



U.S. Department  
of Transportation

**Urban Mass  
Transportation  
Administration**

# UMTA Technical Assistance Advisory Seminar

## Ann Arbor, Michigan

July 1984

**UMTA Technical Assistance Program**

### HIGHLIGHTS

The Urban Mass Transportation Administration's Technical Assistance Advisory Seminar was held in Ann Arbor, Michigan on September 13-14, 1983. The conference, sponsored by the UMTA Office of Technical Assistance, brought together over 50 transportation professionals to discuss the composition and direction of UMTA's Technical Assistance Program.

As the conference progressed, it became evident that although disagreements existed over specific project areas, some consensus on UMTA program directions had emerged:

- **Emphasize Technology Transfer:** There are many good UMTA programs that are underutilized and underpublicized. Better and more widespread use of proven technologies is clearly preferable to solutions that require sophisticated equipment or new specialized skills. It was suggested that UMTA undertake an in-depth examination of existing technology transfer efforts with the objective of enhancing the process.
- **Concentrate on Near-Term Solutions to Needs Defined by the Industry:** The balance between long-term R&D and outreach activity oriented to addressing critical short-term needs should continue to swing toward the latter. In this sense, the UMTA Technical Assistance Program should reflect a "bottom-up" approach and include more guidance from the ultimate users of technical assistance.
- **Pay More Attention to Training and Techniques Which Can Improve the Management of Transit:** Although UMTA has been shifting emphasis to the "soft" technologies, many advancements in finance, information systems,

construction management, business management and human resource development have only begun to be exploited. UMTA should continue to shift its technical assistance emphasis toward the managerial fields.

- **Where Possible, Undertake Fewer, But Bigger Programs:** Better progress in equipment and facility improvements could be made if research efforts were more sharply focused on carefully selected priority areas. However, the recommended emphasis on technology transfer, near-term solutions, and management development will require UMTA to continue with a relatively large number of small-scale, geographically dispersed activities.
- **Encourage Public/Private Cooperation Among Service Providers:** The general consensus was that the transit industry could make better use of private transportation providers in complementing service provided by publicly owned transportation systems. Research efforts are needed within UMTA to find ways to involve private providers in the federally mandated planning process, encourage cooperation between public and private sector providers, and resolve labor issues.
- **Continue Support for Research and Development performed by the Private Sector:** Private sector investments in research and development for transit are restricted by the market size which provides limited opportunities for amortizing R&D costs. UMTA support for a share of these costs is necessary if private sector technical expertise is to be applied effectively on improvements which are needed nationally.

## FOREWORD

It is appropriate, from time to time, to refocus on the technical mission of the Urban Mass Transportation Administration. The most basic responsibility given to UMTA by the Congress is to assist in the development of improved mass transportation facilities, equipment, techniques, and methods, with the cooperation of both public and private sectors of the transit industry.

In keeping with this charge, and in response to several workshops which have been held, prior to this seminar, to discuss various aspects of the future of urban mass transportation, this UMTA Technical Assistance Advisory Seminar was held in Ann Arbor, Michigan on September 13 and 14, 1983.

To help focus the seminar discussions, four general topics were identified:

1. Operations and maintenance
2. Finance and pricing
3. Human resources and management
4. Equipment and facilities

Participants were drawn from the executive, administrative and legislative branches of the federal government; from transportation consulting, engineering and management firms; from manufacturers and suppliers of transit hardware and software; from diverse disciplines in academe; from transit operations, drawing upon management, maintenance and human resources officers; from highway and transit trade and professional associations; from both public and private providers; and from consumer organizations. It should be noted that though several members of organized labor were invited to participate, none were able to attend.

While the discussion groups' deliberations were spirited and there were some disagreements over semantics, consensus was reached on a number of important issues. I believe these are summarized accurately in the report which follows.

We are most appreciative of the opportunity accorded by UMTA to engage in a "no holds barred" dialogue. Given the current trends in mass transit, one might safely forecast that the furnishing and delivery of mass transportation technical assistance is likely to be more directly focused on the specific present needs of the transit operator and on the needs of the transit customer.



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Milton Pikarsky  
Seminar Chairman

# INTRODUCTION

The Urban Mass Transportation Administration (UMTA) Technical Assistance Program is authorized under seven different sections of the UMTA Act (as amended).

- Section 6 is targeted for research, development, and demonstrations;
- Section 10 is for management training;
- Section 11 is set aside for university research;
- Section 3(a)(1)(C) introduces new technology;
- Section 4(i) is devoted to encouraging new services and management techniques;
- Section 15 authorizes the establishment and maintenance of a national set of Urban Mass Transportation Statistics; and
- Section 22 provides the UMTA Safety Authority.

