RESOURCE PAPERS

THE FUTURE OF TRANSPORTATION PLANNING: JUMPSTARTING THE PUSH TOWARD MULTIMODALISM

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INTRODUCTION

Ever since the early 1960s, when the federal government first institutionalized the 3C transportation planning process, the transportation profession has been struggling with how to structure a process that clearly considers investment tradeoffs in a "balanced" manner. If we define "balanced" as being decisions being approached from the perspective of truly comparing alternative modal options, we have not succeeded. The evidence to suggest otherwise is scant. For example, a recent General Accounting Office (GAO) report found that from 1976 to 1991, of approximately $11.5 billion of federal-aid urban funds invested by states and localities, only 2 percent had been used for transit projects.[1] In addition, and although not yet in final form, the preliminary results from an NCHRP Synthesis project focused on identifying good examples of multimodal planning have indicated that few such examples exist.[2]

Why has there been such apparent difficulty in developing and applying a multimodal planning approach in support of transportation investment decisions? The answer to this question lies in both the institutional and finance history of the profession. Probably of most importance were the limitations placed on, and incentives provided to, local decisionmaking as it related to federally funded transportation projects. Historically, the categorical nature of federal funding did not allow funds in one category (e.g., highways) to be used for another purpose (e.g., transit). In fact, the limited use of such substitution for Interstate highways which occured in the mid-70s did not happen without significant political resistance from highway groups. In addition, the local matching ratio required for federal funds influenced local decisionmaking. A 90 percent federal aid highway project was often perceived as bringing more federal aid into the region than a 50 percent federal aid transit project.

To some extent, this limitation in the use of federal funds has been eliminated by the recently passed Intermodal Surface Transportation Efficiency Act (ISTEA). However, even without the funding constraints found within the federal aid program, there are still several significant barriers associated with developing a true multimodal planning process. These include:

1. The traditional modal orientation of the major transportation actors in a typical urban area or state will likely provide great difficulty in adopting a multimodal perspective in decisionmaking (as evidenced by many highway agencies still providing the highway component to the TIP and the transit agency providing the transit element). This modal orientation, often found in agency mandates, is reinforced on a day-to-day basis by the activities of these agencies.

2. State or local constraints on the use of revenues for highway or transit purposes, rather than for "transportation" purposes, can be important limitations on the use of the new, "flexible" federal funds. Just as the federal laws restricted the use of funds to specific categories, so too state and local laws restrict the purposes for which state/local funds can be used. In most cases, state gas tax receipts can be used only for road improvements. There are only a few states that have transportation trust funds that allow the use of funds for any modal investment. However, as was noted by the former Secretary of Transportation for Maryland at the last transportation planning conference held in Boston, the levels of investments made in certain modes, because of political reasons, are most often similar to the levels of revenues generated by these modes. Thus, the existence of a transportation fund will not necessarily provide for a truly unbiased, multimodal, decisionmaking process.

3. The planning process and the supporting analysis framework have never been approached from the perspective of generic transportation investments. Because much of the technical profession has, for years, been modeling highway and transit networks separately, multimodal analysis is very difficult to do. In some cases, there are urban areas where the highway forecasts for a region are developed by the MPO using one model, while the transit agency is doing transit forecasts with another. The consistency of estimates between these two

[1] General Accounting Office, Transportation Infrastructure: Urban Transportation Planning Can Better Address Modal Trade-offs, April 1992.
[2] Conversation with Professor Scott Rutherford, University of Washington, April 1992

efforts is likely to be strained. Even when using the same modeling package there are serious questions as to how the separate modes are treated. For example, the treatment of buses in the highway network and relating the effects of highway congestion to transit performance are often handled differently from one area to another.

4. A multimodal planning process must include concern for the movement and transfer of goods. For such concerns to be addressed in a meaningful way, representatives from concerned carriers and shippers must be part of the planning process. These groups have traditionally not been active participants, and it could possibly take a concerted effort to bring them into the process.

Even though the record on multimodal planning is scarce, the importance of the topic has been noted in many recent conferences. An UMTA/APTA Workshop on Fixed Guideway Planning held in 1991 emphasized the need for multimodal planning at the level of corridor analyses.[3] Several months later, an FHWA-sponsored workshop on congestion management systems highlighted the need for a multimodal approach in developing such management systems in metropolitan areas.[4] And, of course, this conference is focused on multimodal planning and programming.

