Research Center of Excellence

TEXAS TRANSPORTATION INSTITUTE • THE TEXAS A&M UNIVERSITY SYSTEM

Workshop on Integrating Transit with Advanced Traffic Management Systems—Workshop Proceedings

TTI/ITS RCE-97/05

Texas Transportation Institute • The Texas A&M University System • College Station, Texas

Statement of Sponsorship The Texas A&M ITS Research Center of Excellence (RCE) sponsored this project. Partners in funding the ITS RCE include the Federal Highway Administration, the Texas Department of Transportation, the Metropolitan Transportation Authority of Harris County, Texas, Corpus Christi Regional Transit Authority, Dallas Area Rapid Transit, and TTI. The funding partners assume no liability for the contents of this document or the use thereof.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
TTI/ITS RCE-97/05		

4. Title and Subtitle	5. Report Date
WORKSHOP ON INTEGRATING TRANSIT WITH ADVANCED TRAFFIC MANAGEMENT SYSTEMS — WORKSHOP PROCEEDINGS	May 1997
	6. Performing Organization Code
7. Author(s) Katherine F. Turnbull	8. Performing Organization Report No. Research Report
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, TX 77843-3135	10. Work Unit No. (TRAIS)
	11. Contract or Grant No. DTFH61-93-X-00017-004
12. Sponsoring Agency Name and Address Texas A&M ITS Research Center of Excellence Texas Transportation Institute The Texas A&M University System College Station, TX 77843-3135	13. Type of Report and Period Covered Interim: September 1996 - March 1997
	14. Sponsoring Agency Code

15. Supplementary Notes

Research supported by a cooperative agreement from the Federal Highway Administration, ITS Research Center of Excellence Program. Additional support for this research was provided by the Texas Department of Transportation, the Metropolitan Transit Authority of Harris County, Dallas Area Rapid Transit, and the Texas Transportation Institute.
Research Project PT-02: Integrate Transit into Advanced Transportation Management Systems

16. Abstract

This report documents the results from the *Workshop on Integrating Transit with Advanced Traffic Management Systems*, held in Houston, Texas on September 4 and 5, 1996. The workshop was sponsored by the Texas A&M Intelligent Transportation Systems (ITS) Research Center of Excellence and the Texas Transportation Institute (TTI), a part of the Texas A&M University System. Co-sponsors of the workshop included the Metropolitan Transit Authority of Harris County (METRO), Dallas Area Rapid Transit (DART), the Texas Department of Transportation (TxDOT), the Southwest Region University Transportation Center (SWUTC), and the South West Transit Association (SWTA).

The workshop results are summarized in these proceedings. The workshop was held to discuss techniques to enhance the integration of public transit with Advanced Transportation Management Systems (ATMS). Participants at the workshop discussed the information ATMS can provide to enhance the management of transit operations, the information transit can provide to ATMS, and approaches to foster further cooperation and coordination among all agencies responsible for ATMS and public transportation. The major points, suggestions, and recommendations from the workshop are presented in this document.

17. Key Words	18. Distribution Statement
Intelligent Transportation Systems, ITS, Advanced Technologies, Transit, Public Transportation, Advanced Transportation Management Systems, ATMS.	No restrictions. This document is available to the public through NTIS: National Technical Information Service 5285 Port Royal Road Springfield, VA 22161

19. Security Classif.(of this report)	20. Security Classif.(of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	30	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized.

WORKSHOP ON INTEGRATING TRANSIT WITH ADVANCED TRAFFIC MANAGEMENT SYSTEMS

WORKSHOP PROCEEDINGS

September 4-5, 1996
Crowne Plaza Hotel
Houston, Texas

Editor
Katherine F. Turnbull

Research Report 97/05
Research Project:
Integrating Transit with Advanced Traffic Management Systems

Sponsored by the

Texas A&M ITS Research Center of Excellence

In Cooperation With

Metropolitan Transit Authority of Harris County
Texas Department of Transportation
Federal Highway Administration
Dallas Area Rapid Transit
Southwest Region University Transportation Center
South West Transit Association

May 1997

TEXAS TRANSPORTATION INSTITUTE
The Texas A&M University System
College Station, TX 77843-3135

ACKNOWLEDGMENTS

This report documents the proceedings from the *Workshop on Integrating Transit with Advanced Traffic Management Systems*, which was held in Houston, Texas on September 4-5, 1996. The author would like to recognize a number of individuals who assisted with the Workshop. TTI staff members Patti Bass, Stephen Farnsworth, Clifford Perry, and Cynthia Weatherby acted as facilitators and recorders for the working group sessions. TTI staff member Bonnie Duke took care of the administrative details for the Workshop and typed these proceedings. Loyd Smith, Metropolitan Transit Authority of Harris County, and Deanna Anderson, Fort Worth Transit Authority, acted as reporters for the two working groups. In addition, Robert MacClennan, Metropolitan Transit Authority of Harris County, Ed Wueste, Federal Highway Administration, and Tom Urbanik, Ray Krammes, and Chris Poe, TTI, all spoke at the Workshop. The assistance of these individuals is both acknowledged and appreciated.

