

Federal Transit Planning and Research Program Workshop Report



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1.0 ENGINEERING

CHAIRPERSON: Gene Skoropowski, FACILITATORS: Jim McDowell,
Fluor Daniel Transportation Mfg. Co.
CO-CHAIR: Steve Barsony, FTA Richard Tanzil, Deluew
COORDINATOR: Jeff Mora, FTA Cather
REPORTER: Karla Karash, EG&G Dynatrend Richard Wiedenbeck,
Walt Disney

Mr. Skoropowski's summary follows:

"We started with simple guidelines. We had as many topics as number of participants, and 54 items at the outset. The guidelines we established for ourselves were:

- a. Customer focus (who are our customers and users).*
- b. Develop a useful product.*
- c. Timely implementation (5-6 year horizon).*
- d. Economic benefit to the industry that improves the product/business and services to our public.*
- e. That it makes sense.*

We then looked at what the operating and supply industry had talked about; which broke down into six broad areas:

- 1. Reduction in operating and maintenance costs: 25% allocation*
- 2. Increased ridership: 15% allocation*
- 3. Mandated programs: 20% allocation*
- 4. Vehicle weight reduction: 15% allocation*
- 5. Institutional changes: 10% allocation*
- 6. Capital costs: 15% allocation*

PRIORITY OF PROJECTS

We then developed criteria and broke down subgroups into 37 research projects. We narrowed that list further to the top 21 projects. Two levels of priority were identified. The first priority group is as follows:

- 1. Energy utilization for propulsion (type, storage, propulsion system).*
- 2. Passenger convenience (what are the barriers and obstacles that prevent or discourage people from using the system).*
- 3. Intelligent vehicle utilization (mapping, dispatching, monitoring, etc.).*
- 4. Evaluation of new materials (composites, etc.) to combat weight increases being put on vehicles from mandated and other programs.*

5. *Automated surveillance, video imaging to determine the absence or presence of persons/obstruction on the road or track, transmitting information back to the operating people.*
6. *Displays and signage (both audio and visual) communications for the public.*
7. *Size and weight optimization (bus system tradeoff studies). We have a standard transit vehicle of 40 feet, and we have a variety of smaller vehicles. Perhaps we need to determine and optimize the best size and weight. Look at potentially outdated and overly conservative requirements for rail vehicles.*
8. *Lower cost fixed guideways (tunnel, surface, elevated methods, including the interfaces). We build things to last forever, other places are doing things differently, less expensively. What can we do here and still provide a better, lower cost product to the public.*
9. *Life-cycle costing (capital vs. operating) determining optimum life vs. replacement. Maybe we will find the best operating cost is the highest capital cost. That is one of the things we have to look at, to weigh the entire life-cycle costing.*
10. *Emerging new technologies, a lot of research is going on, with all kinds of ideas, we need to focus in on the applications.*

The second level of priority projects is as follows: (These were listed in the order of priority that the group actually established in the voting process.)

11. *Automated maintenance and operation (auto fueling, intelligent maintenance, automated cleaning, automated loading and unloading, simulator). There are a lot of things being done by other countries that would make our operations more efficient. We need to get through the maze of regulations and labor agreements so that we can get to implementation.*
12. *On-board new fuels storage and cylinder life. A host of engineering work must be done in order to determine the way in which we are to handle these new alternate fuels.*
13. *Low-floor, light weight buses. This came up in several areas.*
14. *Collision avoidance and crash protection for both bus and rail. This is also to determine the drivers' state of health, condition of the vehicle, on-board vehicle and personnel monitoring before the driver operates the vehicle. We could monitor fuel and fire suppression systems, etc.*
15. *Traffic control and engineering (HOV lanes). The "transit first" policy for not only the highway but on streets as well, and traffic signal synchronization and pre-emption to favor transit vehicle operation.*

16. *Electric vehicle component development for bus, rail, and hybrid vehicles. This is anything from battery storage vehicles, new generation trolley buses, perhaps even hybrid vehicles. FTA should look to see what is happening around the world to see if there are applications here.*
17. *A federal transit transportation research center might be something that is long overdue. It was even suggested that we select some farm community in Iowa and set up a transit system that would have all the risks that a big property in a major city would have, but would not want to take on an experiment to test new vehicles. Then no single property has to take the "hit" and be stuck with new, untested buses. Let's go and test the stuff in revenue service under an experimentally sanctioned operation. The other option is to contract with an existing property to perform these tests which would be labeled "experimental." There is a real opportunity to debug and try new things without getting the public sector in "hot water."*
18. *Operating profiles (a device to record actual operating characteristics, and determine real performance characteristics).*
19. *Access to the system (a big problem in many areas). Getting people to the systems, study of needs, park-and-ride, feeder bus, reverse commute, suburban access, walking/bike access. The list could go on. Across the U.S., only three metropolitan locations were identified where there was direct access from a major highway to a park-and-ride lot to serve a line haul express transit system, bus or rail. Why not get the highway folks involved, especially in development of park-and-ride facilities?*
20. *Adaptive train control systems (maximize the use of guideway). This is primarily for rapid rail where there are capacity constraints where the old fixed block signal systems may not be useful in the future, in fact, you might be able to get more capacity from existing block signals systems. There needs to be a lot of work done here.*
21. *New technologies (identify the institutional barriers and formulate plans to overcome them). This is a sort of generic area where we can identify many institutional barriers, such as processing paper, awarding of grants, getting permits, etc.*

HYPOTHETICAL ALLOCATION OF FUNDS

That was our list of the top 21 projects. We then went back and allocated the resources. How would we spread the money?

25% - Reduction of maintenance and operating costs. This was the heaviest allocation.

15% - Increased ridership

20% - Mandated programs

15% - Vehicle weight reduction

10% - Institutional changes

15% - Capital costs

We had a very dynamic group, and conducted a good exercise. We had a mixed group, including FTA staff, private consulting community, academic community, operators and suppliers. There was a good interplay and cross representation. There is plenty of opportunity to develop practical, useful products for the transportation industry and plenty of challenges for the engineering community."

ENGINEERING MINUTES

December 11-12, 1992

The Engineering Workshop session was chaired by Gene Skoropowski of Fluor Daniel. Steve Barsony of FTA served as co-chairman. Jim McDowell of Transportation Manufacturing Corporation, Richard Tanzill of Deluew Cather, and Richard Wiedenbeck of Walt Disney World served as facilitators. Jeff Mora of FTA served as coordinator, and Karla Karash of EG&G Dynatrend served as reporter.

Gene Skoropowski explained that the group was to help FTA develop research priorities over the next 5-year period. Issues to be considered include those pertaining to construction, new systems, and federal requirements such as Clean Air and ADA. He charged the group to develop suggestions that were:

- o logical,
- o useful to the transit industry, and
- o implementable within approximately the next 5 years.

Steve Barsony explained that Section VIII of the Draft FTA Proposed Multi-year Plan for Planning and Research represents the FTA's Engineering Division's best thinking for the program. He added that the group should not feel constrained by the Plan, but to use it as a baseline.

Who are the users? There was a discussion of who the users of our recommendations will be. Gene noted that there were only four transit operators represented. Vukan Vuchic suggested that the ultimate users were the riders. Another suggested that the ultimate user is the taxpayer who foots the bill for these systems. Clearly, a broad slice of the country's population and business interests can be called "users."

The operators in attendance provided their input. Dick Sandaas from Seattle spoke of the need to understand changes in project management and different financing approaches. Another large problem for Seattle has been the weight increases in their buses. They now need overweight permits.

John Marino of MATRA said several cities were not gambling with automated guideway transit systems. There is a need for more research and assistance in this area.

Richard Wiedenbeck spoke of the need to provide systems that people want to use. Technology is not the issue. System implementation is a game of risk management. "Turnkey" is a buzzword for assuming the risk and being paid for doing so. Faster delivery is the ultimate goal.

Gene Nishinaga of BART was interested in how we can carry more passengers with the existing infrastructure. We need to research the next generation of train control systems. We should investigate things such as moving block technology, traction power support for higher density usage, and superconductive magnetic storage devices to boost energy.

Federal Advisory Committee Summary: Dick Tansill and Steve Barsony summarized the conclusions of the previous day's advisory committee. They specified six general areas for research:

1. Reduce operating and maintenance costs
2. Increase ridership
3. Regulatory requirements (Clean Air and ADA)
4. Weight reduction in the vehicle
5. Sharing information between agencies (technology transfer/clearinghouse)
6. Reducing capital costs

Steve asked that the engineering breakout session get more specific in these general areas. He hoped we would focus on specifics.

There was a discussion of where the United States is in bus and rail technology. Tom McGean said we were way behind in technology. Should we focus on building American expertise or in disseminating European technology? Ron Madigan said we are doing technical development. Dominick Varmet said we are way ahead in engine technology, but behind in manufacturing technology. Vukan Vuchic said we were behind in design concepts such as low floor buses, but ahead in clean air and safety.

There was a discussion of the effect of the White Book criteria on bus design, and the need to update it to include the latest technology and regulatory requirements. Fred Templeton asked how we might better use bus capacity. More and more weight is being added to carry fewer and fewer passengers. Jim McDowell said that life-cycle costing is the reason for the present weight of buses. Gene Skoropowski said that foreign buses have planned obsolescence, encouraging regular replacement, ensuring high public visibility for new vehicles and allowing the supply industry to anticipate annual vehicle production.

Sam Romano discussed the state of the U.S. transit industry. Most foreign manufacturers have left, and U.S. companies dominate, but the bus market is lousy. Fifteen years ago, U.S. companies dominated in the rail industry, but now there is no one left. Should our goal be to revitalize the transit industry?

