UNITED WE RIDE (UWR)/ MOBILITY SERVICES FOR ALL AMERICANS (MSAA)

Enhanced Human Service Transportation Models Joint Demonstration

Phase 1 – System Planning and Design

INSTITUTIONAL PROCESS EVALUATION: FINAL REPORT

U.S. Department of Transportation
Research and Innovative Technology Administration

November 15, 2009
Publication No. FHWA-JPO-10-003

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1200 New Jersey Avenue, S.E.
Washington, DC 20590

Contract No. DTFH61-02-C-00134 / T.O. BA34025

November 15, 2009

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Technical Report Documentation Page

1. Report No. FHWA-JPO-10-003	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle United We Ride (UWR)/Mobility Services for All Americans (MSAA) Enhanced Human Service Transportation Models Joint Demonstration: Phase 1 – System Planning and Design Institutional Process Evaluation: Final Report		5. Report Date November 15, 2009 6. Performing Organization Code
7. Author(s) Carol Zimmerman and Deepak Gopalakrishna		8. Performing Organization Report No.
9. Performing Organization Name and Address Battelle 100 M Street SE Suite 250 Washington DC 20003		10. Work Unit No. (TRAIS) 11. Contract or Grant No. DTFH61-02-C-00134/ T.O. BA34025
12. Sponsoring Agency Name and Address U.S. Department of Transportation Research and Innovative Technology Administration Joint Program Office Federal Transit Administration 1200 New Jersey Avenue, S.E. Washington, DC 20590		13. Type of Report and Period Covered Evaluation Report March 2007 – November 2009 14. Sponsoring Agency Code
15. Supplementary Notes COTM – Yehuda Gross		

16. Abstract

This document presents the findings of the evaluation of the process used by eight project sites to develop a design for a Travel Management Coordination Center (TMCC) for improved coordination of human service transportation within a region. The TMCC project was funded by U.S. DOT as part of the Mobility Services for All Americans (MSAA) initiative. The process evaluation examined how the sites went about the design activity, the challenges they faced and how they solved them. Findings are discussed in four major areas – project management, stakeholder collaboration, technology issues, and Federal role in the design phase. In each area, lessons learned from the sites are presented along with best practices identified by sites. All eight sites submitted complete TMCC designs with seven of the eight sites submitting a proposal for the implementation phase.

17. Key Word Rural Transit; Human Service Transportation, Travel Management Coordination Center, TMCC, Mobility Services for All Americans, MSAA	18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161.

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 61	22. Price

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

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ACKNOWLEDGEMENTS

The authors are grateful for the enthusiasm and support provided throughout this process evaluation by the eight site teams. The project managers for all the sites were very cooperative and supportive of the evaluation over the period of thirty months while under severe schedule constraints for the design. Without their assistance in explaining their operations and sharing of information about their approach to coordination and this project, this process evaluation would not have been possible. In addition, we appreciate the guidance and support of the ITS Joint Program Office, particularly Yehuda Gross (U.S. DOT) and Gwo-Wei Torng (Noblis).

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LIST OF ABBREVIATIONS

AARP	American Association for Retired Persons
ADRC	Aging and Disability Resource Center
AVL	Automatic Vehicle Location
COTS	Commercial-off-the-shelf
CWREST	Central West Regional Employment Solutions Team
DOT	Department of Transportation
FBFC	Faith-Based Foundation Collaborative
FDOT	Florida Department of Transportation
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Global Positioning System
HST	Human Service Transportation
ITS	Intelligent Transportation Systems
ITS JPO	Intelligent Transportation Systems Joint Program Office
IVR	Interactive Voice Response
MDC	Mobile Data Computers
MPO	Metropolitan Planning Organization
MSAA	Mobility Services for All Americans
NJT	New Jersey Transit
PARTA	Portage Area Regional Transportation Authority
PATS	Paducah Area Transit System
PSA	Public Service Announcement
RMC	Regional Mobility Council
RTMA	Regional Transportation Management Association
SQL	Structured Query Language
TA	Technical Assistance
TMCC	Travel Management Coordination Center
U.S. DOT	United States Department of Transportation
UWR	United We Ride
VoIP	Voice over Internet Protocol
WIB	Workforce Investment Board

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EXECUTIVE SUMMARY

To address the problem of fragmentation of services and programs and to serve greater populations of transportation disadvantaged more effectively and reliably, the U.S. Department of Transportation (U.S. DOT) has been engaged in a Federal interagency program called United We Ride (UWR) focusing on development of coordinated human service transportation models.

