibility study.
- The Greater Cleveland Growth Association seeks assurance from the Mayor that the business community and other interested community agencies and groups be given the opportunity to actively participate in project development.
- March                A Plain Dealer editorial calls for judgment to be reserved on the DPM project until completion of the feasibility study.
- At an RTA Board Meeting, the Senior Citizens Coalition presents results of its survey of Euclid Avenue shop owners and expresses its concern that the DPM system will have a negative impact on community responsive transportation services.
- Two County Commissioners travel to Washington to lobby the Ohio delegation against the DPM project.
- April                By a vote of 29 to 4, the City Council commits \$2.5 million to the DPM project and empowers the Mayor to apply to UMTA for preliminary engineering funds.
- In a column in the Plain Dealer written by the Mayor, he outlines the benefits of the DPM system and states that its construction is dependent on the results of the preliminary engineering study.
- The County Commissioners file suit to halt the DPM project.
- May                 Cleveland submits its preliminary engineering application to UMTA.
- The Cleveland Chapter of the American Institute of Architects deplores the fact that federal guidelines prevent an objective study of downtown transportation needs by RTA prior to restricting funds to an elevated people mover.



- 1977-June      The NOACA Board votes 32 to 8 to approve submission of the City's application for preliminary engineering funds.
- The Westinghouse Corporation makes a DPM presentation to the business community.
- In accordance with requirements of the preliminary engineering application, the City holds a public hearing on the DPM project. Twenty-one people speak in favor of the project and four in opposition.
- The Rotary Club features debate between one member of the County's staff and one member of the Mayor's staff.
- The City awards a consulting contract for the preliminary engineering study and names a project coordinator.
- July             RTA signs a labor agreement with the Amalgamated Transportation Union, as required by UMTA to continue participation in the DPM program.
- The County Commissioners call for a public referendum and for a GAO investigation of the City's award of the feasibility study contract to the selected consultant.
- September      The primary mayoral election results in the Mayor's defeat. The two finalists are on record as opposing the DPM project.
- October         A County Commissioner calls for Congressional investigation of the DPM project, based on UMTA's failure to receive a firm commitment for the local share before promising construction funds. He also calls on both mayoral candidates to disavow the DPM project.
- The Court dismisses the County Commissioner's lawsuit.
- November       The voters of Cleveland elect a new Mayor.
- The new Mayor writes a letter to UMTA withdrawing Cleveland from the DPM Program.
- December       The Mayor fires the DPM consultant and halts work on the project.
- The City Council passes a resolution directing the Mayor to accept DPM funds, but the Mayor refuses further consideration of the project.



## APPENDIX B. HOUSTON SITE VISIT

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## B.1 Description of the Region and System Site

Houston is now the fifth largest city in the United States. Rapid population growth is reflected in the City's expansion from less than a million in 1960 to 1.7 million in 1980. Houston is located near the southeastern coast of Texas, primarily within Harris County, although the metropolitan area extends into several adjacent counties (as illustrated in Figure B-1). Harris County has also undergone rapid growth (even in areas beyond the city limits), expanding from 1.3 million in 1960 to 1.7 million in 1970 to 2.4 million in 1980. Uneven distribution of this growth caused residential areas in the heart of the city to lose 8 percent of their population between 1970 and 1980 while mid-distance neighborhoods have exhibited growth rates of up to 87 percent during the same period. Areas even more distant from the city core continue to be the site of large new subdivisions and planned communities.

The growth in the population has been paralleled by growth in economic activity. Downtown Houston had 35.4 million square feet of office space (and another 13 million square feet planned or under construction) in 1980. An estimated 154,300 people work downtown while some 2,100 people make their residence there. The day-time population of the downtown is now estimated to be in the 350,000 to 400,000 range. Despite the amount of activity in downtown Houston, however, other regional centers have also developed rapidly, giving the city a multiple core structure. These activity centers are served by Houston's extensive freeway network and compete with the downtown for both development and retail activity. Twelve major suburban shopping centers have contributed to a decline in the downtown's retail floor space (which dropped from 4.4 million square feet in 1960 to 3.9 million in 1975). No zoning laws are used to control growth in the City.

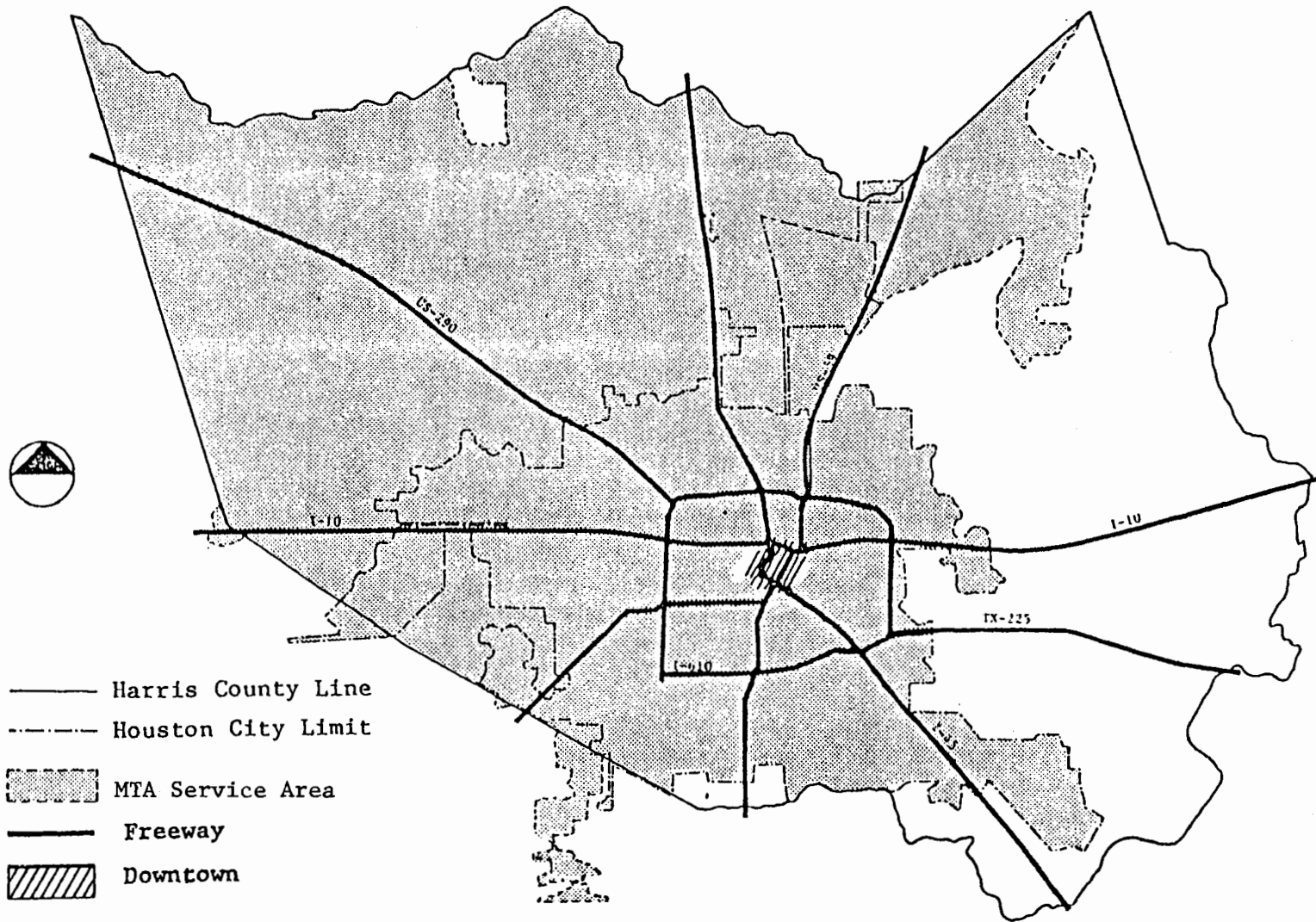


FIGURE B-1. Harris County and the City of Houston

Houston's transportation network has come to be symbolized by the radial highways and concentric beltways illustrated in Figure B-1 that provide access to all corners of Harris County. Traffic volumes have climbed with economic and population growth and congestion is most severe at the interchanges of the region's freeways from the beltway, Interstate 610, outward. The region's public transportation system is run by a regional public authority and provides extensive coverage within most of the county. Most of the bus routes converge on the downtown where 2,100 outbound buses are dispatched on weekdays (between 6 AM and 6 PM). The downtown is additionally served by three miles of underground pedestrian tunnels. Privately developed "convenience" retail operations appear to be thriving at the underground level despite street level store closings. Sixteen "skybridges" provide second story pedestrian crossings between major buildings in the downtown.

In summary, Houston has undergone rapid growth which has, in turn, placed a strain on the City's ability to expand and maintain municipal services. This strain has been particularly evident on the freeway system where stop-and-go conditions prevail at the approaches to interchanges at rush hours. Because the Houston metropolitan area is expected to be the site of continued growth, the region's most difficult problem is "maintaining mobility while accommodating growth". Consequently, the City has taken steps in a number of different directions in recent years in an attempt to combat that problem.

## B.2 The Institutional Structure in Houston

Houston has an active City Government which has a strong tax base to rely upon and which cooperates with the State. Its main transit services have been provided by a regional agency, which has independent taxing authority, since 1979. This agency superseded the City's Office of Public Transportation. The relationships between these agencies are illustrated in Figure B-2 and described in greater detail in the following text.

### B.2.1 The City of Houston

The City of Houston is now governed by a mayor and 14 council members, the majority of whom are elected by district. At the time that the City applied for DPM funds, however, the Council consisted of eight members elected at large. The mayor has the authority to control the agenda which the Council addresses. This allows the Mayor considerable influence over the Council but it does not exempt him from the need for cooperation from council members since he cannot directly control the way in which the Council votes on agenda items.

The five-member DPM Program Steering Committee was composed of City officials. The Committee consisted of:

- o the Mayor of the City of Houston
- o the Transit Administrator who was also the DPM Federal Program Coordinator
- o the Director of the Department of Public Works
- o the Director of the Department of Traffic and Transportation, and
- o the Director of the Department of City Planning.

This committee worked directly with both UMTA and the Houston DPM Program Director's office.



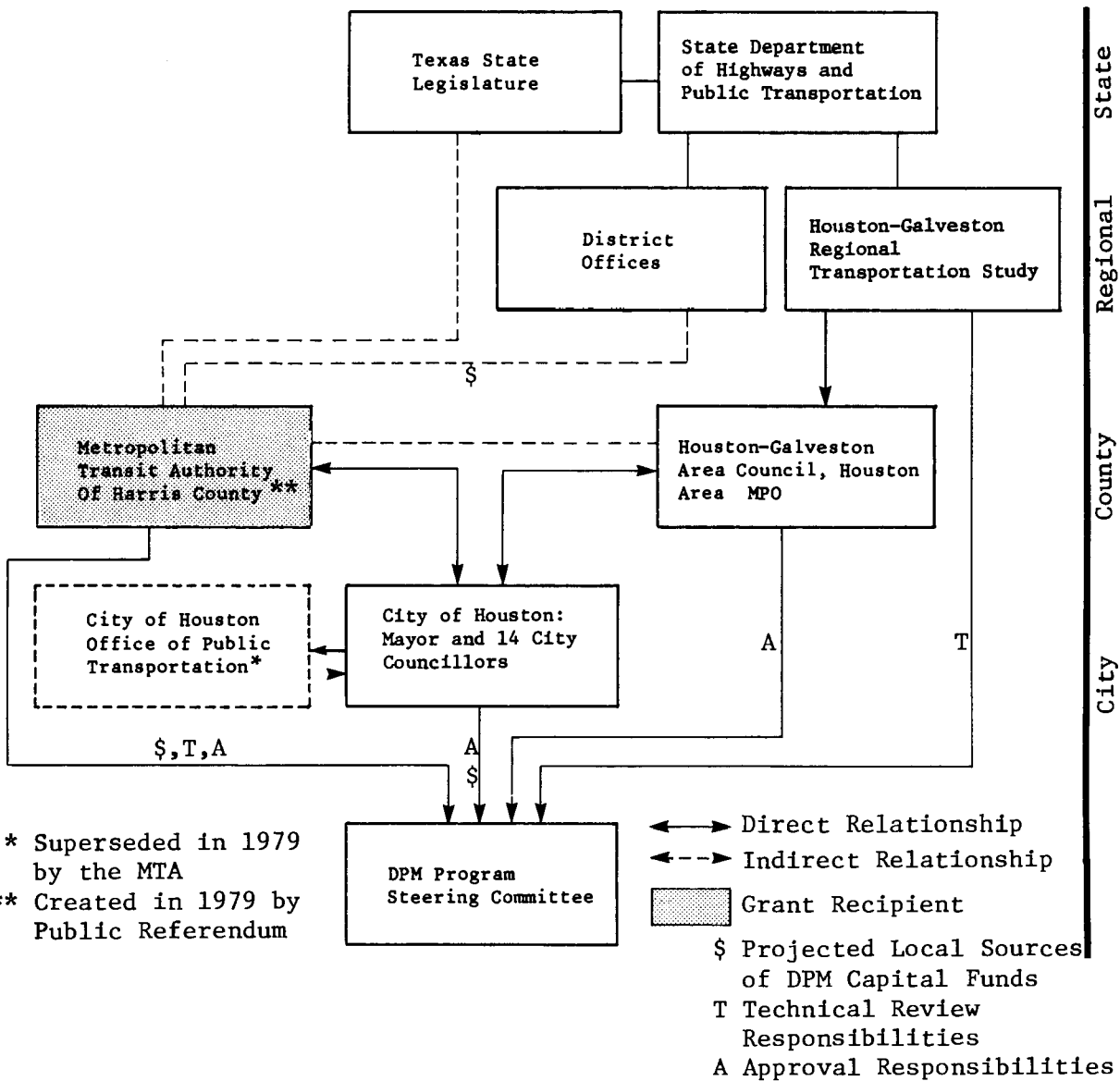


FIGURE B-2

The Transportation Decision-Making Structure  
Relevant to the DPM Planning Process

### B.2.2 The Office of Public Transportation

The original intent of transit proponents within the City Government was to create a regional transit authority in 1973, but this proposal failed at the polls. As a result, in 1974 the City created an Office of Public Transportation. The OPT purchased and then took over the operations of private bus companies at that time. When the campaign to create a regional transit authority was re-opened in 1978--and won approval--an institutional transition took place but staff, projects, and federal funding commitments were all carried over relatively intact from OPT to the MTA.

### B.2.3 The Metropolitan Transit Authority of Harris County

The Metropolitan Transit Authority of Harris County was created by a general referendum which was approved by Houston area voters in August 1978. The agency became fully functional in January 1979. As the regional bus operator, it assumed the responsibilities which had been held by the City Office of Public Transportation. The Board of the MTA has seven members representing the City, suburban, county, minority, labor, and business communities. The Chairman of the Board is typically a prominent member of the Chamber of Commerce.

The August 1978 referendum required the approval of the Texas State Legislature to be put to the voters and granted MTA the power to collect the revenues of a one-percent sales tax to finance transit operations. Voter approval of the referendum effectively included the formal endorsement of a plan for improving regional public transportation service known as the METRO plan which included both long and short term components. MTA formally became the local grantee for the UMTA DPM funds in January 1979.

B.2.4 The Houston-Galveston Area Council

The Houston-Galveston Area Council clears Federal grant applications in its role as the Houston area metropolitan planning organization. Its powers have not been reinforced by the State or City governments and as a result its ability to influence planning policy in the region is limited. The Board of the Council is large and city representation is dominated by representation of the surrounding counties. It was formally represented on the DPM Program Steering Committee.

B.2.5 The State Department' of Highways and Public Transportation

Day to day administration of projects of the State Department of Highways and Public Transportation is carried out by a number of district offices. Despite formal responsibility for public transportation, the majority of the Department's activities and research are highway-focused. Although the State was going to provide two-thirds of the local share (i.e., 13 percent of total capital costs) for the DPM project, coordination preceded at primarily informal levels between the district office and the local grantee. Formal representation on the DPM Program Steering Committee was provided by the Houston-Galveston Regional Transportation Study Staff. This group is a special unit of highway planners from the Department: it and twenty-two other units are active in other area-specific planning and coordinating activities.

B.2.6 The State Legislature

The Texas Legislature is bicameral with 31 senators and 150 representatives. The Legislature maintains an active policy-making role on many

issues including those which concern the activities and welfare of the State's major cities: for example, authorization was required from the Legislature for the creation of Houston's regional transit authority. It is the practice of the Legislature to pass "bracketed" legislation (as they did in the case of the transit authority) which applies only to designated areas. The State has exercised a number of conservative fiscal practices such as refraining from the issuance of bonds to finance construction or services. The State Legislature never became actively involved in the DPM project.

### B.3 The DPM Experience in Houston

The City of Houston responded quickly to the UMTA request for proposals for DPM funds. Following their successful bid for funds, however, they withdrew from the Demonstration Program. The context for that decision and the events which led up to it are described in the following sections.

#### B.3.1 Transit in Houston: The Transition From Private to Public

Publicly provided transportation services are a relatively new concept in Houston and the transition from private to public ownership and planning did not occur without a setback. The City of Houston first appealed to the State Legislature for authorization to create a regional public transit authority with taxing powers to take over and build on existing privately operated services in 1973. Although the Legislature granted its approval, voter approval via a public referendum was also required. When the proposal went to the polls in October 1973 it was rejected by Houston area voters.

In 1974, in lieu of a regional authority, the City created an Office of Public Transportation. The City bought the private bus lines with urban routes and put operations under contract to Rapid Transit Lines, Inc. The OPT staff was put in charge of administering the system. The OPT administrator acted quickly to expand the available bus fleet by applying early for the first deliveries of the Advanced Design Buses and an OPT mini-bus system was put in service in downtown Houston in 1975.

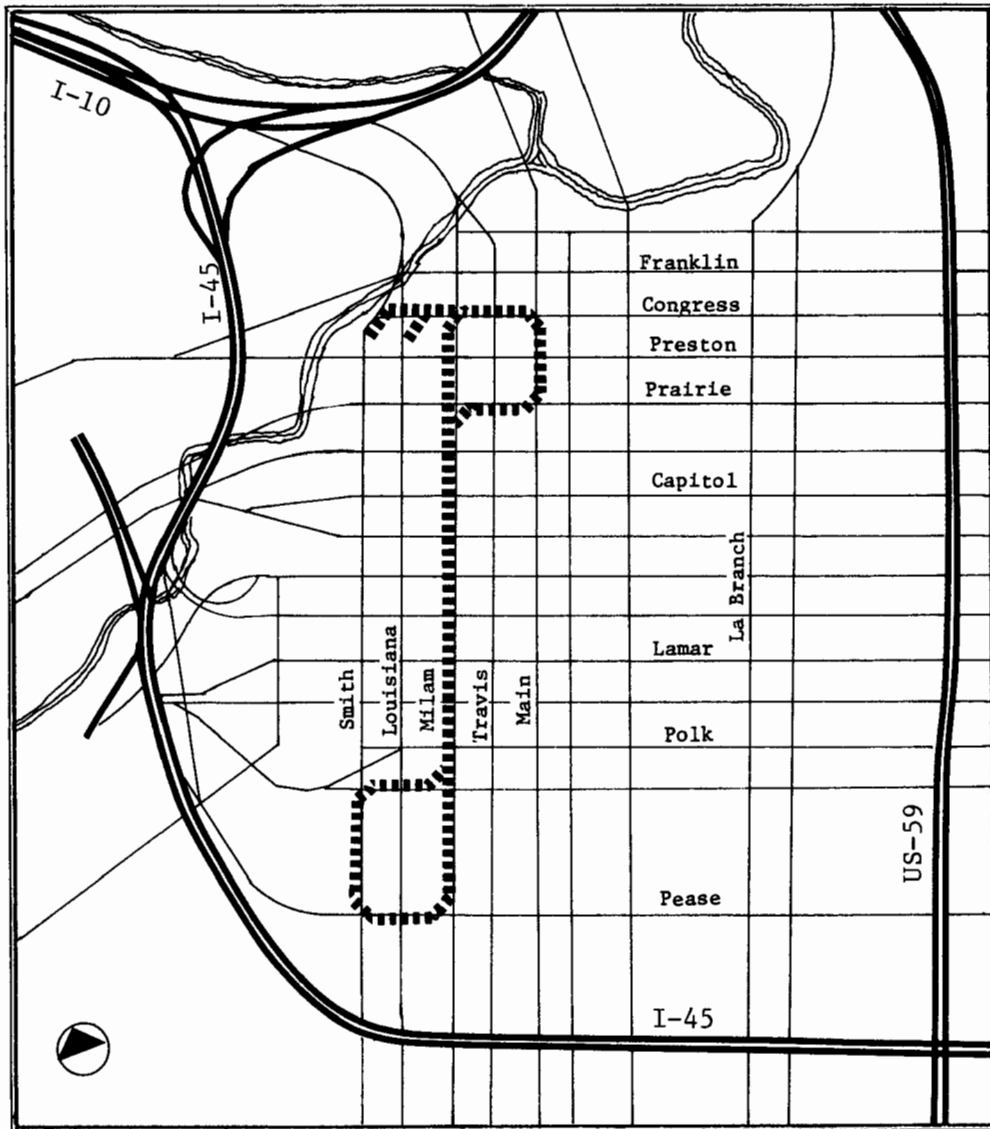
#### B.3.2 Houston Enters the DPM Demonstration Program Competition

In April 1976, the recently created OPT decided to enter the UMTA DPM Demonstration Program competition. Fixed rail planning was not a new idea

to Houston since the City had prepared an extensive rail plan in 1973 (which was rejected). After assessing the competition and deciding that Houston was capable of offering a rather unique contribution to the Demonstration Program--a downtown setting which was not in need of revitalization--City officials went ahead.

The concept of a DPM for Houston was supported and popularized by two key actors: the administrator of the OPT and the executive director of the local university-based research and development center who prepared the proposal. The first had previously been a senior legal counsel for project development at UMTA and had been brought to head OPT with the expectation that his knowledge of Federal-urban relations might put Houston in a better competitive position for federal transportation grants. The second was in the position to take a detached view of the City's needs and had been previously involved in new technology assessment. Together they were convinced that the DPM would be an opportunity for Houston to effectively utilize Federal grant monies, serve downtown needs, and bring tangible innovation to Houston. They were responsible for articulating the project's potential benefits and gaining the critical support of the Mayor and the business community. In-depth study of the project was not undertaken at this time so that public discussion was limited and debate did not become heated. The City awarded \$50,000 to the research and development center to prepare the proposal. The proposal received local endorsement and was submitted to UMTA in June.

The DPM system proposed to UMTA by the OPT was 1.1 miles in length. As shown in Figure B-3, it followed a straight north-south path through the



- ▬▬▬▬▬ DPM Alignment
- ▬▬▬▬▬ Freeway

FIGURE B-3

Downtown Houston and the Proposed DPM Alignment

middle of the central business core with a loop at each end. Houston's proposal stated that the DPM was primarily intended "to intercept bus passengers at the two...ends of the route and distribute them to their CBD destinations". In 1976 the volume of bus traffic on downtown streets was already high but expected future congestion was given as the primary justification for the funding application.

The capital cost of the proposed DPM system was estimated to be \$40 million. The financial plan which Houston submitted was unique. The city proposed to finance the first 25 percent of the capital cost using an UMTA loan; the remaining \$30 million was to be financed using a conventional split of 80 percent federal/20 percent local funds. The loan was to be repaid using tax revenues generated by development at the DPM stations. Houston was willing to take a loan because they felt that it would significantly enhance their chances for selection and their strong financial situation allowed them to do so. The local share was to be financed two-thirds by the State and one-third by the City. The State share (13 percent or \$4 million) was to come from Texas Public Transportation Funds which were uncommitted from 1976 and 1977. The City's share (7 percent or \$2 million) was proposed to come from Houston's 1976 capital improvement program.

### B.3.3 The DPM and a Changing Context

By December 1976, when UMTA announced that Houston and three other cities had been selected in the award competition, a number of factors had come into play which served to mute the initial enthusiasm for the project. These factors included:



- o OPT was coming under serious scrutiny for the number of its buses which were being pulled out of service for repairs.
- o A mayoral election was set to be held in the following year.
- o Renewed interest was mounting for reviving the effort to create a regional transit authority.

One newspaper was creating constant pressure on the OPT by running a "box-score" on the front page each day (listing number of runs missed, buses not in service, etc.) for the previous day's services. The press also reported criticism from some members of the research and development center that the DPM system would not be able to serve what they perceived as the City's needs.

In 1977, the OPT was forced by public and political pressure to focus much of its attention and energy on the problems of the bus system, thus the DPM was significantly slowed. In March, City staff submitted Houston's application for a Preliminary Engineering grant to UMTA.

By the time the first funds (\$172,000) were approved in August, the fall mayoral campaign had begun. At this point one of the leading newspapers took the position in an editorial that the project should not be made an issue in the campaign. This fact, plus the fact that the incumbent mayor chose not to run aided the project's proponents in keeping it out of the limelight during the campaign. In December, UMTA approved additional portions of Houston's request for funds. As a result, Houston received a total of \$934,000 for a feasibility study and \$189,000 for the Phase I Preliminary Engineering work. The total Federal funds obtained in 1977 equalled 80 percent of the \$1.4 million needed for preparatory work. The balance was being funded from State (13 percent) and local (7 percent) sources.

Although the DPM project was superficially progressing through the required planning steps, substantive progress was being slowed for two reasons:

- o The OPT staff's attention was being diverted to aid the MTA referendum support effort
- o The DPM had been down-played in order to avoid having it become an issue in either the referendum vote or the mayoral election.

In appraising the factors that had caused the 1973 attempt to create a regional transit district to fail, critics and proponents agree that this earlier proposal was vulnerable for a wide variety of specific reasons. The campaign staff concluded that while these reasons were important to the defeat of the 1973 proposal, the general lesson was that an overall revision of strategy was needed. It would be necessary both to tone down controversial transit projects and to avoid projects in which the perceived benefits were narrowly distributed. Because the DPM met both of these negative criteria, it was downplayed in the campaign efforts during the spring and summer of 1978.

OPT submitted its proposed DPM consultant contracts to UMTA for review in May 1978. UMTA responded to these contracts and notified the City in June of deficiencies which required correction. OPT was not quick to rectify these deficiencies, however, because the time for the second referendum on a regional transit agency was drawing closer. Staff energies and attention were diverted into trying to influence the referendum's outcome.

In August 1978, the concept of a regional transit authority was put to the test and this time the voters approved it. In doing so they

simultaneously endorsed a three-part plan for improving and expanding transit service in the Houston area, and also provided a funding source in the form of a dedicated one-cent sales tax increase. The three-part METRO plan which was tied to the approval of a regional authority consisted of immediate service improvements, low cost ridesharing and transportation system management improvements, and capital-intensive transit facilities construction. While the DPM could conceivably have fit into the last category, the focus of this part of the plan was on the development of a regional system. The circulation function which could be provided by the DPM was not highlighted, because the downtown was not the center of the public's concern over congestion. The DPM system was also given limited exposure by the planning staff because they felt it might have been perceived as competing for regional system funds.

OPT worked for the remainder of 1978 with the goal of ensuring an efficient and effective transfer of power to MTA. Actions specific to the DPM planning process were the transfer of 13(c) labor agreements and federal grants. Meanwhile, OPT continued the planning process by obtaining UMTA approval of a \$908,000 planning grant. This grant was used to retain an outside consultant to provide technical assistance for planning and design.

In January 1979, MTA took over the OPT's services and responsibilities. During the same period the City staff finally responded to UMTA's notification of contract deficiencies from the previous June. After the required corrections were made, contracts totalling \$1.4 million were executed and MTA formally initiated the Preliminary Engineering effort.

B.3.4 Alternative Mobility Systems: The 1979 DMS Study

As the MTA staff inaugurated the Preliminary Engineering effort in February 1979, they were also negotiating with UMTA to rechannel their DPM planning effort. This was being done because Houston's planners were already becoming somewhat uncertain about the feasibility of a DPM system. Considerable debate ensued between UMTA and Houston because UMTA considered its funds to be earmarked for DPM planning and because the MTA wanted to use the funds for a broader alternatives analysis. The MTA staff was not only proposing to reconsider the DPM's alignment, but they were also proposing to study a completely different modal alternative, bus priority systems, which would serve both circulator and collector functions. Despite concern that this latter intent was not compatible with DPM Demonstration Program objectives, UMTA granted approval in March and a Downtown Mobility System (DMS) study team was assembled from MTA staff and outside consultants.

The study team worked from March to May on the DMS study. In June, the team presented three DPM and two Bus Priority System (BPS) alternatives to the MTA Board. The intent of the DMS study had been to determine the most cost-effective means of:

- o distributing and collecting of work trips generated by the CBD
- o promoting internal circulation in the CBD
- o providing access to the parking facilities which serve the CBD

Citing the study team's finding, the MTA Board voted unanimously in July 1979 to withdraw from the Federal DPM Demonstration Project and to continue investigation of the Bus Priority System alternatives. In doing so, the Board referred to two key points made in the DMS report:

- o that the bus strategies were a complement to the plans for a transit mall which were also being developed, and
- o that the DPM might be viable at another time and in an activity center where Bus Priority Systems might not be applicable.

The BPS alternatives are still under active consideration by the MTA. Implementation is being delayed, however, until a final decision on the first phases of the light rail system construction is made.

#### B.4 Summary and Assessment

The analysis of Houston's involvement in the DPM program is relatively straightforward. While there was a consensus over the original DPM grant application, project proponents were not willing to assume the risks which would have been necessary to maintain that consensus over time and in the face of a changing institutional environment. An interesting footnote to the DPM experience in Houston is that while the City voluntarily withdrew from the Demonstration Program, debate was limited. As a result, neither the technology nor its proponents were discredited; it seems to have retained sufficient popularity and credibility that it may well be utilized in another activity center in Houston in the future.

The issues which arose during the planning process fall into three distinct categories. These categories are:

- o Institutional issues: Those which result from the structure, roles, and relationships among agencies and elected bodies involved directly in the DPM planning process.
- o Technical issues: Those which revolve around the credibility of the technical work, staff, and decision-making involved in the course of the project.
- o Financial issues: Those which relate directly to the project's costs and methods for financing the local share.

##### B.4.1 Institutional Issues

A number of institutional issues arose which affected the DPM planning process in Houston, including:

- o Conflict in timing with the regional transit authority referendum
- o Change from a city scope to a regional scope in transit planning
- o Role of individuals in forwarding the project
- o Impact of the availability of Federal funds
- o Impact of federal demonstration program objectives
- o Need to reconcile local and Federal objectives
- o Strength of the private sector

By the time that UMTA approved the City of Houston's request for additional feasibility study and Phase I Preliminary Engineering funding in December 1977, the City was approaching a critical decision point on another front: the re-initiation of its campaign for the creation of a regional transit authority. The City OPT had been under pressure to improve the core of Houston's regional transit system: bus services. Members of the OPT staff and the City government agreed that a stable funding base was necessary to accomplish this. Given that the City had already lost such a campaign in 1973, the OPT staff recognized the need to minimize potential sources of disagreement. The OPT and the campaign staff were not prepared to risk the success of the 1978 referendum for the DPM. The DPM project was seen as being potentially volatile and the 1973 experience had taught transit advocates that volatile or vulnerable topics were best downplayed.