Vukan suggested we were focussing too much on failure. FTA helped with the articulated buses. It takes time to develop a technology, such as Maglev, so that it is economically feasible. Jeff Mora added that the demonstration of the State-of-the-Art Car was a big success. The chopper or advanced propulsion system is now standard equipment. Research cannot be expected to give instant gratification. Steve Barsony pointed out that FTA has stimulated the development of a fuel cell/battery propulsion system for buses. But the problem was we lost 10 years due to a lack of funding. We need to look forward now and get specific.

At this point, the group decided to look carefully at the priorities of the advisory committee, and to brainstorm about specifics under these categories. The following list was developed:

A. REDUCE OPERATING AND MAINTENANCE COSTS

Increase Labor Productivity:

- o improved diagnostics
- o application of artificial intelligence to improved diagnostics
- o improved training for maintenance
- o collision avoidance/train control systems
- o IVHS - effective utilization of automation
- o automation in operations and maintenance
- o component reliability
- o fare collection
- o graffiti-proof materials
- o monitoring - data reduction
- o AVL - mapping
- o remove and replace
- o vehicle size

Energy Costs:

- o load vs. gross vehicle weight ratio
- o alternative fuels
- o fuel costs
- o safety requirements
- o garage vs. outdoor storage
- o energy storage devices
- o emissions standards
- o HOV vs. general traffic
- o regenerative braking
- o recycling of products
- o speed and acceleration profile
- o propulsion technology
- o track and road profiles

Safety and Security:

- o automated surveillance
- o handicapped constraints
- o protection from vandalism
- o computer-aided intelligence for security
- o computer tools for allocation of manpower
- o egress/ingress systems
- o rail car buffing strength requirements
- o collision avoidance of people and obstructions
- o escalator speeds
- o platform edge protection
- o fare collection - cashless fare verification/validation
- o broken rail detection
- o software verification

- o configuration testing
- o microprocessors
- o fire detection/suppression
- o electronic sensing of the railroad condition
- o state of health of driver and vehicle
- o emergency procedure/automated systems
- o crash protection

B. INCREASED RIDERSHIP

- o accessibility
- o park-and-ride
- o capacity utilization
- o information systems
- o scheduling/routing (intelligent)
- o safety/security
- o fare collection convenience
- o home to station system (golf carts)
- o fault tolerant computer technology
- o time transfer points
- o reliability of service and equipment
- o flexibility of train control system
- o low floor vehicles
- o distance-based fares (fare structure/economics)
- o flexible coupling
- o equipment flexibility and equipment utilization
- o traffic control and engineering ("transit first," terminal design, attractiveness to passenger)

C. MANDATED PROGRAMS

Americans with Disabilities Act (ADA):

- o securement/restraint systems
- o population database for ADA eligible persons
- o vehicle configuration - low floor for light rail/bus
- o displays and signage - audio/visual
- o platform height
- o fare collection
- o geographical information systems (GIS)
- o platform edge detection system and gap issues
- o accessibility to station and curbside
- o maintenance/training on lifts
- o ramps

Clean Air/Environmental:

- o diagnostics (emissions)
- o accelerated evaluation of new products
- o on-board storage for new fuels
- o cylinder life
- o electric vehicle components and vehicle development

- o modification of building regulations and codes to accommodate alternative fuels
- o clean engine development
- o toxic waste disposal

D. VEHICLE WEIGHT REDUCTION

- o new materials (composites)
- o approval for use of new materials
- o low floor, light rail (2-wheel truck)
- o load vs. GVWR (weight) ratios
- o size optimization of vehicle
- o new vehicle design technology - including associated components
- o FRA requirements for commuter rail
- o electric vehicle component/development

E. INSTITUTION CHANGES

- o identify institutional barriers to new technologies and propose a plan to overcome these.
- o technology transfer (a Fellows program to allow an exchange through personnel visitation with national labs and universities).
- o transportation research center to test new technologies in a real-life setting
- o information dissemination (newsletters, industry liaison, electronic bulletins, expanded PPTN)

F. CAPITAL COSTS

- o capital vs. operating costs (life-cycle costing)
- o lower cost guideways
- o lower cost vehicles
- o performance specifications
- o optimum life
- o replacement decisionmaking
- o phased development
- o opportunities for design build and turnkey projects
- o systems analysis
- o cost control systems
- o construction control systems
- o new technologies and new modes
- o evaluation of QA/QC effectiveness in construction/equipment
- o design of intermodal terminals/joint development

Prioritizing by subject area: Following the initial brainstorming sessions, the group divided into four parts to tackle the prioritization and refinement of the above lists. When we met again, the following lists were provided under the main topic areas. The numbering represents labeling used for voting purposes.

A. REDUCE OPERATION AND MAINTENANCE COSTS

Labor Productivity:

1. Automated maintenance and operation (AVCS, automated fueling, intelligent maintenance, automated cleaning, automated loading/unloading, simulation).
2. Intelligent vehicle utilization (increase reliability, AVL mapping, vehicle dispatching, rail headways).

Safety and Security:

3. Microprocessor software and hardware verification.
4. Automated surveillance video imaging (video processing to determine absence or presence of personnel).
5. Collision avoidance and crash protection (state of health of driver/vehicle/road/rail/fuel systems [fire suppression]).
6. Ingress/Egress - make sure safe as possible.

Energy Cost:

7. Energy utilization (fuel type, energy storage, propulsion systems).
8. Reducing consumables (how to reduce oil, filters, electronics boxes, paint, tires, etc.).
9. HOV modeling.
10. Operating profile (a device for recording actual operating characteristics, determine real performance requirements).

B. INCREASED RIDERSHIP

11. Access (how can people get to the station, study of needs/requirements for improved information systems, special vehicles for suburban access, designs to encourage walking and bike access).
12. Safety and security (systems study to optimize security, methods to improve perception of safety).
13. Traffic control engineering ("transit first," investigate European technologies).
14. Adaptive train control systems (shorter headways, needs requirements).
15. Passenger convenience (fare collection/fare structure, information systems, AVM, service reliability).

C. MANDATED PROGRAMS

16. On-board new fuels storage and cylinder life.
17. Low floor, light weight bus.
18. Platform edge height and gap and warning systems.
19. Wheelchair securement restraint devices.
20. Diagnostic emissions (buses).
21. Accelerate evaluation of new products (bus engines).
22. Displays and signage (audio visual).

D. VEHICLE WEIGHT REDUCTION

23. Size/weight optimization - bus system tradeoff study.
24. Low floor, light rail (2-wheel trucks).
25. Evaluation of new materials (composites, etc.).
26. Electric vehicle and component development.

E. INSTITUTIONAL CHANGES

27. Identify institutional barriers to new technologies and propose a plan to overcome. (Why are new technologies not adopted in the U.S.?)
28. Technology transfer - a Fellows program to allow an exchange through personnel visitation with national labs/universities.
29. Research center - design and cost/benefit analysis. (Also, information dissemination through newsletters, industry liaison, electronic bulletins, and expanded PPTN.)

F. CAPITAL COSTS

30. Lower cost guideways - tunnel, surface elevated, methods, interfaces.
31. Life-cycle costing, capital vs. operating, optimum life, replacement.
32. Standardization (criteria/codes).
33. Opportunities for turnkey/privatization.

- 34. Design of intermodal terminals.
- 35. Phased development.
- 36. Cost control systems.
- 37. Emerging new technologies.

Thursday morning when the group met, the major activity was voting on the 37 different research categories above. Each person, excluding federal employees, indicated their top 20 topics. In addition, they indicated how they would split funding by percentage among the major subject areas. The following summary tables were the result. These were presented by Gene Skoropowski in the summary session on Thursday. First was the resource allocation as voted by the group:

RESOURCE ALLOCATION

Area	Resource Allocation %	Description
A	25%	Reduction in operating and maintenance costs (labor and productivity, safety and security, and energy costs)
B	15%	Increased ridership
C	20%	Mandated programs
D	15%	Vehicle weight reduction (bus & rail)
E	10%	Institutional changes
F	15%	Capital costs
Total	100%	

The final priority listing of the top 21 specific projects is shown in the following two tables:

TOP TEN PRIORITIES

Area	Reference #	Item
A	7	Energy utilization for propulsion (fuel type, energy storage, propulsion systems)
B	15	Passenger convenience (fare collection/fare structure, information systems, scheduling systems, reliability of service, low floor vehicles)
A	2	Intelligent Vehicle Utilization (increase reliability, AVL mapping, vehicle dispatching, rail headway)
D	25	Evaluation of new materials (composites, etc.)
A	4	Automated Surveillance Video Imaging (video processing to determine absence or presence of persons or obstructions)
C	22	Displays and signage (audio/video)
D	23	Size/weight optimization (bus system trade-off study)
F	30	Lower cost fixed guideways (tunnel, surface, elevated methods, interfaces)
F	31	Life-cycle costing (capital vs. operating, optimum life, replacement)
F	37	Emerging new technologies

REMAINING 11 PRIORITIES

Area	Reference #	Item
A	1	Automated maintenance and operation (AVCS, automated fueling, intelligent maintenance, automated cleaning, automated loading/unloading, simulator)
C	16	On-board new fuels storage and cylinder life
C	17	Low floor, light weight bus
A	5	Collision avoidance and crash protection for bus and rail (driver state-of-health; condition of vehicle, road, railroad, and fuel system including fire suppression)
B	13	Traffic control/Engineering (HOV lanes, "transit first," signal synchronization)
D	26	Electric Vehicle Component development for bus, rail, and hybrid vehicles
E	29	Transportation Research Center (design, cost/benefit analysis, revenue testing). Also information dissemination (technical sharing, newsletters, electronic bulletins)
A	10	Operating profile (a device to record actual operating characteristics, determine real performance requirements)
B	11	Access (getting people to the system, study of needs, park and ride, feeder bus, reverse commute, suburban access, walking/bike access)
B	14	Adaptive train control systems (maximize use of guideway)
E	27	New technologies - identify institutional barriers and a plan to overcome

2.0 MANAGEMENT

CHAIRPERSON:	Chaster Colby, Metro-Dade/Transit Agency	FACILITATORS:	Dave Cyra, Univ. of Wisconsin
CO-CHAIR:	Franz Gimmler, FTA		Robert Foy, MTA/Flint
COORDINATOR:	Frank Enty, FTA		Paul Skoutelas, TRI
REPORTER:	Thomas Coleman, EG&G Dynatrend		County

Mr. Colby's remarks follow:

"As a beginning point to the matter at hand, a brief sharing of thoughts ensued regarding the overall difficulties in managing a public transit agency. Transit operators have long been in adversarial situations with FTA, other parts of the federal administration, labor unions, riders, local and state governments, State Departments of Transportation, their own governing boards and others over a wide variety of issues. As a result, many top transit managers have adopted a defensive posture to preserve the status quo of their service environment. They have become overly critical and reluctant or slow to offer workable solutions to both common and unique problems.