Collaborating with the UWR program, the Intelligent Transportation Systems Joint Program Office (ITS JPO) started the Mobility Services for All Americans (MSAA) initiative. The MSAA initiative aims to bring all users, service providers and funding institutions together in a coordinated effort, and introduce technological solutions to simplify access and improve cost-effectiveness of human service transportation. The goal of this initiative is to establish scalable and replicable models of a Travel Management Coordination Center (TMCC) that provide efficient, accessible, and quality transportation services to all, by integrating the transportation disadvantaged community and the general public.

As a part the MSAA initiative, a demonstration to test the technical and institutional feasibility of an enhanced and coordinated human service transportation system was started in 2007. The demonstration adopts a two-phased approach: system planning and design (Phase 1) and system deployment (Phase 2). Eight sites were selected for Phase 1—System Development and Design. The eight communities include:

- Aiken, South Carolina
- Atlanta, Georgia
- Camden County, New Jersey
- Fitchburg, Massachusetts
- Kent, Ohio
- Louisville, Kentucky
- Orlando, Florida
- Paducah, Kentucky.

This document presents the findings of the evaluation of the process used by eight sites to develop a design for a TMCC. The process evaluation examined how the sites went about the design activity, the challenges they faced and how they solved them. The objective is to draw lessons from the experience of these eight sites so that other communities seeking to implement a TMCC can benefit from their experience.

EVALUATION APPROACH

The evaluation followed the progress of the sites over 30 months. The evaluation was conducted in the following stages:

- *Baseline Analysis.* The objective of the baseline analysis was to document the process that each site expected to use to develop their TMCC design. This stage occurred in the spring of 2007 shortly after the kickoff. Each site provided names of three to four representative stakeholders involved in the design. Stakeholders who were interviewed typically included the project manager, a transportation provider, a human services representative, and an end user representative.
- *Mid-Way Analysis.* Approximately 9 months into the design process, an assessment of each site was made to gauge their progress and examine the successes and challenges of dealing with

process issues up to that point. This stage occurred around the time that the sites produced their concept of operations, a deliverable to the U.S. DOT. Individual interviews were conducted with each site's project manager and a facilitated discussion with all the project managers was conducted at the U.S. DOT-sponsored MSAA workshop a month later.

- *Finish-Line Analysis.* Approximately 17 months from the kickoff meeting, an analysis of each site's experience across the entire project was conducted. The persons interviewed in the baseline analysis were interviewed again.
- *Phased Implementation Interviews.* Four sites that did not receive the Phase 2 system deployment funding were interviewed to discuss their plans for their TMCC. These interviews took place about 30 months after the start of the evaluation.

EVALUATION FINDINGS

The demonstration sites represent several operational environments and have different types of lead agency organizations (e.g., metropolitan planning organizations [MPOs], a workforce investment board, and transit agencies), which play different roles in human service transportation (planning, coordination, service providers, brokerage). The sites' final designs for TMCCs varied depending on the institutional structure and existing levels of transportation and human service operations. Sites' design approaches ranged from a physical center for integrating the functions to a strictly virtual integration of process and functionality. Comparison of the TMCC designs revealed both common and unique features. One common element of the designs was the notion of a "one-call' (or in some cases "no-wrong-door") functionality which would allow a rider to call one number (or numbers) to access all the transportation options available in the region. The other common design feature was the TMCC functioning as an information and referral hub as well as a data reporting and management hub. Other aspects of design varied from site to site, such as centralized billing, eligibility verification, trip planning, and physical vs. virtual integration.

Process-related findings are categorized into four major sections which are summarized below.

Project Management – Developing and Managing a Project Team. Effective project management is a key ingredient for project success, and the eight sites provided insight into how they managed the TMCC design process. At each of the sites the project manager at the lead agency, most frequently a transit provider or broker, served as the de facto champion of the project, responsible for achieving a TMCC design that was truly a regional initiative. Besides the day-to-day running of the project, gaining and maintaining support of senior management and policy makers in the region was important for ensuring sufficient resources and resolving issues was a critical aspect of the champion's role.