The purpose of this paper is to establish a point of departure for the conference discussion on multimodal transportation planning. Because of the few examples of such planning in the United States, the paper necessarily focusses on background and on normative perspectives of what multimodal planning should be. Given that any planning process should be structured to reflect local institutional and political characteristics, this paper will not offer the approach to multimodal planning. Instead, it will explore characteristics of such planning and hopefully begin the discussion of how we develop and use a multimodal perspective in planning and decisionmaking.

THE CHANGING ENVIRONMENT OF TRANSPORTATION PLANNING

There have been numerous conferences already this year that have highlighted the changing environment of planning, primarily caused by the Clean Air Act Amendments and the ISTEA. As I stated at the Charlotte conference on Moving Urban America, I believe that both legislative initiatives have signficantly changed the way we do business. Not only did the ISTEA mark the end of the Interstate Highway program begun in 1956, but it greatly loosened the institutional, financial, and thus political, framework within which decisions on transportation investment had been made over the past 35 years. Where federal funds once had to be spent only on projects that were eligible in specific program categories, now many of the funds can be used for any transportation project. Where the federal program was once designed to provide uniformity of transportation investment from one state to the next, a necessity for a program like the Interstate Highway System, the ISTEA now encourages states and localities to seek solutions to transportation problems appropriate to their needs and desires. Where the federal program historically emphasized transportation investment as an end in itself, the ISTEA provides transportation funds to meet other societal goals, thus viewing transportation as a means of achieving some greater aim. Where the federal program separated transportation investment into highway and transit pots of money, the ISTEA now encourages **transportation** decisions that are undertaken from a multimodal perspective. Lastly, the federal program once emphasized the construction of new facilities, now the ISTEA encourages better management and operational improvements of existing facilities with such things as incident management programs and the application of advanced technologies.

The Clean Air Act Amendments also provide a strong basis for a changing transportation planning focus in those metropolitan areas in nonattainment of air quality goals. There has been a long history of linkage between transportation planning/decisionmaking and air quality planning. However, never before has Congress made the linkage stronger. Certainly, the transportation portions of the CAAA will greatly influence the focus and scope of many transportation decisions during the next decade. With a stringent schedule of anticipated emission reductions from stationary and mobile source controls, a significant number of areas will have to consider, and possibly implement, transportation control measures (TCMs) to demonstrate attainment. In addition, because of concerns about both attainment **and** maintenance, Congress has supplemented or reinforced the SIP revision process with specific requirements for nonattainment areas to periodically assess and mitigate on a continuing basis increases in VMT, congestion, and vehicle trips.

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[3] Meyer, M.D., Proceedings of a Conference on Fixed Guideway Planning, Urban Mass Transportation Administration/American Public Transit Association, Philadelphia, 1992.

[4] Meyer, M.D., Proceedings of a Workshop on Congestion Management Systems, Federal Highway Administration, Washington, D.C., 1992.

Importantly, the CAA reflects Congress's concern with past and anticipated growth in VMT and congestion as a primary cause of nonattainment. Congress viewed past failures to accurately predict/monitor these travel indicators as a main reason for overly optimistic attainment demonstrations following the 1970 and 1977 Clean Air Act Amendments. Regular determinations that transportation plans, programs, and projects conform to the state implementation plan (SIP) could be the greatest cause of change to how transportation agencies conduct their business.

What impact could the ISTEA and CAAA have on states and metropolitan areas? There are several areas where I think such impact will occur.

Institutionalizing Flexibility

It has been estimated that if state and local officials chose to do so, $103 billion of the $151 billion provided by ISTEA could be spent on transit. How will the decision of how to spend federal dollars be made in our metropolitan areas? What criteria will be used to determine the tradeoffs between different transportation alternatives? A new partnership among the state, MPO, local officials, transit officials and other major participants must be developed to examine the most effective way of institutionalizing this new flexibility.