The DPM project was caught up in the context of a geo-political change even before the MTA was given voter approval in August 1978. While the original grant application had been prepared when the principal transportation planning institution, the OPT, was responsible for planning for the City, the METRO plan (which was being developed for simultaneous endorsement or defeat with the MTA proposal) was explicitly a regional plan. Because the development and construction of a regional system would become the MTA's focus if the plan were endorsed, the DPM was displaced in the project priority listing included in the METRO plan.

The limited number of key project proponents also contributed to the ease with which the project's priority could be changed. There were two key actors who were responsible for spearheading the original grant application

process. Both individuals were in the position to be intimately aware of (and able to influence) the direction of transit system development in Houston. Because both were aware in 1978 that the larger issue (regional versus City transit authority) would dominate, and because they were both actively involved in many projects, they were willing to tone down their position of DPM advocacy when this was perceived to be appropriate. Particularly for the Administrator of the OPT there was a high probability of becoming the MTA's Executive Director if the Regional Transit Authority referendum was approved. The support of these individuals was a catalyst for the project: when they rechanneled their energies they did so with a full understanding that that would contribute to the project's decline. Ultimately, they both left their positions to assume others in the Houston area.

In Houston's case the availability of Federal funds and the concept of a competition clearly impacted the City's interest in the technology. While the local community research and development center had done some planning work which considered automated guideway transit, the City had no formal history of DPM planning. When the City and the Administrator of OPT learned of the UMTA DPM Demonstration Program, the technology was given its first serious consideration. This reduced investment of reputation and research made it easier for the transportation planning staff to redirect the DPM planning effort and ultimately to withdraw from the Program.

As the scope of transit planning in Houston changed from the City to the region, Federal Demonstration Program objectives discouraged local proponents from reshaping the project to fit the broadened scope. Just as



proponents and staff had felt that it would be ill-advised to continue a high-profile planning effort for a system in the downtown, they sensed that the business and academic community were interested in supporting the shift of the project to another activity center. Because the alternate activity centers discussed were not in the downtown, however, the City was obliged to forfeit the award. The issue of project location, however, is only one example of the need to reconcile local and federal objectives in the deployment of an advanced technology. The City was interested in solving what they perceived to be a problem: the Federal government was interested in demonstrating a particular technology in a particular setting. In preparing the original grant application, the City was required to state why the DPM technology was appropriate. However, two things must be considered:

- o the availability of designated Federal funds helped shape the local area's perceptions of their own needs
- o initial compatibility of objectives did not insure continued agreement: As a city, Houston is subject to different political and institutional pressures than the federal government.

These considerations point to the desirability of an increase in the Federal resources devoted to project selection and monitoring, with increased emphasis on critical institutional factors.

Finally, the private sector is an unusually cohesive group in Houston and their influence dominates local politics. On more recent transportation projects, they have come forward and expressed their interest in helping the City to assemble financing. While the business community gave its concensus approval to the DPM project, it remains unclear how intensively they were exposed to all of the project's characteristics and how deep-seated their endorsement was. While they backed the project initially, they also reached

an apparently painless consensus to endorse the City's withdrawal from the program. It is possible that they could have been recruited to form a strong commitment to the project.

#### B.4.2 Technical Issues

A limited number of technical issues arose during the project's duration in Houston. Generally, although some technical issues were introduced, they never became critical. Many more technical issues simply failed to arise in a significant way, because the project did not progress far enough. Included in this group are issues of revenue and economic development forecasting assumptions, system security, and operational reliability.

Issues which were raised included:

- o Projections of bus congestion and credibility of the DPM concept
- o Choice of the DPM alignment
- o Cost-effectiveness

Probably the most critical circumstance which inhibited public support of the system was the lack of traffic congestion in downtown Houston. When congestion was discussed, public attention focused on traffic congestion from the inner beltway outward rather than on the downtown. Thus, when the DPM project justification keyed on projections of future bus congestion--and the public did not see this as a developing problem--the concept that the DPM would be needed to relieve congestion lacked credibility. Criticism of the actual forecasts was limited: it was the lack of tangible evidence which weakened the impact of the case.

An issue with multiple ramifications for the DPM project was the choice of alignment. Considerations raised included:

- o Visual impact on large commercial buildings in which the business community takes pride for architectural reasons

- o Uneven distribution of benefits and dis-benefits as some buildings would be directly connected to DPM stations while others would not
- o Competition with existing privately financed pedestrian systems, constructed to enhance downtown mobility while opening up new commercial space
- o The merit of using the DPM to increase the accessibility of a highly developed corridor rather than to encourage development in another less-developed area
- o Public response to a situation which might have been perceived as a fait accompli since the route alignment had already been chosen and presented to UMTA

Finally, as the Downtown Mobility System study team presented their results to the MTA board in June 1979, they highlighted the issue of cost-effectiveness since that had been the agreed focus for the effort. They had compared the DPM (with a selection of alignments) to several bus priority system alternatives. Using the annual capital cost per trip, annual operating cost per trip, and total annual cost per trip as measures, the study team concluded that a bus priority system could provide an equivalent ride for one-half to two-thirds the cost of a DPM system. This conclusion was subsequently cited by the MTA board when they made their decision to withdraw from the demonstration program in July. This decision was consistent with the generally sound condition of Houston's core.

#### B.4.3 Financial and Economic Issues

The central financial and economic issue associated with the DPM experience in Houston was that financing for the DPM was perceived to be in competition with funds for a regional transit system, both at the local and Federal levels. At the local level, public transit was still a relatively new undertaking in Houston. The MTA might have been in severe danger of

over-extending itself by building both a regional light rail system and a downtown system. Once the planning context and priorities had changed, there was little question about which system would be sacrificed. At the Federal level, while the MTA staff understood that the DPM program funds were dedicated, they were reluctant to put themselves in the position of requiring a second allocation from UMTA for a regional system. They were not willing to risk being told that Houston had already enjoyed its political "fair share."

Beyond this central issue, however, Houston's case is significant because of the potential financial concerns which did not become continuing issues relative to the experience in other cities. Total cost, while reestimated upward in the 1979 DMS study, was not an issue. Operating cost and revenues were not an issue. Economic development benefits and increased taxes never became a major issue. The list could go on but the main point remains the same: Houston went into the competition knowing that they were in a profoundly different economic position than most of their expected competitors. For this reason (and because of the project's relatively modest magnitude), the project did not become entangled in any extended or bitter debates over project financing. Ironically, however, the economic independence and health which allowed the City to proceed with the project also allowed Houston to withdraw. Houston is certainly not free of the economic burden and problems associated with maintaining and expanding public systems: that burden, however, has simply not become so heavy as to be binding.

## B.5 Conclusions

A variety of institutional, technical, and financial issues contributed to the circumstances surrounding Houston's withdrawal from the DPM Demonstration Program, as discussed in the previous section. Several findings emerge from the Houston DPM experience which distinguish it and which may be useful in designing future new technology programs. These findings are:

- o The timing of the project eventually conflicted with OPT's major objective, which took precedence: to become a regional transit authority with independent taxing authority. Early delays in applying for UMTA grants exacerbated this conflict, which in turn led to additional delays.
- o When a regional transit authority was created the criteria for assigning project priority changed; the DPM system decreased dramatically in importance when a regional light rail system became a possibility.
- o The DPM system could be removed from the City's agenda quietly because key support was provided by a limited number of individuals.
- o Although the City saw the potential of building an automated system outside the CBD, they were not able to retain Federal funding for what was seen as a major deviation from the DPM Program objectives. This limited their ability to salvage an automated transportation system implementation project after the context for Houston's transit planning expanded to the regional level.
- o The proponents of the DPM system had difficulty building credibility for the concept because the key planning justification for the project (i.e., future bus congestion in the downtown) was not tangibly evident to the public.
- o The choice of an alignment for the DPM by the consultant may have been necessary due to the time constraints on preparing the proposal, but it proved to be a strategic error because it encouraged dissent and disassociation by potential supporters.
- o The DPM system was never popularly viewed as a necessity for the City; even its proponents were willing to tone down their support when other opportunities presented themselves.

Despite the 1979 consensus on withdrawing from the DPM Demonstration Program, the new technology concept remains viable in Houston. The solidarity of the business community discouraged extensive public debate over the system by minimizing dissension among business leaders. As a result, the DPM technology has maintained sufficient credibility to be a likely candidate for future implementation in a different application in Houston.

B.6 Chronology of DPM Planning Events

- 1973 Texas State Legislature authorizes the creation of a regional transit authority for Houston, if the action is approved by the voters in a county-wide referendum.
- October Proposal to create a regional transit authority is defeated by Houston area voters; press interprets the result as a vote against heavy rail construction; others attribute defeat to complicated financing plan and lack of popular support.
- November Mayoral election is held; new mayor is voted in.
- 1974 The City Office of Public Transportation is created as Houston prepares to take over private bus operations; ex-UMTA staff person brought into head OPT.
- August The City purchases bus operations; OPT is formally put in charge of system administration.
- 1975-November Mayoral election is held; incumbent wins.
- 1976 City Office of Public Transportation begins to develop a long-range transit plan (known as METRO plan).
- April UMTA establishes the Downtown People Mover Demonstration Program to "demonstrate the technical and socio-economic feasibility of an automated transit system operation in an urban environment"; cities throughout the country are invited to compete for a limited number of awards.
- June The City of Houston submits a proposal to UMTA for a 1.1 mile, \$40 million DPM system through the center of the downtown; it is designed to be an elevated two-way line with a loop on each end.
- December UMTA announces that Houston and three other cities have been selected in the DPM award competition.
- 1977-January Local university-based research and development center criticizes ability of DPM to serve City's real transportation needs; criticism picked up by the press.
- March City prepares a Preliminary Engineering grant application for the DPM and submits it to UMTA.
- August UMTA approves \$172,000 grant for feasibility study for Houston.

- 1977
- Media proposes that DPM not be made an issue in the fall mayoral campaign.
- November
- Mayoral election is held, incumbent does not run, and new administration takes office.
- December
- Request by City for Preliminary Engineering grant monies for DPM is approved by UMTA; Houston receives Phase I PE funding (\$189,000) and additional feasibility study funding (\$762,000) from UMTA.
- DPM concept supported by media as an appropriate transit alternative for Houston.
- 1978
- City Office of Public Transportation finishes development of METRO plan.
- May
- City submits proposed DPM consultant contracts to UMTA for review.
- June
- UMTA notifies the City of several deficiencies in its DPM consultant contracts; the City does not take action to correct these.
- August
- Houston area residents approve the creation of a Regional Metropolitan Transit Authority; MTA created with authority to collect a one-cent sales tax to finance transit operations; area in jurisdiction includes two-thirds of Harris County plus portions of surrounding counties.
- MTA works from August to December to complete necessary legal and regulatory requirements to transfer DPM grants and 13 (c) labor agreements from the City Office of Public Transportation to themselves; MTA efforts focus upon solving bus operations problems.
- UMTA approves a \$908,000 planning grant for a consultant to provide Houston with technical support on the DPM project.
- 1979-January
- The City corrects the UMTA-identified deficiencies in its DPM consultant contracts; Contracts totalling \$1.4 million for Preliminary Engineering efforts are executed; MTA takes over OPT duties and obligations.
- February
- UMTA approves DPM PE consultant contracts; MTA initiates PE effort.
- March
- UMTA agrees to MTA request to allow an alternatives analysis of several different downtown circulation options, including both DPM and bus priority systems; study is named the "Downtown Mobility System" (DMS); study team is assembled from MTA staff and consultants.



- 1979-May MTA staff and consultants finish work on investigation of Downtown Mobility System (DMS) alternatives.
- June Three DPM and two bus priority system alternatives are presented to the MTA Board; the relative cost-effectiveness of the DPM alternatives are criticized.
- July MTA Board votes unanimously to cancel the Houston DPM project, but to continue investigation of the Bus Priority System alternatives.
- September The Main Street Mall, which is part of all the Bus Priority Alternatives, is moved into the conceptual design stage.
- November Mayoral election is held; incumbent wins.
- 1981 Discussion of a people-mover for the Texas Medical Center is entertained.



## APPENDIX C. LOS ANGELES SITE VISIT

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### C.1 Description of the Region and System Site

In 1980, the six-county Los Angeles metropolitan region had a population of approximately 10.5 million. This represented a 4.2 percent increase over the area's 1970 population. Los Angeles County, located at the center of this area, had a 1980 population of seven million, having experienced a slight population decline during the last decade. Los Angeles County is famous for its four million-plus registered autos and over 600 miles of freeways. Many residents believe that the high level of mobility provided by these facilities are necessary. The image of the long distance commuter continues to dominate, even though average work trip lengths have contracted through dispersed development of employment opportunities.

Transit proponents have long advocated the development of a more balanced transportation system for Los Angeles County. They support their case by citing the congestion, pollution, and sprawl which have proven to be tangible by-products of their auto-oriented culture. These proponents have been increasingly successful in appealing to the self-interest of businesses and prospective developers. Nonetheless, three proposals to increase taxes to support transit--in 1968, 1974, and 1978--failed at the polls. It is only in the most recent vote (November 1980) that 54 percent of the Los Angeles County voters approved a half-cent sales tax hike to support transit. However, the approved tax increase is facing a legal challenge for not fulfilling the requirements of Proposition 13, California's landmark tax control legislation, which requires a two-thirds vote of the qualified electorate to pass a tax increase.

Regional transit service in the form of an extensive bus system is provided by the Southern California Rapid Transit District, 4 county transit districts, and 12 municipal operators. Currently, SCRTD's ridership has

reached a peak of 1.3 million passengers per day. Not unexpectedly, however, SCRTD and the other operators must rely on a variety of funding sources in addition to farebox revenues.

The City of Los Angeles serves as the central anchor of the metropolitan area, and a 1980 population of 2,952,198 allowed the city to retain its rank as the third largest city in the US. The city represents 36 percent of the population of Los Angeles County; it occupies 464 of the county's 4,069 square miles and sprawls outward toward the sea in an irregular configuration (see Figure C-1).

The Los Angeles central business district lies in the center of the metropolitan area and is served by eight of the area's twelve freeways. The downtown area is bounded by the Santa Monica Freeway on the south, the Harbor Freeway on the west, the Santa Ana Freeway on the north, and Alameda Street on the east. The area has been broken down into the seven planning areas shown in Figure C-2. The DPM study area includes parts of the five areas which would have been most directly impacted (South Park, Bunker Hill, Central Commercial Core, Little Tokyo, and Civic Center).

In recent years, CBD development has shifted steadily away from its east to its west side. Seven million square feet of new office space have been developed in the central city since 1976. The downtown currently has approximately 76 million square feet of floor area. Forty-four percent is office space, 11 percent is used by government, and 15 percent is hotel space. Office space is projected to account for the majority of near- to intermediate-term growth. Manufacturing and wholesale activities, on the other hand, with a 17 percent share currently, are expected to decline to 11 percent by the year 2000.

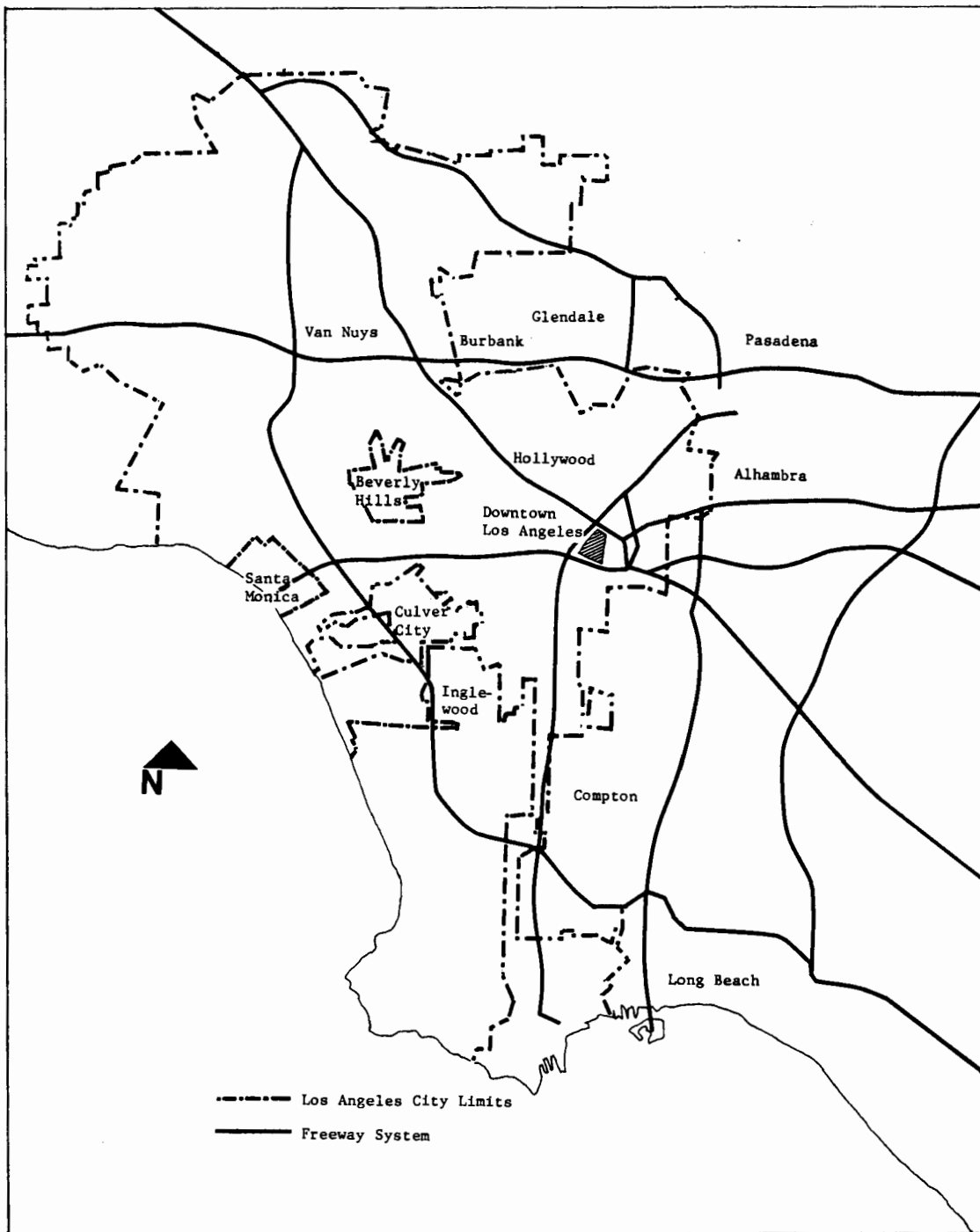


FIGURE C-1  
City of Los Angeles

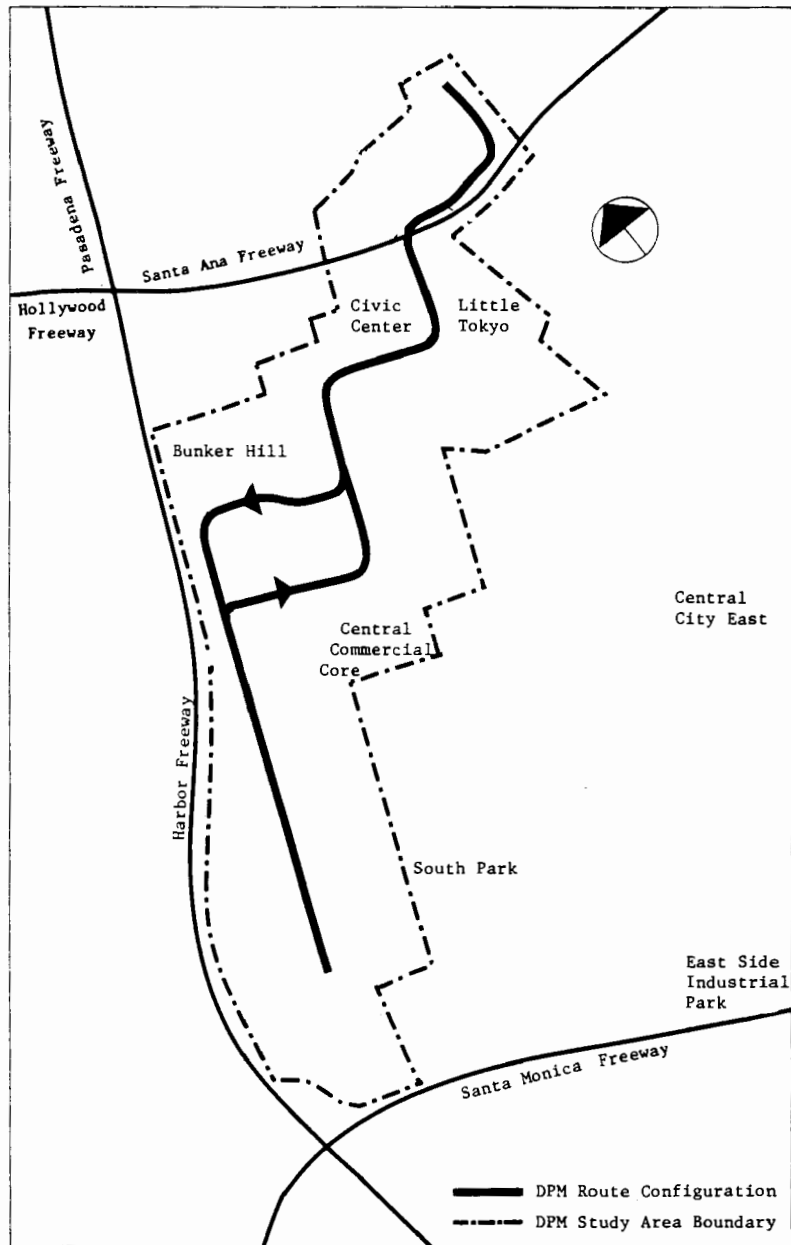


FIGURE C-2

Downtown Los Angeles and DPM Route Configuration



Los Angeles was once criss-crossed by the trolley lines of the Pacific Electric Company. This system, which would grow to over a thousand route-miles before being shut down, operated from 1911 to 1953 before giving way to the attractiveness of the private automobile and the diesel bus. Today, the Southern California Rapid Transit District (SCRTD) provides extensive regional fixed route bus service in Los Angeles County. Many routes focus on the downtown: transit trips to the CBD account for 35 percent of all CBD trips and 50 percent of work trips to the downtown. Heavy bus utilization of the downtown streets has created some congestion problems.

While parking is presently convenient (if not always inexpensive) to most CBD locations, some projections suggest that the area will be faced with a serious parking shortfall in the near future. Commuters are already facing increasing competition for monthly spaces and the City is trying to prevent parking spillover into residential areas, both by providing alternative facilities and by creating restrictions. Developers must provide adequate parking facilities even if it requires foregoing additional office space. Parking, therefore, remains one of downtown Los Angeles's primary planning problems. Traffic congestion is also a concern in downtown Los Angeles. The CBD streets are barely able to accommodate the traffic loads generated by the many multi-level parking facilities in the area.

In summary, downtown Los Angeles continues to face a number of critical transportation issues. The proposed DPM system was seen as a major tool to address some of these issues:

- o Expansion of transportation services for intra-CBD circulation and distribution functions.
- o Provision of a circulation system capable of balancing deficiencies and surpluses in the parking supply

- o Connection of the new west side commercial and financial district with the Convention Center and with government agencies in the Civic Center area
- o Development of a multimodal transfer facility at the Union Station just north of the CBD, with good access to the central business district.

## C.2 Los Angeles' Institutional Structure

Los Angeles has a complex and fragmented institutional structure. The agencies and organizations which influence transportation are outlined in Figure C-3 and a brief description of these organizations follows.

### C.2.1 City Government

Political scientists characterize the City of Los Angeles as having a weak Mayor/strong City Council form of government. The mayor is elected at large and the 15 council members are elected by district. A strong tradition of local autonomy and control has encouraged council members to pursue avidly the interests of their own district. However, projects which benefit only one area often fare poorly. Los Angeles has a reputation for "clean" government that is largely the result of the extent to which issues are settled publicly, i.e. at City Council meetings. However, at times the inability of the Council to speak with a unified voice and in a timely fashion has impeded the City's ability to secure State and Federal funds.

The City Council has historically split over issues involving public projects and services for the downtown. The San Fernando Valley representatives, for example, have a strong reputation for their opposition to publicly-funded projects in the downtown. For this reason, projects such as rapid rail must typically be designed to offer service to many of the districts in order to secure the needed support.

The Mayor has the responsibility for appointing a City Administrative Officer who in turn appoints four assistants who are exempt from regular civil service requirements. These administrative officers and their staffs

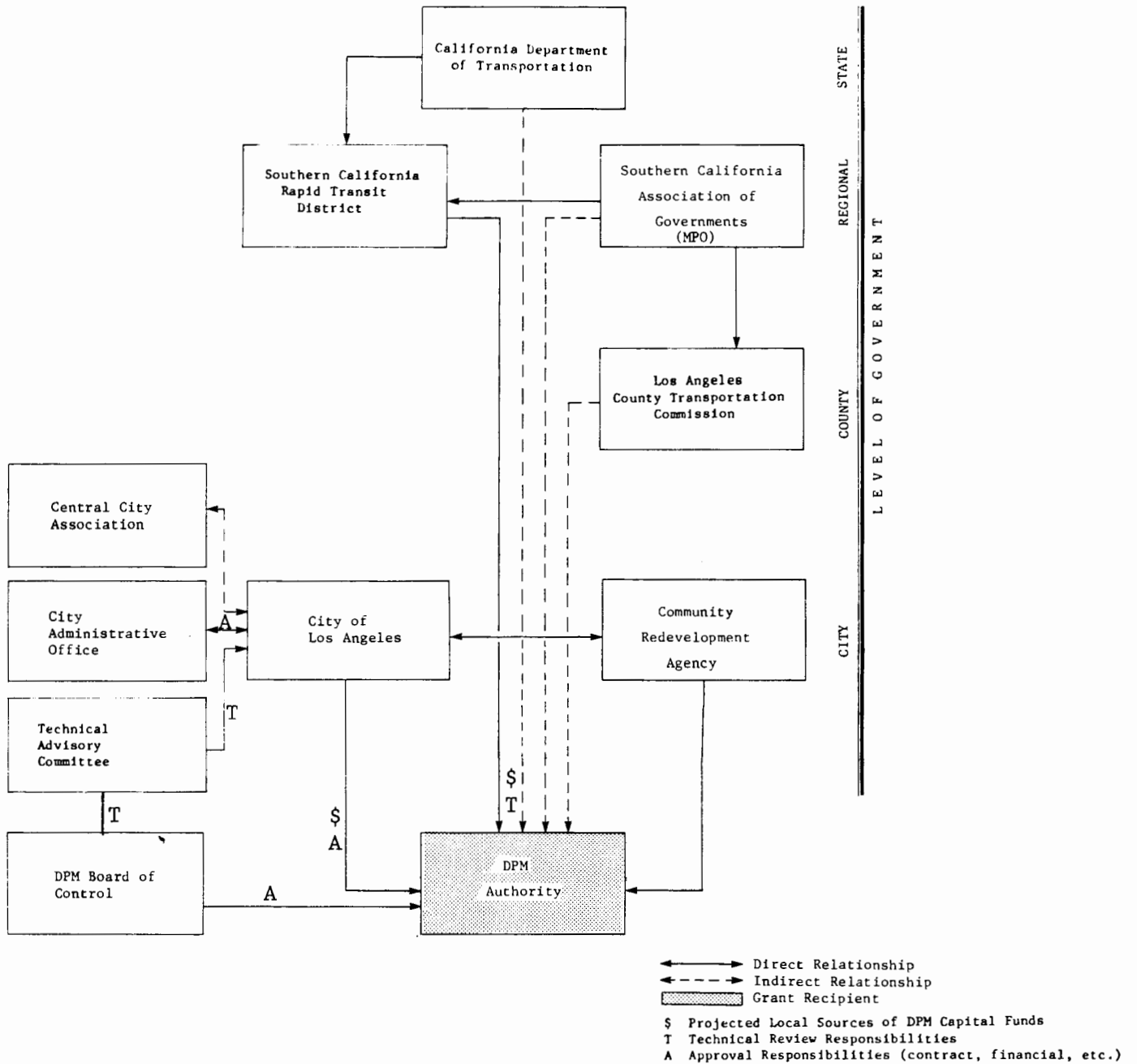


FIGURE C-3  
Transportation Decision-Making Agencies Relevant to the DPM Planning Process

prepare the City's budgets and respond to specific information requests. The City Council members use the City Administrative Office (CAO) as a resource and are generally comfortable with its recommendations. Some City agencies feel that due to the CAO's relative distance from the issues, its understanding is not always comprehensive and in-depth. Overall, however, the CAO has a good reputation and considerable weight in the City's decision-making process.

The Community Redevelopment Agency of the City of Los Angeles (CRA) has been an active participant in transportation planning. Due to its concern with the central city's economic development, CRA has provided input and support to activities which are related to the provision of transportation access in the CBD. It has guided the preparation of major urban land offerings to commercial enterprises and conducted design competitions. It has the authority both to assemble land parcels and to negotiate with developers on behalf of the City. CRA originated the idea of a people mover in downtown Los Angeles, applied to participate in UMTA's Downtown People Mover (DPM) Demonstration Program, and was designated the original grant recipient in 1976.

#### C.2.2 Downtown People Mover Authority

In 1980, the Downtown People Mover Authority (DPMA) was created by a Joint Powers Agreement between the City, CRA, and the Southern California Rapid Transit District (SCRTD). It was set up as a sunset organization which would cease to function one year after the facility became operational. It was separated from CRA due to the need for specialized staff, which would be difficult to reintegrate into CRA after the DPM project was

completed, and due to the magnitude of the project. While creating a separate agency presented the danger of increasing the project's visibility, it was felt to be the most effective way to pursue DPM implementation.

The DPMA was formally placed under the guidance of a DPM Board of Control. The Board of Control had seven members including a representative of SCRTD, two members of the CRA Board of Directors, a member of the Mayor's office, two City Council members, and a representative of the Chamber of Commerce. An effort was made on the part of the entities which entered into the joint powers agreement to assemble a Board of Control which provided representation to the major groups concerned with the project. In addition, the City Comptroller was made the Authority's Comptroller.