Since the early 1970's, the relative size of research and training programs within the general scope of UMTA activities has diminished precipitously. In 1973, such programs represented 17% of the total UMTA budget; today, that figure stands at approximately 1.5%. In constant dollars, UMTA is presently spending less on research and training programs than at any time in its history.

During the past decade - and especially in the last few years - program emphasis has been shifted in several significant ways. The initial UMTA program emphasized development of major hardware-oriented systems which could take advantage of emerging technologies. These new system developments have given way to an increasing concentration on subsystem improvements and the "soft" sciences (management training, operations analysis, policy-oriented studies, marketing and planning). Presently, the budget consists of approximately 50% technology-oriented activity (primarily subsystem refinement), with the remainder devoted to management and human resource developments.

A related yet distinct issue is the emerging programmatic emphasis on implementation assistance at the expense of research and new development. Two new sections of the UMTA budget, 4(i) and 3(a)(1)(C), have been added specifically to help transit agencies with the difficulties and start-up costs associated with introducing innovative techniques and technologies. In general, today's Technical Assistance budget provides a much higher level of near-term problem solving and assistance with implementation than was offered previously.

It is important to note that this shift in emphasis from longer-term, more speculative research and development activity to short-term, immediate impact implementation assistance is distinct from a shift from hardware to software emphasis. Although it is generally true that benefits resulting from technology-based hardware investment are realized in the longer term, it is important to emphasize this correlation is a tendency, not a truism. Much of the subsystem refinement work presently underway is, in fact, premised on short turnaround time.

Mechanisms for conducting technical projects have also changed gradually over recent years. About half of UMTA's research and training program is now being carried out through grants to local agencies. This contrasts sharply with methods used during the "big program" era when limited research and development funds found their way into the hands of transit agencies. By putting project direction closer to the users of new technology, UMTA hopes to produce more relevant, useable results and build more technical capabilities within operating agencies. How successful this will be, and how cost-effective it is, depends on the skills of UMTA and transit agencies in selecting and managing projects which are transferable and meet critical needs. Although the approach appears to be working, it has not been in operation long enough to evaluate fairly.

Two other changes are worthy of note. Instead of a few large programs, UMTA is now sponsoring an increased number of small projects. In fact, the latest edition of *Innovation in Public Transportation*, the directory of technical programs sponsored by UMTA, lists about 600 separate projects. The following list is included to illustrate the diversity of programs funded under the Technical Assistance budget.

- Bus brake and air conditioning improvements
- Development of construction techniques for rail line rehabilitation
- Fare collection studies
- Energy management programs
- Pre-testing of rail vehicles
- Development of evacuation techniques
- Safety programs: fire prevention, introduction of flame-resistant materials
- Marketing and passenger information programs
- Management training scholarships
- Paratransit management programs
- Collection and reporting of transit statistics
- Labor management conferences
- Publication of abstracts and research reports
- Host programs and peer matching, where transit agencies with a problem are "matched" with other agencies which have successfully dealt with similar problems

Finally, UMTA has made a concerted effort to improve communications with the transit community in general. During 1973, it sponsored no meetings and produced no publications which were aimed specifically at transit operators. The 1983 calendar, by contrast, lists close to one workshop per week. Most sessions are conducted by or in cooperation with the American Public Transit Association, the Transportation Research Board, universities, and other institutions which represent the broad community which serves public transportation.

Although the individual program offices in UMTA use many of these meetings to elicit information about technical assistance needs, their meetings tend to focus on specific modes or technical and managerial disciplines. This seminar at Ann Arbor was organized by UMTA to obtain comments from a broad cross section of the transit industry on UMTA's overall program. Stated objectives of the seminar were to:

- Provide UMTA with the transit industry's current assessment of needs for training, planning and management tools, operating techniques, and technological advancements which have the best potential for improving transit productivity and performance.
- Obtain industry advice on mechanisms UMTA may use to provide effective technical assistance in these areas and to stimulate private sector and local initiatives.

In his introductory remarks, Peter Benjamin, Associate Administrator for Technical Assistance, stated that UMTA was especially interested in obtain-

ing help in resolving four basic questions:

- What should the balance be between R&D and outreach?
- Should resources be concentrated on a few major projects, or dispersed over a number of smaller-scale efforts?
- Should the Technical Assistance Program be bigger or smaller?
- What is the most appropriate role for the private sector?

Dr. Benjamin emphasized that participants should not attempt to address detailed operational or training problems, but should utilize these specific issues as a context for broader discussion. It was made clear that UMTA was not requesting "laundry lists" of specific program suggestions.