TABLE OF CONTENTS

SUMMARY

Metropolitan areas throughout Texas and the nation are implementing a wide range of Intelligent Transportation Systems (ITS) and other advanced technologies to address traffic congestion and environmental concerns. ITS technologies are being directed toward improving mobility and transportation productivity and enhancing the environment. Advanced Traffic Management Systems (ATMS), which focus on the development and operation of freeway and roadway surveillance and monitoring systems, represents one of the approaches being used in many urban areas. ATMS provides advanced detection, communication, and control functions in major travel corridors and areas.

Ensuring that public transit is incorporated into ATMS can have benefits for all agencies and groups. To help facilitate the integration of transit with ATMS, the Texas A&M ITS Research Center of Excellence sponsored a Workshop in Houston, Texas on September 4 and 5, 1996. The Workshop participants discussed techniques to enhance the integration of public transportation with ATMS, including the information ATMS can provide to transit agencies, the information transit operators can provide to ATMS, and techniques to enhance coordination among all agencies.

The Workshop results are documented in these proceedings. The Workshop participants identified a number of ways ATMS can improve the operation, management, and planning of public transit services. Further, information provided by transit operators can enhance ATMS. Techniques to foster improved communication and interaction among agencies, and other recommendations are also documented.

WORKSHOP SUMMARY

Katherine F. Turnbull
Assistant Director
Texas Transportation Institute

INTRODUCTION

A Workshop on Integrating Transit with Advanced Traffic Management Systems (ATMS) was held on September 4 and 5, 1996, in Houston, Texas. The workshop was sponsored by the Texas A&M Intelligent Transportation Systems (ITS) Research Center of Excellence, and the Texas Transportation Institute (TTI), in conjunction with the Federal Highway Administration (FHWA), the Texas Department of Transportation (TxDOT), the Metropolitan Transit Authority of Harris County (METRO), Dallas Area Rapid Transit (DART), the Southwest Region University Transportation Center (SWUTC), and the South West Transit Association (SWTA).

The purpose of the workshop was to discuss techniques to enhance the integration of public transportation with ATMS. More specifically, participants focused on the information ATMS can provide to improve transit operations, the information public transportation can provide to enhance the management of the overall transportation system, and approaches to further the coordination and cooperation among all agencies responsible for transit and ATMS.

Approximately 40 individuals from METRO, DART, the Fort Worth Transit Authority, TxDOT, the Federal Transit Administration (FTA), consulting firms, and university transportation research organizations participated in the workshop. Mr. Robert G. MacLennan, General Manager, METRO, opened the workshop with a kick-off speech at the luncheon on September 4. Participants then toured TranStar, the new Greater Houston Transportation and Emergency Management Center. After returning to the hotel, the first day concluded with an afternoon session highlighting major elements of ATMS, current examples of transit integration with ATMS, and the TransLink Research Program.

The morning of the second day was spent in breakout sessions. Workshop participants discussed a series of questions and topics related to transit and ATMS. The major points discussed in the breakout groups were presented at the closing luncheon, which featured Mr. Ed Wueste, FHWA Regional Administrator. Mr. Wueste discussed the reauthorization of the Intermodal Surface Transportation Efficiency Act (ISTEA).

These proceedings summarize the major points, suggestions, and recommendations from the workshop. The common elements emerging from the working sessions and the presentations are presented next, followed by a more detailed outline of the elements discussed in both groups.

SUMMARY — INTEGRATING TRANSIT WITH ATMS

A variety of topics were discussed during the presentations at the workshop and in the working group sessions. A number of common themes emerged from the workshop relating to the information generated by ATMS that can enhance transit operations and planning, as well as the information transit can provide to ATMS to help other modes. In addition, potential institutional and technical issues were identified that may need to be addressed to ensure greater integration of transit with ATMS.