The Board of Control created a separate Technical Advisory Committee (TAC) charged with reviewing all materials and requests proposed by the DPM Authority for action by the City Council. This committee was composed of Heads of City Departments which would be directly affected by DPM construction and operation. Included were the Departments of Transportation, Planning, and Engineering, the City Attorney, the Chief Administrative Officer, and the Chief Legislative Analyst. The TAC effectively assisted the DPM Authority by identifying likely areas of Council concern and by alerting Councilmembers to DPM-related issues they would be asked to decide upon. Ultimately, the City Council relinquished little authority to the DPMA, since they retained the right to approve all contracts of \$50,000 or more. The DPMA was careful to keep the TAC informed of its progress so that a public record of its deliberations and decisions would be created.

C.2.3 Los Angeles County Transportation Commission

In California, county government is strong. With independent taxing authority, counties provide a wide range of services, particularly in unincorporated areas where they serve as the local government. Elected boards of supervisors oversee the county governments. While Los Angeles County has long taken an active role in planning in Los Angeles, in 1978 the State Legislature supplemented the powers of the County by creating a statewide system of county transit commissions.<sup>1</sup> While this act did not impact Los Angeles in isolation, the inability of metropolitan agencies in Southern California to generate a regional consensus, to establish priorities for guidance in transportation funding decisions at the state level, and to carry capital construction projects through to completion was a major motivation for creating the county transportation commissions.

C.2.4 Southern California Rapid Transit District

The Southern California Rapid Transit District (SCRTD) was created by the California State Legislature in 1964 to operate the Los Angeles County bus system and to plan and implement a rapid transit system. In addition to Los Angeles County, it also serves portions of Orange, Riverside, and San Bernadino Counties.

SCRTD is financed by UMTA Section 5 funds, revenues from the State sales tax, and passenger revenues. In addition, it enters into service

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<sup>1</sup>The California State Legislature has played a relatively passive role in Los Angeles politics. Both their location in Sacramento and California's strong tradition of local control has encouraged a low level of involvement in projects and issues not bearing upon the State's financial resources.

contracts with selected municipalities. It coordinates its planning with the Southern California Association of Governments (SCAG) through a number of advisory committees. The Los Angeles County Board of Supervisors exercises significant influence over SCRTD policy through the appointment of five of its eleven board members. The Mayor of the City of Los Angeles appoints two members and the balance are appointed by a special county-wide selection committee which consists of one City Councillor from each of 78 municipalities in the area. One appointee is made to the Board by this Committee for each of the four corridors into which the municipalities have been divided. To date, the rapid transit portion of SCRTD's mandate has remained unfulfilled partially due to difficulty in obtaining the SCRTD Board's approval of a fiscally feasible fixed guideway system. Instead, it has produced several very ambitious proposals and has a poor record in gaining financial support for its plans at the polls. In an effort to make more progress, it has recently made overtures toward sharing the technical initiative for projects with Caltrans, the State Department of Transportation.

#### C.2.5 Southern California Association of Governments

Created in 1965 by the State Legislature, SCAG was intended as a mechanism for coordinating activities and providing comprehensive planning for the 38,000 square mile area defined by Imperial, Los Angeles, Orange, Riverside, San Bernadino, and Ventura Counties. However, SCAG has had a long history of difficulty in developing a regional consensus. This difficulty is not surprising, given the size of the area, the strength of local governmental units, and the number of municipalities in the region.



SCAG is supported by the 111 municipalities which are its members and by grants from the State and Federal governments. Since 1971 it has acted as the region's A-95 clearinghouse and, since 1975, has functioned as the Metropolitan Planning Organization for the region as required by UMTA and FHWA procedures. For the State, it prepares the region's contribution to the State transportation plan and plays a role in allocating State transit assistance funds among the transit agencies in the region.

#### C.2.6 The California Department of Transportation

The California Department of Transportation (Caltrans) was originally formed in 1972 by combining the Department of Public Works with its large and powerful Division of Highways and a number of smaller agencies concerned with other transportation modes. Since then, progress toward a truly multimodal focus at Caltrans has continued, but the emphasis remains on highway construction, maintenance, and operations. Caltrans is unique among the major agencies involved in transportation planning in the Los Angeles region in that as a State agency it is not directly responsible to the local governmental bodies. Caltrans' District 7 office is located in Los Angeles. The transportation planning group within the district is the Los Angeles Regional Transportation Study (LARTS), originally responsible for all aspects of regional transportation planning. As SCAG, SCRTD and LACTC were formed between 1964 and 1978 to meet new planning needs, these agencies took on some of LARTS' former responsibilities. During the DPM project period, LARTS' major responsibilities were to collect regional travel data, develop regional travel models, and exercise these models to predict future travel for various transportation alternatives proposed by

Caltrans and by the other local agencies. The district office was also active during the period in proposing and implementing other transit-oriented highway construction programs, including the El Monte busway and preferential ramp metering facilities.

### C.3 The DPM Experience in Los Angeles

The most striking thing about transit planning in Los Angeles is the large number of fixed guideway studies and plans and that have been developed. Since the first subways were proposed for Los Angeles in 1906 (and promptly forgotten for fiscal reasons), transit plans have met with opposition and, in the majority of cases, defeat. This long history, much of it related to regional transit planning rather than downtown circulator planning, resulted in the Los Angeles region being familiar with the issues involved in building and financing a fixed guideway public transportation system long before the DPM demonstration program existed. A brief summary of the history of regional transit planning as well as downtown circulator planning is provided in the following subsections.

#### C.3.1 Regional Rapid Transit Planning

Los Angeles' first proposal for a subway was developed in 1906 and a one-mile demonstration subway link opened in 1925. However, proposals in 1926 and 1933 to continue construction of the system were not approved due to concerns about costs.

In 1948, the private sector took the initiative in developing subway proposals when the Los Angeles Chamber of Commerce submitted an action plan to the State Legislature. In 1951 the State Legislature authorized the preparation of a more detailed mass transit system plan. A proposal for a 75-mile system was presented in 1960 and then scaled back to 64 miles and presented again in 1963. While these proposals failed to gain wide support, SCRTD was created in 1964 to operate the bus system and to continue the transit planning process. In 1967, new SCRTD plans for a 62-mile system

carrying a \$1.5 billion price tag were presented. The project was scaled up to 89 route-miles to serve more communities, but a proposal to finance the system was defeated on the ballot in 1968.

In 1971, SCRTD responded to this defeat, and to a 100-mile system proposed by the City Planning Department, by developing a new rail construction program of only 14 miles connecting the central and southern portions of the City. This program introduced the concept of a "starter line" which still endures. The following year it was decided that a starter line alignment going east-west along Wilshire Boulevard made more sense.

Propositions to raise the sales tax to finance a rapid rail system again were defeated in 1974 and 1976. However, SCRTD continued to refine the project. Responding to the conflicting objectives of providing direct benefits to many communities and of having a plan with a higher probability of being funded, the size of the proposed system has ranged from 145 miles in 1974 to the current proposal of 18 miles. Finally, in 1980, 54 percent of the County's voters approved a one-half cent increase in the sales tax to support transit service, including construction of the Wilshire Starter Line. However, whether or not this majority is sufficient for the passage of the proposition is an issue which is still in litigation, since its opponents are claiming that California's Proposition 13 requires a two-thirds majority of the qualified electorate for all new tax measures.

### C.3.2 Early Downtown Circulator Planning

From the early 1900's until the 1960's Los Angeles had a "downtown circulator" in the form of the Angel's Flight, a funicular cable railway on the eastern side of Bunker Hill, and Bunker Hill has since then remained the focus of downtown circulator planning in Los Angeles.

The Community Redevelopment Agency first became actively involved in redeveloping the Bunker Hill area during the late fifties. Having assembled a sizeable parcel, planners were willing to rely upon the attractive elevation of the area and the historic interest of Angel's Flight for its basic development potential. By the late sixties, the wave of applications of new transit technologies had not escaped CRA's notice. In 1970 they were considering "some form of slow moving transit system" as a way of increasing the attractiveness and accessibility of the Bunker Hill Project. The idea of a downtown people mover system was integrated with the concept of satellite parking lots to come up with a \$58.5 million plan for both parking facilities and a 2.7 mile east-west system centered on Bunker Hill. The CRA staff stressed that the system would be a full scale, legitimate transportation system rather than a carnival or novelty item. Support for the proposal was solicited from the City Council and from potential system suppliers. During the summer of 1971, one of these private firms proposed a system.

The circulator proposal was kept alive by a City-sponsored and CRA-administered study begun in 1973. However, doubts were being raised over the ability of the single east-west segment to serve or to be integrated into a larger transportation system. Still, the concept of a system based on new transportation technology was sufficiently attractive to keep the proposal alive. As the study continued, the system's orientation was changed, first by adding the possibility of a north-south segment and later by deleting the original east-west segment. These changes helped to provide greater integration into the CBD's transportation structure, but also

expanded its scope and costs. Fortunately for Los Angeles, the UMTA DPM Demonstration Program announced in April 1976 provided the opportunity to obtain federal funds to meet these expanded costs. The downtown circulator planning work which had been going on since 1970 placed Los Angeles in a position to make a strong bid for an award in the DPM program.

As part of the 1973 study, the CRA set up a Citizen's Advisory Panel (CAP) as one element of its citizen participation program. The CAP had 130 members appointed by the Mayor (many on CRA's recommendation) and was provided with funds to hire its own consultants. A core group of CAP members was actively involved in studying CRA's proposals for a circulator system. At the same time that the CRA was submitting its proposal to UMTA to be included in the DPM Demonstration Program, the CAP recommended that the system should not be built. The City's application represented an explicit rejection of the CAP's no-build recommendation. The CAP was predictably disheartened when CRA continued to pursue a course of action which was contrary to its own judgement.

### C.3.3 The Los Angeles DPM Project (1977-1980)

Los Angeles got what it felt was a "Christmas present" in December 1976, when DOT informed the Mayor of Los Angeles and the Chairman of SCRTD that Los Angeles was selected as one of four cities to participate in the DPM Demonstration Program. Along with this selection came a \$1.28 million grant of preliminary engineering funds, and a statement of DOT's intention, subject to the satisfaction of environmental clearances and other statutory conditions, to provide up to \$100 million for DPM system construction from UMTA funds. Although the DOT letter emphasized that no federal commitments

to provide capital funds were possible until all statutory conditions were met, the local news media stated that the federal government was promising to fund the DPM system.

Preliminary engineering tasks for the Los Angeles DPM system were begun, but not without delays. In February 1977 the State Transportation Board was already withholding action on the release of the state's share of the needed planning funds. Establishing a pattern which was to continue, the State wanted to set conditions which the City would have to satisfy before its funds would be released. The State-required plans for the alternatives analysis and public participation programs were prepared, allowing the state funds to be released and the preliminary engineering to move forward.

While the system began to encounter criticism from some elected officials, the CRA was successful in having it made part of a unified transit development package agreed upon by all of the various regional transportation planning agencies. Developed in 1976 and adopted in 1977, the Four-Part Program was a unique landmark in recent Los Angeles planning history because it transcended the differences for which the various jurisdictions were notorious. The four parts of this program, and the agency most closely identified with each, were:

- o The Wilshire rail transit starter line--SCRTD
- o Buses on freeway--Caltrans
- o Transportation Systems Management improvements; including preferential treatment, exclusive lanes, and ramps for high-occupancy vehicles; ramp metering; and other techniques short of taking existing auto traffic lanes--Caltrans assumed local responsibility, but UMTA and FHWA appeared to be the primary advocates of this part of the plan
- o The DPM System--CRA

Basically, the Four-Part Program provided a lasting consensus, unusual for Los Angeles, which resulted in a lack of vigorous opposition to the DPM by all local transportation agencies. This apparent consensus helped to mitigate Los Angeles' reputation for fragmentation in transportation decision-making. Nevertheless, some criticism of the project continued and the DPM became the target of caustic comments by elected officials at both the City and State levels. Accusations that the system would be a "tinker toy" or a "glorified Toonerville trolley" were bandied about and picked up by the press.

The media played an influential, although subtle, role impacting the project. The two most influential papers in Los Angeles, the Times and the Herald Examiner, both supported the project editorially until a reversal at the end early in 1981. However, the news coverage reported the wide range of positions on the project; many proponents felt that the project's opposition was disproportionately represented. Therefore, despite the large amount of media coverage, it is not clear this helped the public image of the project.

Specific objections to the project were voiced by members of various environmental, civic and civil rights groups. These individuals felt that public funds could be better used on projects benefiting more than a portion of the downtown, or that the development of a regional rail system would offer more transportation and air quality benefits and should receive priority.

By 1978 Los Angeles had completed the first phase of preliminary engineering and the proposed DPM route had been refined as shown in Figure C-2.



A 2.7 mile, 50 vehicle system was taking shape. All indications were that the project was proceeding as smoothly as could be expected. Meanwhile, the State Legislature changed the local transportation planning institutional structure by creating a statewide system of county transportation commissions. The LACTC was given taxing authority which made it a potential competitor to SCRTD.

As the institutional situation was becoming more complex, the first serious technical challenge was brewing. The existence of seemingly conflicting patronage forecasts, one of 51,000 passengers and the other of 80,000, created the first credibility problems. Skeptics had already doubted the ability of the system to generate such high levels of demand, particularly given that the low-fare CBD minibuss was only attracting 6,000 to 8,000 passengers daily. The difference between the ridership estimates was linked to assumptions about how demand would be stimulated. Since the system served Union Station, which advocates felt was ripe for conversion to an intermodal transfer center, the opportunity existed to turn this northern terminus of the system into a bus intercept facility. The Convention Center at the southern end of the system could also be used in this way. The result would be a significant reduction in bus traffic through the CBD. SCRTD, as the major bus operator in Los Angeles County, was predictably opposed to a bus turnback system which they felt would decrease bus ridership and revenues. As a result, they were interested in seeing both termini functioning only as voluntary bus-DPM interface points. Clearly, the ability to generate DPM demand varied markedly between the two proposals.

The DPM project continued to proceed, but not without delays, controversy, and criticism. The State environmental impact reporting requirement

was not met until March 1979. The delays in this process have been attributed mainly to the 18 months required to complete the required historical impact study. At this time the members of the Los Angeles Chamber of Commerce and the Central City Association publicly supported the system and made a commitment to contribute to the project's financing in the form of a benefit assessment district in the DPM corridor. The California Club, an exclusive club of top corporate officers, did not take a public position, but had many members who supported the project. Finally, the Committee of 25, an informal group of the chief executive officers of companies headquartered in downtown Los Angeles, strongly supported the project. Representatives of the Committee, including those who served on its technical advisory panels, lobbied informally both in Los Angeles and Washington for the project. This support led to a decision by the City Council to file a federal grant application for DPM construction totalling \$175 million.

Both the League of Women Voters and the Los Angeles Chapter of Americans for Democratic Action went on public record with their concerns for the adequacy of the cost analysis. The League also expressed doubts about whether the City share for DPM construction represented a wise expenditure of public funds in light of other needs in Los Angeles. In addition, in the spring of 1979, the semi-exclusive Jonathan Club filed a legal challenge to the DPM based on the visual intrusion caused by the proposed elevated structure.

While officially supporting the project on the basis of its inclusion in the Four-Part Program and because Federal funds were available, Caltrans stated in August 1979 that the DPM was not necessary to the success of the

other three segments of the Four-Part Program. A subsequent memo suggested that bus service might be more effective and less costly, that the system would not serve the needs of the transit dependent, and that passenger security and system safety could be a problem. The State backed these critical statements with fiscal clout early in 1980. They again made access to State funds for construction contingent upon the City's compliance with numerous conditions. In order to obtain access to gas tax revenues for DPM funding, the City had to agree to accept the burden of operating cost deficit overruns.

Following cues from the State and obtaining support from historic preservationists (including the LA Conservancy) and former members of CAP, a new public group, Taxpayers Revolt Against Needless Special Interest Transit (TRANSIT), was organized. When the DPM Final Environmental Impact Statement was completed in June 1980, they disagreed with its conclusion that the system was a "necessary" element of a downtown circulation and distribution system. On the contrary, they felt that the rail and bus alternatives had not been adequately examined and that the system's patronage, revenues, and development impacts had been exaggerated. Advocates of Personal Rapid Transit (PRT) systems felt that the DPM was not sufficiently sophisticated or extensive to serve public needs in a responsive manner, while regional rail transit proponents felt the system would cause future transit projects to be passed over for funding. In addition, social concerns were expressed: the system was seen as mainly serving the high-income workers on the west side of the CBD rather than the poorer shoppers and workers on the east side. The environmental impacts of visual intrusion, noise, vibration,

and reduction in sunlight and the impact on the City's limited number of historic buildings also were subjects of contention.

C.3.4 Project Continuation by The Downtown People Mover Authority  
(1980-1981)

Until July 1980, CRA had been in charge of the DPM project along with its many other development activities. While most DPM planning staff were assigned exclusively to this task, another institutional arrangement was desired to reflect the differences in foci of the agency's redevelopment and DPM planning activities. As a result, the DPM Authority was set up as an organization which would be disbanded one year after the system became operational. The Authority's creation required a Joint Powers Agreement between the City, SCRTD, and CRA. Representatives from each of these agencies, plus one from the Chamber of Commerce, formed the new DPM Board of Control to guide the project. The Authority drew its core staff from CRA and eventually grew to a peak size of 29.

As the DPM Authority continued the DPM planning process, it was confident of system completion. The court case initiated by the Jonathan Club was decided in the Authority's favor in July 1980, and critical support for the project was being maintained even though some groups opposed it. For a large project, the DPM planning activities were accomplished with relatively few delays.

System supplier bids were submitted by September 1980. Four bids were received, more than in any of the other DPM cities. The four bidders were:

- o Matra-Otis Transportation Co., Denver, Colorado
- o Urban Transportation Development Corporation, Toronto, Ontario, Canada

- o Vought Corporation, Dallas, Texas
- o Westinghouse Electric Corporation, Pittsburgh, Pennsylvania

During the Fall of 1980 the bids were evaluated using a complex multi-attribute scoring function. While the DPMA staff was involved in trading off technical merit with cost and the risk factor associated with the degree to which each system had been previously tested, the public reversed its decade of resistance to transit financial support. Fifty-four percent of the Los Angeles county voters supported a half-cent increase in the county sales tax to fund mass transit operations and construction. Although it did not appear that any of these funds would go to the DPM, the vote did indicate an increased pro-transit sentiment among the county's voters.

Facing uncertainty over what the policy of the new federal administration would be, in December the DPMA went ahead and made a system supplier recommendation which was accepted by the City. When it was announced that UTDC had made the successful bid, Westinghouse wasted no time in taking action regarding the award. Charging distortion in the selection process, potential conflict of interest, and other irregularities, they filed a formal legal protest with the DPMA and sent copies to the Federal General Accounting Office and to UMTA. Although the protest was denied in Los Angeles, it appeared to be partially responsible for longer response times in Washington to local requests for required project approvals.

The difficulties facing the project increased when the new Federal administration called for a cutback in aid to mass transit. By January 1981, partly in response to a new construction cost estimate of \$259 million estimated by the City Administrative Office, the Los Angeles Times withdrew

its support. The CAO estimate was based on UTDC's bid for the full project, and a 12 percent inflation rate rather than the 7 percent rate which the DPM Authority had previously used to develop its financial plans. The continuing opposition of TRANSIT and a few City Councillors was increasingly publicized. In a last-ditch effort, the DPMA staff scaled back the project in an attempt to bring the project costs down to an acceptable level. However, the end had come by the spring when Congress voted to halt Federal funding for the project and UMTA, acting on the new administration's plan to terminate the DPM Program immediately, ordered the DPMA to halt all except wind-down activities. Time, "the biggest villain", had not been on the side of the DPM proponents. Where once Los Angeles had led all cities in the DPM Demonstration Program field, they now appeared to become the first city to have the project halted by an external decision to eliminate Federal funding for the project.

As the reality of the stoppage of the Los Angeles DPM project began to be recognized by both its proponents and its opponents, a number of responses were made. The opponents had some measure of immediate satisfaction, but as of this writing (early 1982) this satisfaction has been short-lived. This is especially true for those who advocated the Wilshire Starter Line or regional PRT systems--since they soon realized that the Federal cut-backs which stopped the DPM also extended to most forms of federal aid for mass transit construction. The responses of DPM proponents have not become so immediately obvious. The DPM Authority is wrapping up its work, documenting the engineering and planning efforts which were completed so that they can be used as part of future downtown transportation planning. CRA must wrestle with the problem of existing agreements with developers

which assumed that the DPM would exist, reducing on-site parking requirements and reserving space for DPM tunnels and stations. UMTA has agreed to pay for the costs of constructing these tunnels, which has helped to resolve this problem and to keep open the option of future DPM construction. Also, as the CRA negotiates agreements with newly-selected developers, it often finds its negotiating position weakened. As a result, the CRA has found it necessary to compensate for the lack of a DPM system by proposing alternative incentives to the developers, or by foregoing desirable but costly developer contributions to the projects. If changes such as these are not agreed upon, some developers threaten not to carry out their projects.

All of the public and private organizations concerned with the CBD must face the projected parking space shortfall, traffic congestion, and lack of a hotel-convention center link. To date, the only alternative which appears to be feasible is an improved circulator bus service, but both the costs and effectiveness of this alternative are questioned.

At the regional level, little remains of the Four-Part Transit Program which provided such an important regional consensus. Preliminary engineering on the Wilshire Starter Line continues, but the SCRTD awaits final word from UMTA on its future. Caltrans' TSM and bus-on-freeway programs have been slowed significantly because state support now favors rail transit systems for the major metropolitan areas. The DPM system has been halted. The LACTC transit funding plan, which would have provided both bus operating funds and the local share of capital costs for rail transit systems, continues to await a favorable court ruling before it can be implemented. Once again, transit planners in the region feel that Los Angeles may continue to fail to obtain what they believe to be its share of Federal funds.

#### C.4 Summary and Assessment

The experience of the Los Angeles Downtown People Mover seems, above all, a case of unfortunate timing. Though there were some indications that local opposition to the project was increasing, it seems likely that the project would have been implemented if a change in Federal policy had not occurred. Most of the legal and institutional barriers that had to be faced could have confronted any large transportation project and, particularly in light of earlier planning efforts in Los Angeles, the DPM planning process was quite effective.

The issues which arose during the planning process fall into three distinct categories. These categories are:

- o Institutional issues: Those which result from the structure, roles and relationships among agencies and elected bodies involved directly in the DPM planning process.
- o Technical issues: Those which revolve around the credibility of the technical work, staff, and decision-making involved in the course of the project.
- o Financial and economic issues: Those which relate directly to the project's costs, distribution of benefits, and methods for financing the local share.

##### C.4.1 Institutional Issues

The following institutional issues were important as the DPM planning process was carried out in Los Angeles; each is discussed below:

- o Fragmentation of interests and agencies
- o Creation of a separate DPM authority
- o Citizen involvement.

##### Fragmentation of Interests and Agencies

A major institutional problem confronting the DPM project was the fragmentation of agencies and interest groups involved in the planning



process. At the regional level SCRTD, SCAG, Caltrans, and eventually the LA County Transportation Commission all had a role in developing public transportation policy for the metropolitan area. All were involved in a project which in fact focused on a relatively small area within the City. Some of these agencies repeatedly raised questions about the merits of the DPM project. All except SCAG considered their own projects to have higher priority; they wished to ensure that construction of the DPM system would not jeopardize their part of the four-part program.

Even at the City level, the strong City Council form of government created a situation where Councilors from districts not directly impacted by the project seriously questioned whether the DPM represented a reasonable use of public funds. Similar questions were raised by a range of civic and environmental groups. While the City Council continued to vote to support the project, they kept tight control over the operations of DPMA and provided a well-publicized forum for dissent on the project.

However, despite the fragmentation of agencies and interests involved, the DPM's success prior to the shift in Federal policy reflected well on the proponents of the project. While the time and effort required to advance the project was increased by the need to deal with a fragmented set of agencies, the delays associated with the DPM might well have been encountered by any large capital project in Los Angeles and are unlikely by themselves to have stopped the project.

Given the complexity of the existing institutional structure in Los Angeles, the creation of a separate DPM authority to implement the project

may have seemed an odd choice. However, in order to ensure inter-agency cooperation and support, the creation of a jointly-sponsored authority was an appropriate response. Similar to the Four-Part Program, each of the agencies with an important role to play in the project had a hand in establishing the Authority. It was everybody's offspring, it had a clear mission, and it had a good base of staff to expand upon. If there was a flaw it was in creating the agency so late in the process. This late timing was a problem because it takes time and energy to establish a new organization, to develop operating procedures, and to develop a recognizable identity. Just at the time that the DPMA staff was involved in the project's most critical activity--the selection of a system supplier--they also had to face the start-up problems associated with any new agency.

Another institutional issue that deserves discussion is the role of formal citizen participation in the planning process, particularly the activities of the Citizen Advisory Panel. The CAP was given its own funds for technical assistance and was able to develop and articulate a very clear position on the DPM somewhat independent of the main planning process. Though ultimately the panel disagreed with the course of action which the City chose, the value and the content of the group's recommendations are not at issue. The panel members expended considerable personal effort and came to believe, with or without justification, that they would be able to influence the City's choice. When the City turned down its recommendation, the CAP itself was disbanded, and its work was not reflected in subsequent planning efforts, panel members were left feeling that the whole citizen

participation program had been nearly meaningless. Considerable bitterness continued to exist; it in turn carried over into the creation of TRANSIT. It is not clear that the whole citizen participation effort was handled as carefully and sensitively as necessary. Any difference in a citizen group's recommendation and an agency's action is certain to be controversial when it is not made clear from the start that the group is not being given decision-making authority.

#### C.4.2 Technical Issues

The two major technical issues which were raised during the course of the DPM planning process in Los Angeles were:

- o Credibility of the DPM concept
- o The system supplier selection process

In Los Angeles, the credibility of the DPM concept was an important issue. While planners were looking at the DPM system as a solution to expected future parking and street capacity problems in what they saw as an increasingly untenable situation, the public was reacting to the proposals only on the basis of existing conditions. The public was generally willing to tolerate the existing problems in the CBD. The idea of tying the DPM in with fringe parking facilities was critical to the project's support from developers, but it failed to make sense to the potential users. It was difficult for individuals to understand why they would choose to get out of their cars and transfer when they were that close to the downtown. Commuters could not understand why the system would cover such a limited geographic area. The restricted extent of the system might have made more

sense to a public which was not conditioned to proposals for rail transit systems blanketing their city.

The credibility of the concept was further damaged by the bus turnback or interface controversy. Those interested in encouraging DPM ridership wanted to force a transfer at the terminals by ending bus routes there. SCRTD wanted to make the transfer voluntary by having the routes continue past the termini into the CBD, using modified versions of current routes. They felt the forced transfer would discourage transit ridership. The issue was further complicated by the fact that several agencies were interested in operating the DPM system and UMTA had not required an operator to be designated during the proposal process.

One vulnerable point of the preliminary engineering and environmental studies critiqued by TRANSIT was the forecasted level of 1990 DPM patronage of approximately 70,000 riders per day. This critique was supported by the existence of a bus system that was serving a similar circulation function and attracting only 6,000 to 8,000 riders per day; and by disagreements between various staffs and their consultant reports concerning reasonable patronage levels. The existence of seemingly conflicting ridership estimates and an existing bus circulation system with low ridership created an atmosphere of uncertainty about the project's benefits.

On a more positive note, however, the fact that business leaders were willing to lobby in Washington for the project indicated strong private sector support. While the credibility of the project was coming under fire and the patronage forecasts were questioned, representatives of companies which had already made significant investments in the City's future were willing to speak for the project and its economic development potential.

The second major technical issue was the system supplier selection process. The DPMA evaluated the four system supplier bids using a number of different criteria. These different rankings were then weighted by the staff to produce one bidder who ranked highest overall. While such a multi-attribute evaluation process was a reasonable approach for helping to decide among complex alternatives, it was subject to many questions about the relative weightings given to different evaluation criteria. After using this process to choose a supplier, the DPMA began to have a number of problems. They ended up by picking the supplier who had the lowest bid, but not the highest technical ranking. While the DPMA recommendation of a Canadian firm with only an operating test track was indeed accepted by the City Council, it generated a significant amount of dissent and controversy. The result was a significant delay at a very sensitive time for the project. Westinghouse's protest of the selection process caused further delays. Even if Federal funding had not been withdrawn, the delay required to resolve the legal issues at the federal level might have ended the project. Whatever the merits of the protest, the proponents of the project in Los Angeles felt it was a black mark at a time that they didn't need one.

#### C.4.3 Financial and Economic Issues

The following financial and economic issues were points of contention in Los Angeles:

- o Cost estimates
- o Economic and development benefits
- o Local and Federal financial commitments.

The instability in the total system cost estimate was an issue which created an increasing problem for the project. By the time that the DPMA recommended a supplier and the City Administrative Office issued its independent review, the public and the press had seen many different numbers, each higher than the last. They were willing to believe the worst. The worst in this case was the CAO's estimate of a total cost of \$259 million. It has been judged in retrospect that this single number did more to damage the project locally than any other. This may be true; the magnitude of construction costs was a particularly sensitive issue. Earlier questions raised about the patronage forecasts and the operating revenue projections had convinced the State to require that the City assume the risk involved with any increased operating cost deficit. While proponents were doing their utmost to restore confidence, this new capital cost estimate was very important, leading some key supporters such as the Los Angeles Times to begin to oppose the project.

The economic and development benefits of the DPM system, based on projections of economic growth for the City as a whole, were expected by its proponents to be large. As a growing financial center, Los Angeles wished to reinforce its desirability as a location for new development. The City and the developers agreed that a DPM was an appropriate way to accomplish this, by connecting the CBD's major activity centers and by relieving congestion.

The CBD's convention-related activity centers provide a case in point. The City felt that it needed improved transportation between its large

Convention Center complex and major hotels in order to attract more large conventions. Currently, the Convention Center can be reached by bus, taxi, and private auto, none of which is very attractive or very interesting.

The business groups endorsing the project never claimed that their support for the DPM was charitable. They were behind the project because they felt it would make the city grow, and would increase competition for office space. The increased competition was expected to do two things: it would cause rents to rise and stimulate new construction as a consequence. Either way those already in the central city stood to gain: in the short term the value of their available space would increase and in the long term the heightened vitality of the new commercial core of the city would be assured.

While the anticipated economic development benefits of the project were a reason for its broad-based support in the business community, they were also a reason for selected criticism. Some groups objected to the use of public funds for a project which was perceived to benefit primarily the business community. Any project that is viewed as primarily benefiting either a restricted geographic area or one segment of the populace (in this case the local business community) runs the risk of drawing criticism from other groups or interests.

Although the details were never mapped out, the willingness of the private sector to support the DPM through the creation of a benefit assessment district should be noted. By making a verbal pledge to pay a special levy which would be dedicated to operating costs, their stance represented a significant continuing commitment. With a total estimated operating cost of

\$4.77 million, the private sector was slated to pick up 27 percent (see Figure C-4). This represented 43 percent of non-fare box based support.

