Title
Institutional Aspects of Multi-Agency Transit Operations

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Publication Date
2003-04-01

CALIFORNIA PATH PROGRAM
INSTITUTE OF TRANSPORTATION STUDIES
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California PATH Research Report
UCB-ITS-PRR-2003-18

This work was performed as part of the California PATH Program of the University of California, in cooperation with the State of California Business, Transportation, and Housing Agency, Department of Transportation; and the United States Department of Transportation, Federal Highway Administration.

Final Report for Task Order 4105

April 2003

ISSN 1055-1425

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February 25, 2003

ACKNOWLEDGEMENTS

This work was performed as part of the California PATH Program of the University of California, in cooperation with the State of California Business, Transportation and Housing Agency, Department of Transportation. The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California. The authors acknowledge Lindsee Tanimoto and Clifford Loveland (formerly) of Caltrans' Division of Research and Innovation for their support of this project.

ABSTRACT

In this project we have investigated the institutional changes that have been undertaken recently by transit properties to work more closely - in partnership and coordination rather than in competition - with other regional public agencies (especially including other transit properties) to help address mutual transportation problems from a regional and less parochial perspective. Our investigation includes case studies both within and outside of California. From the case studies, both formal and informal mechanisms are used to forge strong regional coordination linkages. Several key factors help to create an environment making possible interagency coordination, including an established common vision among the agencies, good leadership from individuals within agencies and a lead agency, persistence of the participants to overcome institutional and operational barriers, and the availability of technologies to encourage and enhance the coordination process. The case studies have shown strong evidence of a continuing shift away from the more parochial perspective to a more regional and systemic approach to the delivery of transit services. Such regional coordination approaches, both formal and informal, have proved to be an effective and successful tool to help address public transportation-related problems. Initiative is taken and sustained primarily from the local and regional level, for a variety of motivating factors, in the development and implementation of regional coordination activities. Chances of success are greatly enhanced with the presence and strong action of a regional champion(s), such as the regional metropolitan planning organization or association or council of governments. Use of intelligent transportation systems technologies can help make particular regional coordination activities possible as well as help create an opportunity and incentive for local and regional agencies to coordinate transit operations. Once expanded to other local transit agencies, coordination can be even more regional in context and widespread. Regional coordination activities bring challenges as well. In particular, if a regional partnership of organizations exists that serves as the regional decision-maker, then a consensus-based partnership may contribute to slow decision-making, which could be very significant at certain critical times.

Keywords: transit operations, institutional issues, regional coordination

EXECUTIVE SUMMARY

Transit systems have traditionally been developed independently from one another, certainly across different regional jurisdictional boundaries, however, even within the same regional jurisdictional boundary where the ramifications of this are most significantly felt. Goals and objectives have tended to remain separate and little attention has been given to coordination, integration, or interoperability between and among systems with the existence of discernable "brand loyalty" barriers among others. As a result, customer satisfaction, market share, and public transit relevance has continued to decline. With coordination becoming an ever more important and essential component for regional transit as a backdrop, we have been motivated to undertake this project, whose objective is to study the institutional aspects of multi-organizational transit operations to understand, through case studies, what multi-agency transit operational frameworks have been developed, their relative level of effectiveness, the institutional gaps and barriers that have been resolved, and the contribution intelligent transportation systems have/can make to resolve these barriers, and to develop a generic model or set of models can be proposed for California.

This report presents findings from an investigation of regional transit coordination activities in the United States, with a focus on California. Initially, we considered the motivation for fundamental change in transit operations, the need to enhance coordination among transit agencies, significant institutional barriers to coordination and the role of various stakeholders in either facilitating or inhibiting inter-agency coordination among transit operators. The role intelligent transportation systems play in bridging these gaps and resolving these issues across different transit operational systems is also discussed.

For the past thirty years, the organizational structure, operations and management of public transportation systems have largely remained unchanged in a rapidly changing economy and society. As we have progressed into the information age, the need for fundamental change is increasingly clear. Motivation for fundamental changes in transit operations and for increased coordination among transit operators originate from chronic problems associated with existing business processes and organizational structures. Public transportation service providers in many regions of the United States, whether urban or suburban, have been experiencing a declining

market share and relevance in the provision of mobility to the traveling public. Although in recent years, transit ridership has increased marginally in some regions of the United States because of population growth, the growth apportioned to single-occupancy vehicle trips far exceeds that of transit passenger trips. Other critical issues inherent in current public transportation systems include fragmented roles and responsibilities among transit operators leading to a poor public image, lack of responsiveness to changes in market demand, and the limited adaptability to changes resulting from the enormous growth of the information-age.

Several factors that have contributed to economic and societal changes have also had significant implications for local transit agencies in terms of maintaining transit's relevance and ability to serve society. The urgency to satisfy changing societal needs and to increase the relevance of transit services have become driving forces for a shift toward greater coordination and interoperability among transit operators.

Transit operators are now responsible for not only managing their own assets in their provision of transit services, they are also responsible for managing mobility and access for customers across different service districts. The shift to focus strategically on customer service (quality, service and convenience) becomes inevitable and essentially drives fundamental changes in business operations and organizational structure among transit operators. Sometimes the use of assets owned and operated by former competitors and the creation and expansion of partnerships among operators can serve to be more responsive to customer needs than through a single operator.

Not only do customers expect improvements in transit operations and coordination, the federal government's expectation for fundamental change is clearly established by the enactment of Intermodal Surface Transportation Efficiency Act in 1991 and the Transportation Equity Act for the 21st century in 1998.

Although there is widespread, consensual expectation for improved coordination among transit agencies, significant institutional barriers hinder the regional extent of such coordination. Some of these barriers include: satisfaction with the status quo, inertia and overall resistance to change, lack of a common vision among interdependent agencies, increasingly political nature of

transportation decision-making that complicates the redistribution of power, authority, and control in any coordination format, inflexible funding arrangements and most important of all, lack of an “enabling environment” to foster fundamental change. Most of these barriers are deeply rooted in existing individual organizational frameworks of transit agencies that govern the interaction among them. The institutional landscape under which public transportation services are provided is complex and involves many stakeholders with varying influence on the decision-making process. In the provision of transit services, an inter-governmental partnership among federal, state, local, regional and legislative authorities is needed with the common goal of serving the traveling public.

The traveling public, the common customer of separate transit agencies, is the ultimate link that brings transit agencies and various levels of governments together in a collaborative effort to improve the existing public transportation system. Once customers make known their traveling needs and how the transit system can be better coordinated to provide efficient and convenient services, local transit agencies need to be responsive to the public’s demands. Transit operators will ultimately benefit form increased interagency collaboration in terms of more cost- efficient and effective operations, decreased operating costs and increased customer satisfaction.

After identifying the institutional barriers to coordination, along with the role of various stakeholders in either facilitating or inhibiting inter-agency collaboration among transit operators, it is also evident from the literature that intelligent transportation systems (ITS) can play a substantive role in the enhancement process of inter-agency coordination within the transit industry by providing a customer-focused and streamlined public transportation system. ITS and particularly Advanced Public Transportation Systems (APTS) can be utilized to improve personal safety through on board surveillance cameras and silent alarm/covert microphone, to provide customer information using traveler’s information systems, and to coordinate fare payment using smart card technologies. Intelligent transportation systems provide the technological tools that give transit organizations the opportunity to measure individual customer needs against the quality of services rendered. Real-time information that links market requirements (i.e. customer needs) with service quality results in customer-based performance measures that help increase accountability of transit agencies to their customers. Knowledge of

the traveler's experience can then be incorporated into the strategic planning and design of transit operations to improve the quality and efficiency of service. ITS can also help in eliminating institutional barriers because it can be seen as a medium through which transit agencies can coordinate with other agencies in order to reap the benefits of implementing ITS on a regional basis. Two particular aspects of transit operations, namely customer information dissemination and fare collection, have the proven capabilities to help encourage coordination among transit service providers.

Regional transit coordination activities may classified into two categories, namely formal and informal coordination. Formal coordination generally involves the creation of a regional organization that is specifically designed to facilitate cooperation among many transportation agencies, regardless of whether the coalition is developed for a specific project or for long-term, regional management of the transportation system. Another characteristic of formal coordination is the existence of either formal agreement(s) reached by all the member agencies or legislation that dictates roles and responsibilities of each agency within the coalition. The decision-making process of formal coordination, however, can range from centralized control by a single organization to a collaborative, consensus-based format. Instead of achieving interagency coordination via a well-structured coalition or a regional organization, informal coordination provides an alternative approach to encouraging cooperation among agencies on an ad hoc basis. Contributing factors to successful *in*formal coordination include interorganizational interdependence, mutual trust and similar corporate values among agencies, a culture of reciprocity, personal contacts and networks serve as informal channels, chance occurrence of events outside of the work environment that provide further opportunities for informal coordination at work, a willingness to permit informal channels as facilitated by management style of each agency, a motivation to coordinate and a lower turnover of personnel that allows an organization to retain "institutional memory" of previously established informal ties. Informal coordination is the cumulative result of many individual decisions that work under conditions favoring development of informal ties.

The key factors helping to create an environment for interagency coordination appear to be the establishment of a common vision among all stakeholders, leadership and persistence of

individuals, and the ability to seize opportunities provided by new technologies to improve multi-agency transit operations.

The next phase of the project investigated fifteen case studies of regional coordination with six in California and nine outside the state. Case study sites were selected based on the primary criteria of physical size of metropolitan area, number of transit agencies within area, population density, level of congestion, regional institutional framework, and status of regional transit coordination activities. The cases examined, while only fifteen in number, show the diversity of settings in which such coordination activities exist and help answer simple questions of (1) Who is doing what type of regional transit coordination activities?, (2) Why is this being done?, and (3) How is it being done? The case studies have shown strong evidence of a continuing shift away from the more parochial perspective to a more regional and systemic approach to the delivery of transit services. Such regional coordination approaches, both formal and informal, have proved to be an effective and successful tool to help address public transportation-related problems. Initiative is taken and sustained primarily from the local and regional level, for a variety of motivating factors, in the development and implementation of regional coordination activities. Chances of success are greatly enhanced with the presence and strong action of a regional champion(s), such as the regional metropolitan planning organization or association or council of governments. Use of intelligent transportation systems technologies can help make particular regional coordination activities possible as well as help create an opportunity and incentive for local and regional agencies to coordinate transit operations. Once expanded to other local transit agencies, coordination can be even more regional in context and widespread. However, regional coordination activities bring challenges as well.

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ABBREVIATIONS AND ACRONYMS

AC Transit	Alameda and Contra Costa County Transit
ADA	Americans with Disability Act
ALUC	Airport Land Use Commission
APTS	Advanced Public Transportation Systems
ATIS	Advanced Traveler Information Systems
AVL	Automated Vehicle Location
BART	Bay Area Rapid Transit
BCAG	Butte County Association of Governments
BCT	Butte County Transit
BRT	Bus Rapid Transit
Caltrans	California Department of Transportation
CATS	Chicago Area Transportation Study
CATS	Chico Area Transit System
CCTS	Countywide Consolidated Transit Services
CCTTF	Cape Cod Transit Task Force
CTA	Chicago Transit Authority
CTSA	Consolidated Transportation Service Agency
DART	Dallas Area Rapid Transit
DARTA	Detroit Area Regional Transportation Authority
DDOT	Detroit Department of Transportation
DHS	Department of Human Services
DOT	Department of Transportation
ECRC	Eastside Community Resource Center
GPS	Global Positioning Systems
HCT	High Capacity Transportation
HOV	High Occupancy Vehicle
IDOT	Illinois Department of Transportation
ISTEA	Intermodal Surface Transportation Efficiency Act
ITS	Intelligent Transportation Systems

JARC	Job Access/Reverse Commute
JPA	Joint Powers Agreement
LCD	Liquid Crystal Display
MAC	Metropolitan Affairs Coalition
MCAG	Merced County Association of Governments
MCT	Merced County Transit
MDOT	Maryland Department of Transportation
MOU	Memorandum of Understanding
MMTA	Maryland Metropolitan Transportation Administration
MPO	Metropolitan Planning Organization
MR/DD	Mental Retardation/Developmental Disabilities
MTA	Los Angeles County Metropolitan Transportation Authority
MTC	Metropolitan Transportation Commission
MTDB	Metropolitan Transit Development Board
NCTCOG	North Central Texas Council of Governments
NCTD	North County Transit District
NIPC	Northern Illinois Planning Commission
NTTCA	North Texas Transit Cooperative Association
NYSDOT	New York State Department of Transportation
OATS	Oroville Area Transit System
ODA	Ohio Department of Aging
ODOT	Ohio Department of Transportation
PATH	Partners for Advanced Transit and Highways
RPTCC	Regional Public Transportation Coordination Committee
RTA	Regional Transit Authority
RTAP	Rural Transit Assistance Program
RTCC	Regional Transit Coordinating Council
RTCP	Regional Transit Coordination Plan
RTPA	Regional Transportation Planning Agency
RTV	Regional Transit Vision
SACOG	Sacramento Area Council of Governments

SAFE	Service Authority for Freeways and Expressways
SamTrans	San Mateo County (California) Transit Authority
SANDAG	San Diego Association of Governments
SB	Senate Bill
SEMCOG	Southeast Michigan Council of Governments
SMART	Suburban Mobility Authority for Regional Transportation
TCC	Transit Coordinating Committee
TCCSMD	Tri-County Council for Southern Maryland
TCRP	Transit Cooperative Research Program
TDA	Transportation Development Act
TEA-21	Transportation Equity Act of the 21st Century
The T	Forth Worth Transportation Authority
VMT	Vehicle Miles Traveled

1.0 INTRODUCTION

This report constitutes the final deliverable for PATH Project Task Order 4105 — "Institutional Aspects of Multi-Transit Operations". The project has examined the extent to which transit agencies coordinate their activities, ranging from day-to-day operations to long-term strategic visions, on a regional basis. The remainder of this section discusses the motivation for, objectives of, and the methodological approach used in the project.