Overall Goal

A consensus was voiced by participants that all agencies and the general public benefit from greater integration of transit with ATMS. As a result, a goal of all agencies should be to incorporate transit as a full partner in planning, designing, implementing, and operating ATMS. Greater coordination and cooperation will be needed among the various agencies involved in ATMS to accomplish this goal.

Continuing discussions among personnel from different agencies, through workshops and other activities, are needed to help advance greater integration of transit with ATMS. All groups should work toward developing shared goals and objectives in metropolitan areas related to involving transit, as well as other modes, in ATMS.

Information ATMS Can Provided to Enhance Public Transit

The information generated by ATMS can have significant benefits for transit operations. Workshop participants identified three general categories for utilizing information available from ATMS to enhance public transportation. These were improving transit operations, enhancing short-range and long-range planning, and expanding the range and quality of real-time information on all modes to commuters and travelers. The primary applications within each of these areas are described in this section.

Enhancing Transit Operations

The real-time information on traffic conditions on freeways, HOV lanes, and adjacent roadways available through ATMS can enhance the operation of transit services using these facilities. Although the majority of regular route bus services in most metropolitan areas operate on arterial streets, express services often use the freeway system and HOV lanes if available. For example, extensive premium park-and-ride bus services are provided in Houston using the HOV lanes. In addition, paratransit and demand responsive services, such as those geared toward individuals with special needs, may use the freeway system for a portion of a trip.

Information on accidents, incidents, and general traffic conditions on freeways, HOV lanes, and other facilities can enhance the real-time management and operation of transit services. Providing this information to transit dispatchers, on-street supervisors, and bus operators will allow these

groups to initiate proactive responses. Although there may be limited options for rerouting buses, alternative actions can be implemented to help buses avoid an accident or incident. For example, buses may be rerouted to different freeways or roadways, additional vehicles may be dispatched, or other measures may be implemented.

In addition, accidents involving buses or other transit vehicles can be detected faster and the appropriate responses can be initiated. The use of closed circuit television cameras and other monitoring techniques can provide an accurate picture of the nature and the extent of an accident involving a bus. The appropriate vehicles and personnel can then be dispatched to respond to the problem. This approach should provide greatly improved response capabilities and faster response times than the current method of sending supervisory personnel to report back on the extent of an accident involving a bus.

Communication techniques and response plans will need to be developed in most areas outlining how the real-time traffic information will be provided to transit operating personnel and the actions that will be taken in response to specific conditions. Linking ATMS with transit operations may include a number of steps. First, protocol will need to be developed for transferring information or co-locating transit personnel in ATMS centers. Second, response policies and plans will need to be developed for specific conditions. Third, communication methods between transit dispatchers and on-street supervisors and bus operators should be developed and deployed. Finally, conducting ongoing monitoring and evaluation activities to refine and update the response policies and plans should be considered.

The approaches and technologies used by transit agencies to communicate with various management and operating personnel and to initiate specific response strategies may evolve over time. Initial approaches may involve transit personnel located in the ATMS center communicating with on-street supervisors and operators by radio. Ultimately, supervisory vehicles and buses may be equipped with in-vehicle real-time information and navigation devices.

Enhancing Transit Planning

A variety of information generated from ATMS can be used to enhance both short-and long-term transit planning. For example, the calculation of average travel speeds on freeways and HOV lanes during different times of the day could be used to assist with developing and updating bus schedules, monitoring schedule adherence, and other short-term planning activities. Real-time traffic information could be used to help identify specific problem areas or bottlenecks that may be slowing buses down. Approaches and techniques to address these problems could then be identified, evaluated, and implemented. Over the longer term, the data collected by ATMS could be used to help monitor changes in travel patterns and traffic volumes, to identify new markets, and to update travel models.

ATMS will generate a wealth of data that can be used for short-and long-range transit and transportation planning, as well as other purposes. For this information to be of benefit and use, however, procedures will need to be developed to collect, analyze, and maintain the data. These

efforts should focus on identifying the critical information needs and developing a database that could provide the greatest benefits to multiple user groups.

Enhancing the Provision of Real-Time Traffic and Transit Information to the Public

ATMS provides the opportunity to collect and analyze real-time information on a range of modes. For example, monitoring general-purpose freeway lanes and HOV facilities provides data on travel conditions for motorists, commercial vehicles, buses, vanpools, and carpools. Providing this information to all users of the roadway system, especially commuters, can help all groups make more educated travel decisions.