Project teams tended to be small, ranging from two to eight individuals, and consisted of public and private sector representatives. The public agency team members provided the transportation, human service and institutional knowledge of the region, while the private sector members usually provided technological know-how or a skill such as facilitation expertise. While inclusion of vendors on half of the teams might be viewed as a potential loss of objective perspective, the vendors' participation offered efficiencies for designs for which legacy systems were the basis.

Effective adaptation to changing needs and conditions was reflected in the project teams in several ways. For example, over the course of the design, needed skills shifted from stakeholder outreach expertise for identifying requirements to engineering skills for translating requirements into a system design. Other significant challenges included the loss of team personnel and loss of a key operating function in the form of changes in Medicaid brokerage in some regions, but site teams were flexible enough to achieve a TMCC design despite these obstacles. Hanging over all the sites was the pressure of schedule and deliverables imposed by U.S. DOT that at times seemed particularly onerous to the project teams.

Stakeholders – Developing Consensus and Collaboration. Stakeholder coordination and consensus building was a primary element of the TMCC design at all sites. Typically, stakeholders' involvement included transportation providers, human service agencies and end-users at various points during the project. Over the course of the design, the sites successfully engaged a broad spectrum of stakeholder across their regions.

Sites with existing committees and forums effectively leveraged them to discuss the TMCC design. In some cases, the existing committees and forums were directly related to human service coordination but some site teams participated in forums discussing mental health or employment where they were able to discuss the case of the TMCC. At most sites, communication with a large group of stakeholders occurred at specific milestones of the project, but only a small subset of stakeholders, primarily those on the project team, was most actively engaged in the design process.

End-user involvement was viewed as essential especially as the concept of operations was being developed. Sites reported a wide variety of approaches including focus-groups, transit user committees, participation in town halls and meetings at senior centers to seek out end-user involvement. Also important was the role of advocacy groups and case workers in concept of operations development. Sites reported benefiting from working with unfamiliar groups, as they opened new avenues for collaboration in the region.

Sites found the sheer number of stakeholders a challenge throughout the project. The project teams also had to deal with the changing nature of the stakeholder group meetings, since different groups and personnel attended the meetings which created a loss of forward momentum as the newcomers needed to be brought up to speed. As the design progressed, stakeholder concerns (specifically loss of control, turf issues and funding concerns) began to emerge. Various strategies for successful stakeholder involvement were identified by the sites based on their practices and hindsight. Overall, the sites felt that they had really engaged their region in the TMCC design leading to tangible commitments from their stakeholder group for the final design.

Technology and Technical Issues – Following a Structured Approach. To apply ITS technology to improve coordination of human service transportation, the structured systems engineering approach was required by U.S. DOT, which presented a steep learning curve for most sites who were unfamiliar with the approach. Nevertheless, the sites made use of the technical expertise on their team and training offered by U.S. DOT to follow the approach and produce the required documentation, including the essential concept of operations. Looking back on the experience many project managers realized

the benefits of the structured approach to developing their TMCC design. On the other hand the use of the National ITS Architecture, which U.S. DOT strongly encouraged, did not appear to add much value to the sites' design process.

A fundamental step for the sites was obtaining a clear understanding of what technology was already in place among the transportation providers and human service agencies that could serve as a possible basis for their TMCCs and what new technological capabilities would be required. Technology inventories often revealed significant disparities in technological capabilities among local partners, such as use of scheduling and dispatch software and equipment on vehicles, which would need to be taken into consideration in the TMCC design or phasing of the implementation plans.

Sites succeeded in meeting U.S. DOT's requirement for scalability of their designs, given that they all wanted to have the capacity to add partners, geographical coverage or functions in the future. The most common approach to scalability was to provide open interfaces to the system design. Replicability of the design to other regions was a more difficult requirement to meet, as most sites felt their design reflected conditions that were to a large extent unique to their site, and even using commercial-off-the-shelf technology would require some degree of customization.