Multimodal Transportation Planning

The ISTEA requires, for the first time, that state departments of transportation develop a statewide multimodal transportation plan. These plans are not simply to be a document which examines highway, transit, rail, aviation, and port issues separately, but rather a process and a plan that look at transportation as an integrated system, related to multiple societal goals, and, in particular, emphasizing efficient and productive people and goods transfer from one mode to another. This requirement will be a particular challenge to those states which have traditionally emphasized highway planning at the expense of other modes. The interrelationship between state level multimodal planning and that occurring in the metropolitan areas will be a big concern.

System Management

The ISTEA requires state departments of transportation to develop management systems in six areas: congestion, pavements, bridges, safety, intermodal activities, and public transit. It is too soon to say what many of these systems will look like. However, Congress is clearly telling transportation officials to develop the capability to better manage the transportation facilities and systems that currently exist. For congestion management systems, this will likely entail the consideration and implementation of regional incident management programs, coordinated traffic signal control systems, transit improvements, preferential lanes and/or other incentives for multi-occupant vehicles, and the like. For many highway agencies that have reputations for high quality freeway construction, the question becomes can they also become leaders in managing the road system that they have so effectively constructed?

Transportation Finance

As noted in my opening remarks, for years, one of the major barriers to a true, multimodal transportation policy was the way transportation funds were allocated for highways or transit, with little opportunity for substitution. The ISTEA has changed all of that, and the CAAA implicitly requires that a different approach to funding decisions be made in nonattainment areas. And yet, for states and metropolitan areas to take advantage of this new-found flexibility, they must also have similar financial flexibility for using their own funds.

The impact of this changing environment on planning will be primarily determined in each state and individual metropolitan area. New institutional relationships will likely occur in many urban areas. Lengthy debates will occur in other areas about what multimodal planning really means and how the different levels of application should be interrelated. In the end, however, the benefits of multimodal planning and decisionmaking will only occur when the profession and those responsible for decisionmaking view the ultimate objective of transportation investment as being one of providing mobility—no matter in what form.

DEFINITIONS

Before discussing the characteristics of multimodal planning, it is first important to establish some working definitions. The primary reason for this is that the terms "multimodal" and "intermodal" are being used interchangeably in policy discussions and debates, when in fact they are not the same. The most likely source of this confusion is Congress which declared in the ISTEA that "it is the policy of the United States to develop a National Intermodal Transportation System ...." and proceeded to define this system as including "all forms of transportation, in a unified, interconnected manner, including the transportation systems of the future...." The

components of this "Intermodal Transportation System" included a National Highway System, significant improvements in public transportation, improved access to ports and airports, with capability of being adapted to "intelligent vehicles". Others have defined "intermodal" in narrower terms. For example, the American Association of State Highway and Transportation Officials has established a Special Committee on Intermodal Issues that would focus on such matters as airside/groundside coordination at airports; freight movement such as containerization and interface requirements between ports, harbors, airports, railroads, and highways; and intermodal passenger movements. Some have focussed instead on "multimodal". In New Mexico, for example, multimodal is defined as the process of looking at all modes of transportation that affect the travel of people and goods in that state.[5]

For purposes of this discussion, the two terms will be defined as follows:

Multimodal planning
A process of:

1. defining a transportation problem in a generic way (that is, in a non-mode-specific manner);
2. identifying more than one modal option to solve this problem; and
3. evaluating these modal options in a manner that provides for an unbiased estimation of each mode's contribution, either individually or in combination, to solving the problem.

Intermodal planning
A process of:

1. identifying the key interactions between one or more modes of transportation where affecting the performance or use of one mode of transportation will affect another;
2. defining strategies for improving the effectiveness of these modal interactions, and;
3. evaluating the effectiveness of these strategies from the perspective of enhancing the overall performance of the system affected by the intermodal connections.