The group met in subgroups for six hours of intensive discussion. Each subgroup offered its recommendations for general review and comments. The following sections detail the discussions of each of the four subgroups.

# OPERATIONS AND MAINTENANCE

The Operations and Maintenance discussions included representatives from operating authorities, federal agencies, academia, trade associations, equipment suppliers, and the taxicab industry. Chaired by Jack Doolittle, former Chairman of the Massachusetts Bay Transportation Authority, the group structured its discussions around the four major issues offered in the suggested agenda: service planning and scheduling, safety and security, operations monitoring and control, and maintenance planning and management. They first addressed the needs within each area individually, and then attempted to prioritize these in their conclusions. Before detailing the specific discussions, however, it is helpful to summarize the more general philosophical perspective which served as the basis for the more substantive discussions.

The group concluded that the need to maintain an ongoing Federal R&D program was evident, as the private sector has little direct incentive for investing in developments for public transportation, and also because transit agencies are compelled by their local government structures to focus on immediate service needs and day-to-day problems. Under these conditions, local agencies tend to limit their R&D investments to work which can yield an immediate return in a single application. Because many problems facing transit management are common to all agencies, however, the most equitable and efficient solution is to assign specific research projects to a central authority which both receives its funding from and disperses its benefits over a wide audience. Because it also has a financial interest in improving transit productivity, the responsibility to address common problems falls most appropriately to UMTA.

The group recommended that UMTA emphasize research on the management, financial, and human aspects of transit. They recognized also that some balance should be maintained between short-term assistance and longer-term technologically oriented R&D projects which have a more speculative, but potentially higher, payback. In agreement with the other groups, they felt that fewer projects would be better and hardware efforts should concentrate on subsystem improvements which can be introduced into the existing infrastructure.

In addition to encouraging UMTA's focus on "softer" projects and near-term technology evolution, the group recommended an increased emphasis on information dissemination activities. Previously sponsored programs, while representing potentially valuable research, are presently underpublicized, and as a result are underutilized. UMTA should also recognize the impact and role of innovative research and experimentation outside its environs (either at the transit agency level or overseas), actively publicize these efforts, and help agencies to avoid duplicating such progress.

A "bottom-up" approach to program planning was advocated. UMTA should more actively solicit the perspective of operators to determine how funding could best be allocated. Because the problems facing the transit industry are immediate and potentially crippling,

UMTA should be especially sensitive to manifest research and development needs as encountered by operators.

## Service Planning and Scheduling

The group saw the management and planning aspects of service planning and scheduling as well-developed and not a strong focus of technical assistance efforts. A lot of good research has already been done in this area; technology transfer by practitioners and outreach assistance from UMTA should represent a sufficient level of effort. However, the importance of such information exchange efforts should not be underestimated, as the service planning function affects virtually all aspects of a transit agency's budget.

Although the methodologies available for service planning were considered adequate, data limitations often inhibit the effectiveness of management efforts. Improvements in passenger counting and performance monitoring techniques would be of assistance to route and schedule planners.

## Safety and Security

For purposes of these discussions safety refers to operating safety, that is accident avoidance, evacuation techniques, fire prevention, etc. Security refers to ensuring passengers a crime-free environment. The consensus to emerge from this area of discussion was that the "softer" side of the security function needs work, particularly the training of transit police forces. The perception of personal safety also must be enhanced. It was suggested that some original R&D on how to appeal more effectively to the psychology of the community (better lighting more prominent police presence alternative station design increased public relations effort) was needed. Revenue collection equipment (as it relates to security) also could use development, although this was not perceived as a major research problem.

In terms of safety needs, it was suggested that improved standards for maintenance of way and equipment should be developed, and standards for personal safety should be incorporated in the design of new rapid transit projects and station rehabilitation projects.

## Operations Monitoring and Control

The group felt there was presently adequate technology available to do a better job with operations monitoring and control. Except for accounting and financial functions, however, the transit industry's use of information processing technology is minimal, in spite of rapidly falling equipment costs and well-suited applications.

For example, in the area of vehicle monitoring, dispatching systems which track buses are now readily available in the market place. Moreover, computer technology presently exists to process this and other forms of performance data quickly and efficiently. UMTA must investigate:

- Whether performance oversight is aided by this technology, and if so,

- How should the hardware be deployed? How large a computer system is needed? Should operators put vehicle locators in every bus? 50%? 25%?