Finally, throughout the design process project teams and their stakeholders struggled with communication over technical issues. Not only was it time consuming but for many stakeholders the level of detail to comprehend and respond to could be overwhelming. Out of the experience emerged useful practices, such as monthly newsletters or e-mails to stakeholders that helped keep stakeholders engaged and communicate the evolution of the TMCC design in understandable terms.

Oversight and Technical Assistance – Support from Federal and Other Agencies. Federal support through the Federal liaisons and the technical assistance teams were critical to and valued by the sites. Assigned technical assistance staff contributed significantly to the sites' designs by reviewing documents, providing expert opinion on technological and technical issues, and conducting training workshops and webinars. Some sites mentioned being unclear on the role of the technical assistance team—were they on the site's team or were they on the U.S. DOT side to judge them? However, this was not a general concern across all sites, and the sites regularly used the technical assistance teams especially during the early part of the design. Some sites also would have liked more clarity on what they could and could not use the technical assistance team for during the project.

Federal liaisons were also a valuable form of assistance, although their use and value varied among the sites. Sites strongly recommended an active Federal role, including participation in local meetings to heighten the importance of the program regionally. Site to site communications were limited through the first phase of the study primarily to interactions at Federally organized workshops. A site suggested that there be more of a focus on sharing and providing information on a regular basis during the design phase, including identifying and focusing on a few common technical and institutional challenges such as systems engineering, cost allocation, etc. A good example of such information sharing mentioned by the sites was the systems engineering webinar which the sites appreciated for the design phase.

1.0 INTRODUCTION AND EVALUATION APPROACH

Human service transportation in the United States includes a wide variety of transportation delivery operations designed to meet the needs of transportation disadvantaged communities. These services are funded through a vast array of Federal and state programs managed by human service agencies such as Medicaid, local workforce development agencies, housing, agencies on aging, and mental health. At a regional level, multiple programs and providers often do not work in coordination with one another resulting in duplicative, and/or unreliable service. From a rider's perspective, the mere task of scheduling a ride can become a logistical burden involving multiple phone calls to multiple agencies.

To address the problem of fragmentation of services and programs and to serve greater populations of transportation disadvantaged more effectively and reliably, the U.S. Department of Transportation (U.S. DOT) has been engaged in a multi-stakeholder program involving several Federal agencies called United We Ride (UWR) focusing on development of coordinated human service transportation models.

Collaborating with the UWR program, the Intelligent Transportation Systems Joint Program Office (ITS JPO) started the Mobility Services for All Americans (MSAA) initiative. The MSAA initiative aims to bring all users, service providers and funding institutions together in a coordinated effort, and introduce technological solutions to simplify access and improve cost-effectiveness of human service transportation. The goal of this initiative is to establish scalable and replicable models of ITS-enhanced human service transportation systems that provide efficient, accessible, and quality transportation services to all, by integrating the transportation disadvantaged community and the general public.

As a part the MSAA roadmap, a demonstration to test the technical and institutional feasibility of an enhanced and coordinated human service transportation system was started in 2007. The demonstration adopts a two-phased approach: system planning and design (Phase 1) and system deployment (Phase 2) and aims to develop a coordinated Travel Management Coordination Center (TMCC). The ITS JPO also funded two independent evaluations—one for system impact and the other for the institutional process—as well as contractors assigned as technical assistants to each site.

Eight sites were selected for Phase 1, known as the Enhanced Human Service Transportation Models Joint Demonstration that is as part of the UWR/MSAA initiative. The thirty-seven proposals for the demonstration that were submitted from around the country were reviewed by a Federal Inter-Agency Evaluation Panel which chose eight that best represented the program objectives. Eight sites were awarded funds for system development and design. The eight communities include:

- Aiken, South Carolina
- Atlanta, Georgia
- Camden County, New Jersey
- Fitchburg, Massachusetts
- Kent, Ohio
- Louisville, Kentucky
- Orlando, Florida
- Paducah, Kentucky.

This document presents the findings of the evaluation of the process used by the eight sites to develop a design for a TMCC. The process evaluation examined how the sites went about the design activity, the challenges they faced and how they solved them. The objective is to draw lessons from the experience

of these eight sites so that other communities seeking to implement a TMCC can benefit from their experience.