There was strong support in both working groups for using a variety of technologies to provide real-time traffic and transit information to individuals in their homes and places of work, in-route, at transit facilities, and at major activity centers to help them make better travel decisions. Technologies suggested for consideration included commercial and cable television, the Internet, personal information devices and pagers, interactive telephone systems, kiosks and signs at transit stops and major activity centers, commercial radio, highway advisory radio (HAR), changeable message signs, and other techniques. In addition, further real-time transit information on the status of buses, bus arrival times, and the availability of wheelchair equipped or other special services could be provided through automatic vehicle location (AVL) systems or other technologies.

Participants stressed the need to use a variety of information delivery methods. Appropriate technologies should be matched with the needs and capabilities of different user groups. In addition, participants stressed that the real-time traffic and transit information provided to the public must be accurate or individuals will not use it.

Information Transit Can Provide to ATMS

The vast majority of regular route buses and paratransit services in metropolitan areas operate on arterial or local streets. As a result, these vehicles and the drivers who operate them may offer opportunities to provide real-time information on traffic conditions, incidents and accidents, or other activities on arterial streets to the ATMS center. This information may in turn be used by other agencies and groups to coordinate the various elements and modes of the surface transportation system.

Both traditional approaches and ITS technologies can be deployed to provide information on arterial street traffic conditions to ATMS. At a basic level, bus operators can report accidents, incidents, general traffic conditions, and other activities by radio to transit dispatchers or ATMS personnel. Bus operators provide another "pair of eyes" and can report on a regular basis or in response to specific accidents or incidents. The current *METRO On Watch* program provides an example of this approach, which could be expanded to regular reports at specific intervals.

At more advanced levels, automated vehicle identification (AVI) or AVL systems could be used to provide real-time information on travel speeds and traffic conditions on arterial streets. The use

of these technologies would have to account for the numerous stops made by transit vehicles to drop-off and pick-up passengers. The information provided through these techniques could be of benefit to other agencies and groups, and could allow for greater coordination with traffic signal systems, incident management and diversion to local streets, and other strategies. Future consideration could also be given to locating cameras on the outside of buses to provide video images of traffic conditions, as technology allows. Further, expanding ATMS to include arterial streets may be appropriate in some areas.

Institutional Issues

Both working groups identified potential institutional issues that may limit the integration of transit with ATMS. It was noted that institutional concerns are often more serious factors limiting the deployment of ITS and ATMS than technical issues. The need for greater understanding and cooperation among personnel from transit agencies, state departments of transportation, local communities, and other groups was stressed in both working groups to overcome these concerns.

Participants also voiced the need to educate all groups on the benefits of greater coordination and on the movement of people, rather than vehicles. The use of multi-agency teams, the need for project champions, and the development of shared goals, objectives, and plans were noted as important. Other potential issues that may need to be addressed to encourage greater integration of transit with ATMS include bus operator union and labor rules, privacy concerns, and conflicting agency goals and objectives. Ensuring that staff have the technical expertise to develop, operate, and maintain the systems was also noted as important.

Funding was identified in both groups as an important consideration in planning, implementing, operating, and maintaining ATMS. Funding from all sources is limited and there was support for innovative public/public and public/private partnerships to deploy ATMS. Providing a realistic assessment of both the short-and the long-term costs and benefits of ATMS was identified as important, as was matching the technologies and approaches to the specific needs of an area. In addition, participants noted that the benefits from ATMS and other ITS projects need to be documented and promoted to help ensure continued funding.

Technology Issues

A number of technical concerns that may limit the integration of transit with ATMS were identified. The major concern dealt with ensuring compatibility among the technologies and systems being developed and implemented by the various agencies. The need for a common system architecture was noted as important to help promote coordination. Participants also noted that the rapid development of technology made it difficult to keep pace, and that hardware and software systems may be almost outdated by the time they are implemented. To help address these concerns, consideration should be given to ensuring that the technology used initially can be updated as needed.

Follow-up Activities and Areas for Further Research

A number of follow-up activities and areas for further research were identified by participants in both working groups. The following items summarize the suggestions provided by workshop participants.

- Provide case study and best practice examples from around the country. These case studies should highlight the institutional, as well as the technical approaches used to foster transit integration with ATMS.

- Develop specific planning applications for data generated by ATMS. Procedures and techniques to collect, analyze, and maintain the wealth of data generated by ATMS are needed to ensure its use in short- and long-range planning. Consideration should be given to developing applications that could be used in multiple areas, as well as to techniques that benefit more than one agency.

- Develop and test different approaches to providing real-time traffic and transit information. Continued testing of various technologies is needed to determine the methods individuals prefer and to better understand changes in travel behavior.