Several issues related to local and Federal financial commitments created concerns in Los Angeles. Not surprisingly given the level of Federal support for system construction, more concern was expressed locally about operating costs than capital costs. While the Los Angeles financial plan did not count on an annual appropriation from the City's general funds, the City (at the State's insistence) was committed to covering any shortfall in revenues caused by low ridership. If any such shortfall occurred, the City would have had to make demands upon a budget which was already overextended.

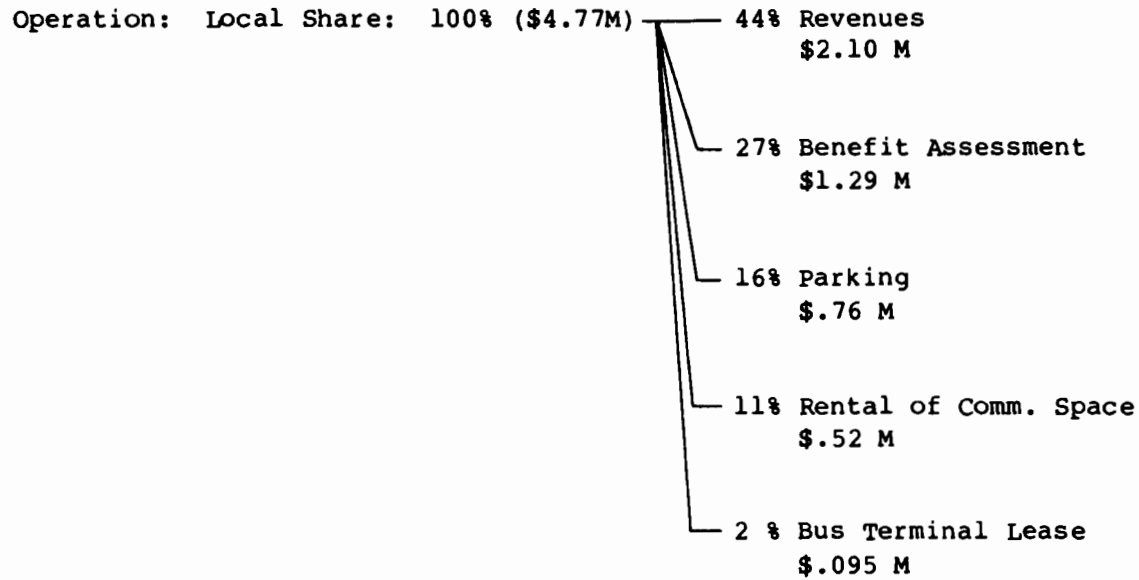
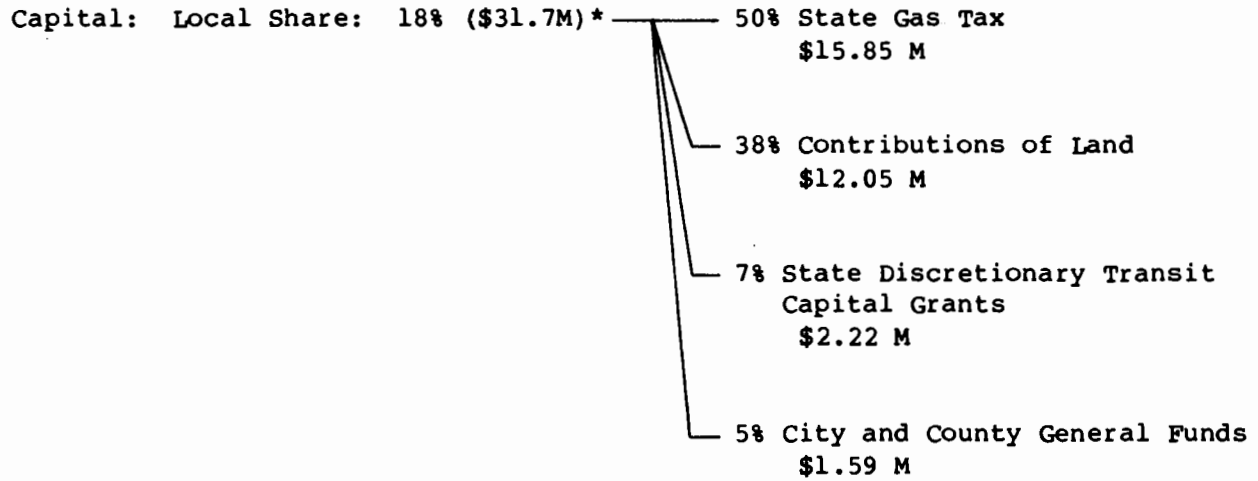
Another concern was the degree to which participation in the DPM program would jeopardize the region's prospects for other Federal funds. Although the DPM Demonstration Program was set up nationally with a separately specified funding level, there were a number of individuals and officials who refused to believe that the DPM represented an opportunity to increase the total amount of Federal funding that the City would receive. Skeptics felt that by passing up the DPM, the region would be in better shape to get a larger transit system more needed by the region.

Most of these individuals felt that a rail transit starter line in the Wilshire Boulevard was a higher priority and was not burdened with some of the criticisms leveled against the DPM. The starter line would extend miles from the central city, could serve a larger share of the region's travelers, and could provide the first step in a truly regional system. These



FIGURE C-4

Los Angeles DPM Financial Plan, 1980



\*Total Capital Cost (Estimated): \$174 Million

factors were cited by starter line proponents who were unwilling to risk another project's preempting what they saw as a limited level of Federal funds.

The inability of the DPMA to obtain a firm funding commitment from UMTA complicated the Authority's efforts to develop a plan for financing the local share. In the face of rising costs, the City wanted to obtain a letter of intent with clear language articulating the extent to which UMTA would fund the project. Whether 80 percent of \$174 million or 80 percent of actual construction costs could be counted on was not clear from the letters expressing Federal intentions. The City had to proceed with the project with much more uncertainty over the likely extent of Federal participation than they desired.

A final factor which pre-disposed the Los Angeles City Administrative Office to avoid the possibility of overcommitting itself financially was the City's record of sound financial management. At a time when the potential bankruptcy of major cities was becoming front page news, Los Angeles was anxious to avoid the risks inherent in deficit operations. The City put a very high premium on protecting its triple-A credit rating.

## C.5 Conclusions

In summary, a number of preliminary findings have emerged from this study of the Los Angeles DPM experience:

### Institutional

- o The strong City Council form of government allowed the Los Angeles Council members to retain a very close hold on the project, impeding the project's pace but insuring public accountability for the results.
- o Jurisdictional overlap between City and regional agencies weakened Los Angeles' ability to deal with the project in an effective and timely manner. However, the creation of a separate DPM authority was an appropriate response to the complex institutional structure relevant to the local transportation planning process.
- o The financial participation of the State made it necessary for local project proponents to obtain State approval periodically, thereby requiring that their continuing support be solicited.
- o Opposition to the DPM system, a legacy of citizen involvement efforts organized before the DPM Program began, was never adequately resolved. The resulting disagreement carried over into the new project phase as a dissenting note.
- o The Technical Advisory Committee served as an effective liaison between the DPM Board of Control and the City Council, monitoring the progress of the DPM Project. This Committee proved to be institutionally sound, heading off Board-Council problems as they developed.
- o The willingness of the private sector to support the project politically as well as financially is a measure of the depth of their commitment.

### Technical

- o The placement of intermodal transfer points on the edges of the downtown caused the credibility of the concept to be questioned by those who felt that as a result the system would not effectively serve the needs of bus commuters.
- o Dispute over the assumptions regarding the integration of bus services with the DPM service meant that the forecasts which were dependent upon those assumptions were also in dispute.

- o Disagreement among technicians, and the subsequent adjustments of patronage forecasts caused the technical credibility of the demand work to be called into question.
- o The system supplier selection process was designed to weigh many factors in addition to cost: however, the adequacy of the weighting scheme and the DPMA's consistency in applying it was called into question.
- o The selection of a DPM system supplier has tremendously important consequences, both locally and for the competing suppliers. The process therefore can be expected to cause controversy and to result in one or more challenges, formal or informal. Supporting documentation must be assembled during the selection process to adequately prepare for this possibility.
- o Controversy due to unfamiliar features (such as automation) or "unpleasantly familiar" elements (such as elevated guideways) must be accepted as inevitable, dealt with as soon in the process as possible, and reflected in project scheduling. Generally, the history of the project indicates that this was done in Los Angeles through most of the planning period. Only at the end, when cost became the overriding concern, did controversy concerning these issues also become out of control.

#### Financial and Economic

- o Changing estimates of cost, and the existence of different estimates by different groups, caused the project to be perceived as difficult to control and risky. The cost calculations for the project were unrealistically low as the result of the use of a Federally-recommended inflation factor of 7 percent per year. This caused unnecessary alarm and loss of project credibility.
- o The fact that the majority of the economic benefits were to accrue to the downtown business community helped to polarize the opposition of the San Fernando Valley and its representatives at all levels of government. The perceived limited distribution of the benefits and the size of the investment for the city allowed it to be questioned at sensitive times during the planning process.
- o Development of a financial plan to provide the local share for capital costs and operating subsidies generated intense interest and debate. The State insisted that the City assume all the risk associated with operating deficits in excess of what was predicted.
- o City and DPMA staff felt their inability to obtain a firm funding commitment from UMTA hampered the development of a financial plan at the local level.

## C.6 Chronology of DPM Planning Events

- 1964 The Southern California Rapid Transit District (SCRTD) is created to replace the Metropolitan Transit Authority, to operate bus service in Los Angeles County and to carry a rapid transit system from design to implementation
- 1965 The Southern California Association of Governments (SCAG) is created to do comprehensive regional planning for Imperial, Orange, Los Angeles, Riverside, San Bernadino, and Ventura Counties
- 1966-67 Rapid transit proposals are prepared by consultants for SCRTD and made available for public review
- 1968 A proposition to increase the sales tax as the financing mechanism for rapid transit was defeated on a county-wide ballot
- 1970 The General Plan for Los Angeles provides for "People Movers" in the core: the Community Redevelopment Authority (CRA) considers some type of slow-moving transit system to be integrated in the Bunker Hill redevelopment project.
- November CRA releases a people mover and satellite parking plan for downtown; assures public that the selected system will be a high quality one, not a "carnival" type operation
- December City Council member goes on record favoring CRA's people mover plan
- 1971 Los Angeles City Planning Department presents 100 mile rapid transit construction program to City Council committee members
- December SCRTD proposes alternative rapid transit construction program calling for 14-mile starter line
- 1972-March City Council's Technical Advisory Committee argues that the starter line should not link the central and southern parts of the city but that it should be located in the Wilshire Corridor
- Spring PRT advocates develop an independent plan for a transit network; this work is integrated in the City's General Development Plan
- November The California Department of Transportation (Caltrans) is created by the State Legislature with multi-modal responsibilities

- 1973-September The role of a people mover in a transportation network is discussed by City Councillors as CRA again proposes such a system for Bunker Hill
- October The Los Angeles Circulation/Distribution study is awarded to a local planning contractor to develop people mover plans
- 1974-March SCRTD consultants recommend an incremental rail rapid transit construction program
- May The State recommends that SCRTD build the most extensive rapid transit system put forward in their consultants' report
- August SCRTD adopts plan for a 145 mile system, putting aside the incremental approach and alienating transit advocates who considered that approach to be more feasible
- November Proposition A financing for rapid transit construction using an increase in the sales tax is defeated by public vote
- 1975-June The Citizens Advisory Panel (CAP) is created to provide public input to the CRA on the Circulation/Distribution study, members are appointed by the Mayor and 30 to 40 end up as an active core; CAP is given limited independent funds to hire its own consultants
- 1976-April UMTA announces the national DPM competition
- May City Council makes decision to enter the competition for Federal Demonstration Program awards
- June Los Angeles submits its DPM project proposal to UMTA
- July After a year of meetings and discussion, CAP issues a final report recommending that a circulation/distribution system should not be built
- August SCRTD General Manager notes that the conflict between DPM and the Wilshire Line would not have arisen without the existence of the national demonstration program
- December The US DOT informs Los Angeles of its selection as a DPM city and of its intention to provide \$136 million in federal funds, including \$11 million for preliminary engineering and environmental studies and \$25 million for improved freeway bus terminal facilities integrated into the DPM terminal stations; the DPM is seen as one part of Los Angeles' Four-Part Program for transit development.

- 1977-February A DPM preliminary engineering grant application is submitted to UMTA
- The State Transportation Board votes to hold back the state share of DPM planning funds until alternatives analysis and public participation plans are assembled
- July UMTA approves a grant for preliminary engineering; the majority of matching State funds are also released
- October The UMTA administrator publicly supports construction of the Los Angeles DPM system
- November The Los Angeles DPM is branded a "tinker toy" by a powerful State Senator and a "glorified toonerville trolley" by some City Council members
- 1978-January UMTA awards Los Angeles its capital grant for preliminary engineering
- May A revised route for the DPM system is approved by the City Council; a 2.7 mile, 50 vehicle system is planned
- The California State Legislature creates a system of county transportation commissions; the Los Angeles County Transportation Commission (LACTC) is formed
- September The DPM Draft Environmental Impact Report (DEIR) is completed in order to satisfy state environmental requirements
- An article is published citing a DPM patronage forecast which is substantially lower than the official forecast, raising the issue of technical credibility
- November The Final Environmental Impact Report (FEIR) is completed
- 1979-March The FEIR is approved by the State
- The Chamber of Commerce and the Central City Association go on record supporting the DPM and the creation of a benefit assessment district to help finance operating costs
- The Los Angeles Times prints letters to the editor from the League of Women Voters and Americans for Democratic Action registering doubts over adequacy of the DPM cost analysis; the League questions this use of public funds in light of other public needs
- Despite growing opposition, the City Council votes 10-1 to apply for Federal and State grants to provide the non-local share of the full system construction cost of \$175 million

- 1979-April The Jonathan Club files a legal challenge to the DPM charging damage through visual intrusion
- May Mayor Bradley goes on record supporting the use of taxes to support transit
- July The Draft Environmental Impact Statement is filed to satisfy Federal requirements
- August Caltrans takes the position that the high construction cost of DPMs can be supported only if the economic development benefits associated with the project are indeed very high
- The State threatens to withhold DPM funds to avoid being "the laughing stock of the nation"; funds are released after the business community makes a financial commitment
- Caltrans issues a report on the Four-Part Program saying that the DPM is not necessary to the success of the other three parts
- UMTA reaffirms its intention to fund the project
- November Caltrans supports the project but issues background materials containing criticisms and noting that:
- o security would be a problem
  - o the transit-dependent would not be significantly helped
  - o bus service could be more effective and less costly
- The Times prints the position of an independent architect who notes the historically deleterious effect of elevated guideways on the street environment
- A City Councilwoman says in a media interview that the DPM project cannot be given high priority treatment, due to other pressing needs of the City
- 1980-February The state sets numerous conditions for the release of DPM funds; makes gas tax revenue contingent upon the City's acceptance of terms
- March The Citizen's Advisory Committee of the LACTC criticizes the DPM route alignment in a policy memo
- April DPM opponents unite to form Taxpayers Revolt Against Needless Special Interest Transit (TRANSIT); the group includes historic preservationists, environmentalists, and regional rail transit proponents
- UMTA reaffirms its ability to provide DPM construction funds



- 1980-May An inter-agency report is issued with modified patronage forecasts
- June The Final Environmental Impact Statement is submitted by CRA and UMTA
- July CRA turns over the DPM planning functions to the Los Angeles DPM Authority which is created by a joint powers agreement (between the City of Los Angeles, SCRTD, and CRA) and is charged with implementation, evaluation, and initial operating responsibilities. The joint powers agreement allows for a seven member Board of Control with representatives from each agency, plus a representative from the Chamber of Commerce. The City Council retains the authority to rule on all major contracts. Liaison between the Board of Control and the City Council is provided by a Technical Advisory Committee, consisting of Heads of City Departments.
- Public debate over the system's merits and drawbacks mounts
- The Jonathan Club legal challenge fails in court
- September A State Senator warns that the DPM award may hurt the City's ability to secure other Federal funds
- System supplier bids are received from Matra-Otis, Vought, Urban Transportation Development Corporation, and Westinghouse
- October A City Council member tries, but fails, to stop DPM project progress
- November Fifty-four percent of the voters in Los Angeles County support a proposition allowing a half-cent sales tax increase to fund mass transit
- December UTDC is recommended and subsequently selected by the City Council to supply the DPM system
- An interim task force set up by the new federal administration issues a report calling for a cutback in Federal aid to mass transit
- Westinghouse files a protest with the DPM Authority, with copies to the Federal General Accounting Office and to UMTA, regarding the selection of UTDC
- 1981-January The Times withdraws its support in light of new (\$259 million) cost figures released by the City Administrative Office
- Some City Council members urge an end to the project

1981-January      Federal officials refuse to commit funds for the DPM project in Los Angeles

                         The project is scaled down by the DPM Authority in an attempt to hold costs to an acceptable level

                         The City defers action on the DPM and awaits a Federal funding decision

April                UMTA instructs Los Angeles to halt DPM planning activities

May                 Los Angeles files a legal challenge to the Federal stoppage of funds

June                 The City Council votes to phase out the DPM project

APPENDIX D. SAINT PAUL SITE VISIT

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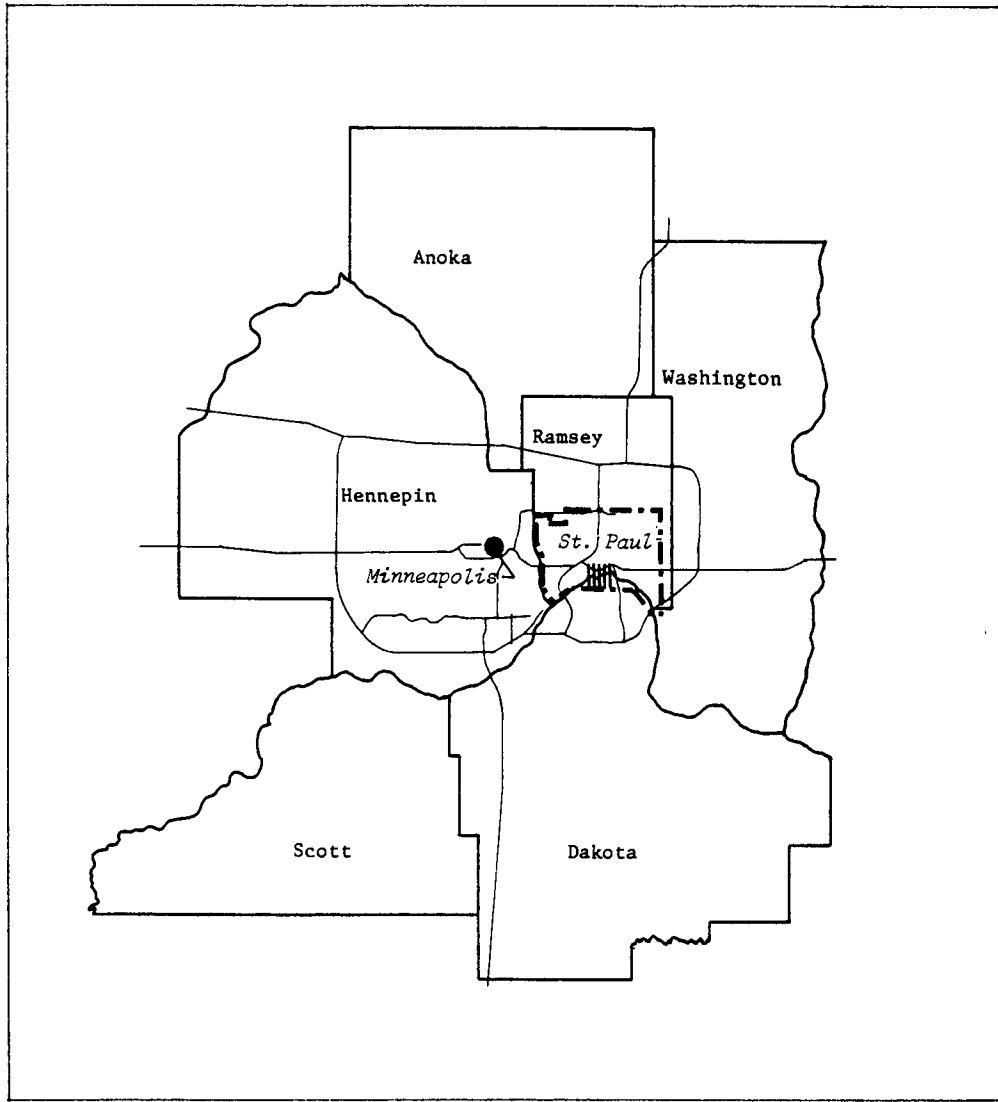


## D.1 Description of the Region and System Site

St. Paul and Minneapolis anchor the large Twin Cities Metropolitan Area which is bisected by the Mississippi River, as illustrated in Figure D-1. The metropolitan area encompasses the seven counties of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington. St. Paul is located in Ramsey County. In 1980, St. Paul's population was 270,230 or 13.6 percent of the metropolitan area's population of 1,985,705. The Twin Cities area accounts for approximately half of Minnesota's population and St. Paul serves as the State Capital. With a wealth of historic architecture, St. Paul has been described as "The Last Eastern City" (and Minneapolis as "The First Western City") because of its ethnic population and neighborhood orientation. Major arterials and limited access highways link the two cities and their suburbs.

As a whole the Twin Cities have been thriving. Between 1970 and 1977 the metropolitan area showed a net gain in employment of 18.6 percent (on a base of 872,300) outstripping the national average of 15.5 percent. Both cities, however, suffered small employment losses of 1 to 2 percent, causing local concern over the distribution of future employment opportunities. The area is able to compete with eastern cities culturally and hosts a variety of theatres, museums, and outdoor activities as well as extensive convention facilities.

Downtown St. Paul, shown in Figure D-2, is a compact commercial center served by a conventional grid of north-south, east-west roads. The downtown is bounded by the State Capital and associated buildings on the north and the river on the south. Figure D-2 also shows the proposed alignment of the DPM system.



||||| *Downtown St. Paul*

FIGURE D-1: The Minneapolis-St. Paul Metropolitan Region

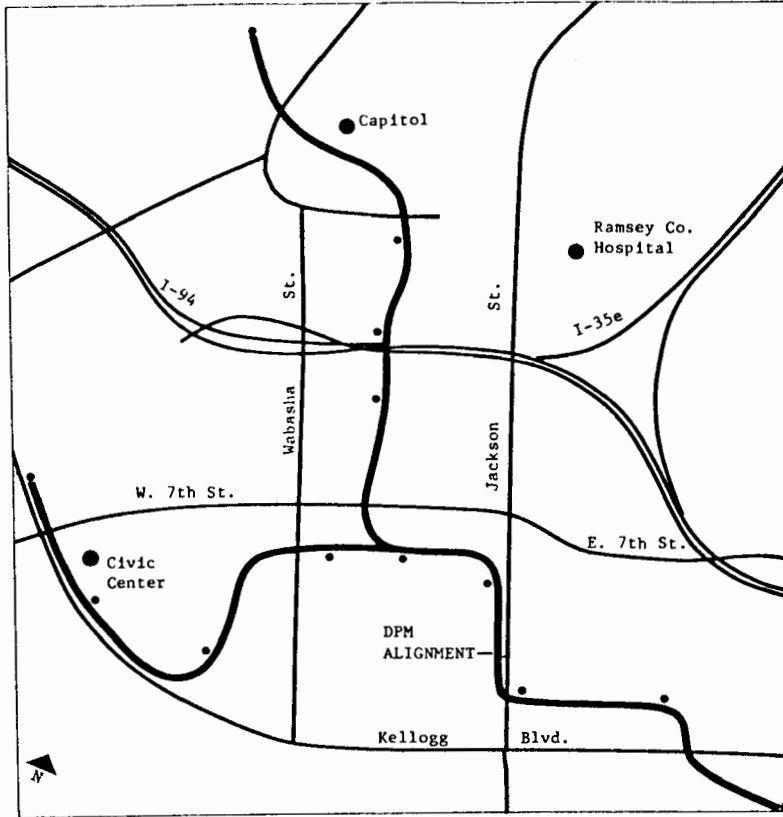


FIGURE D-2

Downtown St. Paul and  
the Proposed DPM Alignment

In 1970, only about four percent of the 5,095,040 daily person trips in the metropolitan area had their origin or destination in downtown St. Paul. Traffic is not generally perceived by the public to be a pressing issue in St. Paul. Marginal congestion levels and a short peak (of 30 to 40 minutes) have combined to make traffic congestion a secondary concern. A large supply of both on and off-street parking with moderate turnover during the day is available. Most workers expect and are able to park relatively close to their jobs.

The modest scale of the downtown combined with the frequently severe winter weather conditions has encouraged the development of an elevated, enclosed pedestrian bridge system. Located at the second story level, the Skyway system connects about ten blocks of the downtown. The Skyways are supplemented by pedestrian tunnels such as those which serve the Capitol. While many additions to the Skyway system have been programmed or proposed, the Capitol will continue to be relatively isolated by winter weather and by a depressed section of Interstate 94 which separates it from the downtown.

An extensive fixed route bus system is operated by a single authority (the Metropolitan Transit Commission) throughout the region. Much of the service remains downtown-to-suburb oriented, although the regular fixed route services are supplemented by shuttle buses and paratransit. Special services are available to major trip generators (such as the Zoo, sporting facilities, and the University of Minnesota), and innovative service options have been tailored to fit particular trip purposes (such as routes with stops at shopping areas where passengers may de-board and then re-align within an hour without paying an additional fare).



The distribution of growth to the suburbs and the consequent weakening of the downtowns has become one of the region's largest problems. As in many US cities, development of industrial facilities and shopping malls in outlying districts has threatened the ability of downtowns to compete. As a result, policies to strengthen the downtowns were introduced in the mid-seventies both at the city and regional levels. Not only are commercial and industrial uses being promoted closer to the downtowns but residential development is also being actively pursued.

In summary, while the two metropolitan areas naturally rival each other in spirit, the planning done for them is coordinated. Future directions foreseen for both St. Paul and Minneapolis include:

- o Providing transportation services which will encourage people to live, work, and shop in the downtown; and providing downtown (transit) circulation and pedestrian systems
- o Encouraging the development of residential, commercial, and employment opportunities which would generate this activity
- o Providing distribution services which would provide access to transit terminals and fringe parking and thereby increase the accessibility of the downtown to suburban residents and workers.

## D.2 St. Paul's Institutional Structure

The St. Paul transportation decision-making political/institutional structure is complex. It includes each of the city, metropolitan, and state agencies illustrated in Figure D-3. St. Paul's situation is further complicated by being the State Capital. The State Legislature takes an active interest in many Twin Cities problems and is responsible for the existence of the metropolitan agency structure. This interest gives the Twin Cities special access to State funds but often complicates the local decision-making process. This section describes the agencies which had a major involvement in the DPM planning process.

### D.2.1 The City of St. Paul

Since 1972, the City of St. Paul has had a strong mayor/weak city council form of government. This change in the City's political structure resulted from a political reform movement which was led by groups like the League of Women Voters; it was approved by City voters in 1970. This change paved the way for the development of key roles in the transportation decision-making process surrounding the deployment of a new technology in downtown St. Paul. The political changes which occurred simultaneously with the initial DPM studies resulted in the election of a mayor who was willing to assume a prominent position of advocacy.

The City Council is made up of seven members elected at large, who select a president from among themselves. The Council members serve two year terms and actively form city policy. The Mayor is not a member of the City Council, but does possess the right to veto its decisions. Depending on personality, the Mayor may influence the Council and the public by acting

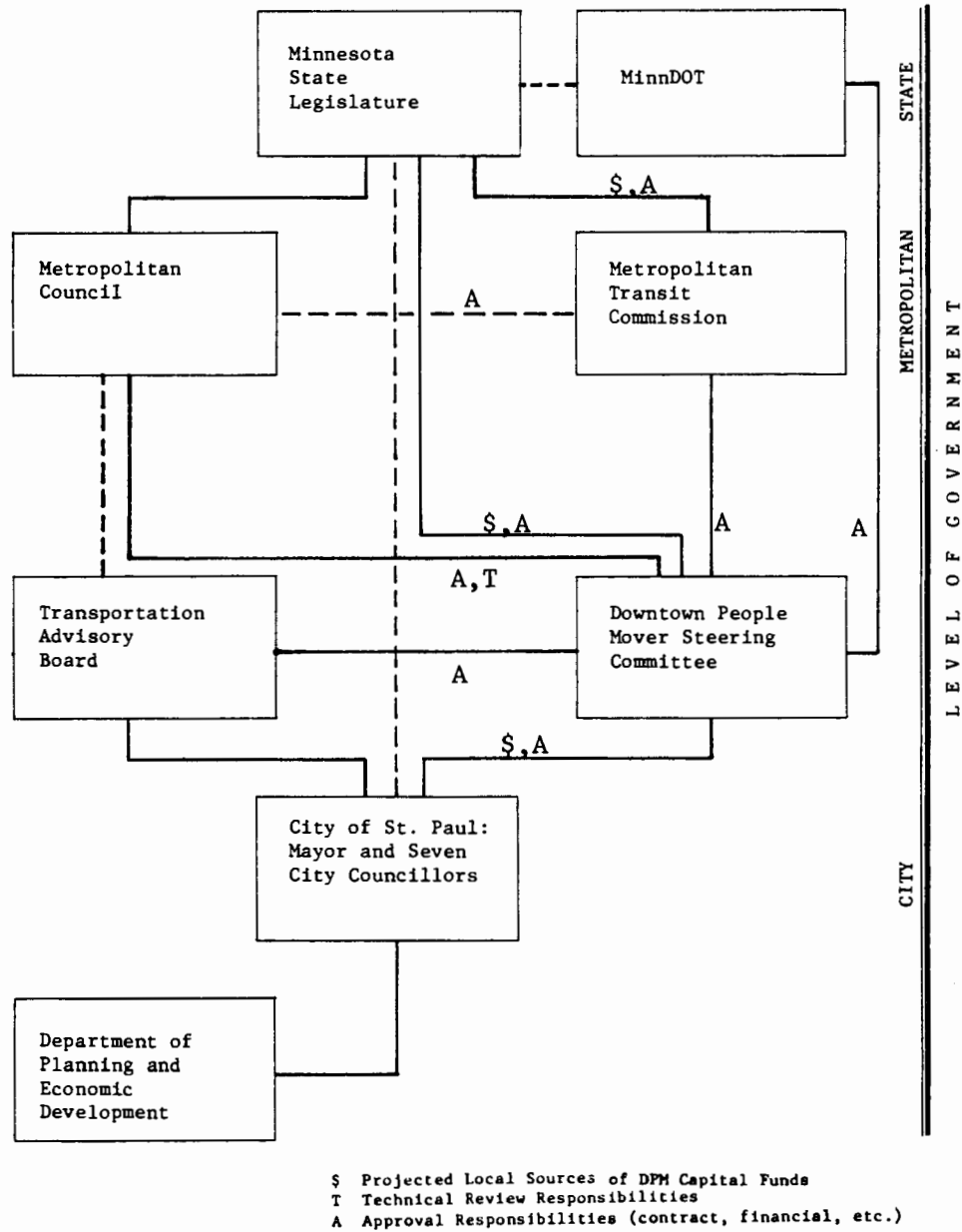


FIGURE D-3: The Transportation Decision-Making Structure Relevant to the DPM Planning Process (1974)

as a spokesperson for the entire City. The Mayor's term of office is the same as that of the Council.