Although the need for more effective performance oversight is evident, most operators will be cautious about introducing new technologies which can be expensive, difficult to maintain, and beyond the technical skills of typical transit operations personnel. The Technical Assistance Program could play a valuable role in helping the industry to evaluate these new technologies.

### **Maintenance Planning and Management**

The group felt that maintenance planning and management should receive top priority (within the operations and maintenance field) in the allocation of the Technical Assistance budget. However, it was suggested that the problems plaguing maintenance management may result more from inattention and lack of knowledge than from research deficiencies. This would suggest that an appropriate UMTA role may be as a facilitator, funding technology transfer programs and encouraging innovative applications. Such implementation assistance is considered vital. Peer matching was seen as particularly applicable to maintenance planning, as maintenance employees traditionally turn either to their contemporaries or to manufacturers to solve problems. It is important, therefore, for

UMTA to publicize its peer matching programs within the maintenance community.

Another peculiarity of maintenance planning is that it is commonly and vigorously defended as a local issue which in practice must reflect the unique circumstances and needs of each transit operator. In this atmosphere, comprehensive maintenance programs may be perceived as inflexible, inappropriate, and insensitive to the agency's needs. For future UMTA technical assistance to be cost-effective, efforts will be needed to isolate and define common problems and provide input to UMTA on improvements which would be transferable and could be used by a sufficient number of agencies. Mechanisms are also needed to help guide developments by manufacturers, management systems experts, and other outside technical resources and to assist agencies with implementation.

Effective maintenance planning is also hampered by present procurement practices. By basing its equipment selections primarily on initial purchase price rather than life-cycle costs, the procurement process represents an obstacle to service and maintenance goals. It would be helpful if UMTA could improve the quality of information needed by agencies to make procurement decisions which result in more durable equipment and which are less subject to protests.

Some specific suggestions for improvement included development of maintenance diagnostic equipment, and improved training manuals for maintenance personnel.

## **FINANCE AND PRICING**

The finance and pricing discussion group was perhaps the most diverse assemblage, with representatives from operating authorities, state and federal agencies, academia, trade and consumer organizations, and equipment suppliers. The group moderator was Richard Simonetta, Executive Director of the Ann Arbor Transit Authority. With only two members directly employed by a transit authority, it could have been expected that the group's observations would be more objective, yet perhaps less practical, than input provided by the remaining conference participants. However, its perception of the present needs of the transit industry was remarkably similar to that of other groups.

The group agreed that the federal government has a definite role within the general R&D effort. In addition, local investment (from either city or state funding sources) in innovative, yet untested, operating and management practices is limited by political concerns. This risk aversion is exacerbated by the financial difficulties presently plaguing state and local government.

The direction of this R&D effort should be oriented to the "softer" projects — management sciences, training programs, policy and planning studies, etc. It was felt that the transit industry did not need, nor could it

afford, exotic new hardware without first ameliorating its severe management and financing problems. The Technical Assistance program should concentrate on helping transit do a better job with the resources that are presently available.

That said, the group concluded that it is not generally new ideas that are needed. UMTA has sponsored some valuable research which presently is underutilized, due to dissemination difficulties. Developing better implementation mechanisms, such as productivity seminars, peer matching and the like, should receive high priority. The group went so far as recommending that a project be initiated immediately to determine how well the current information dissemination effort is working, and further identify more effective delivery systems. Present programs earning notable praise included the productivity seminars run in conjunction with APTA; the use of UMTA regional offices and other local sources such as state DOT's and universities to provide technical assistance; and the "regional facilitators" program which UMTA is testing in Region III and Region V. The group strongly advocated this kind of local approach to technical assistance emphasizing on-site, demand-responsive expertise with implications of a more prominent role for UMTA regional offices.

Like every other group, the members had a difficult time getting a handle on the program size issue. Although members tended to agree that the program size was about right, it was clear this was a very impressionistic assessment, based on extremely limited information. The structure of the UMTA budget was too generic to be helpful in this regard. The group expressed a desire to distinguish between that which is truly technical assistance, and what is more basic technologically oriented R&D. For example, if all of the information dissemination efforts conducted under various sections of the UMTA Act could be broken out as a single line item, it would give participants a better feel for UMTA's current priorities.

The group offered some specific suggestions for UMTA involvement in the area of finance and pricing:

- UMTA should work toward developing a standardized, analytical framework for cost containment, directed primarily towards rural and small urban systems. It was noted that the basic management and budgeting skills needed to streamline an organization's cost structure were sorely lacking at this level. A handbook or guide which outlined the steps a small transit manager should follow to analyze and control costs would be of great value.