- Develop and test incident management response plans and programs. Realizing the full benefits of ATMS will require the development and implementation of incident management plans and procedures. Ensuring that all agencies have a common understanding of the actions to be taken in response to specific problems and that these procedures are carried out in a coordinated manner represents a critical benefit of ATMS.

REPORTS WORKING GROUPS

WORKING GROUP 1

***Reporter**: Deanna Anderson, Fort Worth Transit Authority*
***Facilitator**: Cinde Weatherby, Texas Transportation Institute*
***Recorder**: Chip Perry, Texas Transportation Institute*

***Participants**:*
Darryl Puckett, Texas Transportation Institute
Carol Ketcherside, South West Transit Association
Peter Dittmer, Texas Southern University
Chris Barnes, Houston METRO

Ronald Flink, Houston METRO
Gilmer Gaston, Kimley-Horn & Associates
Tom Lambert, Houston METRO
Pierre Lapuyade, Houston METRO
Gail Lyssy, Federal Transit Administration
Chris Poe, Texas Transportation Institute
Koorosh Olyai, Dallas Area Rapid Transit
Robert Spillar, Parsons Brinckerhoff

SUMMARY OF MAJOR TOPICS

Information ATMS Can Provide to Public Transit

- Real-Time Information on Incidents and Accidents

  — Provide information on incidents and accidents quickly to transit dispatchers, operations personnel, and bus operators.

  — Although buses may not always be able to deviate extensively from routes, pro-active actions can be taken in response to incidents and accidents.

  — Alternative routing plans and strategies should be developed and used in response to specific problems.

  — Ultimately in-vehicle information and response systems could be provided to help bus operators.

  — Currently, transit is not benefitting from real-time traffic information.

- Provide real-time traffic and transit information to individuals in their homes, in-route, in their places of work, at transit facilities, and at major activity centers to allow them to make better commute and travel decisions. A wide range of technologies should be considered to provide this information, including:

  — Changeable message signs.

  — Highway Advisory Radio (HAR).

  — Commercial radio.

  — Kiosks or information signs at transit stops and major activity centers.

  — Personal information devices.

  — Internet and home pages.

  — Telephone information systems.

  — Commercial and cable television.

- Provide real-time transit information to customers at bus stops, centers, and stations.

  — Status of bus or location of bus along route.

  — Arrival times.

  — American with Disabilities Act (ADA) or other special service availability.

- Use real-time traffic information generated through ATMS for routing paratransit vehicles and demand responsive services.

- Use ATMS to increase bus travel speed, reduce bus travel time, and improve bus travel time reliability. Time is a critical issue in making transit more competitive with the private automobile.

- Use ATMS information to enhance transit operations, including monitoring passenger loads and service levels. Add extra vehicles as needed and take pro-active responses to other situations.

- Use information generated by ATMS for transit planning.

  — Schedule development and schedule adherence.

  — Identifying travel patterns and need for new routes.

— Updating and changing route structures.

— Responding to extra heavy loads.

— Public relations.

- ATMS can help respond appropriately to bus accidents or incidents involving buses on freeways and HOV lanes. Currently, supervisors are sent to the accident site to determine the nature and extent of the problem and to initiate the appropriate response with ATMS. The TranStar control room staff should be able to determine the nature of the accident and dispatch the appropriate response vehicles and personnel. Responses can also be coordinated through incident management teams. Policies and procedures will need to be developed to identify the appropriate responses and oversee these groups.

Information Transit can Provide to ATMS

- Buses can act as traffic probes on arterial streets.

  — At the simplest level, bus operators can report incidents, accidents, or general traffic conditions by radio. This approach fits into the *METRO On Watch* program. Bus operators can provide another "pair of eyes" and can report emergency situations or other conditions.

  — At more advanced levels, AVI tags or AVL systems could be used to provide automated real-time information on travel speeds and traffic conditions. The use of these technologies would need to account for the numerous stops made by transit vehicles along arterial streets.

  — The use of *Smart Cards* and other technologies could also provide information useful to both transit personnel and to others involved in ATMS.

  — Buses can provide mobility alternatives in heavy travel corridors, offer flexible services, and respond to specific conditions with extra vehicles and personnel.

  — Future consideration could be given to adding cameras on transit vehicles. Interior cameras can monitor passengers, while cameras on the outside of the bus could monitor traffic conditions.

Institutional Issues

- Institutional and political issues, rather than technical concerns, are often the major problems in deploying ITS and integrating transit with ATMS.

  — More emphasis needs to be placed on the movement of people, rather than vehicles.