1.1 Objectives

The primary objectives of this work were to identify and investigate institutional aspects of multi-organizational transit operations, understand the role that intelligent transportation systems can play in regional coordination, and recommend ways in which a model or set of models for California could be developed.

1.2 Methodological Approach

The methods we used include a more theoretical approach from the academic perspective together with a more pragmatic approach from the practitioners' perspective. Multi-organizational systems and relationships, whether focused on regional transit properties or not, is a subject that has come under a lot of scrutiny in the context of several fields of study, especially organizational behavior. We investigated this approach to understand more of the foundations of these academic fields and their applications to the transit industry. Next we looked at regional coordination from the point of view of transit agency practitioners to understand what activities are being undertaken in pursuit of the overall goal of regional coordination of multi-agency transit operations.

1.3 Contents of the Report

This is the first of four sections. Section 2 provides general background material with a discussion of the two primary methods used in inter-agency coordination. Case study examinations are presented in Section 3. Conclusions are presented in Section 4.

2.0 BACKGROUND

Transit properties traditionally have operated fairly independently of one another, certainly across different regional jurisdictional boundaries, however, even within the same regional jurisdictional boundary where the ramifications of this are most significantly felt. Until relatively recently little attention has been given to attempts at coordination, institutional alliances, service integration, or interoperability between and among properties resulting in declines in passenger satisfaction, transit market share and overall transportation services to the public. Changes, however, are being made, often referred to in the literature as “new paradigms for local public transportation organizations” (1).

Transit systems have traditionally been developed independently from one another, certainly across different regional jurisdictional boundaries, however, even within the same regional jurisdictional boundary where the ramifications of this are most significantly felt. Goals and objectives have tended to remain separate and little attention has been given to coordination, integration, or interoperability between and among systems with the existence of discernable “brand loyalty” barriers among others. Yet more recently there have been attempts to enhance inter-agency coordination. Moreover, intelligent transportation systems can play a substantive

2.1 Motivation for Fundamental Change and the Need for Coordination

For the past thirty years, the organizational structure, operations and management of public transportation systems have largely remained unchanged in a rapidly changing economy and society. As we have progressed into the information age, the need for fundamental change is increasingly clear and exigent. Motivation for fundamental changes in transit operations and for increased coordination among transit operators originate from chronic problems associated with existing business processes and organizational structures. Public transportation service providers in many regions of the United States, whether urban or suburban, have been experiencing a declining real market share and relevance in the provision of mobility to the traveling public. Although in recent years, transit ridership has increased marginally in some regions of the United States because of population growth, the growth apportioned to single-occupancy vehicle trips far exceeds that of transit passenger trips. Other critical issues inherent in the current public transportation system include fragmented roles and responsibilities among transit operators

leading to a poor public image, lack of responsiveness to changes in market demand, and the limited adaptability to changes resulting from the enormous growth of the information age. The urgency to satisfy changing societal needs and to increase the relevance of transit services have become driving forces of a paradigm shift toward greater coordination and interoperability among transit operators. Current and emerging circumstances require "fundamental reinvention of how public transportation services are organized, designed and delivered." (1,2) The study also concluded that '[w]ithout changes in the enabling environment [as fostered by progressive transportation policies such as fundamental changes in existing institutions, statutes, regulations, financial resources and public attitudes], the transportation system would continue down the path of incremental change,' rather than enable the kind of paradigm shifts that would bring us to a truly 'sustainable transportation system.'"(1, 3).

Marginal Performance, Declining Market Share, Stagnant Ridership

Vehicle-miles of traveled (VMT) by personal vehicles has increased approximately 131% from 1970 to 1995 whereas population only increased by 32% during the same time period in the United States (4). As a result of the dramatic increase in travel demand while increases to center-line road capacity over the same period has only increased 6%, widespread congestion remains a major concern of urban and suburban areas and higher expectation is then placed on the role of transit to relieve congestion and increase the efficiency of existing transportation networks. Although public expectations of the quality and scope of transit services are rising, the performance of public transportation has only been marginal as indicated by long-term stagnant ridership statistics. Since 1900, two peak periods of high transit use in the range of 17 to 23 billion passengers per year were observed. These are namely during World War I and the post-War economic boom period (1915-1929) and the period during and beyond the Second World War (1942-1949) (5). Since the end of the second peak period, ridership quickly declined for the next 25 years due in part to the growth of the suburbs, which was encouraged by the government's policies favoring low-density suburban growth such as under-priced fuel and subsidized single-family housing mortgages. It appears that the post-World War II decline in transit use has ended and ridership is more or less stable, which when coupled with continued population growth, the effective transit market share is still probably declining given that more of the increased population uses the private vehicle or other modes of transportation rather than

transit. From the 1995 National Personal Transportation Survey, less than 10% of all passenger trips in North American cities are made by public transit. Modal split of trips to work by transit in the year 1992 was only 5.1%.

Service overlaps and network gaps between service boundaries, lack of coordinated schedules and lack of a coordinated regional single-fare system have resulted from different transit operators providing services within overlapping service boundaries in a region and have all contributed to a sub-optimal performance of transit (6).

Fragmented Roles and Responsibilities; Poor Public Image

With uncoordinated transit operations in the complex political arena made up of transit operators, governmental agencies, policy-making organizations and regulatory agencies, the responsibility for funding, operating, guiding and regulating public transportation services for various service areas are often overlapping and fragmented. The complex fragmentation of roles creates a critical barrier against coordination and public responsiveness. Often the complicated transportation decision-making processes confuse the traveling public, who lacks a complete understanding of the organizational structure and division of responsibilities among different agencies. These agencies are therefore perceived as limited in accountability and responsiveness to the changing needs of the public. Contradictory goals, agendas, policies and regulations often limit the agencies' ability to reduce cost and increase revenue while raising quality and range of service from the perspective of the transit rider.

Public Need for Increased Accountability and Responsiveness

There is broad-based public concern and desire for governmental accountability in which "[S]pecific suggestions included consolidating planning agencies and plans, consolidating transit service providers, and defining clearer authority for each transportation agency (7). The public demands greater responsiveness from local transit organizations including:

- "Enhanced knowledge of today's travel markets;
- Greater variety and differentiation in products and services;
- More effective delivery processes;
- Higher level of integration across services and organizations; and

- Increased accountability in where and how service is provided"(1)

Restructuring Economy and Society

Economic and societal restructuring may be seen from the following trends: (1) the shift from industrial or manufacturing to service and information- and service-based economy, (2) growing income gap among workers, (3) commuting patterns more dispersed spatially and temporally with more flexible work schedules and more sprawl occurring at the urban fringes, (4) increasing proportion of women in the labor force and (5) increased diversity in demographics.

Although the transit-dependent population such as low-income service workers, minority groups, and new immigrants, remain steadfast customers of the public transportation system, all the other trends of this restructuring economy and society create unfavorable conditions for transit to expand its market share. Flexible work schedules, telecommuting, increased proportion of women in the work forces, growth of single-parent household result in resistance to transit's appeal as a convenient and accessible transportation mode. As the relevance of transit decreases in light of these strong societal changes, public transportation agencies see a need to take a proactive role in effectuating fundamental changes within their operational paradigms with the goal to provide effective service coordination, resource allocation, market research and appropriate service planning. Otherwise, the industry as a whole will likely continue to see a declining market share, profitability and relevance in its provision of mobility and access to the traveling public. It is recommended that each agency consider a reorientation of its focus and implement fundamental changes (1, 8).

Need for Customer-Oriented Business Practices

As the performance of public transportation systems continues to decline and relevance of transit in meeting changing societal needs diminish, the private service sector has shifted its focus with heightened attention to the needs of the customer at all levels of businesses in market-driven operations. In many cases, this fundamental shift in vision accompanied by appropriate changes in operations has been rewarded with greater productivity, responsiveness and profit. Transit operators are now responsible for not only managing their own assets in their provision of transit services, they are also responsible for managing mobility and access for customers across

different service districts. The shift to focus strategically on customer service (quality, service and convenience) becomes inevitable and essentially drives fundamental changes in business operations and organizational structure among transit operators. Sometimes the use of assets owned and operated by former competitors and the expansion and creation of partnerships among operators can serve to be more responsive to customer needs than through a single operator.

Emergence of New Information Technologies

Current technological advances such as the emergence of new information technologies have allowed private industry to increase productivity, experiment and implement new business operations and processes, and improve responsiveness to market demand. Often these technologies provide the stimulus for fundamental changes in the organizational structure of organizations to shift from a traditional hierarchical (top-down) framework to virtual networks of managers, employees, customers, suppliers, associates and shareholders. Local public transportation service providers, however, have remained structured in terms of the classic hierarchical model (1).

In the information age the ability to capitalize on the opportunity to use new information technologies in transit operators' business practices to encourage and facilitate fundamental change will significantly maximize their performance. According to (1), the rapid rise of new information technologies calls for a new "Information-Age Paradigm" that focuses on whole system collaboration, flexibility and adaptation, employee involvement and empowerment, information and most importantly people, namely the customers.

With the public increasingly expecting the ability to access real-time information and desiring more of a seamless quality to their transportation needs, information technologies such as intelligent transportation systems (ITS), particularly advanced public transportation systems (APTS), can be successfully deployed to assist transit operators in becoming more responsive to customer needs and improve interoperability among service providers. Specific examples of how ITS can enhance coordination among operators in providing a seamless network of travel are discussed in Section 2.4 and in (9).

New Policy Framework (Federal Government's Expectation for Change)

A new policy framework was established by passage and enactment of federal legislation, the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991 and the Transportation Equity Act for the 21st century (TEA-21) in 1998. Both ISTEA and TEA-21 allowed for greater flexibility in the use of federal funds than previously possible to respond to changing markets. Prior to these two legislative acts, a more rigid budget structure reinforced the independence of transit operators, regional transportation planning agencies, local, state and federal governments that serve the public. These two legislative acts have empowered Metropolitan Planning Organizations (MPOs) to become more directly involved in determining how a significant share of available federal funds are expended (1).

2.2 Institutional Barriers to Coordination

Coordination is hindered by various institutional barriers that are deeply rooted in existing individual organizational frameworks of transit agencies that govern the interaction among them. Some of the barriers to coordination include: satisfaction with the status quo, inertia and overall resistance to change, lack of a common vision among interdependent agencies, increasingly political nature of decision-making that complicates the redistribution of power, authority, and control in any coordination format, inflexible funding arrangements and most important of all, lack of an "enabling environment" to foster fundamental change.

Often parties, including, managers, technicians, members of the transit labor force, politicians and policy-makers resist reform and fail to realize the urgency of the circumstances for fundamental change at the local level. They lack the understanding of the need to coordinate and what measures should be undertaken to facilitate cooperation among different stakeholders within the public transportation domain. Most importantly, individual transit operators fail to recognize the interdependencies within their relationships with other transit operators. These interdependencies are attributable to the common clientele operators often share since the customer's entire trip can involve more than one operator and one service area. An individual transit operator can no longer afford to think in terms of serving each of its customers effectively by only concentrating on the section of their trips within that operator's service boundaries, but

instead it needs to coordinate with other operators to successfully integrate service for the customers' entire trips. The shift from individual "service provider" to collective "mobility manager" is essential to assuring responsiveness to customer needs (10). Resistance to fundamental change may come from attitudes of both employees and management personnel who are satisfied with the status quo format of transit operations. To overcome this barrier, the key element to increase coordination among transit operators is the role of leadership from both the local level of individual operators and the regional level of metropolitan planning agencies.

Coordination, involving fundamental changes in the institutional framework and organizational culture of agencies, needs to be facilitated at two levels:

- Broad, long-term strategic vision level, and
- Key business processes and day-to-day operations level in designing the specifics of service delivery – a more tactical level.

Although the long-term, strategic vision should guide and direct the day-to-day operations, transit operators remain "driven by [the] short-term imperative to match service levels to annual budgets rather than by broader impacts and outcomes…no one is yet held accountable for attaining long-term goals and transportation organizations generally have been unable to balance a long-term strategic mission with day-to-day operating responsibilities."(1).

A new long-term common vision needs to be established among local transit operators to broaden the range of services provided, to improve the quality of transit, and to increase the effectiveness of these services from the customer's standpoint. The common vision that strategically focuses on management of customer service will encourage coordination, drive fundamental changes in business practices and organizational structures and maybe even create partnerships among operators in their common pursuit to provide mobility, accessibility, convenience and quality service to the customer. According to (1) "[w]hen an organization seeks to serve the user's full trip and addresses the broader outcomes of how these trips are to be served, partnerships are inevitable.". The effort and vision to fundamentally change the public transportation framework needs to be supported broadly by local transit operators, community leaders, policy makers and elected officials at the local, regional, state, and federal levels.

Politics of Redistributing Power, Authority and Control

During the coordination process, redistribution of power, authority and control over resources among transit operators and other transportation authorities can be delicate and political since powerful or larger constituencies tend to have more control and power over the process and decisions made than smaller jurisdictions. The issues of who benefits more, who bears most of the costs and who has more decision-making power during this process will be controversial and could easily lead to the dissolution of any effort to coordinate. Should Metropolitan Planning Organizations take the leadership role in managing coordination, and thus have the central power to guide transit operators in this pursuit? Or should a flatter organizational structure be used to encourage coordination among operators? Answers to these questions will vary from region to region depending on the history and political context of the region's public transportation system.