Based on the TMCC designs submitted at the end of the 15-month award period, U.S DOT selected three of the sites—Aiken, Camden, and Paducah—for Phase 2 awards to implement the TMCC. The total awarded to all three sites was $3.5 million. Although not selected for the Phase 2 awards, Fitchburg, Kent, Louisville, and Orlando received Phased Implementation awards of $100,000 each so that they could continue to make progress in realizing a TMCC for their areas. Atlanta discontinued their participation in the program after Phase 1 and did not compete for a Phase 2 award.

Evaluation Approach

The ITS JPO directed the evaluation of the process used at each of the eight sites to design a TMCC. The evaluation followed the progress of the sites over 30 months. The study encompassed Phase 1, starting with the project kickoff in March 2007 through delivery of the sites' final detailed designs to the U.S. DOT in June 2008 and Phase 2 proposals submitted by each site in July 2008. The study ended in August and September 2009 with interviews with the four sites that did not receive the Phase 2 awards.

The evaluation was conducted in the following stages:

- *Baseline Analysis.* The objective of the baseline analysis was to document the process that each site expected to use to develop their TMCC design. This stage occurred in the spring of 2007 shortly after the kickoff. Each site provided names of three to four representative stakeholders involved in the design. Stakeholders who were interviewed typically included the project manager, a transportation provider, a human services representative, and an end user representative.
- *Mid-Way Analysis.* Approximately 9 months into the design process, an assessment of each site was made to gauge their progress and examine the successes and challenges of dealing with process issues up to that point. This stage occurred around the time that the sites produced their concept of operations, a deliverable to U.S. DOT. Individual interviews were conducted with each site's project manager and a facilitated group discussion with all of the project managers was conducted at the U.S. DOT-sponsored MSAA workshop a month later.
- *Finish-Line Analysis.* Approximately 17 months from the kickoff meeting, an analysis of each site's experience across the entire project was conducted. The persons interviewed in the baseline analysis were interviewed again.
- *Phased Implementation Interviews.* Four sites that did not receive the Phase 2 awards were interviewed to discuss their plans for their TMCC. These interviews took place about 30 months after the start of the evaluation.
- *Final Report.* This document comprises the complete synthesis of findings from all stages of the study, documenting the findings and identifying lessons learned.

Report Organization. The remainder of the report is organized as follows by the following numbered sections:

Section 2.0 provides information on the site characteristics and features of the TMCC design.

Sections 3 to 6 provide the process-related findings and lessons learned from all the sites. These sections include a discussion on:

- 3.0 Project Management – Developing and Managing a Project Team
- 4.0 Stakeholders – Developing Consensus and Collaboration
- 5.0 Technology and Technical Issues – Following a Structured Approach
- 6.0 Oversight and Technical Assistance – Support from Federal and Other Agencies

Section 7 includes a discussion on future plans for Phase 2 and the phased implementation sites.

Section 8 provides the summary and the conclusions for the study.

In all the subsequent sections, specific observations and comments from sites are highlighted as sidebars to the main text. Process-related findings and lessons learned by the evaluation team for future projects are identified by the "flashlight" icon.

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2.0 THE SITES

The demonstration sites represent several operational environments and have different types of lead agency organizations (e.g., metropolitan planning organizations [MPOs], a workforce investment board, and transit agencies), which play different roles in human service transportation (planning, coordination, service providers, brokerage). Together, these demonstration sites provide an excellent range of test-beds to develop and pilot new approaches to developing a scalable and replicable model of coordination. Some of the high-level site characteristics of the demonstration sites are summarized below and in Table 1.