  — There is a need for educational efforts with policy makers, the public, and some transportation professionals.

  — There is a need to promote a greater understanding and cooperation among personnel from transit agencies, state departments of transportation, and local communities. This approach is especially important for state departments of transportation and transit agencies.

  — All groups should focus on common goals and objectives related to managing all aspects of the transportation system in an efficient and effective manner.

  — Potential issues related to unions and labor rules may need to be addressed in some cases. For example, operators may have concerns over privacy and turf issues, or concerns that "Big Brother is watching."

  — There may be a lack of a shared vision and commitment among agencies in some areas. All groups need to put turf issues aside and work together to develop multi-disciplinary teams within organizations, as well as across agencies.

  — Project champions are needed within participating agencies to help promote and support greater integration and cooperation.

  — Some agencies do not have the necessary personnel and resources to maintain and operate ATMS and other advanced technologies. The areas of expertise needed to develop, operate, and maintain the various ITS systems should be examined and the need to hire new staff or train existing staff should be identified.

- Funding — both in terms of initial capital investments in hardware and software and ongoing operation and maintenance requirements — may be a limiting factor in many areas. Providing a realistic assessment of both the short- and long-term costs associated with ATMS is important, as is matching the technologies and approaches to the needs of an area.

- It will be critical to show the benefits of ATMS to all groups, including agency management personnel, policy makers, and the general public.

- Innovative funding techniques may be needed for ATMS and for better integration of transit with ATMS. New public/public and public/private partnerships should be explored and promoted.

- The metropolitan planning process, including the Transportation Improvement Program (TIP) and the Long Range Plan (LRP), sometimes restricts the vision of an area. For example, the requirement that plans be fiscally constrained may limit bolder approaches to addressing future needs.

Technical Issues

- Technology is developing so rapidly that it is difficult to keep pace. For example, some hardware and software may be almost obsolete by the time a system is finally implemented.

- There is a need to ensure compatibility among the technologies and systems being developed and implemented by various agencies. A common architecture would help in this regard.

- Link real-time traffic data into Geographical Information Systems (GIS).

Other Comments

- Expand ATMS to cover arterial streets and coordinate bus priority treatments. These may include bus lanes, signal priority, and queue-jump lanes.

- Hold similar workshops in all the major metropolitan areas in the state, and throughout the country if possible. Keep registration fees low or do not charge anything to encourage participation from all groups.

  — Use workshops as a way to bring representatives from all agencies, groups, and jurisdictions together.

  — Consider involving technology vendors and other consultants.

  — Use workshops as a consensus building effort in each area.

WORKING GROUP 2

***Reporter**: Loyd Smith, Houston METRO*
***Facilitator**: Patti Bass, Texas Transportation Institute*
***Recorder**: Stephen Farnsworth, Texas Transportation Institute*

***Participants**:*
Gene Goolsby, Texas Transportation Institute
Robert Bush, LKC Consulting Services
Edward Carranza, Jr., Stone & Webster Engineering
John Sedlak, Houston METRO
Dwight Ferrell, Dallas Area Rapid Transit
Claude Strickland, Houston METRO
Charles Cothran, Huitt-Zollars, Inc.
Mike Rose, Fort Worth Transit Authority
Jeff Arndt, Houston METRO
Ray Krammes, Texas Transportation Institute
Nader Mirjamali, Houston METRO
John Olson, Houston METRO
Tom Simerly, Carter & Burgess
Richard Wong, Barton-Aschman Associates
Pat Seik, Texas Department of Transportation
Bill Kronenberger, Houston METRO

SUMMARY OF MAJOR TOPICS

Information ATMS Can Provide to Public Transit

- A wide range of information available from ATMS could be useful in transit planning and scheduling.

  — Calculation of average speeds on HOV lanes, freeways, and eventually arterial streets can assist with bus scheduling.

  — Use real-time traffic information to identify problem areas that may be slowing buses down. Approaches to addressing these problems could then be examined and implemented.

  — Long-term planning tools - collect and analyze information to help identify changes in travel patterns and traffic volumes, need for new routes or changes in existing services, and new marketing opportunities.

  — Determine how to collect, analyze, and maintain the wealth of data generated by ATMS. Efforts should focus on keeping the information that is needed and is useful.

— Expand system and use of AVI tags to get basic origin/destination information.

— Demographic and travel changes occur so fast that the travel demand models are often out-of-date. The data generated from ATMS may assist long-range planning and modeling.

- The information provided by ATMS can improve transit operations and management.

  — Real-time information on incidents and accidents can be used to initiate the appropriate response.