- UMTA should synthesize existing information on fares and fare policy, particularly relating to distance based fares and peak hour surcharges. Additionally, UMTA should examine present applications of these pricing innovations, and generalize where these innovations will work, and where they will not.
- In one of its few hardware-oriented recommendations, the group felt that advancing the state-of-the-art in electronic fare collection systems could aid in providing a more efficient and equitable service.
- Members of this group contend that better coordination between public and private transportation providers could ameliorate transit's funding problems through better utilization of off-peak school buses, taxi and paratransit services, etc. UMTA assistance in evaluating these kinds of alternatives would be helpful.
- It was also suggested that identifying the external beneficiaries of transit, and further formulating strategies for sharing in this presently uncompensated value, should also receive further research.

## HUMAN RESOURCES AND MANAGEMENT

The Human Resources and Management Discussion Group consisted of representatives from major transit authorities, trade associations, and academia. Chaired by David Gunn, the general manager of the Southeastern Pennsylvania Transportation Authority (SEPTA), the group contained more general managers, past or present, than any other group (4), as well as the lone participating board member. This composition lent the group discussions a distinctly "top-down" perspective on the problems encountered by transit management.

The strongest consensus to emerge was that the UMTA Technical Assistance budget has historically overemphasized hardware at the expense of the human aspects of transit service provision. However, transit operators cannot foist all the blame for the industry's management problems on UMTA. The problems stem in large part from a lack of urgency among industry management in addressing these difficulties. Such inattention cannot continue if the transit industry is to retain and attract well-qualified people.

In addition to increasing the budgetary emphasis on the "soft" sciences, the group felt that UMTA could better disseminate the information already available. Although there is a large amount of information circulating, there is no sense of priority to the process, nor is there an appealing medium through which to circulate that information. It was suggested that UMTA needs to develop a more visually engaging document - shorter, easier to read, eye catching (e.g., a 2-3 page fact sheet detailing the activities of the transit industry within a well-defined subject area). It was also suggested that UMTA fund documentation of agency-

sponsored innovation as a way to increase the breadth of the technical assistance program at minimal cost.

The scope of the dissemination problem was best exhibited by the group's relative ignorance of projects sponsored through the Technical Assistance Program. Participants were consistently surprised that many of their ideas for human resource management have already been developed and applied, frequently under UMTA funding.

### Executive/Board Relationships

The group highlighted three specific areas within the realm of general management which needed attention. Due in part to a perception of need and in part because of the group's composition, the issue that was subjected to the longest discussion was the relationship between the General Manager and the Board of Directors. Participants acknowledged this was a difficult area for UMTA research efforts to address, as each agency's relationship is unique, for political, geographic and institutional reasons. This situation makes it difficult for UMTA to resolve problems and still ensure that its research findings retain value for other agencies. Transferability of results has always been an important justification for conducting technical assistance efforts at the federal level.

However, the group expressed interest in an UMTA-sponsored project which would catalog information on the basic organizational structure of Boards of Directors. This documentation should include:

- How the Chairman is elected, how long he (she) serves.

- Roles and powers of Chairman vis-a-vis General Manager.

The group emphasized that what was desired was simply factual information, not in-depth evaluations of organizational structures. Each agency could then make its own generalization about what is relevant and potentially effective.

It was also suggested that UMTA increase emphasis on instructional classes for board members, both alone and in sessions with senior management. It is important to develop some communication with respect to role definition and expectations in these sessions, although group members cautioned there is no one "model" Board-GM relationship to emulate. Each agency faces unique circumstances, and each must be furnished management recommendations which are general enough to be flexible, yet concrete enough to provide substantive assistance. The group realized that seminars for board members have already been attempted, with limited success. However, participants felt the issue was important enough for UMTA to re-evaluate the marketing and logistical arrangement of the conferences, with an eye towards enhancing their appeal.

### **Human Resources Management**

The second area that the group felt required attention was human resources management. The group was frank in its appraisal, concluding that there was a general scarcity of talent in the industry as a whole, but particularly at the management levels. This is in part due to the traditional industry career path, where technical people (engineers, operations personnel) rise through the ranks into general management. Although such individuals are generally well-schooled in the operational aspects of running a transit system, they frequently may lack fundamental management skills, such as budgeting, accounting and personnel management. UMTA could play an important role by developing training programs to prepare these technicians to become better managers. Information on these programs should be targeted to those individuals who are likely to be most interested, and who have the power to act (i.e., the General Manager or the Executive Officer).

It was agreed that the commitment to invest in training is a general policy decision that is best made at the executive level. Moreover, the fact that the General Manager has endorsed a training program lends that program a certain legitimacy. This sense of importance can provide valuable motivation to those participating in the program. In addition to these management training programs, UMTA should continue to

develop improved programs for hourly workers (although the group felt that the conduct of such programs should be a local matter).