Much of the inability to react positively is perhaps due to the diversity and contradiction of arguments put before the transit riders or governing boards, approaches sponsored by the Administration are in contrast to those by state or local governments, etc. Issue topics range from funding to service quality to service expansion to labor relations to fare structures and many subjects in between.

Where planning and research can directly assist a transit manager to actually manage a transit property across these diversified areas can be set into three priority groups. The three groups listed below appear to be the areas of most immediate benefit to a transit manager. A hypothetical percentage of allocation of funds may also be assigned.

HUMAN RESOURCES

Today's workforce is a dynamic entity, changing in an evolutionary rather than a revolutionary manner. Federal and state legislation in the areas of fair labor employment practices and other civil rights issues are changing the role of labor unions. The computer age and automation are changing the vocational and skills requirements for many jobs - even making some jobs obsolete. Increasing requirements for college-level educations in staff, supervisory and middle-management positions are changing the capabilities and expectations of those employees.

Today's transit manager must cope with these trends among the variety of work groups that comprise a transit agency. While the operating and behavioral characteristics of work groups are changing, so must the ways a manager deals with them. A significant portion of the available planning and research monies for transit management, no less than 50%, should be allocated

to human resources support. Sub-area concentration in the human resources should be focused on the following:

A) Management/labor relations issues.

This topic is not limited to the traditional union/management dialogue, but rather includes all generic labor/management relations. Research activities in the areas of employee satisfaction and opinion surveys regarding involvement perceptions may be helpful.

B) Cultural diversity and minority involvement issues.

An increased awareness and activity in these areas is a general and national trend. How does the transit industry and its component members rank and perform in this arena? What can the transit industry do to improve its image? In what ways can individual transit managers improve their own track record? Are the perceptions real?

C) Organizational team-building.

More emphasis needs to be placed on utilizing a strategic management approach to team-building for satisfying common corporate objectives. Quality-of-service is not only an important topic between a transit agency and its clients - the riders, but is also important between internal elements of the transit agency organization, e.g., between bus maintenance and its clients - the bus drivers, or between inventory/stores and its clients - bus maintenance. Innovative approaches in establishing server/client relationships toward improving efficiencies and qualities of the specific service, either internal or external to the organization, would be beneficial.

All of these human resource priority items relate in some way to surveying, summarizing, developing and performing training, and, most of all, compiling and distributing information. Disseminating information, both from within and from without the industry, is critical to the success of transit management improvement. Application of this notion to the human resource planning and research issues may well set the stage for other areas as well.

ASSET MANAGEMENT

Maintenance directors have a tendency to network well with each other, but top management may not be plugged in to current information. This priority area, particularly in vehicle and facilities maintenance, should receive no less than 30% of the available funding.

Additionally, engineering-level technical skills need to be added to maintenance management. Maintenance directors have historically risen from the ranks as super-mechanics. Today's buses and rail cars have become so sophisticated that engineering-type education, skills and backgrounds are

almost essential for a professional maintenance management organization. This applies both to staff roles and leadership roles.

Another critical item in the asset management field is information systems. There are several good maintenance management information systems available, but they tend to be very proprietary, very customized, and not too accessible. The bus environment in the U.S. is pretty uniform. It seems that shared maintenance information for these vehicles should be readily available. With the significant increase in Federal capital funds becoming available to transit, the industry is going to significantly increase its capital base over the next five to ten years. State-of-the-art systems and personnel will be needed to make sure that these assets will be properly maintained for longevity and operating efficiency.

SYSTEM SAFETY AND SECURITY

The concept here is not so much working on ways to improve the real levels of safety and security, but also on improving the public's perception of transit as a safe mode of travel.

Today's rising technology lends itself to applications in the safety and security fields and adaptations of previously military technologies may be useful. Much has already been done in the area of system safety, guarding against mechanical failures or conditions causing personal injury or property damage. New applications may be most welcome in the area of personal safety on or around transit facilities.

The biggest impact may come from having the public or potential riders be more aware of the level of personal security that does exist in the transit environment and what the industry has accomplished. Surveys and publication of statistics from independent sources can be helpful to change the prevailing perceptions and increase ridership. That portion of the public that is concerned about personal security and safety is the very segment that the industry wants to attract to transit. Success in this effort will also serve to relieve the perception that only second-class citizens use public transit.

As increased planning and research activities are implemented (especially in such a quasi-technical area as management) one particularly critical issue must be addressed, the dissemination and distribution of result and conclusion information. In the past, transit research has been one of the best kept secrets in the industry. It is extremely important that any research conducted be communicated, not just to the participants in the research as an academic exercise, but cooperatively shared with those in the industry who can best use it. Using the University Transportation Centers (UTC) and perhaps an Urban Transportation Assistance Program (UTAP) equivalent of the Rural Transit Assistance Program (RTAP) as reference clearinghouses, the transit managers may be brought into the front line as information recipients, even if they might need some prodding to participate. Many properties spend a lot of time re-inventing wheels when usable information or applications are relatively close at hand."

MANAGEMENT MINUTES

December 11-12, 1991

The Management Workshop session was chaired by Chester Colby, Director of the Metro-Dade Transit Agency. Franz Gimmler, Deputy Associate Administrator for Safety, FTA, was co-chair. Frank Enty, Deputy Director, Office of Training, Research and Rural Transportation, FTA, was our coordinator. Dave Cyra, Director of Statewide Transportation programs, University of Wisconsin, Robert Foy, General Manager, Mass Transportation Authority, Flint, Michigan, and Paul Skoutelas, Executive Director, Tri County Transit, Orlando Florida, acted as facilitators. Tom Coleman, EG&G Dynatrend, acted as reporter. A list of participants is attached.

We were welcomed by Bob Foy, who was acting in Ed Colby's stead (Ed would join us later that morning). Our charter was to provide feedback to FTA on the Proposed Multi-year Plan for Planning and Research (P&R) that was distributed to attendees prior to the workshop. This document was used as a background, but participants were encouraged to voice their concerns and views on the most beneficial research areas. It was agreed that the transit systems, operators, and served populations were the beneficiaries of the P&R Plan, and we should address our efforts accordingly.

In order to provide some focus and background to each other, Bob Foy thought it important we share our backgrounds and primary areas of concern.

Kent McDaniels, Indiana University, was interested in FTA's plans on continuing to fund university research and training programs.

Michael Townes, Peninsula Transportation District Commission, was anxious to discuss the impact of management on every phase of the FTA agenda.

George Rucker, Community Transportation Association of America, was interested in RTAP programs and para-transit programs.

Robert Molofsky, Amalgamated Transit Union, was interested in transit managers working with his constituents on concerns over micro management, privatization, "grass roots" training, substance screening, cooperation on safety and Americans with Disabilities Act (ADA) issues, and management training and recruitment.

Carol Everett, FTA RTAP, expressed a desire to see an improvement in the University Research programs.

Robert Owens, FTA, was interested in addressing civil rights, equity, inclusiveness, and 8(a) participation in FTA sponsored business.

Mary Fernandes, Massachusetts Bay Transportation Authority, was interested in discussing human relations training for transit managers, and issues involving recruitment and retention.

David Winfield, New York City Transit Authority, was interested in exploring management issues surrounding major procurements such as New York's \$1 billion moving block signal procurement.

James Miller, Pennsylvania State University, was here to discuss the needs of transit managers for training.

Gorman Gilbert, University of North Carolina, was interested in transportation managers' views on transit research.

Bob Reilly, Transportation Research Board (TRB), is interested in hearing management's perspective on TRB research, and the overlap in research with the Transit Cooperative Research Program (TCRP).

Roy Taylor, Dewberry & Davis, was interested in management comments on efficiency and safety.

Mike Goode, Parsons, Brinkerhoff, Quade and Douglas, was interested in the information needs of managers. Specifically, information that can help the manager with fixed facility management and staffing.

Carlos Villereal, Wilbur Smith Associates, observed that project management is key, financial management is important, and relevant planning is important.

Mike Kushner, Westinghouse, brought a supplier's perspective to the proceedings. He was interested in commercial R&D activities on information needs, application of Total Quality Management (TQM), and better planning methods.

Mike Bolton, Ann Arbor Transit Authority, was interested in the role of the transit/mobility manager, Clean Air Act, changes in the work place, limits on employee development, and the process of "threat assessment" for managers.

Paul Skoutelas, Tri County Transit, remarked that management is everything, labor relations are the key to effective service, and public relations are important too.