Given the historical background of the United States' political system, each local agency has retained much of its autonomy and become more resistant to top-down decisions that interfere with their local decision-making power. Therefore, it is generally more politically feasible to have an organizational structure that supports local autonomy rather than one that allows a leader-organization to dictate the responsibilities of each local agency. Although having a single organization to overlook the coordination process of many agencies is essential for managed interagency interaction, it is more likely that the local agencies will collaborate with each other on a consensus-based approach under the general guidance of the 'leader' organization.

Separate and Restrictive Funding Mechanisms

Restrictive funding mechanisms that dictate the allocation of federal, state or local funds impede the ability of transit agencies to coordinate among each other and to focus on "community-wide vision planning and interagency collaboration during [their] planning and programming processes" (1). For instance, MPOs historically do not have any direct authority over how federal funds are allocated for transportation investments since the federal government directly apportions the funds to local transit operators and/or to municipalities that own and operate public transportation services in their locality.

Although the passage of ISTEA in 1991 and TEA-21 in 1998 has allowed greater flexibility in the allocation of funds for various transportation uses, MPOs still lack real authority to mandate coordination among transit agencies. The funding mechanism, however, can be used by authorities as an incentive or as a control mechanism to either encourage or enforce coordination depending on the policy measures that are set out in the funding criteria. Therefore, increasing the flexibility of funding allocation is a step towards greater coordination.

Lack of an Enabling Environment

The ability of transit agencies to respond to changing economic conditions and travel demand is compromised by a complex institutional environment that involves multiple players including federal, state, local organizations that have varied and competing responsibilities for funding, directing and regulating the provision of public transportation services for different jurisdictions, and service markets. Inconsistent and fragmented federal, state and local policies may retard the coordination process that needs to occur as a response to the changing operational context. As a prerequisite to any fundamental change, the public policy environment must be improved to eliminate inconsistencies and conflicts that dictate the process and nature of transit operations but restrict the possibility of any change. The responsibility for providing the "enabling environment" necessary for coordination needs to be shared jointly by numerous public sector stakeholders with each serving specific roles.

2.3 Role of Stakeholders in Coordination

The institutional landscape under which public transportation services are provided is complex and involves many stakeholders with varying influence on the decision-making process.

Role of Different Levels of Government

The extent of influence of different levels of government on public transportation services varies by location, by system size and by mode. Federal, state, local and regional governments all play essential roles in the design, delivery and coordination of public transportation services.

The *federal government* sets the overall policy, objectives and institutional framework for the provision of transit services. "While…mass transit systems of California are predominantly

funded by the state and local governments, a significant share of the funds, regulations and standards for the state's transportation facilities has derived from the national government. Federal transportation funds are particularly significant in that they represent a large component of the discretionary funding available to the state and its urban areas."(11). Not only does it fund and finance planning, design, construction and to a smaller extent, operations of transit, the federal government also regulates transit operations and planning using specific guidelines and policy mandates. However, often regulations and policies restrict the ability of transit agencies to introduce new innovations and maximize profits, thus effectively discouraging any search for fundamental change and new operational paradigms. The federal government therefore must be willing and supportive in its partnership with transit agencies to foster an "enabling environment" for encouraging fundamental change in public transportation systems. To do this, the federal government can set policies allowing more flexible funding criteria and therefore, encouraging development of coordinated and regional intermodal transportation systems.

The role of *state governments* (state officials and state Departments of Transportation – DOTs) in local public transportation varies among localities. Most states now act as funding partners by participating actively in transit planning and resource allocation. They also provide funding levels relatively similar to that of local governments. Some states even direct state-operated transit programs. The other significant role of state governments reside in their legal authority to organize transit organizations at a regional and local level and in their capacity to assist the distribution of federal funds to local agencies. State governments also set rules under which local governments can levy specific taxes for transit investment in each locality. Therefore, state governments also take part in determining the institutional framework under which transit agencies provide public transportation services. Although ISTEA and TEA-21 have assisted in refocusing the multimodal perspective for public transportation, rigid corporate cultures and pre-existing business practices among agencies have slowed the implementation of such a vision into reality. Therefore, the role of state governments again is similar to that of the federal government, in changing the existing environment and governance to support coordination efforts among transit service providers.

Local governments for counties and municipalities either directly own and operate or indirectly fund local transit investment; therefore local officials and local transit organizations are at the forefront in planning, delivering, and governing transit services. In cases where regional authorities such as Regional Transportation Planning Agencies (RTPAs) own and operate local transit services, local officials usually serve as policy board members and influence transit services through policy decisions. Other authorities at the local governmental level include the control of land use and development, the control of local infrastructure and public facilities investment, and the regulation of other transportation functions such as private service providers. These key functions of local governments have direct influence on how local public transportation systems are organized and subsequently utilized. As a result, local governmental policies can have a profound impact on transit riders' traveling experiences. To introduce new paradigms of cooperative and coordinated operations into local public transportation, a "reformulation and reconciliation of roles and responsibilities at the local level" need to occur such that the institutional landscape is more open to fundamental change (1).

Prior to ISTEA, the role of MPOs was basically limited to providing technical data and advice and writing long-range plans that were essentially "toothless" with no real authority. Historically, the core functions of MPOs have been to:

- "Establish and manage a level playing field for effective multimodal, intergovernmental decision making in the metropolitan area"(1),
- Develop short-term regional investment programs and multimodal long-range plans,
- Evaluate transportation alternatives, and
- Conduct planning studies and public outreach programs.

Most MPOs lack direct authority to redistribute funds for transportation investments since, as previously mentioned, most federal funds are allocated directly to local jurisdictions or agencies. Although the MPO is responsible for coordinating the participation of different regional and local transit providers and local transportation agencies in the planning process, the MPO lacks the monetary power to enforce interagency coordination. Enactment of ISTEA and TEA-21 has, nevertheless, been a step towards greater flexibility in the allocation of funds, especially with

discretionary funds that can be allocated for coordination and collaborative purposes in a multimodal context. Also, under ISTEA, MPOs were given the responsibility to carefully rank projects and write "fiscally constrained" plans that approve projects that already have or will have realistic funding sources. The MPOs now have the capacity to set budgetary priorities and to design an improvement program that is coherent and regionally-based. Therefore, MPOs can theoretically enforce regionalism and interagency cooperation through its power to allocate funding for projects and set priorities over the metropolitan area, usually consisting of multiple counties. MPOs can also provide the "official forum for cooperative transportation planning and programming in urban areas"(1) among separate transit agencies. Sometimes, MPOs have taken direct roles in system-wide operations and investment activity, particularly in areas of ITS planning and applications.

Another way in which MPOs can contribute to interagency coordination is by providing operators with traveler demand information across existing gaps in the transit system due to inadequate linkages between transit agencies. This information from the demand side, i.e. customers, can be collected as part of the MPO's public outreach program since public involvement was a strong requirement of ISTEA. These gaps are often due to transit district boundary lines mirroring political boundary lines. Additional funds are needed to fill these service gaps but local transit operators would not give up a portion of their local service in order to provide a new regional route. As a result, transit services are at a gridlock: who should initiate change and be responsible for coordinating services across different jurisdictions and service boundaries? MPOs, responsible for managing the transportation system for the metropolitan area or region, appear to be the suitable candidate in taking a greater role in interagency coordination efforts.

One note of caution is that the makeup of MPOs might prevent them from becoming true regional organizations that would impose coordination requirements on local agencies although with their power of funding allocation, MPOs have the power to do so. Each MPO has a governing body that is selected by the local governments within its jurisdictional area, and MPOs are, for most states, cooperative, generally voluntary, intergovernmental organizations. Therefore, it is rather unlikely that MPOs will act as a regional regulator. Instead, it is more

likely that MPOs will serve as a facilitator who collaborates with local agencies to take small steps towards greater interagency coordination.

2.4 Role of Intelligent Transportation Systems to Resolve Institutional Barriers

In the struggle towards the goal of a seamless public transportation system, "[n]ew information technologies can provide the critical link between allied service providers and customers."(9). Technologies such as ITS and particularly APTS can be utilized to improve personal safety such as on board surveillance cameras and silent alarm/covert microphone, to provide customer information using traveler's information systems, and to coordinate fare payment using the smart card technology. Intelligent transportation systems provide the technological tools that give transit organizations the opportunity to measure individual customer needs against the quality of services rendered. Real-time information that links market requirements (i.e. customer needs) with service quality results in customer-based performance measures that help increase accountability of transit agencies to their customers. Knowledge of the traveler's experience can then be incorporated into the strategic planning and design of transit operations to improve the quality and efficiency of service.

ITS can also help in eliminating institutional barriers because it can be seen as a medium through which transit agencies can coordinate with other agencies to reap the benefits of implementing ITS on a regional basis. Two particular aspects of transit operations, namely customer information dissemination and fare collection, have the proven capabilities to help encourage coordination among transit service providers.

Customer Information: Traveler Information Systems

Advanced traveler information systems (ATIS) provide travelers with real-time transit information including arrival and departure information, schedule updates, transit fare and pertinent transfer information. Information can be delivered to travelers in media such as interactive voice response telephone, television monitor, cable and interactive television, radio, electronic signs, kiosks at the transit stations, personal computers, handheld electronic device, pagers, and Internet. Traveler information systems can be categorized into pre-trip, in-terminal, wayside, and in-vehicle information systems (1). Regional multimodal traveler information

systems merge transit information for different transit modes across several transit agencies in the region to enhance the ease of intermodal travel.

To provide transit information, Automated Vehicle Location (AVL) Systems technologies may use a computer tracking system with inputs from a Global Positioning System (GPS), signals from signposts and dead reckoning[1]. Real-time information regarding location of buses, scheduling changes, and service or route adjustments can be disseminated to the customer.

In providing transit information to customers who travel across different service boundaries, transit agencies need to coordinate services and provide individual service inputs to the region-wide traveler information system. Usually, a regional organization such as the MPO or the state DOT assumes the responsibility to coordinate partnerships that involve a host of public and private agencies in the joint effort of providing traveler information systems. ATIS technologies have been widely accepted and deployed in many areas in the United States and are relatively more mature in terms of widespread deployment than smart card technology for integrated fare collection systems.

Fare Collection: Smart Card Technology

The Smart Card, containing a microchip or an embedded integrated circuit, can be used on different modes of public transit and also within the same mode, such as on buses operated by different agencies in a region for fare collection. The correct fare is automatically deducted from pre-stored values on the card when the traveler positions a contactless card near a card reader or inserts a contact card into the reader. Applicable discounts for the elderly, students or the disabled are automatically incorporated into the fare. Also, transfer slips are eliminated with the use of the Smart Card. Other benefits of the smart card technology may include the flexibility in implementing changes in fare policy such as multiple fare structures that include loyalty discounts based on usage. Transaction data can also be used to produce ridership statistics and profiles, thus enabling the operators to modify routes and peak service rates accordingly. Greater efficiency and effectiveness of the network can therefore be achieved with the collaborative effort of transit agencies in sharing and using the data collected.

[1] Dead reckoning determines vehicle location by measuring distance traveled from a particular, known location and the direction of travel.

Processes of card production, distribution and marketing need to be supported by coordinated efforts of all participating agencies. Also, institutional aspects of the revenue collection process among transit agencies need to be considered since each agency must determine which portion of a customer's trip uses its services. When institutional and operational issues of the smart card are addressed, significant cost savings are accrued for the agencies and increased convenience are provided for the customers.

While ITS helps to eliminate some institutional barriers to coordination among transit operators, new barriers may emerge and new communication channels need to be built among these agencies, leading to new alliances among public agencies and between public agencies and the private sector. "ITS planning and deployment required coordination among jurisdictions, data sharing, unique technical knowledge and involvement of nontraditional players."(1). Coalitions between these players need to form.

Although there are new institutional barriers associated with the deployment of ITS technologies, its development, planning and implementation have required greater cooperation and communication among transit agencies. As a result, stronger relationships are built among agencies and a more regional perspective can be instilled. It has been found from case studies such as San Francisco's TransLink® Pilot Project and the New York-New Jersey-Connecticut TRANSCOM coalition that a regional organization can be quite successful at maintaining and fostering close relationships among agencies for the effective implementation of ITS technologies (9).

2.5 Coordination Models

Different approaches and levels of formality have been used in various parts of the world to enhance interagency coordination. We view the degree of formality in the level of coordination between and among regional transit properties as represented by a one-dimensional continuum ranging between totally informal/no formality and completely formal. This is shown diagrammatically in Figure 1.

FIGURE 1 Degree of Formality Continuum.

2.5.1 Formal Coordination

Numerous approaches of coordination may be considered formal. Formal coordination generally involves the creation of a regional organization that is specifically designed to facilitate cooperation among many transportation agencies, regardless of whether the coalition is developed for a specific project or for long-term, regional management of the transportation system. Another characteristic of formal coordination is the existence of either formal agreement(s) reached by all the member agencies or legislation that dictates roles and responsibilities of each agency within the coalition. The decision-making process of formal coordination, however, can range from centralized control by a single organization to a collaborative, consensus-based format.