In general, it was suggested that the transit industry is starting from level ground-zero in the human resources management field. (The group expended a substantial block of time determining just what was meant by "human resource management".) As a result of leadership noted for its "crisis-oriented" management style, a systematic evaluation of human resource needs has been precluded by the more immediate need to "get the buses out on the street". This myopia can, in part, be attributed to the volatile and politically charged environment with which transit managers must contend. However, irrespective of cause, the acknowledged scarcity of talent in the industry is testimony to the severity of the human resource management problem. The transit industry, by historically neglecting the function, has inadvertently elevated its status from a low priority luxury to a short-run necessity. It was suggested that UMTA needs to document the general scope of human resource management needs as well as to disseminate information on what other agencies are doing, with special attention devoted to the areas of information systems, manpower planning, and general training efforts.

The group felt that the field of human resource management has not taken full advantage of the low cost computing capabilities presently available. The idea of automated data banks to measure the effectiveness of current training programs and to document human resource efforts was enthusiastically endorsed. It was felt there is presently poor documentation on which individuals complete training programs, who is qualified for training, etc. Given the present situation, it is virtually impossible to measure the value of such programs. These problems could be addressed if transit agencies were awarded Technical Assistance funding to develop some form of prototype system (either in-house or through consultants).

### **Labor/Management Relations**

The third and final recommendation was not surprisingly that UMTA increase program efforts in the area of labor relations. It was suggested that UMTA undertake a basic industrial relations training effort with management courses in negotiation, motivation, and supervision. Joint management-labor sessions should also be initiated, stressing the commonality of interests, and sensitizing each side to the other's concerns. It was noted that UMTA should support university involvement in this area, as academics often serve as neutral "third parties", facilitating cooperation between labor and management.

# EQUIPMENT AND FACILITIES

The equipment and facilities discussions included representatives from equipment suppliers, federal agencies, and academia. Chaired by Steve Kauffman, former head of the New York City Transit Authority, the group provided a unique insight into how the private sector sees its role in the provision of technical assistance and R&D. Surprisingly, however, the group's perceptions of the needs of the transit industry did not substantively differ from the remaining conference participants (primarily representatives of transit authorities, trade associations, or academia).

## UMTA Role

The group consensus was that the federal government has an important role within the general R&D effort. Participants noted the structural market barriers to performing industry R&D. The market for transit vehicles is limited, competition among suppliers is intense, and purchases are sporadic. It was suggested that it is difficult for equipment manufacturers to amortize research and development costs over such a limited market and still remain cost competitive. Because of the traditional government procurement practice of awarding vehicle contracts to the lowest bidder, suppliers historically faced strong disincentives to initiate innovative (but risky) research and development activity. Although efforts are being made to improve procurement practices, the structural market problem still remains as a formidable barrier to industry-sponsored research and development.

## Dissemination

The group consensus was strong that UMTA must develop better methods to disseminate existing information. The agency has funded some valuable work, but the delivery of these research findings to those in need has been ineffective. The group suggested a short-term (6-12 months) research project to explore improvements in better disseminating the useful information UMTA presently possesses. Research abstracts were not perceived as an effective way to disseminate information. This medium was found to lack visual appeal, and represented an overly academic treatment of the subject matter which operators found entirely inappropriate. Suggested alternatives included:

- An 800 number in Washington to facilitate quick response to problems. Although implementation was not discussed in detail, the general principle would involve the sharing of "success stories" through some form of central network distribution service. An 800 number embodies a number of important attributes: (1) it provides demand-responsive service; (2) the service can be supplied with a short turnaround time; and (3) it more efficiently utilizes a readily available resource.
- Cassette tapes that could be listened to on the way to work.
- Films that could be viewed at home with a video recorder.

An important by-product of more successful information dissemination would be an enhanced image, both within the industry and the general public, for UMTA. Presently, agency-sponsored R&D is eyed somewhat skeptically as a result of the relative failure of a few large-scale projects initiated in the late 1960's and early 1970's (Transbus, Morgantown Downtown People Mover). Improving the knowledge of UMTA's successes could help immeasurably in ameliorating this image problem.