There are four scales of application for multimodal planning that should be of interest to the transportation profession. The first application is for **interstate transportation** strategies. Most recently these applications have included the consideration of new highway corridors serving entire regions of the country. The more traditional application of interstate transportation planning has been in the area of high speed transportation studies which have looked at the options of high speed rail, air travel, or freeway improvements.[6] The federal legislative requirement for **statewide multimodal plans**, combined with a fairly aggressive trend over the past several years of increasing state involvement in public transportation, should provide an interesting opportunity for state-level multimodal planning activities. Several states have shown some indication of moving toward a multimodal planning process (e.g., Washington, Maryland, Wisconsin, and New Mexico).[7] However, perhaps one of the most volatile environments for multimodal planning over the next two years will be the **metropolitan level**. The numerous modal options available in a metropolitan area, along with the interest groups that support each one will provide a strong political element to the normal planning process. In addition, the interrelationship between state level multimodal planning efforts and metropolitan level efforts needs to be developed which will most likely create some concerns at both levels. The final level of multimodal planning activity is at the **corridor level**. This planning probably provides the most specific examples of problems associated with multimodal planning in that it is most related to problems of data bias, insufficient analytical tools, local politics, and funding constraints.

No matter at what level of application, the characteristics of multimodal planning should be the same. Two transportation planning studies that come close to what multimodal planning should be are discussed below.

Illustrations of close-as-you-get multimodal planning
The following two examples are planning studies that exhibit characteristics of multimodal planning. Both studies are described only briefly. The description is not intended to delve into the details of each planning effort

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[5] D. Kurth, et al, A Research Process for Developing a Statewide Multimodal Transportation Forecasting Model, Report No. FHWA-HPR-NM-91-07, Santa Fe, New Mexico, August 1991.

[6] See, for example, Cheslow, D., The Use of Intercity Multimodal Forecasting Models by the USA Department of Transportation, International Conference on Transport Research, June, 1973; Ellis, R.H. and J.C. Prokopy, Development of a Demand Forecasting Framework for Ten Intercity Corridors Within the United States, FRA, Final Report, July, 1973.

[7] See, for example, Kurth, D., Donnelly, R., Arens, B., Hamburg, J., and W. Davidson, A Research Process for Developing a Statewide Multimodal Transportation Forecasting Model, Final Report, Report No. FHWA-HPR-NM-91-07, August 1991; Newell, J.A. and T.L. Gotts, Michigan Statewide Transportation Modeling System: Michigan Goes Multimodal, Report No. Vol. XIII, Michigan DOT, July 1974.

or how the results influenced decisionmaking. Quite simply, the approach taken best illustrates important characteristics of multimodal planning.

Maryland's Commuter Assistance Study

The Maryland Department of Transportation completed a statewide commuter assistance study in 1990 which targeted 24 corridors in the state to identify transportation improvements "needed to ease commuter travel."[8] As noted in the summary report, this effort was not intended to study simply one mode, but rather it was "a study of how best to move people given the varied nature of commuter problems statewide". The menu of alternatives considered for each corridor included: express bus service, highway access control, roadway widening, shoulder bus lanes, exclusive bus roadways, high occupancy vehicle lanes, commuter rail, and light and heavy rail transit. The evaluation of the relevant alternatives for each corridor was undertaken from the perspective of its impact on the problem (i.e., its effect on future congestion levels as well as projected usage), its practicality (i.e., its compatibility with local plans, physical and environmental feasibility, and right-of-way opportunities), and cost. In order to illustrate the process adopted in this study, one corridor will be highlighted.

The Cecil/Hartford/White Marsh/Baltimore Corridor extends 40 miles northeast of Baltimore. It is a link in the Northeast Corridor between Baltimore and the Delaware/Maryland line, and includes a wide range of transportation options including road, rail, and bus service improvements. The evaluation of the alternatives for problem solution were based on the following measures:

- Screenline V/C ratios for low occupancy vehicle highway lanes at selected screenlines along the corridor.
- Percent of highway lane-miles operating at each level of service.
- Person miles traveled by mode, and transit ridership by mode.
- Percent of commuter miles by mode and level of service.
- Travel times by mode between selected points in the a.m. peak.
- Morning peak hour vehicle miles traveled for low occupancy vehicles.

Based on these and other criteria, the study recommended that five major actions be undertaken: enhance existing commuter transit service, develop high occupancy vehicle lanes, establish feeder bus service to existing rail services, expand existing rail service, and provide high capacity transit service in selected markets.