There are numerous factors that contribute to successful formal coordination and may include but are not limited to the following (13):

1. Established tradition of cooperation among agencies
2. Single source of responsibility for strategic planning and general policy guidance: a regional organization with strong leadership
3. Clear division of roles and responsibilities among agencies
4. Strong policy or legal framework requiring coordination
5. Long history of centralized control
6. Established common goal and vision: customer-oriented approach and regional perspective to providing an effective transportation system
7. Availability of suitable technologies to spur institutional and operational changes
8. Consensus- and compromise-driven decision making process

2.5.2 Informal Coordination

Instead of achieving interagency coordination via a well-structured coalition or a regional organization, informal coordination provides an alternative approach to encouraging cooperation among agencies on an ad hoc basis. Recent studies "suggest that existing linkages between organizations, while largely informal and unplanned, may better serve the interests of those demanding transit than a large central authority. One recent organizational study focusing on transit in the Bay Area contends that the most important barriers to coordination would not be solved by structural reform since these barriers are political or technical in nature." (12) Generally, informal cases are not as explicitly documented and studied as formal cases.

According to (13), a range of factors, from personal attributes to organizational structures, contribute to the success of informal coordination. A list of factors is provided here:

1. Interorganizational interdependence
2. Mutual trust and similar corporate values among agencies
3. Culture of reciprocity (people should help those who have helped them) allows informal mechanisms to persist and establish firmly in our society
4. Personal contacts and networks serve as informal channels; therefore, personal attributes of operations managers affect their capability for informal interaction
5. Chance or serendipity: often informal relationships develop outside of individuals' work and in turn, provide further opportunities for informal coordination at work
6. Willingness to permit informal channels as facilitated by management style of each agency, i.e. the executives of an agency allowing subordinates to make operational decisions and to coordinate service with personnel from other agencies
7. Motivation to coordinate: organizations will coordinate if there are extrinsic benefits for all parties involved such as expedited services as well as intrinsic benefits such as increased customer satisfaction and ridership
8. Lower turnover of personnel allows organization to retain an institutional memory-knowledge of previously established informal ties

Informal coordination is the cumulative result of many individual decisions that work with conditions favoring development of informal ties. Informal channels provide the means through

which coordination can occur, sometimes without any direct or formal coordination procedures. Informal mechanisms can address transit needs that arise from the inherent interdependencies among particular operators.

Proponents of informal coordination, however, argue that the additional cost of formal coordination may be too great to achieve the optimal level of coordination. Thus one's expectation of public organizations needs to be adjusted so that frequent reorganization without real gain but with much cost and neglect of available powerful tools of informal mechanisms does not occur. Informal coordination mechanisms are more adaptive to the level of interdependence required on a case-by-case basis while formal channels are more effective in coordinating operations that involve numerous stakeholders.

2.5.3 An Integrated Approach: Formal and Informal Methods

There is no rule prohibiting both formal and informal mechanisms from being used in the same region. This is why it is more reasonable to represent the degree of formality on a continuum rather than in separate and disconnected segments. Clearly then, hybrid approaches may be taken, and, in fact, may be the more common approach, depending on existing conditions in site-specific regions, including a region's geographic size, number of transit agencies, and existence of regional organizations.

2.6 Key Factors to Enable and Encourage Coordination

There are several key factors that help to create the "enabling environment" for interagency coordination, namely an established common vision among the agencies, good leadership from individuals within agencies and a lead agency, persistence of the participants to overcome institutional and operational barriers, and the availability of technologies to encourage and enhance the coordination process. Each of these factors is discussed below.

An established *common vision* among participating agencies is the most important element of successful coordination, regardless of whether arrangements are formal or informal. This common goal is directly linked to the motivation to coordinate, namely benefits that parties derive from coordination. The need for coordination is clearly urgent when transit's market

shares are declining and becoming less relevant to serving the public's transportation needs. Public transportation for the past thirty years has largely been inattentive to the changing societal needs and operated with sub-optimal efficiency and effectiveness. Fundamental changes in transit operations and institutional frameworks, if implemented, can help avoid descending a path of only incremental improvement or no improvement at all. The new paradigm consisting of customer-oriented and regional perspectives serves as the backbone of the agencies' common goal or vision to providing an effective, regional public transportation system.

Once a common goal and the need to change old ways of conducting business are established among transit agencies, the next crucial element is adequate *leadership*. Often, projects supporting regional intermodalism and coordination have overcome many institutional barriers because of the strong leadership of individual personnel within agencies or of a single agency. Another pivotal element once coordination efforts have commenced is the *persistence of all parties* in resolving conflicts that arise during the coordination process due to differences in operations, policies and priorities.

The availability of suitable technologies (ITS), either in operational tests or fully-deployed regional programs may form the backbone for institutional and operational changes. Benefits such as expedited transit services, decreased operational costs, increased customer satisfaction with increased trip connectivity and, in many cases, increased ridership have motivated agencies to collectively utilize ITS in their operations. ITS technologies then provide the essential incentive for agencies to coordinate because these new technologies are most effective and efficient in improving the transportation network when deployed regionally. A significant number of operational or pilot tests have been carried out in the United States that have led to various partnerships and coalitions involving local, state, public and private actors. Without these technologies, the agencies will have less of a common leverage to start the coordination process. ITS technologies, therefore, have effectively provided the opportunity for many agencies to collaborate, plan, and think on a regional and multimodal perspective.

3.0 DEMONSTRATIONS OF REGIONAL TRANSIT COORDINATION ACTIVITIES

Regional interagency coordination efforts in transit operations have been examined in the context of site-specific case studies that encompass different regions in the United States. Case study sites were selected based on the following primary criteria:

- Physical size of metropolitan area
- Number of transit agencies within area
- Population density
- Level of congestion
- Regional institutional framework
- Status of regional transit coordination activities (ongoing or completed)

Input to the case studies was obtained by means of Web-based research and, where feasible, interviews with individual agency staff. Six California case studies and nine out-of-state case studies were conducted and are presented in separate sub-sections of this report.

3.1 Within California

We examined six instances of regional transit coordination activities within California. Our objective was to select sites that provided a range relative to several criteria including population density (urban and rural), size and level of traffic congestion.

3.1.1 Butte County

Butte County, located in north central California, has five incorporated cities of Biggs, Gridley, Chico, Oroville and Town of Paradise as well as unincorporated communities. The county's physical setting ranges from farming communities to small and urbanized areas (14).

Three fixed route transit systems and four demand responsive systems operate within Butte County. The fixed route systems include: Chico Area Transit System (CATS) serving the city of Chico, Oroville Area Transit System (OATS) serving the city of Oroville, and Butte County Transit (BCT) providing intercity service to population centers within the county. BCT also provides some intra-city service in the cities of Paradise, Chico and Oroville. Demand responsive

transit services are provided by the Chico Clipper, Paradise Express, Oroville Express and the Gridley Golden Feather Flyer.

Except for Gridley, each of the seven transit systems use a contract operator to provide transit services with purchased transportation a significant cost for each transit agency. Butte County staff is currently responsible for administering transit services for Butte County, the City of Oroville and Town of Paradise. The systems remain separate in that no uniform fares, service spans or performance indicators are in place to coordinate services.

Several factors have contributed to the desire on the part of the transit properties to consolidate and coordinate transit system operations in the county and these have largely come from the expected and hoped for benefits for the operators:

- Elimination of duplication of services through efficient transfers and coordinated schedules
- Enhancement of the ease of use of the whole transit network with simplified schedules and routes, uniform fare structures, and consistent headways
- Easier marketing and comprehensive customer service under one agency with a single logo
- More flexibility in maintaining important service markets as well as expanding to new markets efficiently

After consolidation of the transit systems, the properties should be able to better balance local access needs and intercity travel with improved overall service efficiencies and more frequent and direct connections.

Costs savings from administration, capital investment and operation are expected as a benefit of consolidation. Nearly $140,000 of administrative cost savings countywide is estimated with Butte County Association of Governments (BCAG) as the lead administrative agency. BCAG can fund personnel-related costs through Federal planning grants since it is the designated MPO and RTPA for Butte County. Capital cost savings, although not currently quantified, may be derived from equipment sharing, simplified traveler information and fare instruments, and shared

fueling and maintenance facilities. Operating costs savings of almost $440,000 is estimated for all services combined.

Since 1981, BCT has been designated as the Consolidated Transportation Service Agency (CTSA) for Butte County. It is responsible for developing and facilitating efforts to consolidate social service transportation providers to improve the efficiencies of all transit systems. With the common, regional goal towards a completely consolidated system, BCAG initiated and sponsored efforts to consolidate transit systems within the county. In January 2001, the Transit Consolidation Study Summary Report documenting the consolidation review process was completed. The study investigated a range of issues including organizational models to consolidation, proposed policy board structure and service design. In the study, cooperative discussions among members of the Countywide Consolidated Transit Services Committee (CCTS) have resulted in a comprehensive analysis of the issues and consensus-based decision-making process.

Through a series of constructive discussions and compromises, stakeholders agreed to the following recommendations concluded from the study:

1. BCAG should proceed with the next steps to pursue transit consolidation.
2. The recommended organizational model is a Joint Powers Agreement (JPA) because of its ease of establishment (without the requirement of special legislation), flexibility (in specifying the duration and extent of the agreement), reduced risk of liability for all parties (with the creation of a separate entity – Joint Powers Authority) and a clear delineation of roles and responsibilities among the agencies.
3. BCAG should serve as the lead administrative agency for the consolidated transit system because of cost savings and its available staff to provide administrative support and customer assistance.
4. The current ten-member BCAG Board, one from each of the incorporated cities and five from the County Board of Supervisors, should serve as the policy oversight body for a consolidated transit system. A super majority of the Policy Board would be required for all votes so that the smaller cities would also have a balanced and equitable

representation. The proposed organizational structure maintains an accountable and centralized structure for management and oversight.

5. The recommended funding formulae for sharing net operating costs (after subtraction of federal funds and passenger fares) for fixed route and dial-a-ride services are:

- 50% population and 50% service hours (Fixed route services)
- 50% population and 50% ridership (Dial-a-ride services)

6. Since Butte County has the largest projected TDA contributions, it has agreed to contribute funds to make up the projected deficit for Oroville.

Following this study, BCAG needs to secure approval to proceed with the consolidation process and establish guidelines to develop a JPA among the participants. The consolidation and coordination activities involve a fairly formal process as it apparently involves a complete institutional realignment of the agencies within the region. However, there does not appear to be any particular use of intelligent transportation systems in facilitating or motivating such a consolidation scheme.

3.1.2 Los Angeles County

Los Angeles County is one of the largest and most populous counties in the nation, with more than nine million people living in its 88 cities. Seventeen municipal bus operators and the regional commuter rail system, Metrolink, serve the county's public transportation needs. Sixteen of the municipal bus operators are funded by the Los Angeles County Metropolitan Transportation Authority (MTA), the second largest transit operator, that also serves as transportation planner and coordinator, designer, builder and largest operator in the county. It operates the Metro Bus fleet as well as built and operates the Metro Rail system. MTA has diversified its transit property assets using a multimodal approach acknowledging that one-size-fits-all does not work in southern California to help address its urban congestion problems. The "M" logo of MTA's Metro System is the public symbol of this fully-coordinated network.

Because MTA funds the county's municipal operators, implementation of new services, such as bus rapid transit or a universal fare system across the entire county can be coordinated much more easily. Both of these projects, only two examples of multi-organizational transit operational

in southern California, which are described below, are aimed to vastly improve customer service and increase ridership and involve multi-agency coordination conducted at the county level. MTA CEO Roger Snoble said, "MTA's customer-first focus requires designing a convenient, seamless countywide fare collection system to serve our public transit customers. The awarding of a contract for new fare collection equipment brings us closer to that goal." (15).

Metro Rapid Bus Program

MTA and the City of Los Angles Department of Transportation (LADOT) have formed a partnership to implement bus signal priority as part of MTA's demonstration of its new Metro Rapid Bus service[2] along the Wilshire-Whittier and Ventura Boulevard corridors. These two corridors were chosen based on criteria of potential transit demand, proportion of transit dependents and potential for patrons to make long distance trips. Metro Rapid service began in June 2000. MTA's Board of Directors has approved the implementation of an additional 21 Metro Rapid corridors criss-crossing Los Angeles county by 2007. For the expanded rapid bus network, a tiered system of bus routes, including local and inter-community travel, will be designed with exclusive right-of-way on certain corridors being considered.

While initially signal priority was implemented along the Wilshire-Whittier corridor only in those segments of the corridor within the city of Los Angeles, more recently, MTA has begun negotiating formal contractual arrangements with those municipal jurisdictions, e.g., cities of Santa Monica, Beverly Hills, and Montebello, to fill the gaps in coverage along the entire corridor. Initially, these cities expressed reluctance to join MTA and the city of Los Angeles in their coordinated effort at providing bus signal priority along the Wilshire-Whittier corridor until the benefits of the technology had been demonstrated and they were convinced of the merits of engaging in such coordinated institutional endeavors. Once this process is complete, the entire 27 mile Wilshire-Whittier Corridor will be instrumented with bus signal priority and associated benefits should accrue on a corridor-wide basis as opposed to the service that was previously implemented piecemeal.

[2] Other attributes associated with the Metro Rapid Buses include low floor buses, far-side stops, fewer stops, more frequent service (headway-based with no published timetable schedules), and a unique look (red buses) to distinguish it from other MTA buses.

Other attributes are under examination for potential deployment by 2007, including off-vehicle fare collection, level-platform boarding and alighting, and multiple-door boarding. Such features would likely improve access as well as increase reliability and speed of the rapid bus system.

Universal Fare System

In February 2002, MTA's Board awarded an $84 million contract to manufacture and implement automated fare collection equipment for a universal fare system across all transit operators in the county. With this regional transit Smart Card, passengers will no longer need tokens, cash or passes to board any of the MTA buses and trains or to transfer to other municipal operators, paratransit and Metrolink (commuter rail system). The full-scale implementation of Smart Cards is expected within three years. As expressed by MTA Board Chairman John Fasana: "This is, without doubt, one of the most ambitious and important projects every undertaken by the MTA from the standpoint of making public transit far more attractive to the residents of Los Angeles County. The day when passengers experience public transit the way it was envisioned, effortless and quickly, is just around the corner." (16).