In the context of the information dissemination question, an institutional framework for peer matching was also discussed. It was suggested that an intermediary was needed between that agency having a problem and that source (whether it be UMTA, other agencies, universities, or consulting firms) which has experience with a similar problem. Discussion revolved around the success of the "county agent" program, whereby states appoint county agents who can either respond or find someone to respond to agricultural questions posed by farmers and private citizens. Because of parochialism and prejudices, it is frequently as difficult a shop foreman to communicate with college professors. Pride often inhibits the willingness of one transit operator to directly appeal to another to help solve its problems. Possibly, a state's transit agencies could be represented by one "facilitator" who can contact and converse with experts in all fields of transit operation and management. It was suggested that UMTA regional offices may want to examine the logistics and cost of providing this service.

## Focus for R&D

The group formulated some specific recommendations for enhancing the value of Technical Assistance Program spending. In terms of funding expenditures for the "soft" sciences, the feeling was that:

- The Technical Assistance program should hasten its emphasis on applied research oriented to solving critical problems.
- UMTA should choose a limited number of substantive areas to be improved (for example, maintenance planning and peak/off-peak load balancing) and fund a series of local efforts to correct these few problems. The group felt that the present budget spreads funding across too many political constituencies. This practice results in an inability to undertake sufficient research in any one area to have a significant impact.

For R&D spending, the group suggested that:

- Research efforts should concentrate on subsystem refinement (i.e., component improvements) rather than system development.
- Fewer but bigger projects should be funded. One or two significant problem areas (i.e., brakes, fare collection, air conditioning, energy conservation) for which there will be the highest anticipated payoff should be identified. The estimated "payoff" should be calculated within a

probabilistic cost-benefit framework, where a project's projected stream of benefits is discounted by its probability of actually occurring.

- If truly effective R&D is to be done, UMTA will need to invest between \$10-20 million for each effort. UMTA should attempt to identify high payoff projects which must be large-scale to be effective, and bid for additional set-aside R&D funds.

The group found it difficult to get a good handle on overall program size without a better idea of the

effectiveness of the present program. For this reason, they did not feel prepared to comment on whether the program should be expanded or contracted. However, the group noted that in the foreseeable future, a high level of expenditure will be necessary for facilities rehabilitation, construction of new rail facilities, and construction of bus maintenance facilities. Vehicles are only one area where the technologies and contracting processes need work; because of the magnitude of the investment, construction management improvements are perhaps even more important.

# CONCLUSIONS

Before reiterating those recommendations receiving consensual agreement from conference participants, it is important to note a fundamental point made at the concluding general session: The UMTA Technical Assistance Program should ideally reflect national goals and objectives for public transportation. Lacking such explicit goals, it is left to each affected individual to define what the Technical Assistance Program should address, and ultimately what transit is expected to accomplish. It is then UMTA's responsibility to synthesize these subjective assessments into a coherent statement of policy.

This assignment poses a formidable challenge to UMTA. Although assembling such an eminently qualified congregation to discuss the needs of public transportation is commendable, it is unreasonable to expect that 51 carefully selected individuals can possibly represent the breadth of opinion pertaining to the needs of the transit industry. However, the consensus of opinion on many fundamental philosophical issues must be heartening, especially where it represents a confirmation of present UMTA policy direction. It is helpful to summarize these recommendations in the context of the four basic questions posed by Peter Benjamin at the opening session.

## **What Should the Balance Be Between R&D and Outreach?**

This question raises two distinct issues:

- New Research vs. Broader Application of Existing Knowledge
- "Hard" Sciences vs. "Soft" Sciences

Deliberations regarding each issue are discussed separately.

## **New vs. More Applications**

**Recommendation:** Focus on technology transfer rather than new research.

The group concluded that UMTA should continue to make better and more widespread use of existing techniques and technologies. Rather than undertaking new developments, UMTA should seek applications which help to resolve current problems. This means more emphasis on implementation and aiding in the transfer of knowledge among operating agencies; more direct assistance on-site; and more information outreach.

The group applauded UMTA efforts to disseminate information more actively through innovative implementation mechanisms (peer matching, regional facilitators, etc.) but agreed that actual use of the many available mechanisms was spotty and generally poor. Both hardware and management-oriented discussion groups recommended that UMTA evaluate the effectiveness of its dissemination methods. It was pointed out in the concluding session, however, that the industry should also examine its receptiveness to obtaining and applying new knowledge.

## **Hard vs. Soft**

**Recommendation:** Emphasize "soft" sciences.

UMTA should continue to move toward meeting the management and human resource development needs of the transit industry. Participants stressed that the principal problems of transit agencies lie in the complex realm of management, finance, and politics. As a labor-intensive service industry, their greatest dependency is on people, and their best opportunities for improving both efficiency and service appear to be with the human element. The group also pointed out that although equipment and facilities cannot be neglected, improvements in operations and management can usually be introduced faster than hardware and can be expected to show results sooner.