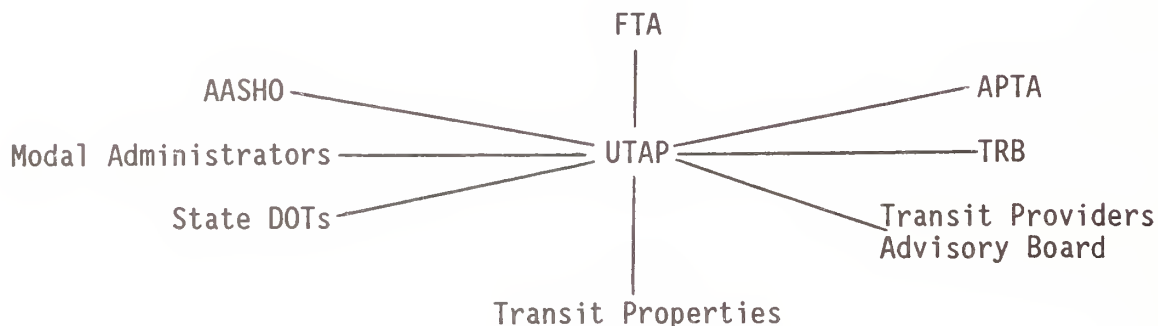
Dave Cyra, University of Wisconsin, distributed an excellent pamphlet that he solicited from members of the TRB Urban Specialized Transit Subcommittees. These answers, in the form of position statements, capture issues and concerns addressing transportation management.

Bob Foy then charged the group to critically address management issues in the next day and a half, and provide inputs to an FTA research agenda that is "based on needs, not on wants."

The group critically examined the roles and challenges of management, and the different perception of responsibilities and authority. The sessions were primarily brainstorming which focused in three areas: human resources, asset maintenance, and safety and security.

After much discussion of individual issues, and their inter-relationship, the group came up with an idea on how to present and manage planning and research issues. A paradigm similar to the highly successful RTAP was seen as the most efficient way to manage and use research projects and products. A UTAP is seen as an effective and focused forum for managing FTA efforts and expenditures. The charter for this organization would be to oversee technical assistance, training, and research, and to serve as an

advisory body to the University Transportation Institutes (UTI/UTC) programs. A relationship diagram may show the following:



Given a UTAP organization, the group decided the optimal distribution of a budget is as follows.

Human Resources: 50%
Asset Maintenance: 30%
Safety and Security: 20%

This was a result of the issues discussed and grouped. The issues, and some qualifying comments are:

HUMAN RESOURCES

Develop and encourage improvements in workforce and management relations.

- o some properties see this as single biggest challenge
- o show examples of "success"
- o how do we enable managers to provide better incentives (performance-based evaluations)
- o applications of TQM
- o re-teach management and bargaining units how to think
- o encourage peer review

Develop a process to facilitate cultural diversity and leadership development.

- o empower employees to develop themselves
- o remove stigma of promoting from the ranks
- o raise quality, motivation of transit entrants, make transit a desirable career choice
- o delineate and crack the "glass ceiling"
- o the opportunities for minorities exist, the process to promote them should be changed

Develop a better approach to strategic management so transit operations can build better teams.

- o employ labor in change (such as ADA implementation)
- o TQM as a change agent, team builder
- o emphasize education of labor, not just training
- o offer training on life skills such as single parenting, stress management

ASSET MAINTENANCE

Develop better maintenance management and technical skills for transit operators.

- o find out what local schools are doing, establish dialogue about needs for vocational skills
- o establish UTAP training centers to teach core subjects/courses
- o look at successful apprenticeship programs, such as in Germany
- o develop interactive maintenance training tools
- o pay attention to all maintenance, not just vehicle maintenance
- o FTA/UTAP sponsorship of technical institutes
- o train maintenance middle managers

Discover better information systems for maintenance management.

- o information should flow horizontally, laterally, and between properties to share knowledge and successes
- o managers need appropriate information, tools and training to handle it
- o information can replace resources (opportunity value); better information can mean better vehicle utilization

Incorporate primary engineering skills into maintenance management. This includes staffing, education and training.

- o more emphasis on real fundamentals
- o university vocational training, maintenance managers "know the equipment"
- o synergy between engineering design and maintenance, let's start making "bus engineers" who thoroughly understand design and maintenance

SAFETY AND SECURITY

Monitor and enhance personal security in the transit system through APTS/AVL technologies.

- o APTS/AVL technology can be used to monitor vehicles, operator, and rider behavior
- o duress signals can increase security of operators, passengers
- o exchange of safety standards between systems
- o make safety engineering an occupational specialty

Improve the public's perception of safety and security within the transit system.

- o some systems are actually safer than the communities they serve
- o transit managers need training on how to deal with the press/public

3.0 SERVICES

CHAIRPERSON:	John C. Pingree, Utah Transit Authority	FACILITATORS:	David Capozzi, National Easter Seal
CO-CHAIR:	Ron Fisher, FTA		Peter Davies, Castle
COORDINATOR:	Roger Tate, FTA		Rock
REPORTER;	Carol Schweiger, EG&G Dynatrend		Nancy Podeszwa, Princeton MVA

Mr. Pingree's summary follows:

"The Services workshop developed two guiding principles which were: reduce costs needs and technologies; and develop and implement programs to increase ridership. In addition, we identified 11 other items which are important to us.

- a. Increase ridership
- b. Expand markets
- c. Involve the private sector
- d. Work within the Clean Air and ADA requirements
- e. Identify funding sources and availability
- f. Improve efficiency, operator control, through advanced technologies
- g. Identify our markets and market segmentation
- h. Satisfy the customer, thereby increasing long-term customer loyalty
- i. Increase management's ability to manage
- j. Work within the safety and drug programs
- k. Identify the effect of ADA on the services

For funding purposes, we broke services into three broad categories with percentages of priority. These three broad areas were put into program areas with percentages.

1. Mobility: 60%
2. Clean air: 20%
3. Transit accessibility: 20%

In each of the three broad categories, a further break down was made according to six technical program areas:

1. New technology development
2. Technology application and evaluation
3. Information dissemination and evaluation
4. Innovative methods techniques
5. Planning tools
6. Education and training

MOBILITY

In the Mobility/New Technology Development, it was decided to include a 1/4-mile moving sidewalk as a technology project. In the area of Mobility/Technology Application and Evaluations, the other program areas where we would encourage research projects are:

- 1. Single-trip ride share. The greatest resource we have in this country is the single occupant vehicle, and we need to get that to be better utilized. A number of people have expressed an interest in IVHS. A number of research projects fit into that area.*
- 2. Intermodal pre-trip planning*
- 3. HOV enforcement*
- 4. Signal priority*
- 5. Electronic fare collection*
- 6. Advanced vehicle control and monitoring*
- 7. Travel information systems*
- 8. Alternative communication systems*
- 9. Advanced transportation management systems*

Within the Mobility/Information Dissemination and evaluation, we would encourage research in the areas of:

- 1. Data sharing on market research*
- 2. Intermodal fare acceptance policies*
- 3. Documentation and evaluation of local initiatives/innovation*

Within the Mobility/Innovative Methods/Techniques, we looked at:

- 1. The human factors issues as suggested by FHWA, those that influence mode-choice (why a mode was chosen).*
- 2. Entrepreneurial service program*
- 3. Regional transportation management coordination with FHWA*
- 4. Transportation demand management*
- 5. Service configurations*
- 6. Pricing policies*
- 7. Management information systems*
- 8. Application of total quality management*
- 9. Application of scheduling and run cutting*
- 10. Trip elimination strategies*

CLEAN AIR

The Clean Air/New Technology Development recommended project was:

- 1. Perform engine research and clean fuels research using a systems approach rather than separately.*

The Clean Air Technology Applications projects were:

- 1. Measurement of vehicle-miles traveled (VMT) and average vehicle occupancy*

2. *Alternative fuels/propulsion*
3. *Infrastructure safety of alternative fuels*
4. *Standardization of test data and methods*

The Clean Air/Innovative Methods/Techniques projects were:

1. *Human factors on a mode split*
2. *The evaluation of transportation control measures (TCM) techniques and incentives*
3. *Telecommuting*

TRANSIT ACCESSIBILITY

The Transit Accessibility/New Technology Development recommended projects were:

1. *Low-floor bus*
2. *Low floor, light rail vehicle (LRV)*
3. *Tie down technology*
4. *Fuzzy logic application similar to elevators*

The Transit Accessibility/Technology Application and Evaluation projects recommended were:

1. *APTS vehicle tracking/dispatching*
2. *Automated third party billing*
3. *Customer and fleet information systems*
4. *Coordination and brokerage*
5. *Information access for the disabled*
6. *Driver information and navigation system for paratransit*

The Transit Accessibility/Innovative Methods/Techniques projects suggested were:

1. *Better dispatching for paratransit*
2. *Intermodal scheduling*
3. *Evaluation of real-time scheduling*
4. *Demonstration and evaluation of service routes and route deviation*



SERVICES MINUTES

December 11-12, 1991

The group used the Draft FTA Proposed Multi-year Plan for Planning and Research as one resource, which was provided to each Workshop participant.

The session chairman, John Pingree, General Manager of the Utah Transit Authority, stated the workshop objectives (as defined by FTA in one of the handouts for participants):

1. Identify high-priority programs and program components for inclusion in the national P&R Program.
2. Clarify, refine, refocus, and in other ways perfect the scope, purposes and approach of programs and program components as necessary.
3. Suggest several broad scenarios for the distribution of limited federal resources among competing programs and program components.