Potential benefits of the automated fare collection system include:

- Making progress toward a more seamless transit system. It will increase customer convenience and operating speeds, simplify fare collection and reduce fare evasion. The MTA estimates that fare fraud costs the agency between $5.5 million and $11.1 million annually (17).
- The Smart Card can be programmed to pay for other purchases or services once partnerships are established with government entities, schools, convention centers, parking lots and retailers near transit stops and rail stations.
- Employer transit benefits offered by corporate or public organizations can be directly added to the card each month. This eliminates administrative burden to both the employer and the traveling employee.
- It can improve data collection and reporting for the MTA through a new central data collection system. Revenue and ridership information may be readily available, providing timely, accurate information retrieval and expanded financial control and service

planning. With this data, MTA and other transit operators can better tailor service to meet ridership demand.

Through the coordinated activities of MTA and other regional transit agencies, in concert with Los Angeles County and other municipalities in the county, deployment of the Metro Rapid Bus project is helping to address the need for faster travel and provide more travel choices for bus riders, especially the transit-dependent. MTA has conducted an in-house evaluation of Metro Rapid Bus service during its initial demonstration test period. Findings from this evaluation include the following (18):

- Increased operating speeds: Wilshire/Whittier Corridor (29% increase) and Ventura Corridor (23% increase)
- Total travel time for each Metro Rapid route has been reduced 25% compared to local service along the same corridors, meeting a project goal. Thirty to forty percent of that drop is credited to the system's signal priority technology. At this rate, the travel time compares favorably with automobile travel in the corridor.
- Increased ridership: Wilshire/Whittier Corridor (33% increase) and Ventura Corridor (26% increase). The three principal sources of ridership increase: 1) one-third of the increase are new riders from households with annual incomes of at least $50,000; 2) one-third of increase are current riders who now ride more often; 3) one-third of increase are current MTA riders diverted from other routes.
- Increase in service reliability with less bus bunching and vehicle overcrowding, a benefit of LADOT's bus signal priority system that helps maintain headway intervals
- Improved fleet appearance: on-board before and after surveys indicated satisfaction with improvement in fleet cleanliness.
- Improved service effectiveness: passengers per revenue hour or mile increased in the Wilshire/Whittier corridor went up (productivity up by 8-10% and subsidy per passenger down by 7%), but that of Ventura did not.
- Building positive relations with communities within the city of LA. Staff worked closely with individual communities to design the Metro Rapid station according to the "image-linkage with the vehicle" requirement as well as community preferences. Concerns of the adjacent property owners in local cities are also addressed.

Although the Wilshire/Whittier corridor has met its goal of improved service effectiveness, the Ventura corridor showed a marked decline of 28-36%. This is due to the large increases in local service concurrent with the demonstration project. The local service actually operated twice as often as the Metro Rapid bus in peak periods. This increase in local service, however, has not generated a significant change in ridership. Better coordination between LADOT's local lines and MTA's Metro Rapid on this corridor is needed to achieve a more optimal use of resources.

The use of intelligent transportation systems, especially the advanced AVL-based bus signal priority system, has reduced travel time while increasing efficiency in bus operations. Real-time bus location information from the AVL technology will be displayed using changeable LED message signs at major stations to provide passenger information and enhance fleet management. Possibly multi-lingual displays are currently considered.

The entire universal fare system is founded on the availability and feasibility of the Smart Card technology, without which, fare integration among different operators would be much more difficult to achieve. Although ITS helps eliminate some of the institutional barriers to coordination by encouraging operators to collaborate in order to deploy the project on a regional basis, it also creates some new institutional challenges such as issues with redistribution of user fees collected, procurement and financing of the technology's infrastructure, and division of responsibilities among agencies.

The coordination activities, especially the inter-jurisdictional partnership between L.A. DOT and MTA involving the development and implementation of advanced technologies and the soon-to-be concluded negotiations over signal priority implementation across local jurisdictional boundaries, involve a fairly formal process.

3.1.3 Merced County

Merced County is a rural area with 200,000 residents in the San Joaquin Valley in central California. In 1991, a fare coordination study was conducted to analyze the potential for fare coordination between city and county transit systems, including transfers and regional passes. It also explored financial and ridership benefits of regional fare coordination for individual

operators. Finally, options to consolidate the county's three transit systems, the Merced County Regional Transit System, the Merced City Shuttle, and a dial-a-ride service in Los Banos, were considered.

Following the study, the Merced County Association of Governments (MCAG), in cooperation with all six cities (Merced, Los Banos, Atwater, Dos Palos, Gustine, and Livingston) consolidated the separate services into one single system, called "The Bus" operated by Merced County Transit (MCT). The new coordinated system operates local urban fixed routes, intercity fixed routes, a general public dial-a-ride in the outlying communities and ADA compliant services. In January 1995, a Joint Powers Agreement (JPA) between the county and the cities officially created the MCT. The MCT Board consists of five representatives from the County Board of Supervisors and one representative from each city.

The two main reasons for consolidating services in Merced County were funding constraints and operational policy changes on the part of county municipalities in that the cities of Merced and Los Banos were no longer interested in operating local services. In the early 1990's, Merced County was experiencing serious financial shortfalls and was exploring the feasibility of consolidating a series of public services such as parks and solid waste management as a strategy to contain costs. These feasibility studies concluded that transit service was the most viable service for coordination and consolidation. Certain elected officials from each political entity supported transit consolidation. An important contribution to the success of the consolidation effort was its being championed by elected public officials.

During the first year of MCT's operation, ridership increased 40 percent because of improved service and scheduling, integrated timed transfers, and a unified fare structure. One key to success has been the agreed-upon level of service for each entity with each jurisdiction having agreed to a minimum level of service. Under the JPA, each member agency oversees service within its own community. Through working closely with city managers, the MCT Transportation Manager can be responsive to each city's individual needs and changing market demands. Cooperative relationships have been established between cities and MCT, overcoming the fear of losing control over local transit policies with the cities. Not only did ridership levels

increased as a result of consolidation, MCT was able to reduce administrative costs from 12 percent of system costs to 8% of total operating costs. Consolidation of facilities, such as moving city fleet to county yard, has also contributed to large cost savings for MCT.

Consolidation of transit services in Merced County did not require the creation of a new agency, which greatly simplified the process. The County Department of Public Works was assigned responsibility for administering and managing the service and vehicle maintenance. The County transportation manager continued managing the service. The original transportation coordinator from the City of Merced was transferred to work within the County department. MCT then purchases administrative services from the County. On behalf of MCT, MCAG prepares official meeting notices and administrative filings as well as provides administrative and grant support to the MCT. Actually, MCAG also created the www.mercedrides.com Web site that gives links and information on "The Bus", Yosemite area's YARTS, and other intercity operators.

After consolidation, all operators and administrative staff retained their jobs at the current pay rate even though the new contractor now is responsible for the consolidated transit service provided for region-wide and local travel.

3.1.4 Sacramento

The Sacramento Area Council of Governments (SACOG), an association of local governments formed by six counties (El Dorado, Placer, Sacramento, Sutter, Yolo and Yuba) and 18 cities, is responsible for the coordination of transportation planning and funding for the entire region in this part of Northern California. Its mission as stated on their website is "Delivering transportation projects, providing public information and serving as a dynamic forum for regional planning and collaboration in the greater Sacramento Metropolitan Area." (19)

SACOG's Board is comprised of county supervisors and city council members, appointed by member jurisdictions. The Board of Directors also directs the Capitol Valley Regional Service Authority for Freeways and Expressways (SAFE) and the Airport Land Use Commission (ALUC). The Board provides a forum for collaboratively solving regional issues. Through the Transit Coordinating Committee (TCC), the SACOG Board assists in federal planning and

oversight of transit services in the region. The committee is comprised of representatives from a myriad of transit operators, including: Sacramento Regional Transit District, Paratransit, Inc., Folsom Stage Line, Yolo County Transportation District, Yuba-Sutter Transit, Roseville Transit, El Dorado Transit, South County Transit/Link, Unitrans, and Placer County Transit. The TCC meets in public forums quarterly to discuss service and planning coordination issues and projects among transit operators.

The TCC created the Regional Job Access Partnership consisting of representatives from region transit operators, human service agencies and Calworks programs. With the assistance of SACOG staff, members jointly identify issues and barriers, and seek coordinated solutions to the transportation needs of low-income residents. The federal Job Access/Reverse Commute (JARC) Grant funds the planning and implementation activities that are designed to develop transportation services to assist welfare recipients and low-income individuals with their transportation needs. Because JARC is a nationwide discretionary grant program, transit operators have the financial incentive to coordinate services for low-income residents to get to work via public transportation.

3.1.5 San Diego County

Transit services in the San Diego Metropolitan area are provided by Chula Vista Transit, National City Transit, San Diego County Transit, San Diego Transit, and the San Diego Trolley. Together, they constitute the Metropolitan Transit System. The Metropolitan Transit Development Board (MTDB) is responsible for coordinating these services in the South San Diego area. The North County Transit District (NCTD), however, operates the Coaster commuter rail system and North (San Diego) County bus routes. Another major institutional player in the region is the San Diego Association of Governments (SANDAG), the regional MPO. It provides funding and planning for public transit in the area; it also shares public transit planning responsibilities with the California Department of Transportation (Caltrans), the two regional transit boards and other transit operators (20).

Regional Transit Vision:

The Regional Transit Vision (RTV) is a strategic public transportation plan developed by SANDAG, MTDB, NCTD and Caltrans. The vision seeks to implement a network of high-occupancy vehicles and lanes and signal priority for buses to bypass congested areas. Also, the agencies in the San Diego region have re-oriented their focus to the customer experience and plan to deliver transit services with quality station designs as well as multi-door loading and low-floor vehicles.

SANDAG, MTDB, NCTD, and Caltrans are coordinating the regional effort to implement the RTV such as finding ways to extend the TransNet measure, the region's 0.5% sales tax for transportation, to fund projects under the RTV. SANDAG has allocated a portion of state and federal to showcase projects that demonstrate new innovations and improvements in services. Moreover, SANDAG is working to establish plans and policies that ensure regional funding priority for transportation projects that contribute to the success of transit.

With the RTV, transit services will be unified under a single, regional system in the San Diego metropolitan area, an effective step towards dissolving the boundary between the two large agencies. In this new regional system, transit services are grouped into four types by color to make the system easy to understand for customers:

1. Yellow Car (regional express service)
2. Red Car (corridor express service)
3. Blue Car (local service)
4. Green Car (circulator service)

The Regional Transit First Showcase Projects Study is an example of an RTV activity that will begin with an integrated Red and Yellow Car service in some corridors to supplement existing local services. New Green Car service may feed regional routes in some parts of the region. Another coordinating activity arising from the RTV is the implementation of transit priority measures on local streets and regional arterials for buses to bypass congested areas quickly.

With the Regional Transit Vision Program, a new strategic direction with committed regional efforts involving all major players have made important strides in improving the coordination of transit services in the San Diego region, thus enhancing the quality of services provided to the customers.

Not only does the search for funding for the transit improvements require regional collaboration, but establishing criteria to rank transit projects for inclusion in the 2030 Regional Transportation Plan requires consensus and open discussion among the various agencies. Local transit plans also need to be coordinated with the RTV. The MTDB's Transit First Strategy (Oct 2000) and NCTD's Fast Forward Strategic Business Plan guides transit development in North and South San Diego, respectively. NCTD's plan has not previously analyzed coordination of transit services in the region.

Agencies are still seeking new funding sources for new infrastructure, increased service frequencies and coverage. No real coordinating-service actions have yet been implemented between North & South County areas. Under the Regional Transit Vision, Smart cards and real-time traveler's information at stops will also be deployed to increase the convenience and ease of use.

3.1.6 San Francisco Bay Area

The San Francisco Bay Area with over three dozen transit operators serving nine counties (encompassing 100 cities) is a classic example of the complexity of service operations when a large number of players are involved in the provision of public transportation services. The public transit systems together carry an average weekday ridership of approximately 1.5 million passengers with a combined annual operating budget of over $1 billion, placing the region among the top transit operating budgets in the nation (21).

The Metropolitan Transportation Commission (MTC), the designated Metropolitan Planning Organization, is the transportation planning, financing and coordinating agency in the nine-county region. Historically, MTC has limited supervisory powers even though it assumes the responsibilities to distribute regional, state and federal subsidies to transit providers and to

promote interagency coordination. Especially prior to the passage of ISTEA and TEA-21, the effectiveness of MTC as a regional planning organization to ensure interoperability of distinct transit systems in the Bay Area has been constrained because many funds are restricted to specific counties, rather than at the sole discretion of MTC to allocate funds to efficient and cooperating agencies.

The Transportation Development Act (TDA), enacted in 1972, actually has specific provisions for coordination of services and transfers between operators: funds apportioned need to "be expended for physical improvement to improve the movement of transit vehicles, the comfort of patrons, and the exchange of patrons from one transportation mode to another." (12).

In response to the passage of ISTEA, MTC established the Bay Area Partnership as an important experiment in interagency cooperation in an effort to create a consensual decision-making process regarding transportation planning and funding allocations across different agencies in the region. Within the Partnership, the Transit Coordination Committee oversees implementation of Senate Bill 1474 (SB 1474) and the specific programs that include service, schedule and fare coordination, accessible services and consolidation of certain transit operator functions.