  — Improve capabilities to provide information to the public on freeway and HOV lane conditions.

  — Enhance ability to respond to special and unique conditions.

  — Provide real-time information to riders on the status of buses and traffic conditions.

  — METRO currently receives information on highway and road closures and construction activities, but there are no procedures or protocol on how this information is distributed or how METRO dispatchers should respond. Streamlining the information dissemination process and establishing procedures for METRO to initiate the proper responses should be considered.

  — METRO operates about 90 percent of its services on the local street system. This percentage is probably similar for other transit agencies. As a result, more attention needs to be given to including the arterial street system in ATMS. This expansion would provide significant benefits for local transit services.

- The information provided to the public from ATMS should be more "user friendly." Information should be presented and disseminated in formats that are easy to read and understand.

- Using information provided through ATMS to assist in generating new ridership, maintaining existing ridership, and enhancing bus operations should be explored. Some of the main factors that slow buses down are traffic signals, passenger boardings and deboarding, decelerating for stops, and traffic conditions. ATMS may help address some of these issues.

- Improve the level and type of information provided to the public on transit routes, schedules, and fares, as well as the real-time status of buses and traffic conditions.

- Use real-time information to help operate and manage the HOV lanes in Houston. Real-time administrative decisions related to the HOV lanes, especially opening and closing the facilities, take time because of the hierarchy of responsibility. Streamlining the decision making process and informing bus operating personnel of any problems before they enter the lanes is important. This situation may improve once METRO's bus dispatchers have moved into TranStar.

- Real-time information on all travel modes should be provided to individuals through a number of methods to allow them to make better travel decisions. Cable television, commercial television, telephones, the Internet, personal information devices, changeable message signs, kiosks, and other technologies can all be used to help disseminate this information.

Information Transit Can Provide to ATMS

- Buses can provide data on traffic conditions on arterial streets with or without the use of advanced technologies. There is a need to stage and test the use of different bus probe technologies on arterial streets. Drivers can provide basic information now on traffic conditions if procedures are established.

- Bus AVI and AVL systems can be developed to provide real-time information on arterial street conditions to ATMS. Multiple technologies may ultimately be incorporated into a *Smart Bus* that would perform a wide range of functions.

- Link traffic signal strategies and other treatments to give buses priority on arterial streets into ATMS.

Technology Issues

- Data integration among agencies is critical.

- The delay in the transition from the data collected by ATMS to functional information that transit agencies need and can use is a problem.

Institutional Issues

- There may be conflicts in the methodologies and procedures used by the various agencies. These will need to be addressed.

- Historically, responsibilities for planning, designing, and operating transit and roadways have been split between various agencies. These groups have not always had strong working relationships. These agencies will need to communicate and cooperate to ensure that the benefits of ATMS are realized by all modes and groups.

- Differences in vocabularies and the use of terms may cause confusion among professionals at different agencies, as well as the public and policy makers.

- Agencies need to develop plans on the type and degree of response that will be provided for various types of incidents and accidents. Incident response plans should be developed and used.

- Funding continues to be a major issue for all agencies and groups. Funding is limited at all levels for both capital and operating needs. Showing the benefits of ITS and ATMS will be important to maintaining future funding.

- The benefits of ATMS and the staffing requirements to operate ATMS will need to be justified.

- Railroads should be included in planning and operating ATMS. Railroad-grade crossing issues continue to be a problem in many areas.

- Questions related to marketing the information generated from TranStar and other ATMS to private businesses will need to be addressed. The legal and institutional issues with selling or providing information from ATMS to other public agencies and private ventures should be examined.

- Common performance measures and procedures should be established to guide interagency actions in response to specific conditions and situations.

- Transit agencies need to play a more pro-active role in the development of ATMS. In many areas the state department of transportation or local governments may not be aware of the interest transit agencies have in ATMS or the benefits to transit from better integration with ATMS.

Other Comments

- There is a need to educate the media, policy makers, and the public on what ITS is, as well as the potential benefits from ITS and ATMS. How ITS can enhance transit and traffic management should be part of this educational effort.

- There are problems on how various agencies currently receive information about accidents and incidents in areas without ATMS. In addition, situations such as fires, broken water mains, downed trees or power lines, and other incidents should be monitored and appropriate responses coordinated.

- ITS is not always the solution. ITS needs to focus on addressing specific issues, rather than ITS in search of a problem.

- The possibility of linking the management systems, such as pavement, congestion, and public transit, with ATMS should be explored. For example, coordinating the pavement management system with transit routes or corridors with high volumes of transit vehicles may be of benefit.