In order to meet these objectives, 11 principles related to transportation services were identified by the group in order to focus the development of priorities and approaches to the FTA programs that relate to transportation services. These principles were (not in priority order):

- o Increase ridership
- o Expand the market for transit/HOVs
- o Involve the private sector
- o Identify the impact of the Clean Air Act (CAA) and Americans with Disabilities Act (ADA) on services
- o Identify funding sources and options
- o Improve efficiency and operator control through the use of advanced technologies
- o Identify the market segments being served
- o Satisfy the customer
- o Manage services more efficiently and effectively
- o Administer safety and drug programs
- o Identify the effect of ADA on the provision of services

Once these principles were discussed, the FTA programs that would be directly applicable to transportation services were identified. These were:

- o APTS
- o Clean Air
- o Financing
- o Regional Mobility
- o Transit Accessibility
- o Project Development

The group prioritized these programs, and identified key elements that should be included in the programs. But after that effort, the group determined that the programs were "apples and oranges," therefore, the priorities had no meaning. For instance, APTS is actually a component of Regional Mobility, Transit Accessibility, etc. This turned the focus of the group toward developing a matrix with objectives on the left-hand side, and techniques for achieving those objectives across the top of the matrix, with the cells containing the percentage of funding that should be allocated to each element of the matrix. After some discussion, the group decided to modify this matrix to show major program areas on the left-hand side (instead of objectives), and to list the following major program components across the top of the matrix:

- o New Technology Development
- o Technology Application and Evaluation
- o Information Dissemination/Technology Sharing/Evaluation
- o Innovative Methods/Techniques
- o Planning Tools
- o Education and Training

Before the group members voted on the percentages that should be entered in each cell of the matrix, the group determined that the funding should be split between major program areas, as follows:

MAJOR PROGRAM AREAS	PERCENT OF TOTAL P&R BUDGET
Mobility	60%
Clean Air	20%
Transit Accessibility	20%

For each major program area, the percentage of funding that should go toward each program component was decided upon by the group, and resulted in the following matrix:

	New tech. dev.	Tech. application/ evaluation	Information dissemination tech. sharing	Innovative methods/ techniques	Planning tools	Education/ training
Mobility	5%	30%	20%	35%	5%	5%
Clean Air	20%	30%	10%	30%	5%	5%
Transit Accessibility	10%	20%	20%	35%	5%	10%

The group then identified, for those program components that had a large percentage of funds assigned to them, important program components as follows:

MOBILITY

New Technology Development:

- o 1/4-mile length moving sidewalks to provide better access to transit

Technology Application and Evaluation:

- o single-trip ridesharing
- o internal pre-trip planning¹
- o HOV enforcement¹
- o signal priority¹
- o electronic fare collection¹
- o advanced vehicle control and monitoring
- o traveler information system¹
- o alternative communication systems
- o advanced transportation management systems (multi-modal)¹

Information Dissemination/Technology Sharing/Evaluation:

- o data sharing on market research
- o intermodal fare acceptance policies
- o document and evaluation local initiatives/innovation

Innovative Methods/Techniques:

- o influencing mode-choice (human factors)
- o entrepreneurial services program
- o regional transportation management (coordinated with Federal Highway Administration)
- o transportation demand management
- o service configurations
- o pricing policy
- o management information systems
- o application of total quality management to transit services
- o application of scheduling and run cutting
- o competitive services program
- o trip elimination strategies

¹FTA should coordinate these with the Federal Highway Administration

CLEAN AIR²

New Technology Development:

- o engine research and clean fuels research using a systems approach (rather than developed separately)

Technology Applicable and Evaluation:

- o measurement of vehicle-miles traveled (VMT) and average vehicle occupancy (AVO)
- o alternative fuels/propulsion
- o infrastructure and safety of alternative fuels
- o standardization of test data and methods³

Innovative Methods/Techniques:

- o human factors on mode split
- o transportation control measures (TCM) evaluation techniques and incentives
- o telecommuting

TRANSIT ACCESSIBILITY:

New Technology Development:

- o low-floor bus
- o low-floor, light rail vehicle (LRV)
- o tie-down technology
- o fuzzy logic (actually an application), similar to elevator operations

Technology Application and Evaluation:

- o APTS vehicle tracking/dispatching
- o automated third party billing
- o customer and fleet information systems
- o "coordination and brokerage"
- o information access for the disabled
- o driver information and navigating system for paratransit

²Many of the ideas set forth under "Mobility" are also applicable to Clean Air.

³To be consistent with the Environmental Protection Agency.

Innovative Methods/Techniques:

- o better dispatching for paratransit
- o intermodal scheduling
- o evaluation of real-time scheduling
- o demonstration and evaluation of service routes and route deviation
- o reservation scheduling⁴
- o eligibility determination and processes

Beyond the matrix and aforementioned program components, specific ideas that should help FTA develop their P&R program were set forth by group members, as follows:

- a. The limited P&R funds for APTS should not be used for capital items. The priority for the selection of discretionary Section 3 projects should be expanded to include APTS operational tests;
- b. Under APTS, the group identified the following major items that should be addressed:
 - customer service/satisfaction/behavior
 - assessment of APTS technology
 - research of technology adaptations
 - electronic bulletin boards for technology sharing
 - development of user requirements and equipment standards
 - institutional arrangements
 - high-risk/high-payoff leverage projects
 - integrated applications
 - private investment/purchase of information;
- c. The national P&R program is broader than just local problems. It should provide cross-cutting opportunities such as the identification of how the market is responding to advanced technologies;
- d. Conduct a comparative analysis and evaluation of these projects description of individual case studies or demonstrations are not as useful;
- e. Address the practical needs of transit;
- f. Identify the role of privatization in supporting the mandated goals of the CAA and ADA;
- g. Make a clear distinction between private sector participation and privatization;
- h. Gather national feedback to assist local decisionmaking;
- i. Focus on programs that have measurable benefits;

⁴Primarily for "day-before" situations like Sunday, when the transit authority may not have staff available to schedule.

- j. Conduct research on how customers use information;
- k. Emphasis should be greater in the area of information dissemination;
- l. Address institutional issues such as the institutional impediments to implementing certain advanced technologies;
- m. Utilize an information sharing system such as a computerized/electronic bulletin-board system in integrating information on projects that have national significance;
- n. Evaluate failures as well as successes;
- o. Research issues regarding automatic vehicle location (AVL) systems, such as:
 - development of decision support systems for AVL
 - how does dispatcher make use of AVL data?
 - how does a transit system do service improvements based on AVL data?
- p. Identify the markets that have not been served in the past by transit/HOVs and should be served now;
- q. Identify and develop equipment standards for compatibility;
- r. FTA should consider fostering high-risk ventures that have high payoffs, since private industry does better than the government in terms of researching and developing. This means that FTA should be involved in maturing the technology, and evaluating the technology;
- s. Make information available, through a bulletin-board system, for specific groups such as policymakers and politicians;
- t. Visit sites of successful projects;
- u. Examine the long-term cost of operating advanced technologies;
- v. Address the issue of how much people are willing to pay for information in order for them to make travel decisions;
- w. Determine funding for advanced technologies by looking at their market potential.⁵
- x. In assessing public perceptions of and attitudes toward transportation services, the key questions should be what is the impact on the customer, and how has their behavior changed?

⁵For instance, if an APTS increases capacity during the peak period, and transit realizes an increase due to the mode shift, developers might be interested in funding that APTS.

4. *Grant Advance Funding - 5% cost factor; borrowing from other properties that may not be able to use the funds now. The intent being to put formula money to work as soon as possible.*
5. *Update the Rice University Study - 5% cost factor which lists all the revenue enhancements methods available.*
6. *Congestion Pricing - 1% cost factor charging for HOV lanes if one or two person cars were to use the lane.*
7. *Joint Property Development in Major Projects - (very high on our list initially, but moved down to #7 due to the condition of the current real estate market).*

FINANCING METHODS

One of the problems with debt is that you have to pay it back. The great comparison that exists with many non-financial people in this industry is that "creative financing equates to a new source of funds." This is not true. Creative financing is a way of borrowing funds which must be paid back later, plus interest. We talked about the financing methods beyond standard methods such as credit rating and reduce your cost of capital. It would also provide assurance to the credit market.

1. *Credit enhancements (temporary FTA/State guarantees).*
2. *Nonprofit rolling stock leasing corporation assures that rolling stock could be provided by this country, with firm projections of orders and configurations. This would reduce all costs (10% cost item).*
3. *Document a model "financial/procurement transactions" that the industry could use to share information on financing issues and turnkey development. This would make small systems more effective (10% cost item).*

COST CONTROLS

1. *Multi-year procurement of buses - to facilitate lower costs through volume purchases and to provide suppliers with a continuous backlog (20% cost item).*
2. *Cash management manual development by FTA - to assist in the training and development of transit finance personnel (5% cost item).*
3. *Use of turnkey procurement and reimbursing proposal costs for finalists (5% cost item).*
4. *Private sector risk sharing (5% cost item).*

5. *Componentization - planning for early replacement items in the original plan (5% cost item).*
6. *Risk management techniques - sharing information such as wrap-up insurance programs (1% cost item).*
7. *More information sharing within the industry.*

MISCELLANEOUS

1. *Sharing industry information.*
2. *Streamlining the grant process to eliminate delays."*



FINANCE MINUTES

December 11-12, 1992

The Financing Workshop included 30 participants, seven from transit properties, six from consulting, two from state/local governments, two from system/hardware supply firms, two from the financial community, one from the engineering/construction sector, one from a stakeholder group (AASHTO), and seven participant-observers from the federal government.

All attendees were encouraged to participate and to share any issues that they believed appropriate to include in the FTA P&R Plan. However, to provide general structure to discussions, a group consensus was reached to address three broad financing topics: mass transit's sources of revenue, methods of finance, and cost control. Although several issues often overlapped one or more of these areas, this framework provided general guidance to the participants without hindering dialogue.