Service overlaps and network gaps between service boundaries, lack of coordinated schedules and lack of a coordinated regional single-fare system have resulted from different transit operators providing services within overlapping service boundaries in a region and have all contributed to a sub-optimal performance of transit (22). For instance, the rail transit operator in the Bay Area, Bay Area Rapid Transit (BART), has parallel surface transit in much of its service network with other local service transit providers, such as Alameda and Contra Costa County Transit (AC Transit). There are also network gaps between the boundaries of service areas for these two transit service providers where no transit services are provided.

With both the federal government and the traveling public's expectation for significant improvements such as bridging gaps in transit systems, eliminating inefficiencies in transit operations and making travel as seamless as possible in the whole Bay Area, MTC's motivation and mandate to coordinate are evident and exigent.

In the study of “Transit System Reorganization in the San Francisco Bay Area”, it is suggested in (23) that the nine county-San Francisco Bay Region is a prime candidate for a “transit federation” in which transit service can be fully integrated. This recommendation is reasonable because there are more than 36 autonomous transit-operating agencies in the Bay Area with separate visions, goals and priorities. Possibilities for integrated planning, operations, marketing, assembling and scheduling for transit services at the regional level are numerous in the Bay Area. Exploring ways to improve the Bay Area's transportation network, MTC’s intelligent transportation systems Early Deployment Plan has defined priorities for the region's use of new technologies over the next five to 10 years. The report discusses two ITS projects, Translink® and TravInfo® that MTC spearheaded to coordinate multi-agency transit operations.

Translinkâ - Smart Card Technology:

MTC has broadened its mission and role beyond that of a traditional Metropolitan Planning Organization by taking a proactive role in managing and sponsoring a smart card technology initiative (TransLink®) that brings together the region’s transit operators to develop a regional, electronic fare payment system. A single transit smart card can be used for the Bay Area’s six largest public transit service providers. The correct fare is automatically deducted from pre-stored values on the card when the traveler slides a contactless card near a card reader or inserts a contact card into the reader. Applicable discounts for the elderly, students or the disabled are automatically incorporated into the fare. Also, transfer slips are eliminated with the use of the Smart Card.

The latent potential of smart card technology is very encouraging in its potential ability to cut administrative costs (in handling the money collection processes), to provide data portability and security (by restricting access of personal and business data available to appropriate administrators or users) and to increase convenience to customers (by eliminating the need to carry cash).

Other benefits of the Smart Card technology may include the flexibility in implementing changes in fare policy such as multiple fare structures that include loyalty discounts based on usage. Transaction data can also be used to produce ridership statistics and profiles, thus enabling the

operators to modify routes and peak service rates accordingly. Greater efficiency and effectiveness of the network can therefore be achieved with the collaborative effort of transit agencies in sharing and using the data collected.

Processes of card production, distribution and marketing need to be supported by coordinated efforts of all participating agencies. Also, institutional aspects of the revenue collection process among transit agencies need to be considered since each agency must determine which portion of a customer's trip uses its services. When institutional and operational issues of the smart card are addressed, significant cost savings are accrued for the agencies and increased convenience are provided for the customers.

TravInfo® - Regional Traveler Information System:

Another example of MTC's success in encouraging interagency coordination is TravInfo®, the Bay Area's regional traveler information system. Since October 1996, by calling the TravInfo® telephone number, 817-1717, a caller could access current transit routes and schedules, ridesharing, park-and-ride lots and bikeways, as well as traffic-related information such as roadway accidents. In-vehicle navigation systems, pagers and cellular phones can also be customized to access such traveler's information. A branch of the TravInfo® program is the website, www.transitinfo.org, which features the "Take Transit" automated transit trip planner. The online trip planner provides door-to-door transit itineraries with walking maps to the stations and between transfer points, expected bus arrival times and in-vehicle travel times. The Website also includes system maps and individual route maps for most transit operators, links to transit providers, up-to-date service changes and other regional transit information.

In providing transit information to customers who need to travel across different service boundaries, transit agencies need to coordinate services and provide individual service inputs to the region-wide traveler information system. MTC takes up the responsibility to coordinate partnerships that involve a host of public and private agencies in the joint effort of providing traveler information systems.

> "[Since] each…agency's facility is just a part of the total regional transportation network covering all modes [bus, rail, ferry, etc.]…and all areas (adjacent cities and counties)[,] [o]perational decisions made by one agency impact facilities operated by other agencies. It is important to collect and coordinate the information and response of different management and control systems by different…agencies."(21)

In both of the TransLink® and TravInfo® programs, MTC has effectively capitalized on the opportunity provided by information technologies and intelligent transportation systems technologies to encourage interagency coordination and enhance interoperability of agencies in the Bay Area.

MTC, as a third party, also played an instrumental role in coordinating efforts of several transit operators to launching bus service across the Richmond-San Rafael Bridge and from the Colma BART station to the San Francisco International Airport (SFO). In 1994, five agencies jointly launched a new, direct bus shuttle (operated by SamTrans) that delivers BART riders to SFO, successfully closing a major gap in the region's public transit network. Several agencies within the Bay Area Partnership are also collaborating on extending BART directly to the airport, a project that is now in the construction phase.

3.2 Outside California

We examined nine regional areas outside of California to gather information on the extent of regional coordination activities from other areas in the U.S.

3.2.1 Cape Cod, Massachusetts

Cape Cod and the Islands of Martha's Vineyard and Nantucket are located at the lower eastern corner of the state of Massachusetts comprising a variety of features for residents and visitors alike, including scenic coastlines, sandy and swimming beaches, historic structures, nature trails, and a variety of picnic areas and scenic overlooks. The region is a popular summer getaway location, with the population tripling every summer and the year-round population one of the fastest growing in the Northeast. Expectedly, this has contributed to a significant increase in

traffic congestion and therefore an increased demand for actions to address it, especially in the public transit arena.

As the fastest growing region in terms of population in Northeastern U.S., Cape Cod and its neighboring islands have to cope with increasing auto congestion, projected population growth and a larger than expected elderly population. In fact, 23% of its population is over 65, as compared to the 13% for the state of Massachusetts. Associated with these trends are issues such as human service needs for elderly, disabled or low-income and seasonal tourist needs that will surely grow in importance to be addressed with an improved, coordinated and intermodal public transportation system. Residents provide strong political and social support for preservation of this valued natural environment by curtailing excessive auto use and dependence.

In February 2000, a Transit Summit was held to develop a community consensus and a plan for improving public transportation on Cape Cod, the islands of Martha's Vineyard and Nantucket, and Southeastern Massachusetts. After participants identified the goals and objectives at the Summit, the Cape Cod Transit Task Force (CCTTF) was created with members from federal, state, and local agencies, social service providers and transportation providers of the Cape Cod Region. Transportation agencies within the task force included: Cape Cod Regional Transit Authority, Cape Cod Central Railroad, Cape Air, Plymouth and Brockton Street Railway Company, Steamship Authority, Martha's Vineyard Transit Authority, Nantucket Regional Transit Authority. Objectives of CCTTF included (24):

1. Reducing auto dependency by providing mobility options.
2. Mitigating seasonal traffic by attracting people to the region without cars, and by providing seasonal public transportation options.
3. Meeting the needs of the year-round population for public transportation, especially the needs of those who are "transit dependant" and in need of human services.
4. Developing coordination, communication, and cooperation between and among regional public transportation providers.
5. Incorporating smart growth and land use planning decisions into the development of public transportation.

Two years later, in February 2002, a Five Year Cape Cod Public Transportation Plan was produced. Concurrently, the Cape Cod Transit Task Force held its third Transit Summit at which stakeholders discussed elements of the 5-year plan, results of the public comment period, and next steps including implementation and the need for a long-range 10-20 year plan. Working groups at the Summit also examined issues on transportation funding, program implementation issues, and professional development training in various transportation issues for state, federal, local, and private sector officials.

A member of the CCTTF is the Cape Cod Chamber of Commerce and it has produced "The Smart Guide Website" by coordinating with neighboring cities and transit agencies. The Website provides information on alternatives to the car to get to and get around Cape Code and the Islands (25). It includes an online Travel Planner that allows the user to enter an origin city, a destination city and preferred mode (air, water, bus or trolley). Although this site includes connections from New York, Boston and Philadephia, it still needs to be improved to increase its effectiveness so that users can actually enter his/her exact origin and destination locations, instead of cities. The Website project is funded in part by the state of Massachusetts, which again indicates how efforts at coordination can be supported from different levels of government.

3.2.2 Chicago

In the Chicago area there are three public-sector organizations that provide transit service for six counties (Cook, DuPage, Kane, Lake, McHenry, and Will): the Chicago Transit Authority (CTA), Metra Commuter Rail, and Pace suburban bus. These three organizations are overseen by the Regional Transit Authority (RTA), whose role it is to ensure financially sound, comprehensive, and coordinated public transportation for the six counties (26).

Transportation planning in the Chicago area and northeastern Illinois is mainly carried out by the Chicago Area Transportation Study (CATS), the region's MPO. There is also another organization, the Northern Illinois Planning Commission (NIPC) that deals with planning in the six counties but focuses mainly on land use issues.

Even though all agencies strive to work together to create a cohesive transit network for the six counties, each has its own distinct role to play that helps distribute the responsibility for regional transit to help ensure a de-centralized institutional framework.

The Regional Transit Authority (RTA) was established in 1974 (as a state legislative Act) as a special purpose unit of local government and a municipal corporation of the state of Illinois. A chairman and twelve other members of the Board of Directors, appointed by the six counties, manage the business of RTA. The Board approves the annual budget and a two-year financial plan for public transportation in the region. In 1983 an amendment to the RTA Act changed the role of RTA and the three transit service providers in Chicago and northeastern Illinois by creating three "service boards" headed by CTA, Metra, and Pace. This amendment significantly altered how transit business was executed because previously CTA, Metra, and Pace were operating independently but with the amendment a more integrated transit system was created by having all transit agencies work together. The amendment states that RTA is responsible for regional transit planning issues and financial and budget supervision of the three service boards. RTA is also required to annually review and approve a five-year capital plan for the capital activities to be funded by RTA and executed by CTA, Metra, and Pace. The RTA Act Amendment assigned the duty of determining the transit system's level of service, operational policies, and fares to the three service boards (26).

CTA began operating in October 1947 after acquiring the properties of the Chicago Rapid Transit Company and the Chicago Surface Lines. It is governed by the Chicago Transit Board consisting of seven members who are appointed by either the Mayor of Chicago or Governor of Illinois, and subject to the approval of the Chicago City Council or Illinois State Senate, respectively. The president of CTA oversees daily transit operation, management, performance, customer service, facilities, and development (27). Metra and Pace also have boards in charge of setting level of service standards, operational and fare policies. The region's county boards and the Mayor of Chicago appoint the seven members of Metra's Board. Twelve current and former suburban village presidents and mayors govern Pace.

The Chicago Area transit system covers a large portion of the six counties by having each of the agencies serve different areas as well as overlap in the interest of regional interconnectivity. CTA serves the City of Chicago and 38 suburban municipalities with bus and rapid transit service. Metra commuter rail service has 230 stations in the six northeastern counties, which includes service to downtown Chicago. Pace runs fixed route buses, paratransit, and vanpool service to 200 communities throughout the six counties and connects with CTA and Metra along the perimeter of the Chicago region. CTA serves only the Chicago area; Metra provides transit to all six counties including the Chicago area; Pace services all six counties outside the Chicago area.

The Chicago Area Transportation Study (CATS) has been the MPO since 1955 when it was founded to develop the region's first comprehensive long-range transportation plan. CATS is responsible for planning, programming, and implementing transportation improvements in northeastern Illinois. Duties of the agency include:

- Developing and updating the regional transportation plan,
- Developing and maintaining the Transportation Improvement Program,
- Developing transportation forecasts and demand management strategies,
- Acting as a liaison with local communities through the Council of Mayors,
- Developing the Congestion Management Plan,
- Performing transportation operations and technology studies,
- Promoting public/private partnerships for transportation services,
- Providing public information and citizen participation opportunities,
- Forecasting for capital and operating funds,
- Developing and maintaining travel simulation models,
- Conducting travel characteristics surveys and studies, and
- Performing other tasks required by existing or new federal rules to maintain federal certification of the region's metropolitan planning process (28, 29).

The CATS Policy Committee is the decision-making body for all transportation plans and programs in the six counties. Policy Committee members include representatives from the

Illinois Department of Transportation (IDOT), RTA, CTA, Metra, Pace, NIPC, representatives from the six counties, and various other private and public agencies. The CATS Policy Committee develops and maintains an affordable, safe, and efficient transportation system (29).

In 1957 the Illinois General Assembly created the official comprehensive planning agency for the six counties, the Northeastern Illinois Planning Commission (NIPC). The responsibilities of NIPC include:

- Conducting research required for regional planning,
- Preparing comprehensive plans and policies to guide the development of the region, and
- Advising and assisting local governments (30).

NIPC is responsible for establishing and adopting the overall regional growth management and land use plans whereas CATS' responsibilities lie specifically with transportation in the region. In terms of transportation, NIPC is the lead agency for the formulation of growth management, land use socioeconomic and environmental goals, objectives, and policies, which are included in the regional transportation planning and programming when appropriate. NIPC is also responsible for evaluating transportation plans with respect to land use, growth management, socioeconomic, and certain environmental impacts.

In 1978 an agreement was signed to establish that northeastern Illinois is committed to integrating regional land use and transportation planning. This agreement outlines the division of responsibilities for each agency involved in transportation planning to help avoid confusion related to overlaps in inter-jurisdictional responsibility.