#### D.2.2 The MTC and Metro Council

In 1967, the State Legislature took action to help shape the future of the Twin Cities' growth and development. They replaced the Metropolitan Planning Commission with the Metropolitan Council, giving it jurisdiction over long range planning in the seven county region. Districts were created corresponding to the sixteen legislative districts included in the region. The Council was directed by a board made up of a member from each district and a chairman appointed by the Governor. The Metro Council was to be assisted by the Metropolitan Transit Commission (MTC) which was created simultaneously (along with the Metropolitan Waste Control Commission and the Metropolitan Airports Commission).

At various points in time MTC and Metro Council disagreed over important regional transportation planning decisions. As a result, the Legislature acted in attempts to ameliorate the difficulties. The Metropolitan Reorganization Act of 1974 redefined the powers of both agencies. While the Governor would retain the right to appoint the chairman of MTC, Metro Council gained the right to appoint the other members of the board to guide the transit commission. Metro Council's final right of approval was also reinforced. Metro Council's advisory group was replaced by the Transportation Advisory Board which provided additional representation to suburban and county concerns.

MTC's relationship to the Legislature and Metro Council is defined to some extent by its funding sources. The State Legislature defined the MTC

service area and the 1.72 mill levy which applies to that area; beyond that area but within the seven-county metropolitan region a .172 mill levy applies. However, since these revenues (combined with Federal subsidies) are not sufficient to support MTC and its services, MTC typically obtains additional appropriations from the State Legislature. Thus, MTC finds itself obligated both to the Legislature which must approve general and special appropriations, and to Metro Council, which must clear Federal grant applications in its role as the MPO and the A-95 clearinghouse for the region. In addition, MTC may obtain funds for capital purposes by issuing bonds, but only within bonding limits set by the Legislature.

#### D.2.3 The State Legislature

The Minnesota Legislature has 67 senators and 134 representatives. Historically, the State Legislature has found that its location in the Twin Cities results in its involvement in urban and metropolitan issues which would not otherwise be likely to come to its attention. As a consequence, the split of the House and Senate between the Independent Republican (IR) and Democratic Farm Labor (DFL) parties--and the balance of power between Ramsey County and other delegations--helps to guide St. Paul policy formation. In some cases the position of the Ramsey County delegation on St. Paul issues dominates other concerns which legislators from the balance of the seven county area and the State might have regarding a particular policy decision. Historically, the State Legislature has been deeply involved in the regional planning issues relevant to this project.

### D.3 A Review of the DPM Experience in St. Paul

#### D.3.1 Automated Transit: A Familiar Idea to St. Paul

St. Paul was able to make a strong bid for selection by UMTA in the Downtown People Mover Demonstration Program because of its previous transportation planning efforts and because local agencies were familiar with the concepts and issues involved in automated guideway technology. The Legislature had reinforced its interest in the metropolitan transit planning effort in 1967 by supporting a transit study of the region. Although a major review of the adequacy of the region's highway network (the Twin Cities Area Transportation Study), had taken place under the jurisdiction of the Minnesota Highway Department during the late fifties, a similar effort had not been made for transit. MTC contracted with a private consultant in 1968-69 to inventory innovative system concepts. This study of 96 systems resulted in the recommendation that conventional technologies (with expected improvements) would be more appropriate for a regional system, but that new systems might be viable in the urban core areas.

While the Metro Council and the MTC enjoyed a good working relationship at this time, Metro Council organized an advisory group, the Transportation Planning Program, which increased its direct influence on regional planning efforts. A report was co-authored by MTC and Metro Council in early 1969 which outlined long range plans and called for an integrated transit system utilizing more than one mode. Metro Council also approved an MTC request to follow up on the previous innovative technologies work.

Even though it was not marked by acrimony or conflict, the year 1970 was an important turning point in the institutional relations between MTC

and Metro Council. At that time, MTC took over the operations of Twin Cities Lines, the private bus carrier, and became the bus transit operator in the region. Although no formal changes occurred, MTC's role changed at this time as they ceased to have simply a planning function and became an operating and implementation agency with new authority and new problems. Later that same year Metro Council, as the federally recognized A-95 clearinghouse for the region, approved a request by MTC to submit an application for funds for a preliminary engineering study of a fixed guideway transit system. This study is indicative of the expanding scope and level of activity with which MTC began to operate.

The following year Metro Council published the Metropolitan Development Guide which outlined transportation development plans for the seven-county area. After this report was made available for review, the Minnesota Legislature acted to clarify the roles and responsibilities of Metro Council and MTC by modifying the extent of MTC's powers and requiring that its plans be consistent with the Guide. Nonetheless, in 1972 the conflict between MTC and Metro Council came to a head. The legislation which had created both agencies had left a "gray area" between planning and implementation. Metro Council interpreted their mandate to include not only the power to adopt transportation plans but to prepare those plans as well. MTC felt that they were responsible for operating existing services and planning future services. The disagreement over which agency was responsible for transit planning led to a refusal by Metro Council to review MTC's Transportation Development Program, both initially and upon appeal. Ultimately, Metro Council hired its own consultant to do an independent analysis of regional transit alternatives.

In 1973, the Legislature was involved in the debate between the two regional agencies. MTC forwarded information to the Legislature on its preferred alternative--fixed guideway transit--while Metro Council was presenting information on its recommended solution--conventional buses on exclusive or protected right of way. The scope of the debate was widened by individual advocates of other solutions--most particularly an innovative personal rapid transit technology. In order to respond responsibly to the choices being presented, the Legislature set up a special sub-committee of legislators to deal with the issue of the DPM. This subcommittee then directed and guided the efforts of specially assigned legislative research staff to delve into the issue's background and context after the legislative session had ended. In addition to holding public meetings to discuss the alternatives, members of the sub-committee made site visits to examine available hardware and meet with system suppliers. Their results were published in a report during the next legislative session and represented a synthesis of ideas from the reports of the two agencies. Their basic conclusion was that any range of alternative technologies for future consideration had to cover a range of costs, because funding limits might make selected alternatives infeasible despite their merits.

In 1974, the Legislature allocated \$300,000 for continued study of transit alternatives, while UMTA reallocated \$127,000 of its technical studies funds at MTC's request to help finance it. A consultant team was hired and managed by a six-person staff group split evenly between MTC and Metro Council. The work involved the comparison of a 40-passenger vehicle automated fixed guideway baseline system with selected alternatives. While



this work was in progress the Metro Council articulated its general development plans, designed to encourage and maintain two diversified urban areas.

Based on its interpretation of the results of the study commissioned by the Legislature, in 1976 Metro Council adopted a policy barring fixed guideway alternatives from consideration except in densely urbanized areas. MTC disagreed with this policy and felt that it was not supported by the findings of the study sponsored by the Legislature. MTC felt that, based on the report, a fixed guideway system was still an appropriate alternative although a smaller 16-passenger vehicle might better fit the demand. Despite MTC's position, however, the Legislature had clearly given Metro Council authority for adopting regional policies and automated transit could not be seriously considered for implementation by MTC anywhere but in the downtowns until the Metro Council changed its policy.

#### D.3.2 The Federal Initiative and a New Role for the City

The role of the city government became important for the first time in April 1976, when UMTA announced the Downtown People Mover Demonstration Program. Complicating St. Paul's intent to bid for an award was the fact that Minneapolis was also interested. Minneapolis made overtures toward becoming involved (although no proposal was ever developed) just at a moment when MTC was being informally advised by UMTA officials of the potential strength of St. Paul's bid. The conflict passed when Minneapolis withdrew its plans on the grounds that the extent of the city's development combined with the narrowness of its streets precluded the construction of elevated fixed guideway structures without extensive structural modifications to existing buildings.

MTC and the City of St. Paul submitted a proposal for a DPM demonstration in June 1976 and while the proposal did not face local competition, it was not endorsed without qualification. The Metro Council planning staff gave the proposal mixed reviews in a much-publicized report. They criticized its lack of a basis in a comprehensive plan, and questioned both its ridership estimates and operating deficit projections.

St. Paul immediately spoke out against the Metro Council critique. The City was defended against Metro Council's charge that it lacked a comprehensive plan by those familiar with its planning process. The rebuttal was based on the fact that a City ordinance was used to control the development process rather than a comprehensive plan. Meanwhile, meetings were being held between City, regional, and Federal officials. Under pressure, Metro Council struck the most negative comments from its report and endorsed the proposal. While advocates of the DPM proposal had managed to gain the qualified approval of the press, a no-strike pledge from labor, and the State Department of Transportation's unofficial endorsement, the St. Paul DPM system was off to a rocky beginning.

#### D.3.3 St. Paul is Selected For a Demonstration Award and Enters a New Round of Debate

UMTA's selection of St. Paul as one of the first four cities selected in the DPM competition in December 1976 created initial local jubilation; it also marked a new round of political and institutional activity and renewed debate over several technical issues. Metro Council continued to question several aspects of the project, including the development benefits. The questioning of the DPM at Metro Council meetings and in other forums

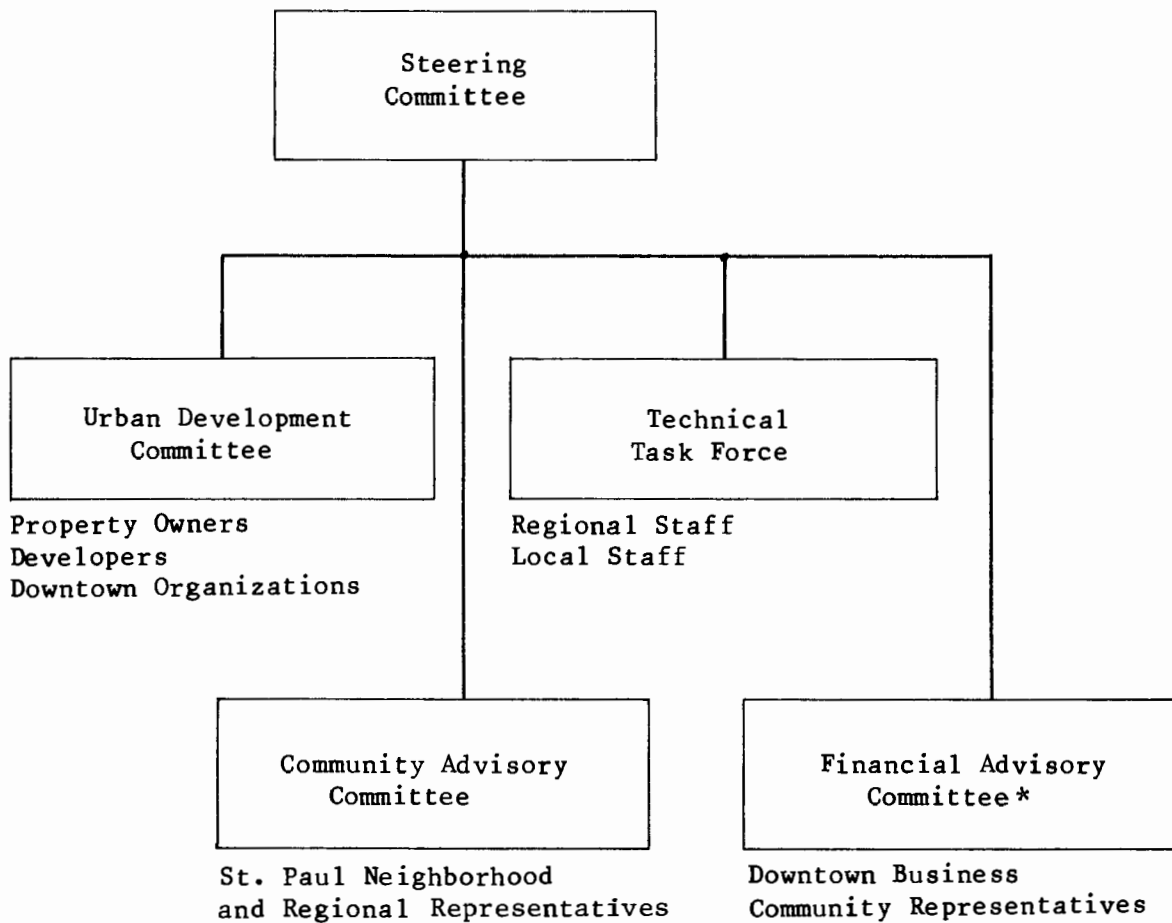
eventually prompted the Senate Majority Leader to oppose the project. The Senate vetoed the allocation of preliminary engineering funds from MTC's budget in April 1977. Although the Senate could not prevent the City from paying the local share of these funds (20 percent or \$150,000), it did create a barrier at a phase in the project's planning process which even those who were unconvinced of its merits wished to see completed. General interest was enough to get the seemingly derailed project back on track, however. A Joint Powers Agreement was signed by MTC and the City in May 1977, allowing the two agencies to act as one for designated purposes. MTC was the designated grant recipient, and a Downtown People Mover (DPM) Steering Committee was created with heavy representation from MTC and the City, and included the chairman of Metro Council.

In June, the Legislature once again exerted its influence over the project by shuffling the composition of the DPM Steering Committee as a condition of approving the preliminary engineering funds. In order to ensure both their own understanding of the project and the representation of the State's interest--and to reduce the influence of MTC--they removed one MTC representative and added the chairman of the Transportation Advisory Board, the Commissioner of the Minnesota Department of Transportation, a State Senator and a State Representative, to arrive at the structure outlined in Figure D-4. Neither of the legislators had voting rights on the Committee.

The preliminary engineering study began in late 1977 and continued through the next year. Despite a call by the Mayor to withhold judgements until the study was completed, the criticism which the project had generated

DPM Steering Committee

- Mayor
- President of City Council
- Chairman of MTC
- Chairman of MTC's Transit Development Council
- Chairman of Metropolitan Council
- Commissioner of Minn/DOT
- Chairman of Transportation Advisory Board (Metropolitan Council)
- State Representative
- State Senator



\* Formed in 1978 by Operation 85

FIGURE D-4. Composition and Structure of the DPM Steering Committee

since its inception continued. In May 1978, Metro Council retained a consultant at the direction of the Legislature to perform an independent assessment of the preliminary engineering study. When construction costs were scaled upward to \$90.0 million in July 1978 critics again voiced opposition. Despite the fact that those costs reflected modifications made at the request of the Steering Committee--and not just cost escalations--opponents pounced on the results as justification for their earlier predictions of trouble, including cost overruns.

#### D.3.4 The Private Sector Role Increases

In November of 1978 the House of Representatives changed its composition markedly; the DFL lost its wide margin, leaving it and the IR absolutely even. While many DFLers had been opponents of the project (in contrast to the established position of the party which traditionally supports public works projects) this was still taken by proponents to be a setback. At this juncture, a new force entered the political arena. The downtown business community, represented by the Chamber of Commerce and the chief executive officers of the larger corporations, offered their support to the project. The support of the downtown business community was not nominal, they were offering money as well as verbal backing, but it was not unqualified. Using the title Operation '85, prominent representatives of the private sector jointly pledged funds to aid the DPM. They agreed to provide funds to at least partially offset any operating deficit which might occur: they did this because the potential for such a deficit developing had been a primary concern for many citizens and was thus a potential stumbling block to the project's progress. The business community might well have stepped forward

earlier in the project to provide this support if a clear precedent for such action had existed. As it was, an active public-private partnership was an innovative aspect of the Twin Cities' DPM planning process.

Operation '85 was prepared to contribute to a \$1.7 million revenue pool to fund any annual operating deficit which might accrue. Beyond the \$1.7 million the City of St. Paul was solely responsible. Operation '85 was prepared to contribute all of the first \$300,000. After that the City, the MTC, and Operation '85 would share equally in the deficit up to their authorized spending limits (\$400,000; \$500,000; and \$500,000 respectively). This contribution by the private sector was offered in return for setting the following conditions:

- o Fringe parking would be developed as an integral part of the plan
- o The newly estimated construction cost of \$90 million would be the absolute maximum acceptable
- o UMTA would pay the first year's operating deficit
- o MTC would absorb cost differences from special fares and free intermodal transfers.

The financial plan provided critical support to the project and MTC approved the plan in December 1978. The plan also called for the City and MTC to split the 20 percent local share of capital construction costs equally. The actual burden on the City was reduced because their \$9 million could be provided by taking credit both for the right-of-way which would be used, and for the funds which were expended to construct the Skyway System.

Despite approval of the financial plan, critical support was lost in MTC as turnover in its senior staff and the Board saw the replacement of DPM advocates by others who lacked the same commitment to the system. This in

turn left greater latitude for internal disagreements and made it more difficult for MTC to speak with a unified, committed voice. The consultant's report, reviewing the DPM project, which Metro Council had commissioned (on behalf of the Legislature) was released in March 1979. The report was critical of several aspects of the work which had been done, including the ridership and economic development projections.

Despite this setback, the project managed to move forward. The final preliminary engineering report was published in March 1979 and recommended a 2.6 mile system estimated to cost \$90 million. Metro Council endorsed the project on the basis of a recommendation from its Physical Development Committee. Meanwhile the City was continuing its efforts to communicate the positive impact which the predicted expanded tax base would have. A bill to approve funding of the local share for implementation was supported in the Senate due to the effort of a former opponent who had been convinced of the project's value while serving on the Steering Committee. Despite intense negotiations, however, the House did not approve the funding required.

The defeat in the Legislature stopped work on the project and precipitated a renewed effort by Operation '85 to come up with an acceptable financial plan. After exacting a promise from the City to maintain its funding commitment for ninety days, Operation '85 sought ways to refinance the MTC contribution to the local share. They came back with a more comprehensive development package which relied on a \$5 million private sector contribution and \$9 million in MTC bonds combined with City and Federal funds. In December of 1979, the City Council decided--with only one dissenting vote--to support the new financial plan.

By January 1980, with its credibility and finances committed to the project, Operation'85 made specific moves to protect its investment. Four professional lobbyists were hired to obtain the support of the Legislature and the local construction trades labor association applied direct pressure to DFLers who did not support the project. At this point the Legislature authorized the requested City bond issue but vetoed the use of MTC funds. The City Council voted to continue work on the project in May.

#### D.3.5 Public Initiative and Referendum

Relative to the extended and dramatic life it had enjoyed both in the political arena and in the press, the end of the project came swiftly. While the Legislature did authorize a City bond issue, proponents did not succeed in getting the Legislature to protect the project from the public initiative and referenda provisions of the City Charter. Citizens soon came out in opposition to the project. With the support and encouragement of a member of the City Council, petitions were drawn up, distributed, and sufficient signatures collected in little less than a month to put an initiative on the November ballot. Operation '85 countered the sudden movement with an intensive, professionally organized telephone campaign. A modest investment in advertising space and a history of agency conflict combined to induce citizens to bar the use of City funds--and thereby to terminate the project--71 to 29 percent at the polls.

However, most proponents agreed that the project had effectively reached an end as soon as it was placed on the ballot. The long history of controversy and repeated setbacks had created an atmosphere where objective debate was probably impossible and most individuals simply wanted to see a



final decision. The results of the referendum, which effectively prohibited City financial participation in the project, confirmed this view as 71 percent of voters opposed the project.

Less than a year later, a strong consensus exists that the concept of a downtown circulation system utilizing automated fixed guideway technology is not viable. New work, however, is underway and light rail transit planning has begun. The Metro Council recently rescinded its ban on fixed guideway transit and studies are being made of the corridor which connects the two downtowns and serves the university. While the Federal funding situation remains unclear, St. Paul at least is ready to consider supplementing its all-bus transit system with fixed guideway services. For the foreseeable future, however, local planners are not considering innovative transportation technologies.

#### D.4 Summary and Assessment

The case of St. Paul is an involved one and the fact that the proponents of an automated downtown circulator almost succeeded in obtaining the necessary local approvals on several occasions makes it all the more interesting. Despite the political support of key actors, a substantial record of new technologies planning and study, the technical support of selected staff planners, and strong relations with the Federal Government, the project floundered several times and was terminated when it was put to a public referendum.

The issues which arose during the planning process fall into three distinct categories. These categories are:

- o Institutional issues: Those which result from the structure, roles, and relationships among agencies and elected bodies involved directly in the DPM planning process.
- o Technical issues: Those which revolve around the credibility of the technical work, staff, and decision-making involved in the course of the project.
- o Financial issues: Those which relate directly to the project's costs and methods for financing the local share.

In addition to the issues identified above, the potential impact on the future introduction of new technologies to St. Paul and the impact on other transit projects are discussed briefly in Section D.5.

##### D.4.1 Institutional Issues

A number of institutional issues arose which affected the DPM planning process in St. Paul including:

- o Conflict between MTC and the Metro Council
- o Involvement of state and regional agencies in a "local" project
- o Role of the private sector
- o Role of the public and other interest groups

By the time that a formal proposal for a DPM Demonstration Project was submitted to UMTA, the relationship between MTC and the Metro Council had been defined by a series of conflicts over agency roles and the appropriate direction for the development of a regional transit system. The seeds of this conflict had been planted when the Legislature first created the two regional entities with overlapping, or at least ambiguous, responsibilities in the area of long range transit development. While the Legislature acted on several occasions to clarify the responsibilities of each agency and to reaffirm Metro Council powers to develop overall regional transportation policies, the agencies were involved in a long history of disagreements on transit development that extended into the DPM project and denied that effort the type of unified regional support that would have been very desirable in pursuing the project.

It was a Metro Council policy decision that fixed guideway technology was a potentially appropriate technology only for circulator service in the region's two downtowns that led St. Paul and MTC to aggressively pursue a DPM Demonstration. While St. Paul and MTC might have applied for a DPM demonstration even if that Metro Council policy did not exist, it is clear that fixed guideway advocates in MTC saw the program as their only chance to pursue that type of technology even though MTC had consistently taken the position that a fixed guideway system was an appropriate response to regional transit needs as well.

While throughout the DPM planning process Metro Council did not actively oppose the project and always "officially" endorsed the project at key points, at best the Metro Council was viewed as a disinterested observer

and often (sometimes at the request of the Legislature) fulfilled a watchdog function. The lack of a strong regional consensus about the project offered opponents a forum to question the project, probably reduced the acceptability of the project in the eyes of the Legislature, and certainly created an additional barrier given that two agencies with a similar (i.e. regional) constituency continued to debate the merits of the project. While the MTC/Metro Council disagreements had indeed put many legitimate concerns on the table, it was the headlines and the media catch phrases which stuck in the voting public's mind. The struggle between the two agencies detracted from the project's image, helped to slow the project's progress and, ultimately, influenced St. Paul's decision to withdraw from the DPM Demonstration Program.

A second institutional issue which created difficulties for the project was the involvement of State and regional agencies in what came to be viewed as essentially a "local" project. While the State Legislature has traditionally played a strong role in issues affecting the Twin Cities, the DPM became a particularly visible and divisive issue and proponents of the DPM spent considerable time and effort trying to convince the Legislature that the project was worthy of financial support from the State or region (through MTC). Ultimately these efforts failed and the Legislature simply allowed the City to try to implement the DPM with no State or regional support. Projections of economic development benefits, the possibility of future system expansions to provide coverage to more areas, and schemes to integrate the DPM into the regional transit system seemed to carry little weight and by the time the referendum was held even the vast majority of

St. Paul voters seemed to view the project as having limited benefits except to the vocal minority of the business community.

Given the relatively large capital costs of all types of fixed guideway transit technologies, state and regional support will often be required to implement systems in urban areas. As a result, the need to demonstrate the benefits of the system and its relationship to the regional transportation system should not be underestimated. In the case of St. Paul, the Legislature and Metro Council were inclined to be skeptical of the project from the beginning. While many factors contributed to the project's lack of popularity (including the history of MTC and Metro Council relationships) it is certainly clear that no sense of urgency about the project and its benefits to the region ever developed. Transportation projects requiring major capital outlays are always likely to generate interest and if downtown applications of such projects require support from higher levels of government, a potentially significant implementation barrier will always exist.

A significant and positive feature of the St. Paul experience was the involvement of the private sector in the DPM planning process. While initially skeptical, most of the banks, larger businesses, and major landowners eventually took strong public positions in support of the project. As the Legislature acted to restrict the financial participation of the State and MTC in the project, the business community worked closely with the City to develop financing alternatives which eventually included private sector support for both a share of the operating deficit and the local share of capital cost (through bonds financed by a tax increment district). Once all

MTC participation in the project had been prohibited by the Legislature, the business community even considered establishing a non-profit organization to operate the system.

The strong support and involvement of the private sector was partially due to a good relationship between the Mayor and the business community who had previously worked together to implement a number of major development projects in the downtown. In addition, the business community felt the DPM would encourage a continuation of downtown revitalization. While opponents of the project felt the business community was merely acting out of self interest, proponents felt that business leaders played a key role in keeping the project moving at critical points in time.

Irrespective of the motivation of the business representatives that became involved in the project, one of the more interesting aspects of the St. Paul experience is that ultimately what appeared to be a very strong coalition between the downtown business community and the City was unable to succeed in getting the DPM approved. Again, while many factors led to the defeat of the DPM project, there is some feeling that the business community waited too long to become actively involved in the project. While business leaders participated on advisory committees right from the start, active and visible business support for the project and the proposal to have private sector participation in financing the system did not occur until prospects for State and MTC funding began to fade. In retrospect, given the continuing series of questions raised about who would benefit from the project, it was unfortunate that one key group which clearly perceived a benefit was not more actively involved in searching for financing alternatives right from the start.

Toward the end of the project, the segment of the business community represented by Operation '85 (large banks, insurance companies, etc.) was criticized for not having reached out more to the smaller merchants and businesses operating in the downtown. Small business people and landowners--especially those not in proximity to proposed station locations--tended not to favor the project. Some had been persuaded by arguments that their taxes (or special assessments) would rise as a result of the DPM financing arrangements, while the benefits of increased sales and land value increases would accrue to others who were more strategically located or who were better positioned financially to adapt to changing market opportunities. As a result, many of the smaller merchants were unconvinced that the DPM would be a benefit to them and many actively opposed the project at the end. This opposition added to the perception that only "big business" was likely to benefit from the project.

A final institutional issue that deserves discussion is the role of the public and other interest groups in the DPM planning process. As described earlier, the DPM project was directed by a Steering committee which had a series of advisory committees associated with it. This structure provided selected individuals with an opportunity to become very involved in the project and at least in one instance resulted in an opponent of the project becoming one of the DPM's most effective proponents. In addition, the technical staff associated with the project conducted an extensive series of community meetings at which a dialogue on a broad range of issues occurred. By most accounts both the formal committee structure and the community meetings were viewed as positive features of the process. While voters

eventually rejected the project overwhelmingly, it is clear that the results of the referendum did not necessarily reflect simply a well-informed judgment on the merits of automated technology for downtown St. Paul. In fact, it seems likely that in the end, voters were reacting to the perceived indecisiveness of elected officials about the project and government spending in general as well as uncertainty about exactly what a DPM system was.

#### D.4.2 Technical Issues

There were several technical issues related to the DPM project which directly affected the proponents' ability to develop the necessary political support for the system. These issues included:

- o Credibility of the downtown circulation concept
- o Lack of public acceptance of potential system suppliers
- o Reaction to elevated guideways and automated vehicles
- o Patronage and economic development forecasts

Probably the most critical technical issue facing the project was the lack of public credibility in the downtown circulation concept. From the time the project actively entered the public forum in 1976 until November 1980, two simple questions plagued the effort: "Who's going to ride it?" and "What problem is the system addressing?". The compact configuration of the downtown office, hotel, and retail space caused doubt as to the system's ability to displace the walking trip at lunchtime particularly in light of the existing Skyway (pedestrian walkway) System. The exception to this was trips from the Capitol to the downtown since people generally perceive that these trips are not currently being made by any mode because of the relative isolation of the Capitol complex. Even in this case doubt was expressed



over the absolute number of trips that would be induced (and therefore the addition to retail sales volume which could be expected) and the cost-effectiveness of this method of inducing them. The existing low levels of ridership on a circulator bus system in the downtown added to the skepticism and the argument that a "new technology" would generate trips within the downtown much like the Skyway system also was unconvincing.

Public skepticism over the ability of the system to cause changes in work trip patterns turned to hostility when plans were discussed to integrate the system more fully into the transportation network. While a logical alternative to support ridership of the new system, particularly if MTC were to operate it, was to cut out redundant bus services, this idea was not greeted enthusiastically by the riding--and non-riding--public. While there is evidence to suggest that congestion of buses in the downtown during the peak hour may be developing into an operational problem, the public and the press were unsupportive of turning buses back at the circulator's stations. Many people felt that the transfer might encourage current bus riders to shift to auto and deter potential new riders.

Also disturbing to the public was the issue of fringe parking construction. The press helped to introduce parking as an issue by proposing that parking would be a logical supporting sub-system to the circulator. This concept was accepted by the business community. Again, however, the public resisted the idea that commuters would drive to a lot on the outskirts of town, leave their car exposed to vandalism, and transfer to the circulator when they were able to drive to their destination without encountering congestion and park near to their workplace. Once again a credibility gap

arose between those who were professionally responsible for or financially dependent upon the future development of St. Paul and those who were not. A communication gap developed between the former, who were comfortable in dealing in abstract terms with the future, and the latter, who were more oriented towards dealing with existing situations. This gap made it difficult for the planners and other project proponents to convince the public that St. Paul's future was dependent on actions taken in the present. Unable to communicate this connection effectively, project proponents were unable to cultivate popular support for their proposal.

In retrospect, what appeared to be a suitable match between UMTA's program objectives (to build a downtown system) and a local policy constraint (not to build a regional fixed guideway system) became a major stumbling block over time for several reasons including:

- o The circulator-only image contributed to the perception of the technology as an exotic toy rather than a system with basic transportation merit
- o Compared with the existing bus system, the capital and continuing costs seemed staggeringly disproportionate
- o By failing to benefit suburban constituents in a concrete way it allowed support to weaken and withdraw

The second technical issue was the lack of public acceptance of potential system suppliers. Local planners and project proponents found that they faced another communication problem when they tried to describe the expected characteristics of the DPM system in the public forum. Because no manufacturers could be legally excluded from bidding--and because system designs, including guideway structure designs, vary widely from manufacturer to manufacturer--the planners were unable to point to a single description

of what St. Paul's system would be like. This inability reinforced the atmosphere of uncertainty being generated by opponents around the project and as a result, MTC and the City were unable to combat effectively particular anxieties expressed at public meetings and in the Legislature. If a citizen or representative was worried that St. Paul would end up with a system which was clearly functioning poorly in an activity center application, no firm guarantee could be given that the technology would not be selected. It didn't matter how unlikely it was that a particular system would be selected, if the supplier chose to prepare a proper bid it could not be barred from consideration.