SOURCES OF REVENUE

The first two hours were dedicated to addressing sources of revenue for mass transit. The discussion focused on comparing mass transit to its number one competitor - the passenger vehicle. There was a clear consensus regarding the lack of a "level playing field" between the auto and transit. Participants argued that the low cost of fuel, ready availability of low cost or often free parking, and the lack of, or inordinately low cost of, tolls contributed to a systemic bias in favor of the automobile and against mass transit. As one attendee noted "as long as bottled water is more expensive than gasoline, mass transit will never be a true competitor."

However, despite the perception of a systemic bias, the auto-restrictive requirements of the Federal Clean Air Act (CAA), several state-level environmental initiatives, and surrounding delay/capacity issues provided a basis for asserting that there may be an opportunity for mass transit to assume a stronger mobility role.

For example, congestion pricing might provide a means to mitigate highway delay, while the proceeds might be a source of mass transit revenue. Similarly, where individual drivers may choose to pay extra for the use of HOV lanes, these funds might also go to improvements or expansion of the local mass transit system. Additionally, the restrictions of the federal, and of certain state, CAA initiatives might cause passengers to choose mass transit as the preferred transportation option, thereby increasing mass transit's ridership/revenues.

In addition to the lack of a level playing field between transit and autos, it was noted that suppliers of mass transit systems and hardware were at a significant disadvantage when competing with foreign firms. Reasons for this "uneven playing field" between American suppliers and foreign manufacturers were identified as the lack of standardization, the inability of suppliers to plan on the volume of orders, the limited size of the United States' market, and the protectionist policies of foreign governments.

In addition to these more macro-policy discussions, a number of other revenue-related recommendations were made to FTA. It was suggested that FTA could assist in the development of better revenue collection techniques, e.g., explore the use of smart card technology, R&D in the development of a standard and highly reliable fare box. Participants from the financial community noted that FTA should attempt to coordinate with other federal agencies, particularly the IRS, to communicate the "harms" that the 1986 Tax Act levied on mass transit. Issues to be addressed include the provision of tax breaks for business-related parking and not business use of transit and the limitations on the use of public bond issues to provide incentives to the private sector to contribute to mass transit.

Below are specific recommendations made by the Finance attendees to FTA for inclusion in its P&R Plan:

- o Investigate the development of advance funding (borrowing) provisions of formula grants to put capital to work as soon as possible.
- o Study and demonstrate use of congestion pricing on HOV lanes (e.g., Orange County, CA.) and its potential as a revenue generator for mass transit.
- o Conduct research to identify and improve upon existing revenue capture and control systems (electric, regular, fareboxes) (debit cards; smart cards, stored value).
- o Study and provide cost estimates to transit regarding the effect of the 1986 Tax Act, e.g., use of T.E. Bonds, Invest Tax Credits LTD Refunding, Safe Harbor Leasing, Arbitrage Regulations.
- o Study and provide information on potential benefits of improving deductibility of transit fares, taxing of parking for transit purposes.
- o Review reauthorization bill to accommodate large turnkey projects with federal funds, e.g., develop model RFP for turnkey projects, identify areas where increased flexibility could be provided to facilitate turnkey development.
- o Review and update the Rice University Study which provides a catalogue of revenue producing methods.
- o Assess the effectiveness of various ticket and pass distribution systems, e.g., those based upon discounts, equity, prepaid fares.
- o Develop guidance on how properties might optimize the use of real estate leasing and development rights.

METHODS OF FINANCING

The first day's early afternoon session was organized around discussing methods of financing mass transit. Although many of the themes from the earlier discussion continued, e.g., the impact of the 1986 Tax Act, other observations/recommendations were made.

Below are specific recommendations for FTA made by the participants:

- o Develop a "document model" which includes the process and develops standard forms that may be used in mass transit-related procurements and financial transactions. Considerable time and money is spent attempting to procure equipment/services and finances using different forms and procedures both within and between states.
- o Conduct a feasibility study of how FTA and/or state governments might enhance the credit of transit properties by underwriting the finances and selected capital ventures of eligible operations, e.g., partial loan guarantees by FTA.
- o Investigate the formation of a "National/Regional Rolling Stock Leasing Corporation" to receive FTA funding to procure and lease buses to industry at subsidized rates. The potential benefits of such an organization would possibly result in regional standardization of hardware/systems procurements, planned/volume purchases from a few entities vs. a multitude of purchases from single transit properties and would provide better guidance to suppliers on the necessary production levels. Such a corporation would optimize the benefits inherent to economies of scale, e.g., low cost.
- o Study the potential benefits of changing the current 5% bond proceeds for "Private Use" limitation to 10%-15%.

COST CONTROL

The third discussion topic was cost control. General themes of the discussion included standardization of methods/practices and the development of information sharing programs/techniques.

Recommendations by the attendees were that FTA:

- o Establish/implement the rule for multi-year procurement of buses so as to facilitate lower costs with volume purchases and to provide suppliers with a continuous backlog.
- o Develop/revise policies and procedures to better accommodate private sector participation. For example, FTA should develop risk sharing and risk management tools so that transit could work in partnership with the private sector to facilitate joint development and expansion of transit facilities.

- o Study the use of design competitions on the costs and programmatic success of capital projects. Similarly, FTA should assess the possibility of reimbursing contestants for proposal costs.
- o Develop a set of standard cash management techniques for major capital projects to assist transit financial management.
- o Develop a model for transit operators to evaluate the advisability and financial costs of self-insurance. Conduct a series of case studies to illustrate the process, benefits, and costs of such an alternative.
- o Study the effective levels of performance bonding requirements.
- o Develop information sharing programs on a variety of finance topics. For example, what is an effective level of change order authority in procurement/construction, provide guidance, and a means for comparison between operators.
- o Investigate the development of a peer group review process to assess financial management in transit, e.g., optimal use of information systems, financial planning and control techniques.
- o Study componentization vis a vis replacement costs in procurements. For example, a database on such costs could be developed for operators to consult prior to purchase.

Cross-Cutting Themes

There were a number of cross-cutting themes that attendees articulated and recommended that FTA consider in developing their overall P&R philosophy and in the writing of the final P&R Plan.

The first theme was FTA should be proactive and reinvigorate its role in information sharing/dissemination. Most participants felt that if they only knew what their colleagues were doing they could operate more effectively. To this end, FTA should not only develop more extensive information programs, but it should also evaluate the medium of that information transfer. It was recommended that the transition to video, where appropriate, might be more effective than traditional "studies." Another theme voiced was that FTA should be more aggressive in inter-agency coordination on issues impacting mass transit, e.g., communicating to the IRS the impact of the tax code, work with FHWA on coordination of mobility management by optimizing use of mass transit as a choice, etc. And finally, FTA should work to streamline procedures and processes. Wherever there might be an opportunity to streamline a grant process or standardize practices across state boundaries, e.g., rental of equipment, repair agreements, etc., FTA should aggressively identify and streamline these operations and administrative processes.

5.0 PLANNING

CHAIRPERSON: Daniel Brand, FACILITATORS: Harry Reed, Florida DOT
Charles River Assoc. Bob Dunphy, Urban Land
CO-CHAIR: Sam Zimmerman, FTA Institute
COORDINATOR: John Durham, FTA Bob Reilly, TRB
REPORTER: Larry Harman, EG&G Dynatrend

Mr. Brand's summary follows:

"We had 43 projects identified at the outset, coincidentally the same number as the number of members in our group. Operations and service planning were included, as was capital planning (Houston/Tampa/New York City).

The projects were short listed from 43 to 11 in our selection process. We then broke into subgroups to prepare 11 problem and benefit statements, as well as our recommended research approach and methodology for each project. The cost of our projects was \$21 million over 3 years, some of which came from other agencies.

Without further grouping into major categories, the following is our list of prioritized projects and our estimated cost and time required estimates:

- 1. Mode choice analysis. \$5M over 5 years.*
- 2. Economic and development benefits of transit development. \$750K over 3 years.*
- 3. Develop measures of multi-modal mobility. \$1M over 2 years (some thought this to be already accomplished while others thought not).*
- 4. Transit sensitive site planning that increases transit use (why do shopping centers and residential areas not want transit). \$500K over 2 years.*
- 5. Quantify the private and social costs of transit (social costs of congestion on highways, etc.).*
- 6. The effect of transfers on transit use. \$300K over 18 months.*
- 7. Travel and air quality impacts of TCMS. \$8M over 3 years.*
- 8. Design of transit alternatives to serve suburbs/non-urban core. \$2M over 4 years.*
- 9. Improved land use/activities. \$1M.*
- 10. Land use effects of transit improvements. \$2M over 3 years.*
- 11. Multi-modal planning process research. \$700K over 2 years."*

R&D WORKSHOP

RANK	PROJECT TITLES	TOPIC	COST OVER TIME PERIOD
1	Mode Choice Analysis - what influences transit use and how much	Model choice - Influences on: o multi-modal - inc. carpools o summarize elasticities Effect of parking and pricing/ subsidies on transit use New empirical work on mode choice	\$5M over 5 years
8	Transit Costs and Benefits	Develop measures of economic and development benefits.	\$750K over 3 years
3	Multi-Modal Mobility	Develop better measures of multi-modal mobility	\$1M over 2 years
4	Transit-Sensitive Site Planning - that increases transit use	Site planning - effects on travel by mode Handbook of transit sensitive site planning	\$500K over 2 years
5	Quantify Private and Social Cost of Transit	Quantify costs of (private and social) transportation	
6	Effects of Transfers on Transit Use	Effects of physical nature of transfers - terminal design Quantify nature of access effects of transfers on terminal design	\$300K over 18 months
7	Travel and Air Quality Impacts of TCMS	Travel and air quality impacts of TCMS	\$8M over 3 years
8	Suburban Transit Alternatives	Design of transit alternatives to serve suburbs/non-urban core	\$8M over 3 years
9	Improved Forecast of Land Use/Activities	Improved forecasts of land use/activities: o telecommunications o impacts of travel needs	\$1M
10	Land Use Effects of Transit Improvements	Study land use effect of recent transit improvements	\$2M over 3 years
11	Multi-Modal Planning Process Research	Need for multi-modal planning process (transportation planning)	\$700K over 2 years
		\$21 million program over 3-5 years (not all FTA)	

Rank 1
MODE CHOICE ANALYSIS

1. Project Title:

Studies on the effects of pricing, service quality, policy strategies and macro-factors on mode choice.