Duties of IDOT include synchronizing the regional efforts in northeastern Illinois with the overall statewide transportation goals and policies, coordinating the efforts of all planning organizations in the region to meet federal and state regulations, providing funding marks for consideration by the region in its development of regional transportation plans and programs, and

with CATS and the Illinois Environmental Protection Agency, developing cooperative plans and strategies that meet air quality requirements (28).

RTA is responsible for the planning and programming of mass transit improvements, coordinating the efforts of the CTA, Metra, and Pace, providing funding estimates for transit improvements for use in the development of the regional transportation plans and programs, developing transit planning issues, and ensuring compliance with state and federal mass transit regulations.

All agencies work together to provide northeastern Illinois with an effective transportation system. RTA, NIPC, and IDOT representatives are members of the CATS Policy Committee, which approves the regional transportation plan and other transportation programming. Yet even with such attempts to work together, problems still exist, especially the lack of coordination in schedules, fare structures and policies, transfer locations, and marketing programs.

In response to rectifying these problems of the existing transit system and addressing the public's widespread concern, the RTA has been in the process of developing a Regional Transit Coordination Plan (RTCP). This effort began in 1999, with a state legislative act that urges RTA to plan for an improved, coordinated mass transit system, involving the three major transit operators, CTA, Metra and Pace for the entire region. Development of the plan focuses on four areas of coordination: physical, service, fare and information coordination. To date, a series of activities have been conducted to improve coordination of the transit systems:

- 2000 Fare Media Study that analyzed the different media used by the CTA, Metra, and Pace
- 2000 Focus Group Assessment of residents and businesses to acquire public input into regional coordination issues, such as better distribution and display of transit information, more convenient and fast transfers between and within transit systems, and more service and flexible hours for transit services.
- 2001 Transfer Location Study of interagency transfer locations that enabled RTA to understand precisely where transfers between agencies are feasible and where transfers are actually occurring. Understanding the extent of the interdependence of transit systems in terms of the common clientele's travel needs, coordination efforts such as construction of new transfer stations or improvement of existing transfer locations can be decided based on needs assessment. RTA has conducted a study on the information and physical coordination components of the RTCP to determine

necessary modifications, physical site as well as service changes, to improve connections for transferring passengers. Cost estimates of the proposed improvements are also prepared to integrate the RTA's and three operators' capital improvement programs (31).

3.2.3 Detroit

Metropolitan Detroit's mass transit system is one of the weakest among the nation's 25 major metropolitan regions, ranking very low in terms of investment per capita on bus and rail systems. It is the few metropolitan areas without rapid transit. The region of Southeastern Michigan encompasses the city of Detroit and Wayne, Oakland, and Macomb counties and is served by two major transit operators, the Detroit Department of Transportation (DDOT) and the Suburban Mobility Authority for Regional Transportation (SMART). SMART provides suburb-to-suburb bus services, while DDOT provides bus services in Detroit.

In addition to the transit agencies, two organizations play important roles in the region's development, the metropolitan planning organization, the Southeast Michigan Council of Governments (SEMCOG) and the Metropolitan Affairs Coalition (MAC). SEMCOG is a consortium of non-profit organizations, public agencies, human service agencies and employers whereas MAC is a regional coalition of business, labor and government formed in 1958 to address public policy issues affecting the economic vitality of the region. MAC is a private non-profit civic organization co-located with SEMCOG, the Detroit area MPO.

Originating from the local idea that metro Detroit needs world-class rapid transit to be a major economic center, a bill to establish the Detroit Area Regional Transportation Agency (DARTA) though having passed the Michigan state legislature, has recently been vetoed by outgoing Governor Engler. The new incoming governor said she would sign the regional transit proposal if the new incoming state legislature passes it again (32). With a mandate to plan and implement a regional transit plan, DARTA was to have been a single, regional transit agency that would have coordinate transit services by contracting with existing agencies to provide bus service and working to create rapid transit in the region. The six-county DARTA would have replaced the ineffective, five-county Regional Transit Coordinating Council (RTCC), which had acted merely as a conduit for federal and state funds to DDOT and SMART, the agencies that provide bus

service in Detroit and the suburbs. The legislation would have provided the authority with the power and funding to staff the agency.

The motivation for transit services coordination was founded on two important grounds:

- Grass-roots citizen groups are participating in the discussion of the need to establish a regional transit agency for coordinated transit services.
- The Detroit Regional Chamber of Commerce and regional leaders are openly supporting the bill and discussing funding ideas for the new agency. Business leaders within the Chamber of Commerce are considering the possibility of a new tax to fund rapid buses or trains, i.e. they are actually offering to help pay for it in order to get workers without cars to jobs and for Greater Detroit to better compete with other transit-rich metropolitan areas.

The push for creating a regional transit agency was largely facilitated and encouraged by the political championing of state and local legislative leaders, including Detroit's Mayor. However, viewed through the prism of the Governor's veto in the context of his leaving office (under term limit restrictions) and being replaced by someone of another political party, political forces, even external ones, can play significant roles.

Until the Governor's veto, SEMCOG developed and adopted a plan for a regional mass transit system that would have cost two billion dollars over 25 years and would have included rapid transit along 12 major corridors as well as improvements to fixed-route bus (such as DDOT and SMART) and community transit service. This regional mass transit system would have added approximately two-third's of the total rapid transit miles in the currently under-served suburbs.

MAC has developed a rapid bus plan for the region, known as the SpeedLink – buses that run on dedicated road lanes with entrances and handicap access at street level, similar to the operations in Curitiba, Brazil. SpeedLink has the potential to create a completely integrated, regional rapid transit system. The system would have the following characteristics:

- Color-coded vehicles, stations, and routes, making it legible and easy to navigate. Lighted and heated passenger stations will also have real-time passenger information.
- Signal preemption will allow transit vehicles to have better schedule adherence.
- Fare collection systems that allow payment prior to boarding.

The local officials have agreed to the vision of the SpeedLink program for most of the future capital investments. Consensus among counties has been reached in terms of transferring the operations and responsibilities to the new authority, but no agreement is established on how to fund the new system. Parties are exploring options such as a regional sales tax or a tax on specific services ranging from haircuts to attorney fees. The impact of the Governor's veto (of the legislative bill authorizing the creation of DARTA) on the SpeedLink program is unknown at this time.

MAC has also spearheaded efforts to create EZ Ride, a community-based van transportation system that uses computer-based scheduling and dispatch system and low emission vehicles to transport low-income, disadvantaged and disabled to jobs and social services. EZ Ride is a public/private partnership involving community-based leadership, city governments and a major civic organization such as MAC. Contributions and/or expertise pooled from major parties to this project include:

- Eastside Community Resource Center (ECR): understanding of the community needs and experience in operating transportation programs
- MAC: leadership, resources and expertise in designing and implementing EZ Ride
- The DDOT and Detroit Employment and Training Department: leadership and connection to federal dollars

MAC, ECR and other partners have raised more than three million dollars from private and public sources for implementation of EZ Ride. This project uses an integrated approach to transportation by sharing the resources among different agencies to meeting the needs of different social groups, effectively breaking down passenger eligibility requirements and restrictions often mandated by federal, state and local agencies (33).

In the quest to create a regional transit agency, issues of funding, control and division of power among agencies remain to be the crux of the discussion. “Leaders of Oakland and Macomb counties are worrying aloud that they might pay the most and get the least. Officials have not offered citizen advocates an equal role in deciding key questions, such as whether buses or trains are best. Ideas for a new transit tax have swelled to include money for sewer and road repairs that could collapse the whole deal if the public balks at the bill.” (34).

3.2.4 Southern Maryland

Southern Maryland encompasses the counties of Calvert, Charles and St. Mary’s, within which the Tri-County Council for Southern Maryland (TCCSMD) prepares and implements the regional transportation plan, coordinates regional transit services and provides commute assistance. TCCSMD was created in December 1964, “as a cooperative planning and development agency to foster the social and economic development” of the region (35). Rural areas are scattered throughout the region between the urban areas, making it difficult and expensive to serve by public transit. 73% of residents drive alone to work; 20% carpool and 7% take transit, walk or bike to work. Over half of the commuters from Calvert County and Charles County traveled outside their county of residence to work in places like Prince George’s County and Washington, D.C.

To reduce the region’s reliance on drive-alone automobile, relief congestion, enhance economic vitality and improve air quality, TCCMD organizes and is involved in a range of programs to improve the transportation network in Southern Maryland. One such program is the Regional Public Transportation Coordination Committee (RPTCC). The purpose of the Committee is “to encourage the regional coordination and cooperation among all Southern Maryland transportation providers in order to serve various transportation needs, including job access, health care, and other general needs” (36). Members of the RPTCC include: the Maryland Mass Transportation Administration (MTA), the Maryland Department of Transportation (MDOT), Maryland Department of Health and Mental Hygiene, the Governor’s Coordination Committee for Human Services Transportation, public transit agencies, and non-profit transportation providers.

Southern Maryland is the fastest growing region in the State of Maryland. With large population growth rates and people's continuing propensity to drive, increases in congestion remain a problem. However, more long-distance travelers are using the commuter bus routes to major job centers to combat congestion. The TCCSMD's regional transportation plan, the Southern Maryland Transportation Strategy, encourages use of state-of-the-art technologies such as advanced traveler information systems that provide real-time transit information and Smart Cards that facilitate seamless transfers between different operators and modes. Intermodalism of bus, rail and ferry is important since the region has many waterways.

3.2.5 Western Minnesota

Most of the counties in Western Minnesota, especially in the Southwestern area are rural and sparsely populated. Although housing costs are rising, wages have not because most job growth has been occurring in industries that typically pay lower wages. The lack of adequate transit services for low-income families has become a significant barrier to access regional job centers.

For trips to regional market centers, many local rural transit systems independently cannot provide adequate access. Because of the travel demand that span across individual county lines, coordination among rural transit providers becomes essential in meeting these needs in the most cost-efficient way. Accessibility to regional centers is critical for maintaining the region's economic vitality and population.

In southwest and west central Minnesota, three rural transit operators, Rainbow Rider, Western Community Action and Prairie Five Rides, have jointly undertaken a project, Southwest and West Central Minnesota Transit Link, to increase inter-operator coordination among these transit service providers. This project is included in the Minnesota Guidestar's Statewide ITS Strategic Plan (37). This project, through the use of advanced technologies, is intended to improve travel options for regional users while increasing each agency's operational efficiency. A standardized computer-aided trip management and dispatching system will be developed, incorporating all three transit systems for trip reservations and scheduling purposes. With one call, users can access information on interconnected transit services across 14 counties in this region.

The primary goal of the transit link project is to "provide a high level of fast, reliable and simple communication between rural transit providers and common local data management practices and parallel data operating systems" (38). The three transit agencies are coordinating services to expand access to common regional centers and jointly define the best service level at the lowest operational costs. This project is expected to form the basis for eventual statewide transit coordination.

A scoping study was conducted in September 1997 to define the existing systems, problems and needs, to identify functional needs for the new system, and to prepare an implementation plan. The deployment of this operational test project initiated in November 1998 and the draft timeline for deployment has been developed.

The entire transit link project is based on the viability and availability of ITS technologies for dispatching, scheduling and coordinating transit services among the three agencies. Also, the transit user is provided with traveler's information for a single trip across more than one transit system.

3.2.6 Rural New York

The Rural Transit Assistance Program, a federally-funded program, has two components: 1) a national program coordinated by the Federal Transit Administration that provides funding, training, technical assistance and an information clearinghouse for each state to implement programs to improve rural transit system 2) a state program managed by the New York State Department of Transportation (NYSDOT) to administer the RTAP and assist rural transit operations. An RTAP Advisory Committee, consisting of rural transit operators and human service transportation providers in the state. The Committee advises NYSDOT on training and technical assistance activities needed.

The need to coordinate transit services in the rural areas of New York State with a central clearinghouse for information exchange, training and technical assistance to rural transit operators motivated the establishment of the RTAP. With RTAP funds, NYSDOT formed a consortium of public transportation providers in the eleven-county Southern Tier region,

including rural, small urban, urban and intercity operators. This committee acts as a forum for information exchange and service coordination (39).

The NYSDOT RTAP staff has produced a Southern Tier Bus Network map and a brochure that include information on all transit services in the region. Copies are distributed to transit operators, social service agencies and colleges. The network map should be available on-line shortly.

3.2.7 Ohio

The state of Ohio ranks in the top 10 nationally for transit ridership, number of transit miles traveled and number of transit vehicles operating in the state. The Ohio Department of Transportation (ODOT) administers several different funding programs. Recognizing that interacting efficiently with an agency as large as ODOT is often challenging, it provides guidance to local communities to overcome obstacles to transportation coordination between agencies.

ODOT created the Statewide Transportation Coordination Task Force in July 1996 to help transportation providers overcome barriers that prevent successful coordination of programs and sharing of resources to serve their traveling customers. In 1997, the Task Force applied for and received a grant from the national Governor's Association to further work on transportation coordination and its impact on welfare reform. Not only do the task force sponsors statewide conferences to educate individuals from municipalities, human service agencies, public and private transportation providers about the benefits of transportation coordination, it also publishes the "Handbook for Coordinating Transportation Services", a step-by-step guide to implementing coordinated transportation systems. Instructions and tools for forming new organizations and policies and procedures to implement coordination are also discussed in the handbook. The statewide conferences concluded that local communities were clearly seeking guidance on transportation coordination among agencies. ODOT supported coordination between state agencies such as the Department of Mental Retardation/Developmental Disabilities (MR/DD), Ohio Department of Aging (ODA), and the state Department of Human Services

(DHS) to meet the transportation needs in the state. ODOT established MOUs with each of the participating agencies to address obstacles to coordination.