Table 1. Characteristics of the MSAA Demonstration Sites

Site Characteristics	Demonstration Sites							
	Aiken	Atlanta	Camden Co.	Fitchburg	Kent	Louisville	Orlando	Paducah
Service Area Characteristics								
Primarily Rural	X			X	X			X
Primarily Urban		X				X	X	
Mixed			X					
TMCC Design Area								
Single County			X					
Two Counties					X			
Multiple Counties/Jurisdictions	X	X		X		X	X	X
Transit Operations Available in Service Area								
Fixed Route		X	X			X	X	
Demand Response or Fixed Route with Deviations	X	X	X	X	X	X	X	x
Brokerage	X			X		X		X
All of the above								
History of Collaboration Between the Stakeholders Prior to the Study								
Low		X	X	X	X			
High	X					X	X	X
Baseline Level of Coordination at the Sites Prior to the Study								
Low	X	X	X		X			
High				X		X	X	X
Baseline Level of Technology in the Region								
Low		X	X					
High	X			X	X	X	X	X

During the baseline interviews, representatives of the demonstration sites discussed various attributes of their vision, such as near- and long-term goals, specific approaches, and benefits that they hope to realize. They also identified challenges that would have to be addressed to achieve their vision. Table 2 summarizes the expectations articulated by interviewees at each site in response to open-ended questions. The absence of a response in a particular category does not necessarily reflect a total absence of that characteristic at a particular site but instead reflects what was uppermost in the minds of the interviewee.

As indicated in Table 2, TMCC expectations and characteristics varied significantly across the site, with the exception of a few characteristics that were common to most or all sites. The first of these characteristics is that all sites envisioned a customer-oriented system that provides an easy means (e.g., one stop) for a customer to get information about the transportation services available to them. Six of the eight sites also saw the TMCC as enabling them to serve more customers. Two sites, Fitchburg and Kent, specifically wanted service expanded to provide better transportation to jobs for those who need them.

The second area where many sites had similar expectations is operational benefits. Most sites expected to realize efficiencies through elimination of duplication in paperwork or services. Themes of centralization and coordination were apparent in the responses of sites in terms of enhanced service delivery and unified billing.

In the finish line interviews, all project teams for the sites reported achieving some or all of their anticipated vision through their TMCC design. Several sites reported that the design more than met their initial vision and expectations.

From a user's (traveler's) perspective, at the end of the design, there was a mix of pride, hope, as well as concern. Toward the end of the process, while hopeful and excited by the design, several user representatives expressed concern about the implementation of the design such as the following:

- Funding available to implement the design and operate the TMCC. Would there be new monies or would funding be from existing resources which are insufficient to provide the existing level of service? These could possibly lower level of service to certain sets of users.
- The lack of technological sophistication among some user groups
- Lack of clarity on how it will impact daily operations

Table 2. Aspects of TMCC Vision Highlighted by Site Representatives*

Expected Characteristics	Demonstration Sites							
	Aiken	Atlanta	Camden Co.	Fitchburg	Kent	Louisville	Orlando	Paducah
Customer								
Serve more customers/more types of clients/access or mobility for all/service on demand	X	X		X	X	X	X	X
One stop for users/ easier for user/ information on all choices/better service	X	X	X	X	X	X	X	X
Expand service to transportation for jobs	X	X		X	X			
Increasing outreach		X					X	
Passenger as part of the solution		X					X	
Providers								
More providers/include small operators	X	X					X	
More multi-modal interaction		X			X	X		
Share vehicles of different agencies/organizations	X	X				X		
Operations								
Enhance delivery/coordinate & streamline/transparent to user	X	X						
Efficiency/eliminate duplication of paper work or service	X	X	X	X	X	X	X	
Benefit of centralized dispatch & scheduling	X	X					X	
Centralized information hub, possibly operation hub	X	X					X	
Unified billing		X					X	
Technology for more effectiveness or better service	X	X				X	X	
Reduce cost		X						
Riders from different funding sources travel together	X	X						X
Approach								
Regional rather than county/intercounty coordination	X	X						X
Start small then expand to more areas or providers		X			X			
Phased approach to ease transition for users and providers	X	X						
Build on current robust system				X				
Centralize forms first then later replace with on-line					X			

* Responses to open-ended questions volunteered by interviewee. Absence of a response does not mean a specific expected characteristic is not applicable to a site.