A related problem from the local point of view was the need to design a baseline system. While input from system suppliers was used to design that baseline system, it was felt that it would have been more cost-effective to select a supplier based on qualifications and then develop a detailed system design. By not being able to point to a specific system, local implementors were again faced with giving citizens qualified answers. Doubt remained where hard facts could not be cited.

In addition to concerns about the concept of a downtown circulator and the lack of specificity in the definition of a DPM, the issue of implementing a new technology involving elevated guideways and automated vehicles also had to be faced. However, there appears to have been little concern over the fact that automated command control technology would be used to direct the vehicle. Rather other concerns took precedence, including:

- o Security of riding on a driverless vehicle
- o Reliability of winter operation

- o Difficulty of third-floor level transfer to Skyways
- o Noise and dirt generated by an elevated guideway
- o Visual intrusion

While the need to address these issues did not surprise anyone connected with the project, the inability of the technical staff to convince the public that there were acceptable solutions to these problems was a source of frustration. Again, the nature of the project and the wide range of potentially available systems led people to make comparisons to systems that were familiar like the Chicago El (dirty and noisy), Morgantown (unreliable), and amusement park systems ("tinker toy" and ornaments). Efforts to assure people that the system would operate during the winter were set back by the Minnesota Zoo System. The zoo system which had been installed by a potential system supplier had a long series of cost overruns and operating problems. While the Morgantown experience, as reported in the local press, was bad for the project, the proximity of another automated system having trouble was extremely unfortunate. Even the recent experience with a prison construction project that had recently been completed with a large cost overrun was cited as evidence of the inability of the public sector to get a project done on time and on budget. Finally, Minneapolis had been trying to build a stadium using metropolitan funding for several years and thus the question of "local" projects receiving metropolitan funding was already a controversial issue in the Legislature.

Doubts over credibility of the concept paved the path to questioning the credibility of other technical work. The most pressing need of the demonstration program--to establish a proven record of downtown experience with a new concept--also made local deployment difficult. Local attitudes

toward being the subject of an "experiment" varied widely from those who believed it was a unique and intriguing opportunity to those who felt they were being exploited and asked to bear an unreasonable burden of risk. The lack of construction and operating experience was brought up again and again throughout the planning process by those who were uncomfortable with the lack of "hard" evidence.

The concern about the reliability of various aspects of the technical work done, especially patronage and economic development forecasts, was increased by the nature of the relationship between MTC and Metro Council. While it could be argued that MTC and Metro Council were encouraging the kind of debate which would expose issues for the public and the Legislature, their difference of opinion on key technical issues aggravated existing concerns. While Metro Council officially endorsed the project at key points in time, reviews of DPM technical work by Metro Council staff or consultants questioned many aspects of the project including ridership forecasts and operating cost estimates and tended to:

- o Fuel the perception of risk and uncertainty already associated with the project
- o Cast doubt on technical issues with no apparent recourse to impartial review adding to the "political" cast of the debate

Patronage was a key system variable which was reviewed by a consultant for Metro Council at the request of the Legislature. The review, which suggested that ridership estimates were high, made an impact because the public was predisposed towards doubting a daily ridership projection of 35,000 to 45,000 passengers. The doubt over the willingness of commuters to transfer at outlying stations to travel downtown was compounded by doubt

that a significant number of people would be willing to ride the system at lunchtime. While this was due in part to the existing Skyway System mentioned earlier it was also due to an existing transit service called the Dime Zone System. The Dime Zone covers downtown St. Paul (and Minneapolis) and allows noon hour shoppers to board MTC buses for a reduced fare. The public doubted that the new system would be able to induce significant ridership above and beyond the 600 to 1,000 passengers a day that were taking advantage of the Dime Zone.

Another forecast which was a point of contention was the projection of new development attributed to the implementation of the circulator system. The basic premise of the project proponents--that the DPM would accelerate redevelopment and revitalization of the downtown seems to have been widely accepted. Questions concerning projections of future growth concentrated on details rather than on full-scale challenges to the validity of study findings. Attention was primarily given to the questions of whether DPM benefits would be great enough to balance the project costs and to whom those benefits would flow. Since the development benefits associated with the project were important for attracting support from those who questioned the transportation merits of the project, this issue also eroded support.

Consideration of the DPM occurred at a time when downtown St. Paul was undergoing its most significant real estate development in over 50 years. Proponents were hard pressed to argue that the DPM was essential to future growth at a time when major real estate projects such as Oxford Development's Town Square project were already committed and underway. Events subsequent to St. Paul's withdrawal from the DPM Demonstration Program--such

as plans announced by Dayton's to undertake a \$12 million renovation of its downtown department store--seem to bear out the position of DPM opponents who claimed that major development could take place even in the absence of a people mover. In fact, proponents of the system who felt a DPM would support greater downtown development have reluctantly concluded that St. Paul has not actually lost any development to date as a result of the decision not to build the system.

In part, the immediate and overwhelming success of Oxford Development's Town Square project highlighted the types of problems that some skeptics expected would accompany the DPM project. In that case, an aggressive Canadian firm put together a landmark project which immediately captured much of the retail vitality that exists in downtown St. Paul. Although the adjacent Dayton's Department Store has undergone renovation as a result, other retail buildings downtown have lost prime tenants. Other businesses which remained in their old locations have suffered as a result of the competition from newer Town Square stores, many of which are national franchise operations. Even more to the point for downtown merchants and property owners is that they are assessed for the upkeep and maintenance of the two-acre indoor public park which forms the heart of the Town Square project. The smaller merchant's point of view that the DPM could result in a similar outcome did not aid the project's cause.

#### D.4.3 Economic Issues

The two critical financial issues that entered into the debate over the DPM were:

- o Capital and operating cost estimates
- o Appropriate mechanisms for financing the local share

Capital and operating cost estimates and cost escalation rates were the subject of debate. The projection of costs was the area which suffered the most from the fact that a technology was being considered for downtown implementation. The lack of a range of implementation experiences left St. Paul prey to extrapolation from the experiences with other systems such as Morgantown. The fact that the small vehicle/off-line station concept was radically different from what was being proposed for the City (and that the Morgantown technology probably could not have qualified given the baseline specifications) did not prevent it from becoming an issue. Unfortunately when the local media went to Morgantown to do a feature story the system broke down.

The fact that the projected DPM system costs climbed from \$56 million in 1976 to \$90 million in 1979 is not extraordinary in light of the inflation which was occurring and the design modifications which were made in response to concerns that were raised locally. The fringe parking plan discussed by the press--15,000 spaces by 1990--would have added approximately \$36 million to that 1979 figure. As the referendum drew near the press was quoting a total cost of \$120 million while opponents were citing \$147 million.

Whatever the final number would have been there was no disagreement that the project--at a \$100 million plus level of effort--constituted a major undertaking. While there was universal interest in the project's proving cost-effective, the criteria for making that judgement varied in a critical fashion. Proponents were concerned that the local investment be cost effective and that St. Paul take advantage of this opportunity to



receive federal funds that otherwise would go to another city. Opponents and the public, on the other hand, focussed on the cost-effectiveness of the total investment. The argument that the federal share represented an opportunity to funnel additional resources into St. Paul fell flat.

In estimating the total capital costs a seven percent annual inflation rate was used. While this might have seemed to be a reasonable rate in light of the Federal Government's efforts to control inflation, it was an unfortunate choice for the project. At the time, inflation was averaging one percent per month and two consultants took issue with the choice of seven percent. Again credibility was strained because the choice of a low rate of inflation supported the proponents position. A more realistic rate would have simultaneously provided a safety buffer (albeit driving up total costs) and diffused the issue. In retrospect the seven percent rate was very conservative and would have caused the contingency fund to be prematurely exhausted.

The operating costs also were a source of discord and in a way overshadowed the concern about capital costs. Even if the local share of capital costs could be obtained, opponents were concerned that runaway operating costs could become a significant local burden. Suggestions that operating costs could be stabilized through contractual agreements with the supplier did little to convince those who questioned the patronage, and therefore, the revenue forecasts.

While UMTA had made general reference to special funds which were available to cover unusual start-up costs, it was difficult to convince the wary that:

- o St. Paul would be able to depend on receiving those funds.
- o Adequate funds would be available in order to ensure that no additional burden would be locally borne.
- o Provision of this type of contingency fund was not an indication of the Federal Government's lack of faith in the new technology and its ability to perform.

Controversy over the sources of local funds, the distribution of costs, and the future financial burden being anticipated all complicated the project as much as any technical problem. The protracted debate in the Legislature over MTC's contribution to the local share helped to exhaust public tolerance for the project. If MTC's participation had been approved in a timely fashion, or if the City had been able to handle the project alone, or if the business community had entered into the partnership with the City that it ultimately pledged itself to earlier in the planning process, then the project might have continued.

As summarized in Table D-1, the financial plan for capital costs went through three major revisions. While the City supported the project throughout, the State gradually withdrew the support that it could have channelled to the project through the MTC. The project retained its viability through these transitions because of increasing local support for the project. At the final decision point, however, the length and complexity of the financial plan's evolution worked against the project. The public, after having observed many stages in the project's development, was not prepared to continue.

TABLE D-1.

Successive Financial Plans for St. Paul DPM Capital Costs

	<u>1976</u>	<u>1979</u>	<u>1980</u>
MTC	10 percent	10 percent	no contribution
City of St. Paul*	10 percent	10 percent	20 percent
UMTA	80 percent	80 percent	80 percent
Total Estimated Capital Cost	\$56 million	\$90 million	\$120 million

\*Including in-kind contributions

### D.5 Conclusions

As discussed in the previous section, a variety of institutional, technical and financial issues contributed to the defeat of the DPM project in St. Paul. While it is difficult to assess the relative impact of each issue, several findings emerge from the case study that make the St. Paul experience both interesting and potentially useful for shaping future new technology programs. These findings are:

- o Despite the strong support of the City, regional transit operator and business community, DPM supporters were unable to convince the Legislature that the project should receive State or regional financial support.
- o The Legislature was undoubtedly influenced by disagreements between regional agencies about the project's merits as well as by the variety of technical and financial issues which arose from the debate. Ultimately, however, it adopted the position that the project was a downtown improvement having only local benefits. While the City had no recourse in this decision, the State's decision left the City in a difficult position since they had to find alternative funding. The Legislature would probably never have become as actively involved in the issue if the project had been located in other area.
- o In retrospect, the portion of the business community which strongly supported the project might have made a financial commitment to the DPM much earlier in the process if a clear precedent for such a public-private partnership had existed. Such a commitment could have decreased or eliminated the need for State support and possibly avoided the referendum.
- o The concept of an automated downtown circulator system for a city such as St. Paul where existing traffic, parking, and pedestrian issues did not appear to be of great concern created difficulties. First, it required that much of the benefit of the system be predicated on future development and dramatically increased trip-making levels. Second, the need to carefully integrate the circulator into the regional auto and transit systems was heightened since downtown circulation alone was not perceived by most to be a priority concern.
- o The very nature of the demonstration program assumed cities applying for federal grants would be willing to serve as case studies for a new application of automated technology for which the

prospects, while promising, were really unknown. The task of convincing the public and others of the wisdom of participating in such a program and of describing precisely what a DPM system was proved difficult even with the prospect of significant federal financial support.

- o The process of evolving toward a financial plan that was acceptable to the Legislature (i.e., local revenue sources only) resulted in a rather creative proposal for a joint public/private sector venture. Unfortunately the number of iterations involved in developing financial options and repeated rejections by the Legislature helped to create the perception that the project would only benefit a small group of business and labor interests.
- o The project might have gone ahead as planned if the planning process had not been complicated by the amount of media coverage, if editorializing directed at the project had been reduced, if the active interest taken by the State Legislature had not evolved, and if other large capital projects in the area had themselves been the subject of less controversy.
- o The referendum that finally ended the project was probably as much a rejection of both an apparently indecisive planning process which stretched over several years and of government spending on large capital projects as it was a rejection of an automated technology for a downtown circulator, since other large projects have also encountered resistance in the area.

Despite the fact that the citizens of St. Paul effectively decided to withdraw from the DPM Demonstration Program, the project experience has yielded some benefits. Primary among these is that the St. Paul business community has shown that despite the fact that it is a mixture of old and new organizations, it is capable of assuming a unified stand on significant public issues. If the DPM experience can be used as a lesson in strategy, then the business community--as represented by the Chamber of Commerce--may well emerge stronger and more capable of entering into future partnerships with the public sector. Meanwhile, Metro Council has lifted its ban on fixed guideway transit, and planning for a line haul distribution service between the two downtowns using light rail vehicles has begun.

D.6 Chronology of DPM Planning Events

- 1958 Twin Cities Area Transportation Study (TCATS) begun by Minnesota Highway Department with no formal involvement of the Metropolitan Planning Commission; essentially a highway network review (No money available from US Bureau of Public Roads for transit studies).
- 1962 Joint Program established with representatives from relevant agencies concerned with transportation decision-making; designated 3-C planning agency; undertakes major transportation-land use planning study.
- 1967 Metropolitan Council created by State Legislature with districts corresponding to legislative districts (16). One representative per district plus a chairman appointed by the Governor.
- Metropolitan Transit Commission (MTC) created by State Legislature to provide public transit service in a seven-county area, Legislature fails to coordinate the planning authority of MTC and Metro Council; beginning of transit planning effort marked by Legislative initiative to study transit.
- 1968-69 MTC commissions a consultant to inventory "New Concept" vehicle systems: 96 reviewed with conclusion system should evolve from conventional system improvements and that new systems might be applicable to higher density corridors/ areas, for example.
- 1969 Metro Council organizes an advisory group: the Transportation Planning Program (TPP) with three committees: Management, Policy Advisory, and Technical Advisory; created through inter-agency agreements.
- February MTC/Metro Council staff report prepared in February; sets out major components of long range transportation planning program based on integration of several modes.
- May Metro Council approves \$413K for MTC to follow up consultant work on transit vehicle systems.
- 1970-September MTC takes over private bus operations.
- Fall Metro Council approves MTC request for a Federal grant application for preliminary engineering funds to develop system specifications for a regional fixed vehicle system using 40-passenger vehicles.

- 1971-February MTC and Metro Council's Transportation Plans published by Metro Council in Metropolitan Development Guide.
- Minnesota Legislature amends MTC's powers to require their plans to be consistent with the Guide.
- 1972-Fall MTC and Metro Council conflict over transit planning authority arises; MTC maintains it has power to plan and to implement, subject only to approval by the Metro Council; Metro Council maintains it is the only agency which has authority to prepare and adopt long range plans.
- MTC submits its Transit Development Program to Metro Council for review; the Council declines to review it; MTC renews its request; the request is again declined.
- Metro Council hires a consultant to do another alternatives analysis (for \$15K) of bus versus fixed rail and to develop an implementation strategy.
- PRT systems are discussed by private advocates.
- 1973 Legislature is forwarded information on an intermediate capacity transit system by MTC, an exclusive busway system by Metro Council, and a PRT network by individuals.
- House approves MTC plan; Senate Committee tables it.
- Summer Legislature creates sub-committee on mass transit; directs staff research, holds public meetings, travels to West Coast to look at transit hardware.
- November Sub-committee publishes report favoring elements of each plan but hesitant about their costs; emphasizes that low cost alternatives must continue to be considered.
- 1974 Legislature enacts several pieces of legislation dealing with low cost solutions to transportation problems.
- Transportation Advisory Board replaces Technical Planning Program as an advisory body to the Metropolitan Council.
- Legislature directs MTC to plan a small-vehicle automated fixed guideway system within Metropolitan transit taxing district; Metro Council is directed to cooperate with MTC.
- MTC convenes Study Design Conference to identify issues and get state-of-the-art information on technologies; conference attendees include system suppliers.

- 1974                    Legislature provides \$300K for small vehicle study; UMTA reallocates \$127K of technical study funds at MTC's request
- Six-man board (3 from MTC and 3 from Metro Council) manages work by consultants to compare 40-passenger vehicle system with several alternatives.
- MTC decides optimum choice is 16-passenger vehicle; Metro Council announces decision opposing any fixed guideway system.
- State legislature passes the Metropolitan Reorganization Act of 1974 giving Metro Council final approval of transportation plans and ability to appoint members to MTC; Governor retains right to appoint Chairman of Commission.
- 1976                    Metro Council passes resolution barring fixed rail as an alternative except in downtown areas.
- April                    UMTA announces the DPM Demonstration Program.
- May                     City and MTC decide to apply for UMTA funds.
- June                    City and MTC submit proposal to UMTA for \$56 million, 2.6 mile system.
- Minneapolis withdraws from consideration for people mover funds; gives support to St. Paul.
- St. Paul Dispatch expresses qualified support.
- MTC endorses proposal calling for it and the City to split local share of construction costs 50/50 and to split the operating costs on the same basis.
- Labor makes no-strike pledge to system.
- July                    Metro Council planning staff gives plan a mixed review; calls operating cost estimate unrealistically low and criticizes lack of discussion of long range transportation goals.
- City Councillor criticizes Metro Council for giving negative review; says that Council endorsement of the staff report would hurt St. Paul's chance of winning UMTA competition; rebuts Metro Council criticism that St. Paul does not have a comprehensive plan, saying its zoning ordinance is stronger.
- Metro Council strikes negative comments and endorses project.
- August                 New MinnDOT Commissioner endorses people mover.
- December             UMTA selects St. Paul as one of four demonstration cities.



- 1977-April Metro Council member charges that system is not needed and stresses that emphasis should be on St. Paul's development goals rather than choice of technology.
- Senate vetos preliminary engineering funds for MTC in a surprise move supported by Senate Majority Leader.
- May Joint Powers Agreement made with MTC as the designated grant recipient; DPM Steering Committee created with six members:
- o The Mayor of St. Paul
  - o President of City Council
  - o Chairman of MTC
  - o Chairman of MTC's Transit Development Committee
  - o Chief Administrator of MTC
  - o Chairman of Metro Council
- June Legislature authorizes MTC's preliminary engineering money, directing the chief administrator of MTC to be removed from the steering committee and the following to be added:
- o Chairman of MinnDOT
  - o Chairman of TAB
  - o State Senator (non-voting)
  - o State Representative (non-voting)
- July Pioneer Press notes that DPMs may be wave of future and that St. Paul may be in the unusual position of being an innovater.
- October City and MTC receive funds; preliminary engineering begins.
- September Legislature is criticized by Mayor at a Joint Subcommittee meeting for not approaching project openly and for not waiting for completion of the preliminary engineering study before criticizing project.
- 1978-May Contract signed by Metro Council with consultant for review. Study mandated by Legislature.
- July Construction costs are re-estimated at \$90 million.
- August DPM Steering Committee selects route and station locations after 10 months of study.
- October Steering Committee member suggests wrecking fund be created if system is a failure.

1978-December Downtown business community pledges \$800,000 to meet operating deficits; sets conditions for support:

- o fringe parking
- o \$90 million maximum ceiling
- o UMTA must pay first year deficit
- o MTC must absorb cost differences from fares

MTC approves financial plan; MTC would sell \$9 million in bonds to fund half of local share of capital cost (20 percent); City would provide other half using \$5.6 million in capital improvement bonds and \$3.4 million in in-kind contributions; UMTA would supply remaining 80 percent or \$72 million.

City Council approves plans, funds for DPM.

1979

New Commissioner appointed to MTC with no commitment to DPM project.

February Draft preliminary engineering report published.

March Consultant report presented to Metro Council and questions ridership and development estimates.

Final preliminary engineering report published.

Metro Council approves the project's Phase I findings (despite its consultant's criticism) on the recommendation of its Physical Development Committee.

St. Paul Dispatch declares that fringe parking is a critical issue with a high price tag and is only one of many problems which have not been resolved.

April City Councillor sees property taxes cut as a result of increased tax base; says St. Paul will get credit for building new Skyways.

Strong support in Senate by former opponents.

House Local and Urban Affairs Sub-Committee endorses project.

May Senate passes legislation to provide funds for project, but House overwhelmingly rejects the bill.

June City Council agrees to honor its funding commitment for 90 days as Operation '85 studies alternative ways to finance the rest of the local share.

1979-December Business community develops new funding package that uses \$9.5 million in city bonds, \$5 million from the private sector.

City Council backs new financial plan.

1980-January The State Legislature passes bill barring the use of MTC funds for DPM but allowing City to sell bonds.

Private sector hires four professional lobbyists and a public relations firm to push DPM.

February Building Trades and Construction Council votes to sanction DFL'ers not supporting project.

May City Council votes to continue work on people mover

Small merchant opposition articulated.

August City council member begins to lobby for referendum to prevent the use of City funds.

September Petitions are circulated to obtain signatures necessary to place project funding issue on the ballot.

St. Paul Dispatch goes on record opposing the use of tax increment financing.

Petition signature deadline is met: question goes on ballot.

October Operation '85 hires another political consultant to conduct last-ditch advertising campaign.

November Referendum stopping use of City funds for people mover passed 71 to 29 percent: 57 percent of the 196,712 registered voters qualified to vote on the referendum did so.



## APPENDIX E. BOEING SITE VISIT

### E.1 General Structure and Prospects for the Firm

The Boeing Company is the free world's largest manufacturer of jetpowered commercial aircraft. In 1980, the firm received 78 percent of all orders for this class of aircraft. The firm is also a major supplier of military aircraft, missiles and space systems, and miscellaneous other products and services. Table E-1 shows the 1980 shares of the firm's total category-specific revenues and profits for each of these areas of business.

At the end of 1980, total Boeing employment stood at 118,700, up 8,750 from the end of 1979. Earnings were also at a record level at that time (\$6.23 per share), but are expected to be about 15 percent lower in 1981. At the time of the site visit (August, 1981) commercial air transport markets were weakening significantly due to low profitability in the airline industry. Also, Boeing was incurring high costs associated with its new aircraft development programs. As a result of these trends, although Boeing's long-term business outlook was good, its profitability in 1982 was expected to be as low as \$2.00 per share.<sup>1</sup>

### E.2 The Firm's Experience with People Movers

The "other industries" category in Table E-1 includes the following products and services:

- o Computer services
- o Military base support services
- o General construction, primarily involving environmental and energy-related projects
- o Waste water treatment plants
- o Advanced energy systems, including wind turbines and solar facilities

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<sup>1</sup>Standard and Poor, Stock Reports, 1981.

TABLE E-1

Boeing 1980 Revenues and Profits by Product Type

Source: 1980 Annual Report

<u>Product Type</u>	<u>Percentage Shares</u>	
	<u>Revenues</u>	<u>Profits</u>
Commercial Transportation	80	85
Military Transportation	10	10
Missiles and Space	5	3
Other Industries	5	2

- o Uranium enrichment facilities
- o Advanced ground transportation systems

Boeing's activity in advanced ground transport systems began in 1970. At that time, the firm faced the same business outlook it is now facing: commercial aircraft sales were down, and the US supersonic transport program had just been cancelled. Boeing's employment in the Seattle area was down from a previous high of 101,000 to just 37,000, and the firm decided to diversify from its role as an aircraft builder into a number of the new areas listed above.

The firm's first major involvement with surface transportation systems was in providing vehicles for the Morgantown PRT system at the University of West Virginia. This system was funded wholly by UMTA; its ownership was subsequently transferred to the University. Later, Boeing was able to expand its role in the project, taking over as system manager. The Morgantown system is a sophisticated one, accommodating small vehicles, off-line stations, and the option of operating in demand-responsive and fixed routing modes. Boeing attributes the highly-publicized problems at Morgantown to the vehicle control system and to the attempt to use unheated guideways, both outside Boeing's original area of responsibility. Both were corrected as the system was expanded and improved under Boeing's direction in 1978-79. The system expansion was completed at a lower cost than targeted, and ahead of the agreed-upon completion deadline. Due to incentive clauses in its contract with UMTA, these results were rewarded by an increased rate of profits for Boeing. Although it now operates satisfactorily, Morgantown has not completely overcome its public reputation as the prime example of an unsuccessful innovative transportation system.

Boeing also sold a 16-vehicle version of the Morgantown system for use during the Okinawa Exhibition in Japan in 1975-76. That system was completely constructed and made operational in a short period of time. It worked very well for 1.5 years, but was dismantled, as planned at the end of the exhibition, to make way for post-exhibition development of the site. The Okinawa system was Boeing's last sale of a complete Morgantown-type system.

Although Boeing did not bid on any of the DPM systems, the firm does foresee a potential small role in the future of one type of technology used for these systems. Its current work with linear induction motors has led to the design of a promising power conversion unit (PCU), which could serve as a critically-needed component of the UTDC system. Unfortunately, the Boeing PCU will not have advanced to the production stage in time for its use in UTDC's systems for Vancouver, Hamilton, and probably Detroit.

At the height of Boeing's work on Morgantown, its Automated Transportation Systems (ATS) Division employed 250 people. Today, this number is down to about 40. Work is currently being done on two projects sponsored by the UMTA Automated Group Rapid Transit (AGRT) program:

- o the development of improved subsystems for Morgantown-type systems, and
- o the use of magnetic levitation (Maglev) and linear induction motor propulsion.

Boeing has been involved in the AGRT program and its predecessor, the High Performance Personal Rapid Transit (HPPRT) program, since the beginning of HPPRT in 1976. Their work began with the overall goal of developing and testing a prototype system more advanced than Morgantown but using it as a starting point. The testing was to have been done on a test track constructed



by Boeing with project funds. As the program has evolved, the goal has been limited to the development of new control and collision avoidance subsystems which can be tested on the Morgantown vehicles. Test track construction has been eliminated from the project. This reduction in project scope has been necessary because both total AGRT funding and Boeing's funding level have been reduced. Boeing is now limited to a monthly expenditure level which is 45 percent less than was originally projected. The result has been a corresponding project engineering staff decrease--from 51 to 29 individuals--and a more drastic reduction in hardware procurement, due to the high costs of the required components relative to the low funding level. The net effect has been reduced project productivity and lengthening of the time required to reach the major project milestones.

Boeing's work on magnetic levitation began in 1979. Prior to that time, Rohr had been working on this technology as part of the HPPRT/AGRT program. As part of its exit from the ground transportation technology business, Rohr sold its rights in the Maglev area to Boeing in 1978. Since 1979, Boeing has been continuing to work on the development of a linear induction motor (LIM) and power converter unit (PCU) for use in Maglev systems. This work has been carried out with UMTA funding provided in a series of temporary letter authorizations. Just prior to the visit by Cambridge Systematics staff, UMTA notified Boeing that its Maglev work should be halted on October 21, 1981. Subsequently, Boeing received authorization to continue its Maglev development work.

The Maglev project was originally conceived as an \$8.4 million effort to be completed in May 1985. To date, \$2.8 million has been funded by UMTA.

Non-reimbursed costs include the purchase of Maglev rights from Rohr, internal funding of Maglev research and development, and the setting aside of Boeing land on which a test track was to be built. These costs are estimated to total \$5.6 million.

### E.3 Advanced Technologies as an Area for Development

As indicated above, Boeing first became involved in surface transportation work as part of the firm's broader decision to diversify. This decision was made during a very slow period for the firm, suggesting that the purpose of diversification was to even out the valleys in the company's revenue and employee size trend lines. Boeing's experience suggests that their involvement with innovative ground technologies has been only marginally successful in this regard--the level of ATS employment has never exceeded 1 percent of the total firm employment, and is presently less than 0.1 percent.

Boeing has changed its posture with respect to accepting the risks associated with the development of innovative technologies. Its initial acceptance of these risks is demonstrated by its willingness to lose money on the first phase of Morgantown, its use of internal R&D funds to finance AGRT-related work, its purchase of Maglev rights from Rohr, and its setting aside of land for an AGRT test track. Although some of these funds represent Boeing's profits on Morgantown Phase II which were re-invested, other funds have had to come from outside the ATS Division. Currently, however, Boeing staff members indicate that no more company funds will be made available--if AGRT funding stops, the ATS Division will be disbanded. In light of no recent system sales, and of the stance of the new federal administration, the Boeing

management is no longer willing to assume the risks of innovative ground transportation technology development.

#### E.4 Involvement in the DPM Program

Boeing did not bid on DPM systems because the specifications called for a number of features not included in the Morgantown system (such as large, reversible, coupled vehicles); and included timing constraints which precluded any major new system development. The Boeing staff suggested that the determination of the ground rules for the DPM program in 1976, when Morgantown was in serious trouble, may have been an important factor in the exclusion of Morgantown-type systems for use in the DPM cities.

Boeing would like to have been considered as a qualified DPM bidder, and feels that the Morgantown system would be an appropriate basis for the DPMs. However, they have no argument with what they saw as UMTA's desire for uniquely different technologies for the DPM program. They do feel that UMTA's change in ground rules from existing systems to those for which a prototype had been demonstrated on a test track was, in effect, a dissolution of the original program's focus and goals.

Although Boeing did not bid its own system in any of the DPM cities, the firm acted as a subcontractor to Matra/Otis in their bidding. The services of three Boeing people assisted the Matra/Otis consortium in bid preparation, and a Boeing subsidiary (Boeing Services International, involved in military base support services) was also proposed as part of the Matra/Otis team with responsibilities for DPM systems operations and maintenance.

Not having had direct involvement in the DPM bidding and supplier selection process, the Boeing staff members interviewed were surprised at the

time of filing by the Westinghouse protest in Los Angeles. This surprise is based on their feeling that Boeing would never risk damaging the sales of their primary product lines through customer alienation due to such an action: they therefore are surprised that Westinghouse would take this risk.

#### E.5 The Federal Role in Advanced Technology Development

The individuals interviewed at Boeing were highly critical of the federal role in advanced technology development. First of all, they sense the complete lack of a long-term strategic plan. In the place of such a plan, they see frequent changes in DOT Secretaries and UMTA administrators, each accompanied by new policies and programs. They feel that the programs which result are inadequately coordinated, both at any given point in time and also from one administration to the next. The results are the production of many documents, but little new hardware. Boeing would advocate a more single-purpose, coordinated, and continuing development process oriented specifically to successful system development. To illustrate the approach they advocate, they point both to the military procurement procedures used in this country, and to the new systems development efforts of Canada, Germany, and Japan. They feel that as a result of these different approaches, the foreign programs have a high probability of success. They also cite recent evidence (from the 1981 draft report of the House Subcommittee on the DOT and Related Agencies Appropriations, Committee on Appropriations) that Congress has these same objectives. They quote recommendations related to the appropriations for UMTA and the Research and Special Projects Administration in which the subcommittee states its desire for a deployable advanced technology system by 1984. If

current funding levels are maintained, and proper direction is provided, Boeing people feel that the Subcommittee's goal could be reached.