2. Project Statement:

This work would develop theories, methods and information sources for improving the ability to predict and estimate the mode choice impacts of an array of price, service, and policy factors as well as larger exogenous influences (e.g., changing demographics, lifestyles, etc.). Since so many objectives of mass transit (social equity, air quality, congestion relief) hinge on effecting mode shifts to transit, carpools and vanpools, this is fundamental research that feeds into all areas of evaluation and decisionmaking. Given the complexities of today's travel, there is a need for a more sophisticated framework and empirical evidence for estimating the mode choice impacts of such factors as the aging of the population, increase trip making in different built environments, parking policies, site designs, and increased non-work trip making, among others. Emphasis should be placed on deploying mode choice methods and indices for disaggregate and corridor-level analyses as well as more traditional aggregate, regional modeling.

3. Opportunities and Benefits:

Improve alternatives analyses and capital investment decisions; improve performance evaluation of mobility plans, TDM efforts and transit's general achievements in attaining its many broad social and environmental benefits. Besides improving decisionmaking, such new empirical information and updated measures would enable a more proactive role in land use planning to be carried out. The results should also feed into state-of-the-art microcomputer programs for carrying out sketch plans and scenario-testing. At the regional level, the outputs would help update and upgrade UTPS-level applications.

4. Research Approach:

Step one is to define the current state-of-practice. Current data and conceptual gaps should be defined and needs articulated. Next, conceptual work should be conducted on current microeconomic and choice theories with an eye toward expanding future models and approaches. This should be followed by synthetic work that reviews empirical evidence and merges the literature. The rest of the effort should then be devoted to new empirical work that provides useful indicators of factors influencing multimodal travel demand and that, in particular, weighs the influences of changing demographics, lifestyle, and other mega-factors. Empirical studies should be both aggregate and disaggregate, longitudinal (where possible), and provide some general equilibrium framework for gauging mode choice impacts.

5. Reports/Products:

- o An assessment of the current state-of-the-field.
- o A report on conceptual frameworks and new approaches for mode choice analysis.
- o A national compendium of mode choice indices, including elasticities and cross-elasticities segmented by submarkets.
- o An updated Ecosometrics report on elasticities and NCHRP 186/187 quick response set of indicators.
- o An on-going data collection/monitoring effort to obtain real-time, reliable mode choice information for guiding investment decisions and policy choices.

6. Effort:

- o Multi-year initial effort: 5 years
- o Funding: \$5 million

Rank 2
TRANSIT COSTS AND BENEFITS

1. Project Title:

Develop methods of measures of economic, social and environmental costs of transit (direct and indirect) and benefits (real and perceived).

2. Project Statement:

Evaluate the true costs and benefits of transit, one which both highway and transit analysts can agree upon is not currently available.

3. Opportunities and Benefits:

Provide fair evaluation and selection criteria of communities in order to evaluate between transportation alternatives.

4. Research Approach:

- o Evaluate existing methods/techniques leading to state-of-the-art approach.
- o Develop and maintain timely data on full costs and benefits to support analytical techniques in #1 below.
- o Joint FHWA/ODOT approach.

5. Effort:

- 1) = \$450,000
- 2) = \$150,000 each year

Rank 3
MULTI-MODAL MOBILITY

1. Project Title:

Developing measures and planning for multi-modal mobility.

2. Project Statement:

Basic research is needed on defining and measuring the full dimensions of mobility, weighing such factors as the perceived and actual quality of services, equality of access, the health implications of congestion, ease of site access, ease of transfer, and other factors which assist in gauging how well our transportation systems work. This is envisioned as very fundamental conceptual research followed by empirical testing and evaluation. Measures of mobility should capture how well services and modes are integrated, reflect both macro-regional and micro-corridor levels of mobility, and be measurable, uniform, and consistent across modes. Once measurement tools, indicators, and frameworks are developed for gauging mobility, a process should be developed for linking it to performance evaluations as related to capital investment decisions, mobility management and TDM plans, and short-term transportation policy planning. Mobility indicators should be targeted to specific consumers: 1) mode users - to improve choice decisions; 2) planners and service designers - to strategically plan and design for service reforms; and 3) decision makers - to make basic resource allocation decisions on modal alternatives, as well as pricing and service choices.

3. Opportunities and Benefits:

Improved decisionmaking. A richer framework for studying and understanding the links between modes, the quality of service and price innovations, the many factors that bear on mobility and ultimately user mode preferences, and the overall quality of urban environments.

4. Research Approach:

An initial product should be a think piece that outlines the many dimensions of mobility, ideally one that provides a new paradigm for thinking about transportation planning and mobility. This should then feed into a series of studies that attempt to develop a multi-factor set of measures that collectively gauge mobility across modes. As part of this, a comprehensive investigation should be carried out on current data availability, quality, and format that would allow more sophisticated measures of mobility to evolve. Potential data sources, whether from regional transportation plans, censuses, traffic impact studies, or on-board surveys, should be individually and collectively studied to see how well they serve as potential indicators of multi-modal mobility. Next should be a series of empirical case studies that attempt to measure mobility across modes at both the macro and micro levels. This should be followed by studies that evaluate these measures, particularly as they relate to actual political decisions, user mode preferences, and public perceptions of the quality of regional and local mobility. This should be an on-going research/data compilation effort, perhaps in concert with mode choice surveillance.

5. Reports/Products:

A series of reports that provide a conceptual framework, empirical measures, and that establish guidelines for MPOs and local agencies.

6. Effort:

Since this is multi-modal, it should be linked to efforts of other federal agencies, like FHWA, as well as private interests like ITE and APTA. The total bill is estimated as \$1 million spread over 2 years. FTA's share should be 1/3 to 1/2 of this amount.

Rank 4
SITE PLANNING

1. Project Title:

Site planning principles that facilitate the ease and comfort of all modes of transit.

2. Project Statement:

How do we influence and, if necessary, adjust the physical environment to improve transit utilization while accommodating the needs of the adjoining community. Challenges are faced by the transit industry in meeting the demands of existing urban conditions (retrofitting/force fitting) and new development where creative approaches can be examined.

3. Opportunities and Benefits:

Cost effective approaches to overcome obstacles to the physical, political, social and institutional issues can provide improvements to the transit integration within the overall transportation framework.

4. Research Approach:

- o Review of case studies and how they accomplished successful results.
- o On-the-ground observations required.
- o Work with other research agencies or groups who have worked on related topics.
- o Handbooks dealing with retrofit conditions and new development.
- o Training course.

5. Effort:

\$300K - \$500K including expenses over 18-24 months.

Rank 5
PRIVATE AND SOCIAL COST OF TRANSIT

- 1, Project Title:
Quantify costs of (private and social) transportation.
2. Project Statement: not given.
3. Opportunities and Benefits: not given.
4. Research Approach: not given.
5. Reports/Products: not given.
6. Effort: not given.

Rank 6
TRANSFERS/TERMINAL DESIGN

1. Project Title:

Effect of physical nature of transfers - terminal design quantify nature of access.

2. Project Statement:

What are the effects of transfers on consumer choice as affected by physical features, (notably vertical change, walking distances, environmental conditions), schedule integration, fare policy, function and operation of the transit facility.

3. Opportunities and Benefits:

Transfers are an integral part of the transit environment. Understanding the effects on consumer choice of transportation mode as it relates to transfers will be beneficial to improvements in the design of transit system elements.

4. Research Approach:

- o Market research (focus groups).
- o Examination of different facilities in service.
- o Review of prior work.
- o Demand models of relationships of multiple variables (physical features, fare policy, schedule integration).
- o Study results report.
- o Models of multiple arrangements (varying by complexity and site constraints).

5. Effort:

\$300,000 over 18 months

Rank 7
TRANSPORTATION CONTROL MEASURES (TCM)

1. Project Title:

Travel and air quality impacts of TCMs.

2. Project Statement:

The need for better methods to forecast the VMT and emissions effects of TCMs. TCMs include:

- o Transit improvements including ridesharing.
- o Employer actions to reduce SOV uses.
- o Parking pricing.
- o Paying people to exercise their own choices if they do not use SOVs.

3. Opportunities and Benefits:

- o Improve air quality.
- o Design transportation options with predictable impacts.
- o Minimize costs of transportation options to achieve the desired benefits.
- o Minimize private and social costs of travel.

4. Research Approach:

Pollution-generated emissions is affected by VMT by vehicle type, flow conditions, trip lengths, etc.

Approach:

- o TCMs normally affects mode choice; not generally a land use or trip generation effect.
- o Investigate the single and synergistic effects of TCMs at employer and regional level.
- o Estimate the traveler perceived cost per trip by each action.
- o Quantify the attributes of the TCMs as they affect behavior.

Research Methods:

- o Stated preference surveys to quantify willingness to pay for TCM attributes.
- o Design experiments and collect new data to evaluate TCMs.
- o Cross-cutting studies of case studies already done of TCMs and their effects.
- o Incorporate relationships found in first three methods into existing travel model structures.

5. Reports/Products:

- o Ability to estimate benefit/costs of each TCM.
- o Models and methods which measure the air quality/emission impacts to evaluate TCMs.

6. Effort - 3 Year Program:

Methods

- o Design and evaluation of experiments including cross cutting studies: \$5 million.
- o Stated preference surveys: \$1 million.
- o Re-work old models: \$1 million.