The sites' designs for TMCCs varied depending on the institutional structure and existing levels of transportation and human service operations. Design approaches ranged from including a physical center for integrating the functions to a strictly virtual integration of process and functionality. TMCC design approaches for the eight sites are summarized in Table 3. One common element of the designs was the notion of a "one-call' (or in some cases "no-wrong-door") functionality which would allow a rider to call one number (or any number) to access all the transportation available in the region. The other common design feature was the TMCC functioning as an information and referral hub as well as a data reporting and management hub. Other aspects of design varied from site to site. Centralized billing and eligibility verification were two design features for a couple of sites, as was providing trip planning capability. Four sites had a physical central location for the TMCC whereas at four other sites, TMCC was a virtual integration of services. (This does not imply no physical call centers, just that a specific TMCC call center was not part of the design.) While no site design was a purely centralized TMCC, several sites proposed a hybrid centralized-decentralized approach where a central TMCC would be created with all the functionality but local centers would continue to operate within their jurisdictions linked to the TMCC system.

Table 3. TMCC Design Types

Site	TMCC Type	Functionality
Aiken	• Includes centralized physical TMCC call center but also smaller, de-centralized, but linked, "virtual" centers in local communities.	• "One-call" or "one-click" access • Routing and scheduling • Information service and referral • Medicaid brokerage integration • Data management and reporting
Atlanta	• Includes centralized one-stop physical location	• Information and referral only
Camden	• Includes centralized one-stop physical location	• Information and referral • Eligibility • Centralized billing • Trip reservations
Fitchburg	• Virtual integrated traveler services portal	• Trip booking and reservation • Centralized billing • Trip planner • Routing and scheduling • Vehicle routing
Kent	• Virtual integration of services	• Centralized reservations • Routing and scheduling • Reporting
Louisville	• Virtual integration of services	• Information and referral • Eligibility • Centralized billing • Trip reservations
Orlando	• Virtual integration of services	• "No wrong door" • Trip booking and reservation • Centralized billing • Routing and scheduling • Vehicle routing
Paducah	• Includes centralized physical call center with all the functions available, but also smaller, de-centralized, but linked, "virtual" centers in local communities.	• "One-call" or "one-click" access • Routing and scheduling • Information service and referral • Medicaid brokerage integration • Data management and reporting

The next four chapters present findings about the process used by the eight sites in achieving their TMCC designs.

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3.0 PROJECT MANAGEMENT – DEVELOPING AND MANAGING A PROJECT TEAM

The following sections discuss the project management-related findings including team composition, required skills, managing technical complexity, project pacing, and change management across the eight sites. This is the first of the four sections which delve into the process-related findings.

Leadership – The Role of the Champion. The TMCC design processes used at the various sites were prime examples of a multi-stakeholder collaboration with strong champions. At each site, the project manager at the lead agency, in addition to being responsible for the TMCC design, was the de facto champion of the project. Generating support, achieving consensus, and seeking out like-minded and progressive individuals within regional agencies have been reported as major components of the lead agency's role in the project. The champions played a vital role in ensuring that the TMCC design was seen as a truly regional initiative through constant outreach for this project. Several champions also reported having to overcome cynicism from the stakeholders on the likelihood of success (e.g., "everybody talks, no action" or funding constraints).

> *""Keep board members, mayors, council members etc in the region updated periodically on the status of the project. The key has been to keep the project in the fore-front and promote the project whenever opportunity presents itself."*
>
> ***Aiken***

One of the major roles of the champion was obtaining and maintaining senior-level and policy-level support within the agency as well as regionally (see sidebar). Such support was a significant boost to the project sites, helping to ensure that sufficient resources were available or to help with difficult issues that arise, particularly of a policy or inter-agency nature.

The following are some approaches reported by the sites for involving senior leadership in the project.

- Need to demonstrate how similar services and operations are handled elsewhere (in other parts of the world, in other industries).
- To have the government to buy-in, need to show how it will benefit them and how many people this project will serve.
- Take advantage of changes in state administration and promote the project as a means of trying new ideas and pilot tests.
- Let senior executives know that their peers are coming to meetings.
- Have an inclusive planning process and include them in the beginning to provide some positive pressure in the region.
- Promote the project in as many venues as possible, such as town hall meetings and senior centers.