#### E.6 Fields of Competitors and "Buy America"

In the past, Boeing's competition with other firms has been mainly for UMTA R&D funds, rather than for system deployments. Actually, the original choice of three firms to carry out AGRT work allowed each major interested firm (Otis, Rohr, and Boeing) to participate. Subsequently, Rohr's exit from the field left Boeing with the opportunity to expand its role by taking over the Maglev work, but not without the cost of buying Rohr's rights, a cost borne by the firm without any federal reimbursement to date. Boeing feels that the AGRT work may eventually be reduced to one contractor, in a future competitive round, but finds its current funding stoppages and limitations of much more concern than this future possibility.

Competitors for possible US AGT deployments also do not appear to concern the Boeing staff. They maintain that recent history demonstrates that there is no significant market for systems such as theirs at Morgantown. Attempts have also been made to compete in the market for airport systems (using a European system rather than the Morgantown system), but these efforts have also failed to be successful, due either to what were considered to be unacceptable contract conditions or to shifts in plans to implement systems at specific airports.

"Buy America" provisions of the US procurement regulations have not affected Boeing's AGT program significantly. Where they do recognize a US market for systems, they have competed generally with other US firms rather than with foreign firms. The Boeing staff does feel that the foreign

competition which exists in spite of "Buy America" was a factor in the firm's exit from the light rail vehicle (LRV) market. The Boeing staff members also feel that US system suppliers find themselves at a disadvantage when they attempt to compete outside the US. They characterize this situation as a competition between a US company and a foreign country. Foreign firms obtain a number of types of assistance from their governments--R&D funding, business development support, financing for the clients--which have limited or no availability to US firms. Examples of these situations were discussed, but none involved Boeing directly, reflecting Boeing's lack of activity in the international advanced ground technology marketplace.

#### E.7 Future Involvement

As stated previously, Boeing does not expect to find buyers for its existing AGT system, and its management has decided that it cannot provide any more internal funding for AGT R&D. At the same time, a desire is expressed to maintain a capability which can respond to a possible future market for their system. Experience to date suggests that even the reduced level of UMTA-sponsored R&D now being carried out has been sufficient to maintain this capability--although the staff of the ATS Division has declined from 250 to 41, many of those no longer in the division remain with other groups at Boeing, and the remaining division's staff provides a nucleus around which a rejuvenated group could be developed. However, if further cuts become necessary in the future, this situation may not continue to exist.

#### E.8 Summary

Generally, the Boeing staff members interviewed reflected several areas of discouragement concerning the future of US advanced ground transportation technologies in general and the future of ATS in particular:

- o After overcoming many problems with the Morgantown system and now seeing it meeting their own expectations, they recognize that its reputation still reflects its well-publicized early difficulties.
- o After planning major AGRT development efforts, they see project redirections, stoppages, and slow-downs drastically reducing program productivity and preventing the attainment of their goal: deployable, profitable AGT systems.
- o After having a major role in deploying the first US PRT system, they saw a less advanced technology chosen for UMTA's major deployment activity in the period 1975-1980.
- o After supervising the expenditure of major quantities of internal funds in R&D, test track site reservation, etc., they see no evidence that such expenditures were wise ones for the firm.
- o After beginning investigations of alternative new technologies (accelerating walkways and wire following systems), they have failed to obtain support for further development or deployment of such systems.
- o After attempting to make the ATS a profitable Boeing Division, they presently expect it to disappear soon, leaving them with critical personal decisions concerning future employment and career trajectories.

Few positive factors exist to balance these discouragements, and these factors have high degrees of uncertainty associated with them:

- o The power converter unit (PCU) being developed in the Maglev project may be applicable in UTDC's ICTS and in other transit-related electric motor control applications.
- o The current House Subcommittee on the DOT and Related Agencies Appropriations' view that AGT system deployment should be a definite DOT and national goal may eventually become accepted federal policy.





## APPENDIX F. FORD SITE VISIT

### F.1 The Structure of the Firm

Ford Motor Company is the second largest auto and truck maker in the United States; in 1980, the year prior to the site visit (October, 1981), its shares of the domestic market were 17 percent of auto sales and 32 percent of truck sales. Ford is also first among all auto producers in the world in auto sales outside their home market. In 1980, the firm's combined national and international auto operations represented 90 percent of its total sales and 96 percent of the total operating losses incurred in that year.

Ford's non-automotive operations, which represented ten percent of total sales in 1980, are collected under the heading of the Diversified Products Operations group. These operations include Ford Tractor Operations, the Ford Aerospace and Communications Corporation, and the firm's Glass, Steel, and Electrical Divisions. Ford Aerospace and Communications Corporation, in which its advanced transportation technology work was done, typically contributes 1.0 - 1.5 percent to the total firm's sales. Its size, however, is much more significant than these percentages suggest--1979 sales totalled \$503 million.

Within Ford Aerospace, the firm's advanced technology work was carried out by a specially-formed Transportation Systems Operations Group (TSO), a subdivision of Western Development Laboratories.<sup>1</sup> Although the work of TSO represented a significant contribution in the area of new technology development, it was always a very small portion of the total firm, and also of Ford Aerospace. At its maximum strength, TSO represented less than five percent of the total resources of Ford Aerospace.

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<sup>1</sup>Western Development Laboratories is generally responsible for product development in the areas of electronics, aerospace, and defense systems.

## F.2 The Firm's Experience with People Movers

Ford's involvement in the area of advanced ground transportation technologies began in 1968 in response to two major factors:

- o Within the firm, the Research Group was looking for ways to increase its involvement in problems and issues related to future urban transportation.
- o Outside the firm, the Department of Defense was scaling its activities down in many areas, including the development and procurement of military land vehicles, an important area of business for Ford.

Ford's efforts in this new area began with work done by both the Military Vehicle Development and Research Groups within Ford Aerospace. Initial work by the latter group involved the investment of less than \$40,000 over six week's time in the development of control systems which could be readily demonstrated. The outcome of this work was an on-board vehicle switching device, which was subsequently patented, and a motor control system.

Based on the encouraging results of this early work, Ford decided in 1969 to compete for the UMTA funds then available to develop demonstration systems for Transpo '72. They were one of the firms selected by UMTA and subsequently provided with \$1.5 million to provide an operating prototype of their system for the exhibition at Dulles International Airport. Following Transpo '72, UMTA provided relatively minor follow-on contracts to each of the participating firms, including Ford, to continue the development of their systems.

At this point, Ford's President made a policy decision to remain in the advanced ground transportation business. The Transportation System Operations Group was set up to implement this decision by carrying out system development in the areas of guideways, vehicles, and mechanical systems. Over the

five-year life of this group, \$126 million was spent on these activities. The group's maximum employment level was 126. Soon after the formation of the group, the Ford Automatically Controlled Transportation (ACT) system was completed at the Fairlane Shopping Center in Dearborn. Still in operation, this system connects a shopping mall and a hotel via a 2600-foot guideway. The system involves two vehicles operating as simple shuttles on a single guideway with a bypass located at its center. The vehicles have capacities of 24 passengers each and can operate at speeds up to 30 mph with minimum headways of 2.5 minutes. Rubber tires operate on concrete and/or steel guideway running surfaces.

Ford's system at Fairlane was envisioned as the first portion of a 6-mile test/demonstration facility connecting separate buildings of the shopping center with nearby Ford office buildings. The ultimate goal was to develop a system capable of operating with 100 vehicles, on-board switching, and 4-second headways. The initial intended market was a downtown AGT program often discussed by UMTA staff members. Unfortunately for TSO, however, the start-up date for this expected new program continued to be postponed.

While waiting for the UMTA program to be announced, in 1974 Ford was successful in selling a system similar to that at Fairlane to the State of Connecticut, for Bradley airport in the Hartford area. Unfortunately, upon completion in 1975, this system was immediately mothballed by Connecticut's new Governor, who refused to provide state operating funds for what was derogatorily labelled a "rich man's trolley". This decision was also felt to reflect changes in the level of activity at Bradley, which had been reduced significantly due to the energy crisis of the early seventies.

In addition to the sale of the Bradley system, Ford expected, prior to 1974, to make additional system sales for airport, theme park, and urban applications. The sales of as many as eight more systems seemed likely. Because the prospective urban applications called for larger vehicles, Ford's development efforts during this time were concentrated on the design of a 40-foot, 120-passenger vehicle which could operate in two-car trains.

With the general downturn in business activity in 1974-75, all of Ford's prospective system sales evaporated. This unfavorable turn of events occurred at the same time that Ford, on a company-wide basis, was having cash flow problems. As part of an evaluation of its involvement with advanced ground transportation systems in 1975, the firm carried out studies which showed no significant future market for its ACT system. Ultimately, the firm felt that it had to decide whether to use limited investment funds to provide further people mover marketing and development, or a new Econoline truck plant. The decision was made to get out of the people mover business. Development and marketing efforts were stopped immediately, and the firm's obligations related to the Bradley and Fairlane systems were completed as soon as possible.

In April 1977, the Transportation Systems Operations Group was disbanded. At the present time, Ford's only involvement in the area of automated urban transportation technologies is the continued operation of the Fairlane system by a group within the Western Development Laboratories.

### F.3 Advanced Technologies as an Area for Development

As for a number of firms interviewed in this project, a major incentive for Ford's diversification into the area of advanced ground technologies was a downturn in other areas of business for which the Federal government is the

major client. In Ford's case, this involvement included both aerospace and military ground vehicle work. Other factors were also important, however, in Ford's decision to develop this new area of business and to remain in it for six years:

- o Previous diversification into areas of urban transportation planning and research provided a group which was interested in seeing Ford move into the advanced transportation technology area. This group conducted the initial conceptual studies in the new area, and continued to provide support on the "softer" side by specifying system service requirements, expected passenger demand levels, etc.
- o Ford's President was personally interested in seeing the firm expand into this new area. In the early years of Ford's effort, this personal interest was strong enough to overrule a number of Vice Presidents who opposed the firm's continued involvement. Only when the firm as a whole did not have sufficient resources to continue did its President accept the decision to halt involvement in the area.

Basically, Ford's decision to diversify came at a time of shrinking Federal sales of military vehicles and space systems, but of plentiful resources for funding new ventures. Conversely, its decision to retrench came at a time of limited resources and significant needs for modernization in its primary business, auto production. These conditions, combined with limited success in new systems sales and projections of even more limited future markets, led to the firm's decision to abandon the automated technology field.

The former staff of TSO found various ways to adjust their careers following the Group's disbandment. About 20 percent of the hardware engineers left Ford for other jobs. The transportation research staff members, many of whom had come to Ford from other planning positions, generally moved on to other cities or consulting firms. Other individuals took advantage of early retirement opportunities; many transferred to other positions within Ford.

Only six of the 126 individuals were not able to find other employment readily either inside or outside Ford.

#### F.4 Involvement in the DPM Program

Discussions by UMTA officials of their plans for funding advanced technologies in downtown applications appear to have been an important encouragement to the TSO Group to remain in the field. However, when the DPM Demonstration Program was announced in 1976, the firm's previous decision to get out of the area was not reconsidered. At this time, Ford was still recovering from its two previous bad years. Ford's involvement in the DPM Program was limited to the following peripheral activities:

- o assistance to Detroit in their pre-DPM planning efforts prior to the Federal program, and
- o continued assistance to Detroit's SEMTA in its DPM planning efforts on an individual basis by at least one official formerly in the TSO Group.

Both of these activities exemplify Ford's role as a benefactor to the Detroit area, its own home, and the home of many of its employees. As part of the individual assistance role, Detroit has been encouraged to specify a system which would:

- o avoid rubber tires, which result in excessive power requirements in systems which must operate in snowy environments,
- o avoid two-way operations, which are felt to complicate control systems unduly, and
- o provide assurance of passenger security to overcome the public's resistance to unattended vehicle operations.

These areas represent major problems identified by Ford in its Fairlane system. Also, interestingly, the first two are strongly reflected in the Detroit system, with its one-way loop design and its selection of UTDC's steel-wheel system.

Although Ford did not participate in the DPM Program, the employee interviewed felt that their ACT system, with the larger vehicles developed after the installations at Fairlane and Bradley Field, would have qualified for use in the Program.

#### F.5 The Federal Role in Advanced Technology Development

The Ford representative implied that representatives of the Federal Government were misleading (although not necessarily intentionally so) in the 1972-74 period with their discussions of the possibility of a soon-to-be announced urban deployment program. These discussions appeared to have been an important factor in the formation of the TSO and in its continuation during this period. UMTA's involvement in new technologies is seen as being essential; its delays in funding deployments was a major factor in Ford's departure from the field.

One of UMTA's efforts to support a number of system suppliers--the multiple technology guidelines of the DPM Program--is seen as a mistake by the Ford representative. He feels that there were at most two good systems for the DPM application, and promising to select three suppliers was not enough incentive for a third system to be adequately developed.

The Ford representative also felt that UMTA decided early in its advanced technology work that DPM-type technologies should be rubber-tired, contrary to the representative's own preference for steel-wheel systems in cold-weather outdoor applications. The selection of rubber tires for Ford's ACT system was made in response to UMTA's preference for such a system.

Finally, with respect to the Federal role in advanced technologies, the Ford representative felt that UMTA's apparent loosening of the definition of

systems qualifying to obtain DPM system supplier contracts should not have taken place. Ford's experience at Fairlane suggested that a 6 to 12-month operating test period prior to passenger service should be planned for any new system.

#### F.6 Fields of Competitors

At the height of its involvement with advanced transportation technologies, the TSO group at Ford saw Westinghouse as its strongest competitor. In response to this competition, Ford concentrated its development activities on a large-vehicle system which would provide the capacity required in CBD applications. Ford also recognized the potential of General Motors as a major competitor, but saw their involvement generally as being limited to feasibility studies of systems in cities with high levels of GM employment. These studies appeared to Ford to be motivated by the public relations benefits to be gained; they failed to lead to the development of any systems.

The Ford TSO group did not feel threatened by a number of smaller firms who were developing and promoting advanced systems in the 1972-77 period. Ford's significantly greater resources and its experience in dealing with Federal agencies were seen as decisive advantages in its favor when competing against these firms.

#### F.7 Future Involvement

Ford has no plans to re-enter the advanced transportation technology field. At the present time there are three major factors which reinforce this position:



- o Along with the other US automakers, Ford faces major problems in its major product line. The resulting losses are accompanied by even more severe limitations on funds for diversification than existed in 1975.
- o The Federal Government has apparently withdrawn from its previous role as a promoter and funder of advanced technology systems.
- o No evidence suggests that the pessimistic market studies carried out by Ford in 1975 should be revised upward.

Significant changes in all three of these factors will be necessary before Ford is likely to consider returning to the development of advanced transportation systems. Until then, Ford's involvement is likely to be no more than the continued operation of the Fairlane system.

#### F.8 Summary

Generally, the Ford representative interviewed reflected the feeling that Ford is permanently out of the new public transportation technology business. The firm's involvement came at a time when diversification was actively being sought and the Federal Government was actively promoting new technologies, providing funding for their demonstration at Transpo '72. The firm remained involved in hopes of the early start of an urban deployment program, but internal funding limitations forced it to withdraw just one year before the DPM Program began. For a time, prospects appeared to be bright for non-federal sales, but Ford's one system sale received a bad reputation by being shut down due to lack of operating funds before its normal operation began. Then, the energy crisis of 1974, largely responsible for Ford's internal funding restrictions, also resulted in the disappearance of other opportunities to sell new systems. Although the DPM Program did provide new hope in 1976, it was too late. Since then, a number of factors have made Ford's return as a new technology supplier even less likely than it was in 1976.



## APPENDIX G. OTIS SITE VISIT

### G.1 The Firm's Experience with People Movers

Otis Elevator Company is an American firm based in Denver, Colorado. At the time of the site visit reported here (September, 1981), the Connecticut-based United Technologies Inc. had owned a controlling share of the company for six years. UTI's purchase was part of an effort to increase industrial and commercial sales and to broaden their "business base in non-governmental sectors through internal growth and selective acquisitions."<sup>1</sup> UTI's main activity base remains, however, the production of defense-related hardware. UTI is divided into three industry segments:

- o Power, which produces aircraft engines and parts and manages all phases of rocket booster deployment
- o Flight Systems, which produces helicopters, flight systems, and radar and display systems
- o Industrial Products (including the Otis Group), which designs and manufactures products for the construction, automotive, appliance, and other industries

The Otis Group continues to deal primarily in elevators, escalators, and elevator and escalator service contracts. However, the Transportation Technology Division (TTD) of Otis is active in the development of advanced technology transportation systems. Its major focus has been an air cushion/linear induction motor (LIM) system which requires no wheels. It was acquired by Otis rather than begun internally, however. TTD traces its origins to 1968 when its predecessor was formed by Sverdrup and Parcel and Associates, a large architectural engineering firm based in St. Louis. It quickly became apparent, however, that the talents and activities of the division (such as the fabrication of prototypes) would only continue to diverge from those of the parent firm. As a result, the division used

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<sup>1</sup>United Technologies Inc., Annual Report, 1975.

financing from private sources to become independent in 1969 and emerged as Transportation Technology, Incorporated (TTI). In 1970, Otis began a TTI stock acquisition program. Meanwhile, TTI staff continued development work on an air cushion system utilizing linear induction motors for propulsion.<sup>1</sup> The stock acquisition was completed in 1974 and TTI became a division of Otis. In July 1975, the division received a contract to deploy a system at Duke University. This system was completed late in 1979 and operation was begun in May 1980. In 1979, as a direct result of the opportunity to bid on the UMTA DPM Demonstration Program projects, Otis began negotiations with the French firm, Matra, regarding a possible joint venture.

Matra is a large defense contractor headquartered in Paris. Matra's activities are divided among seven branches including:

- o The Military Branch, which produces conventional aeronautical weapons and several classes of missiles
- o The Space Branch, which both oversees and participates in the fabrication of satellites
- o The Automobile Branch, which produces two models for Chrysler-France
- o The Communications Branch, which is involved in the automation of communications and the substitution of new electronic hardware for traditional communications modes
- o The Optics Branch, which manufactures image processing and other hardware related to airborne photography systems
- o The Data Engineering Branch, which specializes in the design of data processing systems with applications in sales and marketing
- o The Transportation Branch which is the prime contractor for the VAL advanced transit system as well as being involved in development of the Aramis personal rapid transit system, fabrication of conventional rolling stock, and the design of traffic control systems

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<sup>1</sup>This technology was one of the four displayed at Transpo '72.

Matra and Otis concluded their negotiations in early 1980 with an agreement to bid Matra's VAL technology. The formation of a continuing partnership was made conditional upon making a successful joint bid in one of the UMTA DPM Demonstration Program cities.

Matra is currently involved in deploying their VAL system in Lille, France. Matra won this contract as the result of an international competitive bidding process set up by the local authority in 1972. Ultimately planned to have four lines, one 7.9 mile (12.7 kilometer) line with 17 stations is expected to be in operation by 1983. The initial capacity will be 5,000 people/hour/direction with a theoretical expansion capability to 15,000 p/h/d. The base system will be able to use one element (i.e., two car unit) trains but the expanded system will require two element trains to meet capacity requirements. Each element is 83 feet long and can carry 124 to 160 passengers under normal conditions. The VAL system features automated train control with on-line stations, central monitoring, two way communications, and manual over-ride. It uses rubber tires which run on a concrete guideway.

## G.2 Involvement in the DPM Program

Matra-Otis prepared bids for two demonstration cities, Detroit and Los Angeles. Because the team was not selected in either of these cities, this partnership has effectively been dissolved in accordance with the original agreement between the two companies. French members of the team no longer conduct operations from their former Denver headquarters.

In preparing their bid, Matra-Otis identified four subcontractors they would use to round out the project team. These were:

- o Boeing, which would be able to utilize experience with the Morgantown automated transit system in managing the operations and maintenance of any new systems
- o Bechtel, which would handle the architectural and engineering work associated with project construction
- o CIMT, a partially-owned subsidiary of Matra, which would fabricate the VAL vehicles, bringing to the project experience gained from vehicle fabrication for Lille
- o Inter-Elec, a company in which Matra has a controlling stock interest, which would design and install the train control system

Matra-Otis' intent was to direct the project from Denver, to provide the control technology, and to purchase sub-systems themselves. The American components of the project were estimated to account for 80 percent of total cost.

While preparation of full project bids represents a significant commitment of resources on the part of the Otis division, this cost, of itself, has not been an issue since it is accepted as a routine requirement of such ventures. The representative interviewed did express, however, that the firm's reaction to UMTA's and the local areas' handling of the actual demonstration project, and particularly the system supplier selection process, has been quite negative. This feeling results from a belief that the selections were not made in a fair manner and that the terms of selection were changed after bids were submitted. They concurred with the Westinghouse protest to the selection of UTDC in Los Angeles and were supportive of the legal action taken by Westinghouse. Ill feelings about the Demonstration Program focus upon the handling of these situations both by UMTA and by the local agencies, and upon the prolonged period over which activity was required.

### G.3 Advanced Technologies As An Area of Involvement

The independent commitments of Otis and of Matra to the development of automated circulation systems pre-date the official initiation of the UMTA DPM Demonstration Program in 1976, while their joint venture was a direct response to the Program. Otis made a modest commitment to advanced technology development in acquiring TTI. Matra and its divisions have been involved in new systems deployment for approximately a decade. Matra's interest in the American market for new systems is a outgrowth of their research and development of innovative technologies and of their familiarity with the North American market for rapid rail equipment. Both firms have a base of sales in other areas which are not transit related that could potentially support continuing research and development, but it is not clear to what extent cross-subsidization between divisions and branches occurs. Otis uses UMTA Section 6 monies to help support their AGRT development activities.

Otis prepares market estimates internally which reflect the financial dynamics of the market-place as well as travel demand. In light of the reduced Federal support for automated technology deployment, the domination of the airport circulation/distribution system market by other manufacturers, and the current economic climate in the US, the representative of Otis interviewed does not perceive any near-term domestic opportunities. He did not refer to any formal estimates of the foreign market. The division apparently has not addressed this market in detail, as the result of a cursory assessment of the Western European, Japanese, and South American markets which indicated to them a clear lack of potential.

#### G.4 The Federal Role in Advanced Technology Development

The representative of Otis interviewed was highly critical of the Federal role in advanced technology development. The lack of a consistent path between UMTA's perceived encouragement of certain specific technological choices and the grant awards was raised as a particular source of concern. The lack of consistency was attributed in part to changing administrations and to UMTA's attempt to respond to the different demands placed upon it. It was proposed by the representative that the lack of consistent Federal policy has led to poorly-managed Federal programs and costly discontinuities in funded projects. Hand-in-hand with this was seen to be UMTA's pattern of funding projects incrementally. This practice was cited as being detrimental to project progress and to creativity and was contrasted with the military practice of seeking lump sum authorizations. Lump sum authorizations were seen as allowing for better management and greater project and staff stability.

The DPM program's changing list of cities and non-adherence to original schedules were seen as indicators of increasing DPM program instability. These indicators caused the program's status to be perceived as tenuous, even prior to the new administration's opposition to the program.

#### G.5 Fields of Competitors and "Buy America"

Since the guideway and other local construction costs ensured that Matra-Otis' DPM proposals would easily satisfy the provisions of the "Buy America" legislation, the partnership would not have been negatively impacted by these requirements. The representative was, however, solidly opposed to "Buy America" and to trade barriers created by other countries.



He was particularly sensitive to the exclusionary practices evinced in selected procurement processes in Canada. This sensitivity is aggravated by the successful penetration of Canadian suppliers into the US market.

The Otis representative stated that the firm's desire to see the removal of US trade barriers to foreign competitors is founded on the principle of free competition. For this reason he would also promote the introduction of a system of "rational equivalence". This system would be used to equalize the footing of private American firms with foreign firms which receive significant subsidies from their governments. It would add the costs of foregone US taxes and jobs to foreign bids prior to their comparison with bids from US firms. These terms would then make the concept of accepting the lowest bid for a job more acceptable to Otis as an American manufacturer.

#### G.6 Future Involvement

In the near term, the Otis representative feels that the continued existence of the Transportation Technology Division will be dependent upon UMTA research and development funds. Without continuing support for their AGRT development--and with a domestic market which Otis perceives to hold few opportunities--there appears to be little justification for maintaining the TTD staff. The one potential justification seen for holding the technical team together, however, grows out of the fact that Otis has devoted considerable effort to the area of control system architecture. This area has been a key element of Otis' AGRT system development work. The result of this effort has been the attainment of significant gains over state-of-the-art technology. Now, the period of highest risk in this development is

past, and the resulting automatic train control technology is a serious candidate for application in the rail industry and for use in many industrial processes. This progress was also cited as having been instrumental in maintaining the morale of the team in the face of other uncertainties such as budget reductions.

The representative interviewed feels that there has been little reason for maintaining an aggressive marketing strategy since the new administration was inaugurated in Washington. Before, TTD researched and prepared a number of bids for advanced technology systems at significant cost. Despite the size of Otis (and in turn the size of UTI) the division cannot responsibly continue to draw upon the total resources of the company to support its own business development activities. The development of the AGRT technology is treated as an independent business venture which is subject to periodic review to determine its success or potential. For this reason, recent performance and expected market opportunities have not been sufficient to recommend a high level of continued involvement in advanced technologies by TTD.

#### G.7 Summary

The overall tone of the interview with the Otis representative was one of discouragement and disappointment regarding the division's participation in the DPM Demonstration Program. Key issues included:

- o Lack of consistent policy formation at UMTA leading to program redirection or termination
- o UMTA's practice of seeking incremental project funding rather than lump sum authorizations and the resulting long term project instability and non-adherence to schedules

- o Perceived mismanagement of the selection process by UMTA and the DPM planners in both Los Angeles and Detroit
- o The aggravation of facing competition from suppliers whose countries do not invite or allow American bids to supply transit equipment
- o The frustration of competing with foreign suppliers who are subsidized by their governments and whose bids do not reflect their true costs
- o A market outlook which appears bleak in the near term with no certainty of revival downstream

This discouragement has been offset only by technological advances in vehicle control systems which may have applications broader than AGRT.



## APPENDIX H. PRT SYSTEMS SITE VISIT

### H.1 The Firm's Experience with People Movers

PRT Systems Corporation, an American firm based in Chicago Heights, Illinois, was visited in October, 1981. PRT Systems is a very small company formed in 1973 by members of the original systems and operations team which developed the Jetrail system at Dallas' Love Field. The firm is also licensed by Herbert Morris Limited of England to sell LINTROL linear induction motors and controls. This allows the company to be involved in other applications of this component's technology and to support continued business development for its people mover systems.

The Jetrail technology was originally developed by Stanray Pacific Corporation, a construction company involved in the provision of ground support services to airports, under the name of the Jetrail Automated Guideway Transit System. The system utilizes small vehicles which operate automatically over fixed guideways in response to passenger requests. Early design and development activities occurred in the 1963 to 1965 period and a full scale test track was operated in California from 1967 to 1968. This technology was then selected for deployment by Braniff Airlines at Love Field in April 1968. In June 1969, when it became apparent that the project would encounter severe cost overruns (and thereby dampen future market prospects), Stanray Corporation divested themselves of its Jetrail Division. Braniff took over the project in July and began revenue operation of the system the following April.

The Jetrail system was operated<sup>1</sup> at Love Field from April 1970 to January 1974 when Braniff switched its passenger service operation to the

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<sup>1</sup>The system encountered initial reliability problems. While system availability was increased through technical modifications, the system never achieved over half of its theoretical maximum capacity of 1200 passengers/hour.

then-new Dallas-Fort Worth Airport. Braniff, which owns the ten-vehicle, 1.4-mile system, hopes to sell it "as is" for use either at Love Field or another location. PRT Systems Corporation has a marketing services agreement with Braniff which allows them to pursue opportunities for the sale of the original system, while limiting Braniff's liability for the terms of the sale and future system performance.

Members of both the Braniff and Stanray Jetrail Division teams which worked on the Love Field system formed the PRT Systems Corporation because of continued belief in the technology's potential. Since the site visit was conducted, PRT Systems has obtained patent rights to the technology from Stanray. In 1973 they submitted an unsolicited proposal to UMTA for the demonstration of a linear induction motor (LIM) propulsion system on the Jetrail technology. This proposal was submitted with support from Braniff Airlines and the Franklin Research Institute of Philadelphia. Later that year, with financial support from Braniff as well as from UMTA, development was begun. In September of 1974, the first LIM propulsion system was installed and operated. To differentiate the system from the original Jetrail system, the modified technology was named the Astroglide.

In addition to the Love Field system and the Astroglide system, PRT Systems has deployed its Palomino system for passenger transportation at an entertainment center in Pomona, California. The Palomino system utilizes the same propulsion and control technology as the Astroglide. Unlike the Astroglide, however, the system is bottom-supported and is capable of running on steel wheels. Due to large vehicle capacities, the Palomino's design load is 4,000 people/hour.

PRT Systems has continued to be active in sales efforts for both of their systems. While the Palomino system at Pomona has undergone a change in function from a transportation facility linking parking lots and the entertainment center to become a recreational ride, the company still sees the primary application for the technology in airports and other activity centers, including urban sites.

## H.2 Advanced Technologies as an Area of Involvement

The commitment of the PRT Systems Corporation staff to the successful development and deployment of automated guideway transit pre-dates both the official initiation of the UMTA DPM Demonstration Program in 1976 and the incorporation of the company in 1973. The representative of the firm interviewed felt that many of the staff members continue to have a deep commitment to the technological concept itself.

The extent of the belief of the management of PRT Systems in their ability to deliver performance is best symbolized by the company's unique system construction financing proposals. In August 1981, for example, the company offered to privately finance a Chicago lakefront system built in air rights leased from the City. The company was also prepared to give the City the option of buying the system when (and if) desired. Similarly innovative proposals have been made in San Jose and Atlantic City. The representative interviewed feels that this type of financing gives the system concept credibility since it transfers the immediate financial risk from the local area to the system supplier. In spite of these advantages, however, the firm has not yet been successful in selling a system for an urban environment.

PRT Systems has not prepared any formal independent market estimates. The company relies on the contacts of its employees with airline representatives and on an aggressive marketing style with local areas to develop potential sales opportunities.

### H.3 Involvement in the DPM Program

PRT Systems has not prepared any detailed proposals for the UMTA DPM Demonstration Program cities. PRT Systems management decided not to participate aggressively in the UMTA DPM Demonstration Program because the proposal preparation costs involved in placing a competitive bid were high and also because they felt that the funds were better spent elsewhere. The representative pointed out that the resources which would have been required to prepare DPM proposals could support extensive progress toward attaining other high priority (but as yet not undertaken) corporate objectives, such as the development of a larger vehicle. They forwarded existing materials and a cover letter (which contained a rough estimate of construction cost) to Miami; that submittal was subsequently declared non-responsive.

### H.4 The Federal Role in Advanced Technology Development

The representative of PRT Systems Corporation interviewed was firm in expressing a desire to see the Federal Government withdraw from advanced technology development activities. The primary reason given for this position was the belief that the Federal procurement process generates a great deal of non-productive work. This work is then undertaken by consultants who charge fees disproportionate to their contribution. The representative feels that activities such as system evaluation, the drafting of specifications, and environmental assessments are non-productive because they neither



further the deployment of actual systems nor provide for research in hardware development.