APPENDIX — LIST OF PARTICIPANTS

Deanna Anderson
Director, Planning & Scheduling
Fort Worth Transit Authority
P. O. Box 1477
Fort Worth, TX 76101

Jeffrey C. Arndt
Asst. General Manager - Transit Operations
Houston METRO
5700 Eastex Freeway
Houston, TX 77026

Christopher M. Barnes
Manager, Traffic Planning & Engineering
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

Patricia L. Bass
Associate Research Scientist
Texas Transportation Institute
The Texas A&M University System
College Station, TX 77843-3135

Robert E. Bush
Associate
LKC Consulting Services
4617 Montrose, Suite C230
Houston, TX 77006

Edward Carranza, Jr.
Project Manager
Stone & Webster Engineering Corp.
7041 Koll Center Parkway, Suite 110
Pleasonton, CA 94566

Larry Cothran
Senior Vice President
Huitt-Zollars, Inc.
3151 McKinney Avenue
Dallas, TX 75024

Peter M. Dittmer
Assistant Professor
Texas Southern University
3100 Cleburne
Houston, TX 77004

Stephen P. Farnsworth
Assistant Research Scientist
Texas Transportation Institute
The Texas A&M University System
College Station, TX 77843-3135

Dwight A. Ferrell
Senior Manager, Service Management
Dallas Area Rapid Transit
P. O. Box 660163
Dallas, TX 75226-7265

Ronald J. Flink
Project Manager
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

Gilmer D. Gaston
Senior Project Manager
Kimley-Horn and Associates, Inc.
10375 Richmond Ave., Suite 1354
Houston, TX 77042

Merrell E. Goolsby
Research Engineer
Texas Transportation Institute
701 N. Post Oak, Suite 430
Houston, TX 77024-3818

Carol L. Ketcherside
Executive Director
South West Transit Association
10715 Gulfdale, Suite 215
San Antonio, TX 78216-3633

Raymond A. Krammes
Associate Professor
Texas A&M University
CE/TTI Bldg., Room 310C
College Station, TX 77843-3135

Bill Kronenberger
Manager, Advanced Technical Projects
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

Thomas C. Lambert
Assistant General Manager, Traffic
Management, Chief of Police
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

Pierre Lapuyade
Superintendent of Service Support
Houston METRO
5700 Eastex Freeway
Houston, TX 77026

Gail C. Lyssy
Regional Engineer
Federal Transit Administration
524 East Lamar Blvd., Suite 175
Arlington, TX 76011

Nader Mirjamali
Senior Traffic Engineer
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

John Olson
Manager, Traffic Management Systems
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

Koorosh Olyai
Senior Manager, Mobility Programs
Dallas Area Rapid Transit
P. O. Box 660163
Dallas, TX 75226-7265

Clifford F. Perry
Assistant Research Scientist
Texas Transportation Institute
The Texas A&M University System
College Station, TX 77843-3135

Christopher M. Poe
Director, TransLink Research Program
Texas Transportation Institute
The Texas A&M University System
College Station, TX 77843-3135

Darryl D. Puckett
Associate Research Scientist
Texas Transportation Institute
701 N. Post Oak, Suite 430
Houston, TX 77024

Mike Rose
The T
Planning/Scheduling
P. O. Box 1477
Fort Worth, TX 76101

John M. Sedlak
Assistant General Manager
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

Tom J. Simerly
Senior Traffic Engineer
Carter & Burgess
5970 Elmbrook
Dallas, TX 75247

Loyd Smith, Director
Traffic Mgmt., Planning & Development
Houston METRO
P. O. Box 61429
Houston, TX 77208-1429

Robert J. Spillar
Lead Transportation Engineer
Parsons Brinckerhoff, Inc.
2500 City West Blvd, Suite 275
Houston, TX 77042

Claude Strickland
Street Supervisor
Houston METRO
5700 Eastex Freeway
Houston, TX 77026

Katherine F. Turnbull
Assistant Director
Texas Transportation Institute
The Texas A&M University System
College Station, TX 77843-3135

Thomas Urbanik, II
Assistant Director
Texas Transportation Institute
The Texas A&M University System
College Station, TX 77843-3135

Cynthia A. Weatherby
Associate Research Scientist
Texas Transportation Institute
201 E. Abram Street, Suite 600
Arlington, TX 76010

Richard S. Wong
Senior Associate
Barton-Aschman Associates
9906 Gulf Freeway #100
Houston, TX 77034