One of the coordinating efforts of ODOT is the Program Resource Guide, to inform agencies of all funding programs and resources. Because it is unlikely that there will ever be adequate funds to meet all of the state's transportation needs, ODOT will continue to work with local communities to improve access to the available funding programs and resources while encouraging coordination of transportation service providers to ensure efficient use of the funding.

One of the programs organized by the ODOT is the Ohio Coordination Program (Transit). It provides grant funds to assist coordination of transportation services among providers, and to enhance and expand transportation through coordination in Ohio counties with no public transportation system. Under the program, 13 projects are currently funded at the county level, primarily working with health and human service agencies. Some of the projects include:

- Working with local transit agencies to expand services and hours in underserved areas
- Consolidating maintenance and fueling facilities between transit and human transit agencies
- Implementing a coordinated brokerage system to eliminate duplicate services

Eligibility requirements for funding include the lack of public transportation services rests within part of a county or a county and some level of inter-agency coordination for each project. "Inter-agency coordination is defined as cooperating in the delivery of transportation services between two or more agencies resulting in one of three types of coordination: cooperation, joint use arrangements or consolidation…Each project must designate a lead agency to administer day-to-day operations, execute memorandums of understanding with all participating agencies, and commence the project within 90 days of contract award" (40).

Only operating expenses are eligible for funding. Up to 75 percent of each project's total direct operating expenses, not to exceed $75,000, per project for a one-year period can be claimed. 25 percent of the funds must be matched by the lead agency or project agencies. Applicants need to

reapply every year for a total of three years. After funding ceases, ODOT will continue to provide technical assistance to encourage continuation of coordination efforts among partner agencies.

"Through…partnerships and the exchange of planning expertise, members are better able to remove barriers that prevent successful coordination and to plan for efficient coordinated services" (41).

3.2.8 Puget Sound Area, Washington State

In the Puget Sound area, Sound Transit is the single agency responsible for meeting transit needs in terms of planning, building and operating a high-capacity transportation (HCT) system for the three-county region. It is also responsible for coordinating the provision of transit services in the region. The state Legislature passed a law in 1993 that allowed counties to create a single transit agency upon recognition of the inadequacy of the existing system to meet travel demands. The bill also authorized Sound Transit to levy and collect voter-approved local option taxes (employer tax, special motor vehicle excise tax, sales tax and use tax) to pay for the capital and operating costs of the HCT system. The Sound Transit District primarily covers congested urban areas; about 85 percent of King, Pierce and Snohomish county residents live within the District and only these people vote for local tax increases to build and operate the regional transit system. The agency however is not allowed to levy property taxes. The HCT system includes a "system" of services as well as facilities such as express buses, light rail, commuter rail, bus and carpool lanes, passenger ferries, busways, transit centers and park-and-ride lots to provide a fast, frequent and reliable public transportation network (42).

"To ensure coordination between local and regional transit plans, half of the appointments in each county must be officials who serve on the local transit agency board" (43). Sound Transit is an effective regional agency committed to lead improvements to the regional transit system and coordinate with local transit agencies. The Board holds relatively frequent (twice a month) meetings and each agenda is prepared by the Sound Transit Administrator, under the guidance of the Sound Transit Chair who is elected by Board members. There are also three standing board

committees, Executive, Finance, and Public and Government Affairs who advise the Board on relevant activities.

In May 1996, the Board of Sound Transit adopted Sound Move, the Regional Transit System Plan, a comprehensive plan to increasing the public transportation system capacity. In November 1996, voters approved a 0.4% increase in local sales tax and a 0.3 percent increase in local motor vehicle excise tax to fund Sound Move investments. The transit plan was developed to fit with the region's Metropolitan Transportation Plan as well as local transit agencies' plans. Local transit agencies actually have been partners in formulating the regional transit plan.

Under Sound Move, new regional services are designed to work with existing services provided by local agencies to offer an integrated, region-wide transit system. The plan specifies the region-wide coordination of schedules and fares among local and regional transit services to provide more convenient, reliable and legible connections.

In August 1999, the region's transit agencies, Community Transit, Everett Transit, King County Metro, Pierce Transit and Sound Transit, reached a fare integration agreement that created the PugetPass, the regional transit pass allowing customers to easily transfer between different transit agencies. A coordinated cash transfer system is also being developed for cash-paying customers. Different denominations of the pass can be purchased depending on the number of travel zones and pass' duration a customer needs. In September 1999, riders can also use PugetPass on the Washington state Puget Sound ferries and the Olympia Express service offered by Thurston County's Intercity Transit.

"PugetPass is proof that by working together, we can meet our region's transportation challenges through cooperation and with innovative, common-sense and customer-friendly solutions like the PugetPass," Sound Transit Board Chair and Tacoma City Councilmember Paul Miller said (44).

The fare integration agreement and creation of the regional pass originated from a series of forums held between December 1997 and June 1998. Representatives from transit agencies discussed potential fare integration structures, existing fare policies and financial implications.

The regional pass is intended to prepare the institutional arena for the future implementation of the "Smart Card" technology in the region. As discussed in the next section, Sound Transit is also extensively considering the use of ITS technologies to improve transit operations and continues to work towards a seamless transit system.

With Sound Transit as the coordinator, it will coordinate with its transit partners to develop a single package for federal discretionary bus appropriation requests. Collaborative effort by all agencies will maximize federal grant funds that augment local tax revenues and/or support capital investments such as the central Link light rail system.

Sound Transit is in currently considering smart buses that use Global Positioning Systems, audio messages and LCD screens to provide passengers with routing, stops and arrival information. These buses will also have automatic fare collection system as well as the ability to collect ridership data for analysis leading to future service improvements. Sound Transit and King County Metro has jointly developed and implemented a demonstration project involving smart transit buses in fall 2001 to assess the larger-scale implementation potential of the technologies. Projects such as this create opportunity and incentive for local and regional agencies to coordinate on transit operations. Once expanded to other local transit agencies, coordination can be even more regional in context and widespread. Some of the technologies are listed here:

- Automatic Vehicle Location based on Global Positioning System technology and on-time status relative to schedule and route
- Automated vehicle maintenance data
- Automated ridership data collection and integration
- Automated stop annunciation and signage inside and outside of the vehicle

Both agencies will evaluate the project: King County Metro will concentrate on the Smart Bus systems and customer feedback while Sound Transit will consider the feasibility of the technology for region-wide implementation.

In the larger four county-Central Puget Sound area, seven transportation agencies (City of Everett, Community Transit, King County, Kitsap Transit, Pierce Transit, Sound Transit and Washington state ferries) are collaborating to plan and implement a regional fare coordination

project which would allow customers to use one smart card across multiple transit systems in the region. This ITS technology facilitates coordination among agencies by allowing each agency to implement and integrate its fare policy with that of other agencies. The contractor was selected in 2001, and the service test will occur in 2002. Full system revenue operations are expected in 2003. "As part of the Regional Fare Coordination System project, the agencies will coordinate regional marketing under a single identity, developed in collaboration with the Contractor, and will develop and implement a regional marketing program for the fare card. Introduction of the fare card will increase awareness of public transportation as a means of regional travel, so the Agencies anticipate using a "team" approach" (45).

3.2.9 North Central Texas

Since the 1990s, there is a growing acceptance and necessity of public transit to serve the North Central Texas region. The two major transit agencies in this region are the Dallas Area Rapid Transit (DART) and Fort Worth Transportation Authority (The T). DART provides bus, light rail, paratransit, HOV lanes and vanpool services for Addison, Carrollton, Cockrell Hill, Dallas, Farmers Branch, Garland, Glenn Heights, Highland Park, Irving, Richardson, Rowlett, Plano & University Park areas. In partnership with the T, DART operates the Trinity Railway Express. The T also operates bus, trolley and car/vanpool in Tarrant County.

With 3% annual growth rate of elderly population, 4% annual growth rate of persons with disabilities, consecutive non-attainment of ozone standards due to air pollution caused by vehicles and rising traffic congestion in the region, the success of public transit has a very significant stake in the welfare of local residents in this region. Also, a lack of institutional structure to construct transit elements has impeded the identification of regional transportation needs and options in the Metropolitan Transportation Plan: Mobility 2025 Update for the Dallas-Fort Worth metropolitan area. The lack of regional coordination of transit services across counties appears to be an increasingly common concern. General consensus is that the T and DART needs to coordinate and cooperate in short-term and long-term plans to provide a seamless system for travelers. A regional traveler information clearinghouse for planning trips involving both agencies seems necessary.

In March 2002, North Central Texas Council Of Governments, MPO for the Dallas-Fort Worth area, and the Regional Transportation Council hosted the region's first transit summit as a forum for local policy makers to address the implementation of public transportation from a regional perspective. There were three primary issues raised during the summit (46):

1. The community's interest in public transportation
2. Problems that may arise to satisfy these interests
3. Regional actions to take to address transportation needs

The community is primarily focused on access to jobs and special venues, air quality, congestion, quality of service, service for different markets (students, elderly and disabled, work, discretionary trips), regional flexibility and connectivity among different modes. Among problems that may arise include presence of locally available funding, system connectivity (between DART and the T plans and services) and regional coordination, and balancing regional and local roles. Actions that could help address such problems include: (1) Develop and implementing strategic long-term vision for transportation options, (2) Focus on local and regional solutions to set own regional course, though keep options open for state or federal participation, e.g., legislative solutions, (3) Identify funding sources and maintaining flexibility in funding options, (4) Maintain sensitivity to local/community needs, (5) Design and implement regional public outreach programs, e.g., voter education, (6) Study feasibility and effectiveness of a regional coordination agency to help build consensus on regional plan, collaboratively identify needs, solutions, costs and benefits, region-wide task force.

At the summit, stakeholders supported future regional coordination efforts initiated by NCTCOG and urged the region as a whole to consider using an umbrella agency to step in and coordinate regional interests to ensure consistency and continuity in solving regional transportation issues. Progress was made in identifying needs, issues, as well as possible next steps to tackle the problems at hand.

Two multi-system transit information systems have been deployed in North Central Texas:

1) NCTCOG's Transportation Department maintains a website www.dfwinfo.com/trans/tpi/ that provides an interactive inventory of all transportation providers (fixed route, paratransit and human services agencies) in the 16-county region of north central Texas. By clicking on a regional map divided up by counties, the user can identify the providers that serve a particular county. Relevant information such as fares, hours of operations and contact information of the transportation providers can be obtained. The user can also use the Website's query function to find a provider by specifying the city, county, types of service, funding sources, and types of agency.

2) North Texas Transit Cooperative Association (NTTCA) is a non-profit organization affiliated with the Office of Community Transportation (OCTS) of the Texas Health & Human Services Commission. Member agencies of the NTTCA include all transit organizations (DART, The T, SPAN, etc.) of sixteen North Texas counties and many human services organizations. NTTCA maintains the website www.bus-stop.org with compiled information on inter-county travel. A North Texas resident traveling across different transit provider service areas may simply click on the northern Texas map that is partitioned by county lines for origin and destination county. The user can also select a destination from the list of major regional destinations including employment centers, hospitals and recreation centers. This website's usefulness is, however, is limited to giving the user the general idea of which agency he/she needs to contact for travel from origin to destination. No specific schedules or routes are given. The user also cannot enter specific origin address or destination address for trip planning purposes.

4.0 CONCLUSIONS

Demonstrations of regional transit coordination activities abound throughout the U.S. as well as in California. This is a relatively recent occurrence with substantial growth in the last ten years. The cases examined in Section 3, while only fifteen in number, show the diversity of settings in which such coordination activities exist and help answer simple questions of Who, What, Where, Why, and How, i.e.,

- Who is doing what type of regional transit coordination activities?
- Why is this being done?
- How is it being done?

Though the investigation of regional coordination was descriptive and qualitative rather than statistical and exclusively quantitative, several significant conclusions can nevertheless be drawn from the study. These can have implications for the continued implementation of regional coordination activities:

1. There is strong evidence of a continuing shift away from the more parochial perspective to a more regional and systemic approach to the delivery of transit services.
2. Regional coordination methods have proved to be an effective and successful tool to help address public transportation-related problems.
3. Fairly formal mechanisms have been put into place to develop and implement regional coordination practices.
4. Initiative is taken and sustained primarily from the local and regional level in the development and implementation of regional coordination activities.
5. Various factors have motivated the desire to consider progress toward regional coordination efforts, including potential benefits to be accrued from coordination activities, current funding constraints associated with the delivery of public transit services, growth in traffic congestion levels, discovery of success stories of regional coordination in other locations, local and regional institutional changes in the delivery of transit services, volume of local transit agencies present in the region, and position and responsibility of a regional transportation authority.
6. Chances of success are greatly enhanced with the presence and strong action of a regional champion(s). A natural candidate for such a champion would be the regional metropolitan planning organization or association or council of governments. Alternatively, without such a pre-existing regional organization, more locally-based and narrowly-focused agencies could be consolidated into a regional transportation/transit authority.
7. Use of intelligent transportation systems technologies can help make particular regional coordination activities possible as well as help create an opportunity and incentive for local and regional agencies to coordinate transit operations. Once expanded to other local transit agencies, coordination can be even more regional in context and widespread.

8. Regional coordination activities bring challenges as well. In particular, if a regional partnership of organizations exists that serves as the regional decision-maker, then a consensus-based partnership may contribute to slow decision-making, which could be very significant at certain critical times.
9. Always expect the unexpected in the way of external events, especially political ones.

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