#### H.5 Fields of Competitors and "Buy America"

The representative interviewed expressed no strong opposition to or support for the "Buy America" provisions. His main source of concern was that the interpretation of Buy America which allows civil works to be involved in the total American contribution to the system has allowed the field of competitors to be widened. Nevertheless, the representative was supportive of all deployments which utilize LIMs even if the systems were supplied by foreign manufacturers. The representative feels that all successful operating systems make a positive contribution to the credibility and rate of acceptance of this technology.

The representative acknowledged the breadth of the field of competitors although he feels that there are many reasons why the individual technologies cited do not compare favorably to the Astroglide (or Titan PRT, as it has more recently been advertised) technology. One of the most important variable characteristics of the competitors in this field which was obliquely referenced was the different resource constraints which companies face as a function of size and management style. The implication was that smaller companies, such as PRT Systems, are at a disadvantage because of limited sources from which to draw project development funds.

#### H.6 Future Involvement

The representative interviewed gave every indication that PRT Systems would continue to market their technology heavily in spite of the lack of success to date. Their approach has been differentiated from other

suppliers by their willingness to approach local areas without solicitation and then to be given the authority by the cities to negotiate for them with UMTA for grant money. These negotiating services are not made conditional upon future award of any potential contracts to PRT Systems. The company will also continue to promote the use of their technology for airports, particularly in light of the evolution of airport "megastructures" with significant terminal separation foreseen by the representative.

#### H.7 Summary

The pervading tone of the interview with the PRT Systems representative was one of continuing enthusiasm coupled with a firm position that the Federal Government had not been successful in promoting advanced transportation technologies. Key issues included:

- o Lack of UMTA support for primary research on the application of LIM propulsion systems to DPM technologies
- o The company's willingness to find private financing for the construction of their systems and the credibility which this provides for their claims of system ridership and benefits.
- o The non-productive work which is generated by the Federal procurement process and which includes the consultants that because involved with little gain to the actual project.
- o The essentially prohibitive cost of bid preparation for a small firm and the competing uses for those resources.
- o The interpretation of "Buy America" to include civil works which has benefitted foreign competitors
- o A personal view, based on a strong belief in the potential effectiveness of advanced transportation systems, that the market outlook continues to be positive.

## APPENDIX I. VOUGHT SITE VISIT

### I.1 General Structure of the Firm

The Vought Corporation, an American firm based in Dallas, Texas, was visited in October, 1981. It is one of a number of firms which comprise the Delaware-based LTV Corporation. LTV Corporation is the product of several mergers and acquisitions and has been in existence since 1958. LTV is involved in a diverse range of activities; its principal companies include:

- Youngstown Sheet and Tube Company, principally a manufacturer of tubular and hot and cold rolled sheet carbon steel products
- Jones & Laughlin Steel Corporation, which together with Youngstown makes Vought the third largest steel operation in the nation
- Vought Corporation, which manufactures predominantly aeronautical components and systems for both commercial industry and the military, as well as providing services
- Wilson Foods Corporation, which deals in meat and food products and is the nation's third largest meat packer
- Lykes Brothers Steamship Company, which provides ocean shipping services

All of Vought's outstanding common stock is owned by Jones and Laughlin Industries, a wholly-owned subsidiary of LTV.

Vought Corporation has described its primary field of business as the design, development, and production of military aircraft, commercial aircraft components, missiles, space launch vehicles and other aerospace products, and in furnishing related administrative and technical support services. It has also been active in the development of innovative surface transportation systems and services. The company's development of this area began about ten years ago when the aerospace industry slumped and Vought was looking for fields utilizing related technologies into which they could diversify. Vought's major ground transportation activities, both past and current, include:

- o SeaFlite, a water transportation service operated commercially during the mid-seventies between the major islands of Hawaii: this service was provided using the Boeing 929 Jetfoil
- o LectraVia, a small personal rapid transit vehicle which was under development for a period in the mid-seventies
- o A contract involving the testing, prototype construction, and assembly of Metroliner rail trucks. This contract was undertaken by Vought to produce and install one hundred wheel-and-axle assemblies for the Metroliner rail cars which operate from Washington to New York.
- o Airtrans, an automated group rapid transit vehicle system which has been deployed at the Dallas-Fort Worth Airport.

## I.2 The Firm's Experience with People Movers

The Airtrans system represents an intensive long-range commitment to the development of a commercially competitive fixed guideway people mover system. The system, first deployed in 1974, was designed for use in independent activity centers. During the 1976 to 1979 period the P-40, a modification of the original Airtrans vehicle, was developed for use in urban settings. This vehicle, which provides higher speeds (30 vs. 17 mph) and reliability, improved communications and control systems, and reduced capital and operating costs, was turned over to the Airport in 1979 for testing and is now in revenue operation.

The Dallas/Fort Worth Airport (DFW) system has a complex switching network which was designed to handle a maximum of 32 different route structures: it currently operates with 6 to 7 passenger routes and 5 cargo and service routes with a cruise speed of 17 mph. The 13-mile network is constructed of reinforced concrete, has 53 on-and-off-line stations, and is utilized by 51 passenger and 17 utility vehicles. The vehicles run in a trough-shaped guideway on foam-filled rubber tires with the trough side

walls providing guidance. This system has been in operation for seven years and has achieved an availability of greater than 99 percent.

Several problems constituted a setback from an otherwise auspicious beginning, however, and caused Vought to enter into disputes with the airport management. For example, Vought maintains that because of delays caused by other construction they were unable to have their system running on the Airport's opening day in January 1974. As a result of cost overruns, the company lost \$22.6 million in 1974, of which they were only ultimately reimbursed for approximately a third by the client. This loss followed a 1973 loss for the Ground Transportation Division of \$7.2 million. The 1974 loss occurred in spite of an effort by the company to "increase operating efficiency and provide more effective management control" by merging the Ground Transportation Division into the Systems Division.

### I.3 Involvement in the DPM Demonstration Program

Vought prepared and submitted a full bid to the City of Los Angeles as part of the UMTA DPM Demonstration Program. As the result of a complex evaluation process, Vought was not recommended by the Los Angeles DPM Authority Technical Selection Committee. Following that recommendation in December 1980, representatives of Vought appeared before the City of Los Angeles Grants, Housing, and Community Development Committee to protest the manner in which the competition was handled. The main issues of their protest were that:

- o the original intent of the competition was altered after the Request for Proposals was issued
- o a firm which did not meet the minimum technical risk criteria was selected

- o the pre-established selection criteria did not seem to be applied during the selection process
- o firms which did not have a track record of meeting Federal Minority Business Enterprise and affirmative action goals were seriously considered
- o Vought's life cycle cost estimates were arbitrarily increased by the evaluation team.

Vought's statement expressed their belief that these issues constituted "occurrences...which are...severe departures from normal U.S. competitive practices."<sup>1</sup>

The representative of Vought who was interviewed described the company as being very naive with respect to its DPM involvement. This grows out of his position that the company acted in good faith by preparing a bid which took the terms in the RFP at face value--and that those terms were not subsequently honored. While Vought did not go on to file a formal legal protest over the method of the Los Angeles selection, the representative interviewed was supportive of Westinghouse's position and the action which that company took. In an effort to concentrate their resources on the bid for which they felt their chances were highest, Vought did not bid in Detroit or Miami.

#### I.4 Fields of Competitors and "Buy America"

Vought argued strongly at the time of the Los Angeles DPM competition in 1980 that their only serious competitor was Westinghouse. At that time, the company's position was that the both UTDC and Matra-Otis lacked the necessary experience to be a "proven" technology. The representative interviewed acknowledged that the nature of the competition is rapidly changing,

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<sup>1</sup>Vought, "Appearance before the Grants, Housing, and Community Development Committee", January 6, 1981.

however, as both Japanese and Canadian suppliers have made rapid gains in the last few years. The Japanese were cited as having chosen, constructed, and put into operation people mover systems since the inception of the US DPM Demonstration Program. If the Canadians also successfully deploy a system, then the field of competitors as expected to be wider and stronger in future competitions.

While the Vought representative did not express any strong feelings about the "Buy America" policy, he did remark that it was UMTA's interpretation of "Buy America" (that the system cost includes civil works) that allowed the strong foreign competition. Vought also took the position in their protest in Los Angeles that an award to a foreign competitor would cause tax dollars to flow out of the country.

#### I.5 Future Involvement

Vought's entry into advanced ground transit technologies was the result of an explicit decision to diversify the Corporation's base and to expand beyond their traditional aerospace activities. While winning the contract to install a people mover system at DFW represented a major beginning in this area, a number of significant problems arose around that work at its inception. Since the construction of the Airtrans system at DFW, however, Vought has licensed their system in Japan but has not won any major contracts, despite their development of the P-40. While their ground transport group continues to have 35 to 40 professional staff members, the representative interviewed did not express optimism about the company's ability to continue to support the group. It was made clear, however, that such decisions are made at a higher management level. Vought had a market study

prepared by an outside consultant in 1975; no more recent formal or external activities were discussed.

#### I.6 Summary

The overall tone of the interview with Vought was one of resignation. While Vought has committed significant resources to the development of the people mover technology and has deployed a commercial system, the company's future involvement in the business remains uncertain at best. Major points raised during the interview included:

- o occurrences during the LA DPM selection process which Vought felt constituted irregularities
- o a retrospective sense that Vought approached the LA DPM project very naively.
- o contract awards made to foreign manufacturers provide a mechanism which allows US tax dollars to flow out of the country
- o the company has been pleased with the overall performance of the DFW system, despite initial delays and cost overruns
- o without new contracts it will be difficult to justify continuing the group's support at its current level of staffing.



## APPENDIX J. VSL SITE VISIT

### J.1 The Firm's Experience with People Movers

VSL Corporation is an American subsidiary of Losinger, Limited, a Swiss firm ranked as the world's 94th largest in the construction industry. VSL's activities are carried out by three groups or divisions:

- o The Construction Systems Group, which specializes in post-tensioning, lift-slab, and rock and soil stabilization systems.
- o The Construction Group, which is involved in property development and design/build construction of engineering structures, parking structures, and commercial buildings.
- o The Mechanical and Industrial Systems Group, which is involved in heavy transportation and lifting systems, manufacturing of mechanical and hydraulic tools and equipment, and cable-powered people movers and material transportation systems.

The firm has been involved in designing and building gondola and tramway systems for more than a decade. Since 1973 it has constructed a number of cable-powered people movers. These include gondola systems in theme parks and at ski areas; aerial tramways in Gatlinburg, Tennessee and New York City (Roosevelt Island to Manhattan); and "Metro-Shuttle 6000" systems in Las Vegas and Memphis, both of which are being completed this year.

The common features of each of the people mover systems built by VSL are the following:

- o the use of driverless, passive vehicles pulled by cables, which in turn are powered by electric motors at one of the systems' termini.
- o cable configurations which provide a simple point-to-point connection.
- o only two stations (at the termini) a relatively short distance apart (1,500-3,100 feet).
- o only two vehicles, or trains of vehicles, which both must move at the same time, in opposite directions.
- o based on conventional system concepts and components which have been in use for many years for both people and material transportation systems.
- o compared with other automated systems, much lower costs.

The major features which vary from one system to another are the means of vehicle support and passenger-carrying capacities. Cable-supported system technology lends itself to rough terrain such as ski slopes and over-water crossings. The Roosevelt Island Tramway is an example of this type. Alternatively, the vehicles can be run on a fixed guideway which provides either bottom or top support. The Las Vegas and Memphis systems, respectively, exemplify these two fixed guideway design approaches. The single-direction capacities of the three systems depend on the respective vehicle sizes, operating speeds, and system lengths. These capacities, in passengers per hour, are:

- o Roosevelt Island: 1,500
- o Las Vegas: 1,200
- o Memphis: 3,000

The common features listed above generally represent technical limits of cable-driven systems, although additional stations can be accommodated if special restrictions, such as equal spacing of intermediate stations, can be met. Similarly, the point-to-point, linear nature of the systems could be modified to form open loop systems, and their lengths could be extended to about 3 miles. Longer and more complex systems could be developed by stringing together the basic units described above, but the resulting systems would necessitate passenger transfers between vehicles at the junction points.<sup>1</sup>

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<sup>1</sup>Additional technical information is available in the following UMTA reports:

"Four Cable Systems under Various Stages of Development," prepared by N.D. Lea & Associates, Inc., August 1979.

"Roosevelt Island Tramway System Assessment," prepared by N.D. Lea & Associates, August, 1979.

VSL has designed each system it has built, using a combination of off-the-shelf and specially-constructed components. Most of the larger components, such as vehicles and propulsion systems, are developed by European firms. About 40 percent of the cost of the systems represents smaller elements obtained from American manufacturers, including drive units, transformers, and air conditioning systems.

None of the systems developed by VSL to date have been funded by UMTA. Most of the systems, including the Las Vegas Metro-Shuttle, have been privately funded. The Memphis system has been funded by the City of Memphis. The Roosevelt Island tramway was funded by the Roosevelt Island Development Corporation. The systems' relatively low costs have made these funding approaches possible.

#### J.2 Advanced Technologies as an Area for Development

VSL's entry into the field of cable-powered people movers in urban areas is seen by the firm as a natural continuation of the parent firm's past involvement with similar recreational and materials handling systems in Europe. The Mechanical and Industrial Systems Group sees its role as being mainly one of adapting existing technological components to address new, specific applications, rather than one of conducting technology research and development. Great pride is taken in the engineering solutions developed, and in the fact that these development costs are covered by each system as it is built. To date, the firm's orientation to design and construction of specific facilities has precluded its involvement in more general technological research.

VSL mentioned no market forecasts for their systems, developed either internally or externally. The implication is that the firm's major commitment to market development at this time is assignment of one professional to the area of business development in a number of areas served by VSL, with a significant proportion of this time devoted to people movers. The risks inherent in participating in a new market of undefined size are thus being addressed by:

- o limiting the firm's commitment to a relatively low level of marketing effort, and
- o discouraging internally-funded research and development activities.

The company has assumed a less aggressive marketing posture since the change of Federal administrations in early 1981, in response to current policies such as the termination of the DPM program. The small size of the division and the limited desire of the entire firm and its European parent to cross-subsidize people mover operations results in the availability of limited resources for this area of development. The interviewees felt that their resource limitation was particularly significant compared with the strength of other potential system suppliers, requiring what they recognize to be a relatively low level of business development.

### J.3 Involvement in the DPM Program

VSL was not a bidder in any of the DPM cities because they recognized that their bids would not conform to the DPM specifications due to the unique characteristics of cable-powered systems. In a number of specific local cases, company representatives feel that portions of the transportation functions addressed by DPMs could be met by lower cost VSL-type systems, such as specific parking facility to activity node shuttles. They recognize, however, that these types of solutions would have had to be explicitly considered and

selected much earlier in the local feasibility study and preliminary engineering phases in order to be seriously considered.

Los Angeles was mentioned as an example of a situation in which a cable-driven shuttle system could be applied. The Bunker Hill transportation problem was originally seen as the need to connect off-site parking with new developments in the redevelopment area. A cable-powered system would be an appropriate solution to this problem. However, VSL feels that the problem was later respecified, partly in response to the UMTA DPM program, leading to the more extensive multi-station north-south alignment which could not be readily addressed using a cable-powered system.

#### J.4 Fields of Competitors and "Buy America"

As an American subsidiary of an European firm with manufacturing and construction capabilities on both continents, VSL and its parent do not find themselves impacted negatively either by the US "Buy America" provisions, or by trade barriers against US firms in Europe. The group based in Los Gatos is limiting its activities to the US market. In addition, VSL has an affiliated marketing group in Switzerland which concentrates on the European market. Currently, VSL considers itself to be without any significant competition in the U.S. cable-powered market, but concerned about the possible entry of European firms in the future. These firms, such as DEMAG/MBB with simplified shuttle versions of its CabinLift system, currently provide competition in the European market.

#### J.5 Future Involvement

For the foreseeable future, VSL sees its major market as one which can be characterized in the following ways:

- o funded locally or privately rather than by UMTA,
- o having system selection decisions strongly influenced by consulting firms and/or developers,
- o involving applications related to airport, shopping center, and urban revitalization projects.

Thus in the short term, VSL plans to develop contacts, mainly with consultants and developers, and to cultivate approaches with these types of potential clients. The Las Vegas and Memphis systems are expected to provide evidence of the success and cost-effectiveness of cable-powered systems, thus providing a solid basis for these marketing efforts, which will be expanded as the new systems begin to show their effectiveness. VSL sees this marketing strategy as patterned after Westinghouse's, which until recently was concentrated on private and airport systems rather than on UMTA-funded programs.

In the long range, VSL has hopes that its experience in the passenger transportation business will be established and its marketing strategy can be re-evaluated. Until that time, they have no plans to target their marketing toward UMTA-funded applications.

#### J.6 Summary

VSL recognizes that although it enjoys technological leadership in the US in the area of cable-powered passenger systems, it also lacks familiarity with the passenger transportation planning establishment, specifically experience in working with UMTA. The firm expresses definite commitments to marketing cable-powered passenger systems in the US. It hopes to gain the required familiarity by concentrating its efforts in the private and locally-funded sectors, and to demonstrate this familiarity, as well as the applicability of

its systems, by providing successful applications in these markets. By so doing, VSL feels that it can help to counter the public's perceptions that new transportation technologies never work and are always prohibitively costly. VSL feels that UMTA has biased potential customers in local areas against their systems by offering the alternative of high levels of support for more expensive technologies. VSL cites both UMTA's DPM program and New Orleans' interest in a cable-supported (but not cable-powered) system as evidences of these biases. (Note that although UMTA funded a feasibility study of the New Orleans proposal, interest in this alternative originated at the local/system supplier level.)

At the present time, VSL's decision not to pursue UMTA-funded markets is reinforced by:

- o the perception of the Mechanical and Industrial Systems Group that it has limited resources compared with large firms such as Westinghouse and Boeing and governmentally-supported firms such as UTDC;
- o the lack of a well-established base within the firm already involved in marketing in this environment; and
- o UMTA's current policies with respect to new technologies and support for fixed guideway systems.





## APPENDIX K. WESTINGHOUSE SITE VISIT

### K.1 The Firm's Experience with People Movers

Westinghouse Corporation representatives were interviewed in October and November, 1981. Westinghouse is an American firm which was incorporated in 1872. Its primary line of business has been and continues to be the "manufacture, sale and service of equipment and components for the generation, transmission, distribution, utilization and control of electricity."<sup>1</sup> Since it was founded, the Corporation has diversified into a significant number of areas falling within the board scope of its stated business orientation. Westinghouse Corporation is organized into three manufacturing companies:

- o Power Systems, which is involved in every aspect of the delivery of energy from conventional and innovative sources to consumers
- o Industry Products, which supplies industrial customers with a variety of electrical systems components and services
- o Public Systems, which primarily contracts with the US Government and defense-related customers to provide a range of high-technology equipment including communications systems, radar, and aircraft electrical systems; and with industry to provide elevators, escalators, and other building components.

Each operating company is divided into groups which are in turn subdivided into divisions. The Transportation Division is part of the Construction Group of the Public Systems Company. As one of 33 business units within Westinghouse, the Transportation Division is responsible for its own strategic and profit planning and acts as a decentralized profit center.<sup>2</sup>

In 1979, Westinghouse reorganized its corporate business strategy and added a fourth major arm to the company, the International group. This organization does not have an independent manufacturing capability; instead, it is a mechanism for coordinating the international activities of

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<sup>1</sup>Westinghouse, Annual Report, 1980.

<sup>2</sup>Westinghouse, Standard Disclosure 10-K, 1980.

Westinghouse's domestic units and for integrating those activities with the Corporation's existing foreign-based operations. International is "intended to provide a management structure tailored to adapt to the various marketing and economic conditions in each country or market area."<sup>1</sup> This function was determined to be vital to Westinghouse, because the contribution of its foreign-based operations and its exports to total sales is significant. In 1980, Westinghouse's foreign manufacturing subsidiaries and exports each accounted for approximately one-eighth of consolidated sales. Westinghouse also has a broadcasting subsidiary, Westinghouse Broadcasting Company Incorporated, and a financial subsidiary, Westinghouse Credit Corporation.

Westinghouse Corporation has been involved with supplying transit components and systems since the 1880's. Their original strength was developed in the area of propulsion systems, and they have continued to pioneer major innovations such as chopper speed controls in that area. This record of innovation and experience has led Westinghouse to a point where approximately half of all the self-propelled electric railroad passenger cars in the US utilize Westinghouse propulsion equipment, including motors and gears. The Corporation has also been deeply involved in the modernization and development of light and heavy rail transit systems. Their primary activities in this area have been providing propulsion systems and automatic train control equipment to the Bay Area Rapid Transit system (BART) in San Francisco and to systems in Sao Paulo and Rio de Janeiro in Brazil.

Westinghouse first became involved with the development of people movers in the late 1950's and early 1960's. This development was the result

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<sup>1</sup>Ibid.

of the conviction of the management of the Transportation Division that two major innovations were needed in transit for different applications:

- o Automation and rubber tires, for reasons of aesthetics, safety, rising labor costs, and noise pollution.
- o Development of chopper controls, for reasons of energy efficiency (due in part to the related ability to introduce regenerative braking), comfort, and safety

A series of decisions followed naturally out of the decision to automate including the use of a grade-separated guideway and sophisticated train control equipment. The first system, Skybus, was then deployed in 1965 at South Park, a public recreation area near Pittsburgh, Pennsylvania. Funds came from the Federal Government and a consortium of Allegheny County-based entities which included the Port Authority, Westinghouse itself, and other private companies. The system has since been dismantled.

Westinghouse built on its South Park experience by deploying a number of people mover systems at airports. The Division's first commercial project was in 1968 at the Tampa International Airport, where a shuttle was installed to connect the main terminal building with multiple satellite terminals. In the following year, Westinghouse began work on an underground system at the Seattle-Tacoma International Airport. This system uses two loops bridged by a shuttle to connect the main terminal building with two satellite terminals. Westinghouse has gone on to develop people mover systems at airports in Miami and Orlando, Florida; Atlanta, Georgia; and Gatwick, England. They have also deployed a people mover system at the Busch Gardens near Williamsburg, Virginia.

Westinghouse originally developed a standard people mover vehicle which was capable of holding 100 passengers and of operating completely under

computer control. This design was then modified to become the C-100 vehicle which features greater window area, increased lighting, and more efficient air conditioning than its predecessor. Although the existing Westinghouse systems are all based on the large C-100 vehicle or its predecessors, Westinghouse also offers the C-45 and C-20 vehicles with capacities of 40 to 45 passengers and 8 to 20 passengers, respectively. The C-45 and C-100 vehicles are capable of operating either singly or in pairs and are intended for use in urban activity center applications. The C-20 is intended for use in a three-car train for commercial applications where capacity requirements are lower (such as amusement parks, shopping centers, universities, etc.). This selection of vehicles offers passenger handling capabilities ranging from 2,000 to 20,000 passengers per hour at speeds of up to 60 mph. All of the vehicles utilize grade-separated guideways, completely automated train control systems, and rubber tires.

#### K.2 Involvement in the DPM Demonstration Program

Westinghouse was an active participant in the DPM Demonstration Program, with full bids prepared for both Los Angeles and Miami. While their bid in Miami proved to be successful, the recommendation of the technical selection committee of the Los Angeles DPM Authority did not favor Westinghouse, and they subsequently were not chosen by the City Council. They responded to this decision by preparing a legal protest over the system supplier selection process: this protest has been circulated both to the City of Los Angeles and to the Federal General Accounting Office and Urban Mass Transportation Administration. The basic issues raised by the protest were:

- o Westinghouse was not selected even though the cost criterion was assigned a weight of 20 percent in the ranking procedure and the Westinghouse system was bid at lower cost than UTDC's.
- o Westinghouse was not selected even though its system had a strong history of operation in revenue service while the chosen system had none, and the selection process had nominally included such a factor.

In addition to these two issues, three other issues were prominent in their informal discussions with the local actors and with the Federal Government.

These were:

- o that foreign-owned competition is unfair because of subsidies provided by other countries;
- o that foreign competition is unfair because Westinghouse is effectively barred from selling its systems in the competitors' home countries; and
- o that Federal law was clearly violated by the transition of a Federal official from government to the supplier industry without the required grace period.

This protest was rejected by the Los Angeles DPM Board of Control and rendered moot at the Federal level because of the decision to discontinue funding for the Los Angeles system.

Westinghouse did not prepare a bid in Detroit. They felt that the potential difficulties which they might encounter in providing a reliable cold weather system would weaken their bid and increase their risk. Thus, the net effect of Westinghouse's involvement in the DPM program was a successful bid in Miami, plus the failure to be selected in Los Angeles for a system whose construction has subsequently been cancelled.

### K.3 Advanced Technologies as an Area for Development

Westinghouse's commitment to the development of advanced transit technologies clearly predates the UMTA DPM Demonstration Program. Their early

research on, and subsequent deployment of, automated, rubber-tired systems may be considered a major factor in the public acceptance of such advanced technologies to date. As mentioned previously, Westinghouse has pioneered many innovations in the broader transit market which have been significant in public efforts to build and modernize large scale transit systems. Given their investment and experience to date, there can be little question that Westinghouse has a firm commitment not only to people movers but also to a system design which they consider to be "proven." Given the cycles of testing and modification which Westinghouse has been through to date, one of the representatives interviewed expressed Westinghouse's position that theirs is a "mature" technology to whose continued deployment the Corporation is committed.

#### K.4 The Federal Role in Advanced Technology Deployment

The representatives of Westinghouse voiced sentiments regarding the role of the Federal Government in the deployment of advanced technologies: basically, while there may well be an appropriate and useful role for the Federal Government, that role was not realized by UMTA's involvement with the DPM Demonstration Program. They expressed the belief that the structure of the Demonstration Program had been complicated and weakened by political demands which were made on UMTA and its representatives. The urban problems of a decade ago were regarded as a reasonable genesis for such a program, but regional and industrial competition was felt to have disrupted the focus of the program's intent to provide a mechanism for urban recovery. In addition to general comments, the supplier selection processes of the participating cities were also singled out for criticism. The representatives

felt that UMTA had attempted to influence and guide local decisions to a degree which was inappropriate.

They also had hesitations over the workability of the "multiple technologies" concept. While they originally planned to work with that policy, they modified their bidding strategy in response to the reduction to three DPM cities, each requesting bids within a short period of time. Rather than to propose technological differences for each city, they took the risk of bidding essentially the same system in both Los Angeles and Miami. They also felt that UMTA should not support new technology development and refinement indefinitely and that the federal focus should switch from development to deployment support once initial development work is complete.

Alternative roles for the Federal Government were proposed by the Westinghouse representatives. These included:

- o Increased subsidization and support of basic research and development, such as the winterization work which Westinghouse has done.
- o Increased support of American corporations in international competition in order to match financial advantages which are now being offered by foreign suppliers' countries.
- o The funding of demonstration projects using the system supplier of the selected city's choice without the constraints of Federal procurement procedures.
- o The protection of domestic opportunities from foreign suppliers in order to nurture the industry.

The representatives were both receptive to and aware of the opportunities which private/public collaboration could have in the advancement of technology. As a company, Westinghouse has had broad exposure to the benefits which such cooperation has yielded for Japanese, French, German and Canadian manufacturers.

K.5 Fields of Competitors and "Buy America"

Westinghouse's representatives have had many opportunities to articulate the Corporation's position on the provisions of the "Buy America" legislation: the company's basic position is one of firm, but qualified, opposition. As a trans-national firm, Westinghouse supports free trade and competition, and consequently advocates the removal of all trade barriers. Westinghouse has, in fact, benefitted from "Buy America" since it has enhanced their sale of components to foreign car builders wishing to sell equipment in the United States. They recognize, however, that "Buy America" has not protected American Rail manufacturers to the degree which was intended. As long as trade barriers continue to be a reality in foreign markets, Westinghouse has taken the position that domestic industry should be protected from foreign competition. A particular case which was cited was that of Canada and the new regional transit system which is scheduled for deployment in Vancouver, B.C. Westinghouse's representatives maintain that as long as the Canadian competition was never formally opened to their firm, there is no reason why American domestic opportunities should be opened to Canadian firms. As an indirect result of this position, they would dispute the interpretation of the Buy America provisions for turnkey systems such as DPMS, which includes the civil works in the calculation of total system cost.

The representatives expressed that belief that the field of domestic competitors is rapidly narrowing. They feel that Westinghouse's record of experience--and ability to provide a proven technology--puts competitors at a significant disadvantage and cite recent awards to Westinghouse, both



competitive and sole source, as evidence. While they expect that smaller companies may be left in the recreation center system market, they do not view this as being the core of Westinghouse's business.

#### K.6 Future Involvement

The representatives interviewed expressed an attitude of continuing confidence and enthusiasm. The company has been and continues to be supportive of the technology and remains ready to subsidize its research and business development to a degree which exceeds short term prospects. Within the firm, the Transportation Division is classed as a high-growth unit, eligible for higher than average "strategic management" funds. Westinghouse has had significant success in selling systems to quasi-public agencies in situations not requiring Federal involvement (such as sales to airports). Domestically, the company expects to remain competitive (and indeed dominant) in the airport market and hopes to cultivate the activity center market. Sports centers were cited as a particularly appropriate application of the people mover technology because of the need to move large numbers of people over moderate distances at peak periods. The representatives feel that the standard Westinghouse systems are capable of meeting those demands because of their ability to accommodate extreme peaks in demand. In addition, Westinghouse continues to proceed with the Miami circulator project as funds for 1982 have been appropriated by Congress. In terms of the foreign market, the need for Federal support was remarked upon several times. Financial support was viewed as being generally critical in restoring equilibrium to foreign competitions, particularly those in the less developed countries which rely on foreign financing.

K.7 Summary

The overall tone of the interviews was one of bullishness regarding the prospects for future deployments of the technology tempered by difficulties which were encountered during the planning and system selection process in the DPM cities. For the foreseeable future, Westinghouse has every intent of remaining a primary competitor in the domestic and international markets for people mover systems. Primary issues which were raised included:

- o occurrences which Westinghouse feels represent irregularities in the selection process in Los Angeles
- o Westinghouse's deep and continuing commitment to gaining public acceptance for the people mover technology
- o disappointment over the structuring and implementation of the Federal Demonstration Program
- o the company's qualified opposition to all trade barriers, including the Buy America legislation, coupled with their disapproval of the interpretation which was made of the "Buy America" legislation that included civil works in total project costs
- o disagreement with the Federal interpretation of Buy America for the people mover technology
- o distress over effective exclusion from particular foreign competitions

Westinghouse's representatives reinforced their position several times that there is a role for the Federal Government in advanced technology deployment. The primary roles were felt to be aid in financing foreign projects and subsidization of early phases of basic research and development.