Expensive - Would be jointly funded by FTA, EPA and FHWA

- o TCMs are the offset or price of building new highways. FHWA and EPA should participate in the research.

Rank 8
SUBURBAN TRANSIT ALTERNATIVES

1. Project Title:

Design of transit alternatives to serve suburbs/non-urban core.

2. Project Statement:

This is a broad-based topic which requires a multi-faceted approach including the following:

- a. Define emerging markets for travel in urban areas:
 - o suburb to suburb
 - o service to concentrated suburban activity centers
 - o airports
 - o new development
 - o rural access to suburban activity centers
 - o job access/reverse commute
 - o other
- b. Identify methods presently being used to provide transit in the suburban areas and evaluate their effectiveness. Produce a state-of-the-art report.
- c. Examine institutional and regulatory barriers to innovative services in suburban areas.
- d. Examine intergovernmental barriers to joint and coordinated public transit services.
- e. Explore the potential use of improved telecommunication technology to support suburban transit service.
- f. Increase the level of input by the public sector transit agencies in real estate development project design and implementation - transit-friendly design. Identify features for transit-friendly design, and improved pedestrian connections. Identify benefits to private sector.
- g. Improved design of multi-activity transit centers. Incorporate retail and service activity at transit centers.
- h. Service design of suburban transit, express shuttles, distribution within activity centers.
- i. Land use design - how should land use patterns be arranged to facilitate transit use? How can existing suburban areas, properties and sites be modified to facilitate higher quality transit service? How does transit sensitive design fit into the real estate/development marketplace?

3. Opportunities and Benefits:

- o Improved knowledge of transfer and dissemination.
- o Cleaner air.
- o Transit will be able to provide impact in rapidly growing areas.
- o Provide a broader range of options for transit authorities to participate in.
- o Control of transit operating costs.
- o Provide additional lifestyle options/job opportunities.
- o Increased labor pool.
- o Reduced parking demand and costs.
- o Opportunities for more independent living for aging population in the suburbs.

4. Research Approach:

Phase I A multi-year, comprehensive multi-project approach, beginning with #1 and #2 (current methods, emerging markets).

Phase II Then #3 and #4 (barriers to implementation) along with #6 - development and #9 - land use design.

Phase III Then #8 - Service design, #7 - Transfer centers, and #5 - Telecommunications.

Phase IV Demonstration projects

5. Reports/Products:

- o Highly user-orientated reports, state-of-the-art/synthesis.
- o Demonstration - site visit programs.

6. Effort:

Substantial - \$500K (4-6 person years) per year in multiple projects rather than as a single project. For example, different groups could look at certain market areas, i.e., airports, suburban job center, reverse commute, non-CBD urban centers, etc. Exurban (Sec. 18) ring, cross suburb travel (suburb to suburb), new developments.

Initial projects would focus on issues #1 and #2.

Rank 9
IMPROVED FORECAST OF LAND USE/ACTIVITIES

1. Project Title:

Land use effects of recent transit investments.

2. Project Statement:

There is a lack of good information to assist local officials in auto-oriented communities (Houston, Tampa, Seattle, etc.) on how transit investments can support desired patterns of urban form.

3. Opportunities and Benefits:

Congressional over-subscription of FTS's new starts budget represents only the tip of the iceberg of expanding local and state interest in new transit investments. Better information can result in better decisions now.

4. Research Approach:

Immediate synthesis of experiences, new (post 1970) systems;

- o survey developments, older systems - infill on older lines; growth along new extensions; rehabilitations.
- o identify current work in progress, tracking trends.
- o selected case studies of land values.
- o review existing land models, compare to results.

5. Reports/Products:

A. Synthesis report: Year #1

1. synthesis of current reports (selected localities, experience since 1970s).
2. contact names for additional information.
3. identify research in progress.

B. Symposium: Years #2 and #3

1. series of technical reports.
2. user manuals; training courses.
3. summary brochure for public distribution.
4. check list of policies, pitfalls and timing to support development patterns.

6. Effort:

Year 1 - \$300,000

Years 2 and 3 - \$1,000,000 - \$2,000,000

Rank 10
LAND USE EFFECTS OF TRANSIT IMPROVEMENTS

1. Project Title:

Land use effects of recent transit improvements.

2. Project Statement:

There is a lack of good information to assist local officials in auto-oriented communities (Houston, Tampa, Seattle, etc.) on how transit investments can support desired patterns of urban form.

3. Opportunities and Benefits:

Congressional over-subscription of FTA's new starts budget represents only the tip of the iceberg of expanding local and state interest in new transit investments. Better information can result in better decisions now.

4. Research Approach:

Immediate synthesis of experiences, new (post 1970) systems;
o survey developments, older systems - infill on older lines; growth along new extensions; rehabilitations.
o identify current work in progress, tracking trends.
o selected case studies of land values.
o review existing land models and compare results.

5. Reports/Products:

A. Synthesis report: Year #1

1. synthesis of current reports (selected localities, experience since 1970s).
2. contact names for additional information.
3. identify research in progress.

B. Symposium: Years #2 and #3

1. series of technical reports.
2. user manuals and training courses
3. summary brochure for public distribution.
4. checklist of policies, pitfalls and timing to support development patterns.

6. Effort:

Year 1 - #300,000

Years 2 and 3 - \$1,000,000 - \$2,000,000

Rank 11
MULTI-MODAL PLANNING PROCESS (MMPP) RESEARCH

1. Project Title:

The need for multi-modal planning process (transportation planning).

2. Project Statement:

The need for recently enacted legislation (CAA) to go to MPOs. MPOs are not prepared; Federal agencies provide guidance. Multi-modal planning is the preferred approach.

3. Opportunities and Benefits:

Clean air and other national goals are achieved through effective regional, multi-modal planning process.

4. Research Approach:

- a. State of practice: final report
- b. Study: draft
- c. National review and consensus
- d. Final report
- e. Rulemaking

Assumptions:

- a. Clean air, prime variable/goal
- b. M.M.P. planning is the best process by which to attain clean air. MMPP is alternate transportation strategies for change. Other areas of investigation/recommendations to include (not be limited to):
 - o institutional and regulatory barriers
 - o funding and programming barriers (funding itself)
 - o technical tools/analysis required to document trade-offs
 - o government roles and responsibilities, including local, state and federal
 - o citizen participation
 - o FHWA/FTA similarity of procedures and rules
 - o consequences of not meeting provisions of the Clean Air Act and/or ISTEA

5. Reports/Products:

Reports and rulemaking.

6. Effort:

- Short term (Phase I): State of practice report-4 months at \$200-\$250K
Long term (Phase IIa): Draft proposals-6 months at \$250-\$500K
Long term (Phase IIb): Regional meetings, draft review, final report - 6 months at \$100-\$200K
Long term (Phase IIc): Rulemaking - 4 months at \$0



APPENDIX A. ADMINISTRATOR CLYMER'S REMARKS



CONCLUDING REMARKS BY FTA ADMINISTRATOR
BRIAN CLYMER

There were so many comments and thoughts that I wrote down as we went along.

You talked about a lot of things: grant advance funding under Section 9, which has a lot of promise; of course, our new lease regulation came out about eight weeks ago, which allows you to lease or lease purchase using your Section 9 dollars over a period of years. It changes the criteria from strict cost-effective criteria, where you could only compare which was cheaper, lease or lease purchase or an outright purchase. You now have a lot of latitude to spread the cost of the major capital investments over time using the lease provisions. I would encourage everyone to look at that. You will have a lot of flexibility when you are going to spend \$10 million for a bus purchase. You can now spend \$2 million per year in paying off a lease purchase, leaving the balance for other projects.

We talked about methods of financing: cost control, the cash management manual, componentization.

I started thinking about the idea that all buses have to last 12 years. Maybe we could create an aftermarket to sell buses so we may roll the equity forward into new vehicles. This will help both the private and the public sector.

Financial management and peer group review--I like that idea. We do have a similar concept now whereby we sent a group out to MARTA and BART, two good systems, to see what they are doing well and how it can be applied to other systems.

In the area of planning, there were also a lot of good ideas -- site planning, mode choice, analysis, and transfer. The multi-modal planning process is the last item. While it did not make it into the top ten, I might add that the FHWA has already started working in this area.

Transportation services, congestion pricing, mobility, and clean air--all of these things are excellent.

Human resources management came up again and again. Engineering threw out the biggest challenge; they wanted to have projects that made sense!

I would like to thank the Chairman, volunteers, and the efforts of everyone who made this a success. If you think this was tough, imagine Larry Shulman's [Associate Administrator for Technical Assistance and Safety] job trying to put this all together in the past few days, as well as trying to squeeze all these projects into his budget. I think it's important to remember that this is a dynamic agenda, and I want to talk about the future. We will report back on our accomplishments as we start to move forward with this kind of agenda. As we look into the results, it may change our decision and cause some reprioritization, and we may branch off into other areas that we think are important.

A lot of human resource areas were discussed. Training is a high priority that came out of Kansas City last year. Information dissemination came out of every group here. It is something we need to place a lot of priority on, and I think the industry will also have to prioritize it. We will have to work together on this. How can we create all these things and be assured that everyone knows about it? As was said earlier, "transportation is one of the best kept secrets around." Mode choice came up in several areas as well.

Where are we going from here? We have a couple of days to do our allocation, but other than that, we are ready to go. We will get this information out to you as soon as possible and then we will begin to program the results of our plan. We will report this back as well, then we need to start thinking about next year's budget. We need to be ready by this Spring to identify and program our budget.

This has been very productive. I know you have done this before over the past years. Your charge is to attend and participate, as you have. Our charge now is to convert the workshops and your projects into a meaningful program and implement it.

APPENDIX B. LIST OF PARTICIPANTS



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