I-15 Alternatives Analysis

The I-15 corridor in Salt Lake City was designated in 1988 as one of the most urgent transportation problems facing the region. In response, state and local governments undertook an alternatives analysis which examined 12 alternatives, ranging from a no-build alternative to an extensive multimodal combination of transit and highway components. As noted in the report, the study:

> "compares the outcomes for each alternative and the intensity of highway and transit components within alternatives. While each alternative's highway and transit components are described and summarized individually, the analysis considered combined alternatives designed to address the total problem regardless of transportation mode. This approach helps the public and decision-makers make trade-offs between different levels of highway or transit investment"[9]

Over 50 performance and impact measures were developed for the alternatives. In the final evaluation of the alternatives, the discussion was divided into three major areas: improvements to I-15, transit improvements, and the combination of I-15 and transit system improvements. With regard to the last area, the study concluded that the highway-transit trade-offs were not as large as might have been expected. The addition of highway capacity did not seem to have any significant impact on projected transit ridership, and the addition of light rail transit did not reduce highway congestion significantly.

CHARACTERISTICS OF MULTIMODAL PLANNING

Multimodal transportation plans should clearly relate to the goals and problem definitions as defined previously. The elements of a plan should also be specific to the

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[8] Maryland Department of Transportation, Maryland Statewide Commuter Assistance Study, Summary Report, 1990.

[9] U.S. Department of Transportation, Wasatch Front Regional Council of Governments and Utah Department of Transportation, Draft Environmental Impact Statement, I-15/State Street Corridor, Report FHWA-UT-EIS-90-02-D, 1990.

characteristics of the application and the financial capability of a state or region. Congress has specified several elements that must be considered in the development of state and MPO "intermodal" transportation plans. The relevant section of the law is as follows:

Statewide Planning

"The State shall develop transportation plans and programs for all areas of the State. Such plans and programs shall provide for development of transportation facilities (including pedestrian walkways and bicycle transportation facilities) which will function as an intermodal State transportation system...Each State shall undertake a continuous transportation planning process which shall, at a minimum, consider the following:

The ISTEA then outlines the 20 factors that must be considered in the transportation planning process. These factors include such things as the results of the management systems, energy goals, bicycle/pedestrian transportation, port/airport access, metropolitan plans, connectivity between metropolitan areas, transportation system management, land use, innovative financing mechanisms, and the like.

For metropolitan planning, the ISTEA states that the long range plan shall "identify transportation facilities (including but not limited to major roadways, transit and intermodal and multimodal facilities) that should function as an integrated metropolitan transportation system, giving emphasis to those facilities that serve important national and regional transportation functions. The ISTEA then lists 15 factors, similar to those for the States, that must be considered in the regional transportation planning process.

Looking at the list of considerations, it seems that Congress intends that true multimodal plans should include everything that could possibly relate to transportation. However, there are several characteristics and elements of such planning that merit attention. These are discussed below.

Policy Goals and Objectives

The purpose of any planning effort is to inform decisionmakers. Therefore, it is very important that the planning process is informed on what the goals and objectives are. With regard to multimodal planning, it becomes extremely important that these goals and objectives be formulated to reflect a multimodal perspective. If the overall policy goal is fashioned in such a way as to bias the planning in one direction or another, it would be no surprise if the results of the effort were not multimodal in nature. Defining these goals and objectives in a multimodal perspective is something that should not be difficult. However, it requires transportation professionals and decisionmakers to ask themselves, when they formulate such goals if they could be construed as pushing the likely decision in a particular direction.

Problem Definition

The definition of the problem, similar to goals and objectives, is a very important part of multimodal planning that could present biases toward one mode. For example, for years, the perspective of the transportation profession was to improve the vehicle-carrying capacity of our highways. As long as we focused on vehicular throughput, we ignored the perspective of providing mobility without single occupant cars. The perspective shifts from a supply oriented approach toward planning to a demand management one. The problem definition process will become even more important over the next two years as nonattainment areas must identify transportation means of reducing mobile emissions, and the likely impact of alternative measures on air quality.