## **Should Resources Be Concentrated on a Few Major Projects, or Dispersed Over a Number of Small-Scale Efforts?**

**Recommendation:** For equipment and facility R&D, concentrate on major projects; in other areas, recommended emphasis on outreach will probably lead to a large number of small-scale efforts.

The question of whether UMTA should concentrate its resources into fewer but larger projects met with varied responses. In discussions of equipment and facilities, the group felt that more progress could be made if efforts were more sharply focused on carefully selected priority areas. In other fields, participants found it difficult to conceptualize how research and training and direct technical assistance could be consolidated and still serve the diverse needs of the industry.

It must be understood that the fundamental programmatic directions advocated by conference participants — stressing outreach and implementation assistance — are inherently small-scale, geographically dispersed activities. This desire to achieve broader application appears to call for more rather than fewer projects in technical assistance. However, for the research and development work on hardware which UMTA continues to sponsor, the group's concern with "focus" appears to imply funding fewer but larger projects.

## **Should the Technical Assistance Program Be Bigger or Smaller?**

**Recommendation:** Unsure.

Challenged by statements during the opening session, all four of the discussion groups addressed this issue but were reluctant to offer a consensus. In most cases, participants felt they needed more time to study the issues, more information on the program, and a better understanding of nationwide needs for technical assistance.

It is not possible to evaluate effectively the question of overall program size without carefully considering which elements of the program should receive

more emphasis, and additionally whether other elements should receive less. Therefore, discussions of program size inevitably forced participants to examine their sense of whether or not the programmatic allocation of the Technical Assistance budget was optimal. Could shifts in emphasis provide a better match to national needs, assuming the size of the budget remained constant? Participants again could not reach a consensus, commenting generally that they found it difficult to relate UMTA's budget categories to breakdowns familiar within their own organization. They suggested that some cross-cutting budget analyses would help in future seminars of this kind.

Another important factor in assessing the overall budget is the proportion which is actually discretionary and can be modified to meet current expressed needs of the industry. Participants were unaware that significant portions of the research and training budget are earmarked for mandated projects and are not available to assist local agency initiatives. Many suggested that total budget size may not be as important as its flexibility.

In sum, participants found the question of program size complex and unwieldy. Difficulties in analysis were exacerbated by participants' lack of information regarding the overall scope of the program.

### **What is the Most Appropriate Role for the Private Sector?**

**Recommendation:** Encourage public/private cooperation between service providers; continue support for R&D performed by the private sector.

The private sector can aid public transportation efforts in two ways: 1) by providing supplementary transportation service; and 2) by providing the public transportation industry with technical support and assistance. Conference participants foresaw these roles evolving very differently.

The general consensus of participants was that transit could make better use of private transportation providers in complementing publicly owned transportation systems. Technical assistance is needed in this area to help the industry in obtaining data on the cost-effectiveness of contract services. In the discussions on Finance and Pricing, the group concluded that efforts are also needed within UMTA to find ways to involve private providers in the federally mandated planning process, encourage cooperation between

public and private sector providers, and resolve labor issues.

It was further suggested that a relatively nominal UMTA investment in facilitating this relationship could yield high returns. It is possible that, in certain cases, private transportation providers would be eager to tap a new revenue source, particularly in situations which enable the provider to spread fixed costs over a wider user base. In such a case, regional transportation service hours or service areas could be covered at a lower cost per passenger mile.

Participants agreed that opportunities exist and the technical and managerial talents necessary to make substantial productivity gains are readily available to transit in the private sector. Most transit-related R&D has been performed by the private sector in the past and the group could see no reason why it should not continue to do so. However, industry members pointed out that there are a number of structural market barriers to private financing of such R&D.

From the industry's standpoint, the transit market is small, sporadic, and often overcrowded. Suppliers cannot amortize any significant investments in R&D over this limited market and remain cost-competitive. Because the returns on most such R&D investments are ultimately realized by transit operators only by long-term reductions in operating costs, they are difficult to substantiate and factor into initial procurements.

Transit agencies are rarely able to sponsor research and development on their own. Most local funding is raised and directly earmarked for operations, and it is difficult to convince local government board members to invest local funds on problems common to the industry. The prudent local course of action is to let someone else bear the costs and headaches associated with innovation, and implement new techniques or technologies only after they have been thoroughly tested.

This leaves UMTA's Technical Assistance Program as a principal means for getting private sector expertise applied to the management and technologies of transit. The Seminar consensus was that effective private sector R&D will require both continuing sponsorship by UMTA and a high level of communication among sponsors, users and performers of technical assistance.

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