Criteria

The criteria used for planning, and in particular for evaluation, become critical elements of multimodal planning. Similar to the point made in "problem definition", if the criteria for evaluation focus on the performance of one mode, then the solutions will necessarily focus on that mode. An example from current practice could well illustrate this point. There is a great deal of interest in the profession to develop some form of "index" to measure the performance of the transportation system. In particular, research is currently underway to develop a congestion index that will presumably allow planners to monitor over time changes in system performance. I would submit that we should not be focusing on a congestion index, but rather a mobility index. If we are truly interested in mobility, then the measures of success of our transportation program should reflect this objective. Reducing congestion does not necessarily increase mobility.

Analysis and Evaluation Tools

Having the technical tools to analyze and evaluate the tradeoffs among multimodal alternatives is very important, and yet is seriously lacking. I have no doubt that existing models and approaches can be "adjusted" to come up with some estimate of likely impact. However, until we have the technical tools and approaches needed to provide some level of sophistication in such an analysis, the multimodal planning process could well be mired in strong disagreements over suspected biases in

technique. One opportunity for transportation agencies to develop a multimodal approach to planning is found in the ISTEA requirement for six management systems. My fear is that each will be developed independently of the other, with little interaction. At the very least, a common database could begin the process of providing the needed interaction among the systems.

Public Involvement

The ISTEA places a great deal of emphasis on public involvement. With different groups now likely to be involved in transportation planning, serious attention must be given to how these non-traditional groups are to be brought into the process. With regard to multimodal planning, the most important "new" groups are likely to be the business community and those groups concerned with air quality. How to implement many of the transportation measures likely to be required under the Clean Air Act will necessarily focus a great deal of attention on those groups, e.g., major employers, that must be involved in order for the measure to be successful. In particular, given the interrelationship between State and metropolitan multimodal planning efforts, how do we develop a **meaningful** public involvement process that encompasses both efforts?

Relationship Between Multimodals

Given the requirement for States and metropolitan areas to undertake multimodal planning, there is likely to be a period of time when the interrelationship between the planning efforts is uncertain. This could, in the next several years, create a transition period where the plans themselves might be inconsistent. Clearly, there needs to be some coordination among the different groups involved in developing multimodal plans. However, the timing of such activities, the linkage between projects, the important relationship to the State Transportation Improvement Program and the MPO Transportation Improvement Program, the interaction with required transportation control measures, the consistency of analysis assumptions, and the often different political constituencies that influence planning efforts at both the State and regional levels, are all elements that will influence how effective the multimodal planning effort is.

Institutional Issues

Another session at this conference will be addressing institutional issues, so I will not dwell on this topic. However, it needs to be mentioned because without the institutional framework to support multimodal planning and decisionmaking, such efforts will be unsuccessful. One of the few examples of a reorganization of an agency around a multimodal perspective occurred at the Los Angeles County Transportation Commission. The agency divided the County into regions and formed teams consisting of individuals with expertise on TDM, traffic engineering, transit, and public involvement. The transition to this format has not been accomplished easily. There needed to be serious decisions made about personnel, reporting relationships, training, and ultimate decisionmaking responsibility. In most cases, an institutional structure conducive to multimodal planning will not be easy to implement.

CONCLUSIONS

FHWA Administrator Tom Larson, at a recent conference on urban transportation, argued that the transportation profession is facing a "paradigm shift" and that what is needed is a new approach to doing things, in his terms, pliable paradigms. Specifically, he said,

> "Clearly, our "old paradigm" driven definition of one transportation goal, to complete the Interstate, influenced our perceptions in many ways. The focus on the engineering challenge of putting such an immense set of facilities in place contributed to the dominance of civil engineers in investment decisions. By defining the products in terms of construction, the opportunity for feedback on the social, economic, and environmental contribution of the facilities was limited. Assessments of alternative investments was limited to traditional engineering criteria. The focus on issues related to the facilities themselves distanced the designers and planners from the multiplicity of what we now consider relevant interests, even as the System matured. The highway community continued to follow the old paradigm, pursuing the provision of an even more pervasive system, providing facilities for the majority of vehicles and assuming that this was in the public interest."

In many ways, a multimodal perspective is a paradigm shift in the way we do planning. It will be a difficult step to take. However, I think it is a necessary step if we are to truly provide the most cost effective transportation investment to achieve the maximum levels of mobility in our States and urban areas.