Team Composition. No single model for size and composition of the project team was exhibited by the demonstration sites, although each consists of at least one public agency and one private sector firm, as shown in Table 4. They range in size from two to eight team members. Most frequently (at five sites) the lead agency was a transit provider or broker, who was in a position to leverage its knowledge of transportation options and operations in the design process. The lead agencies at the three other sites were regional entities (one regional planning agency, one MPO, and one Workforce Investment Board) who could build on not only their experiences with human service transportation but also their knowledge of the local area and institutional arrangements. Five sites partnered with vendors who supply transit software. Five sites used consultants to provide expertise in key areas, such as facilitation with stakeholders, and additional staff support.

Table 4. Project Team Structure and Functioning by Demonstration Sites

Characteristic	Demonstration Sites							
	Aiken	Atlanta	Camden Co.	Fitchburg	Kent	Louisville	Orlando	Paducah
Team Size and Composition								
Total	8	2	3	2	4	5	6	3
Public Sector	3	1	1	1	2	4	3	2
Private Sector	4	1	1	1	2	1	2	1
University	1		1				1	
Lead Organization								
Regional Organization (i.e., planning or workforce investment board)	X	X	X					
Transit Provider/Broker				X	X	X	X	X
Private Sector Team Member								
Vendor (e.g., transit software product)	X			X	X	X		X
Consultant(s)	X	X	X		X		X	

Vendors on the Project Team. One of the early comments and concerns heard from a few sites was the use of vendors on the specific sites' project teams. The concern stemmed from a potential conflict of interest in the system design phase of the project. In other words, by using a vendor as the systems designer, was there an objective perspective to the various technology alternatives during the design process? On the flip side, the use of the vendors was logical at several sites as they provided the sites with a valuable resource given their legacy systems. Since most of these site's stakeholders used the vendor-provided system and were not planning to change their scheduling and dispatch systems, having the vendor on board conceivably allowed the site to proceed further with some technical details of their design (see sidebar).

All of the sites tried to achieve a replicable and scalable TMCC design; however, having technology vendors did preclude certain design options. By defining implicitly the technology/system at the end of the design process, the value of the requirements, concepts of operations and other considerations were diluted by violating a fundamental of the systems engineering process – "not identifying the solution before defining the problem." However, from a practical standpoint, it was clear during the interviews that a site's legacy systems would be a major factor in the design and, consequently, by involving vendors in the design phase, certain inefficiencies in the design process could be minimized.

One of the tenets of a successful TMCC is to be technology and vendor independent. However, the Phase 2 proposal required estimates regarding system costs that could not be completed without the involvement of specific vendors. The MORE-TMCC team distributed a Request for Information to 10 vendors during the High Level Design process, however, in keeping with the philosophy of technology and vendor independence, this RFI was not specific enough to meet the needs of the proposal.

Consequently, the core team had to make decisions regarding vendors while the proposal was being written. If decisions involving vendors had been completed during the high level design, then all parties involved would have had more time to consider their options.

Orlando

The following were some of the observations and findings regarding the use of vendors as part of the project team:

- Use of vendors is recommended during the design phase when all of the major stakeholders use or plan to use a single vendor-supplied system. When the stakeholders at a project site use different systems, a specific vendor on the project team is not suggested.
- When using vendors on the project team, to have an objective definition of the problem and technology alternatives, it is recommended that the vendor not lead the early parts of the system design (like concept of operations development, needs assessment, alternative analysis). These steps should be done either internally and/or through other consultants on the project team.

Skills Required. Early in the process there was greater focus on institutional knowledge and stakeholder skills than on technical skills or detailed operations expertise. Given that dealing with stakeholders was identified as a significant challenge, it is not surprising that the project team would view having the skills to handle the challenge as important. However, as the project progressed, several sites realized the need for a strong technical expert, especially someone who is familiar with use of the systems engineering process for developing technology systems.

The following were the skills identified by the sites as critical to project success:

- Local knowledge especially institutional knowledge
- Credibility with local officials
- Facilitation skills
- Technology knowledge
- Operational knowledge/experience
- Outreach/communications experiences
- Document production and editing

Managing Change. Several sites experienced major changes during the design period which stretched their capacity for flexibility. Two sites were affected greatly by a new private broker for Medicaid transportation. Two other sites were influenced by staff layoffs. One site experienced a large operational change during the project (due to the brokerage change): the change in Medicaid brokers for the region brought many lay-offs and downsizing to the providers. One site had a key staff person relocate during the project.

Another important challenge in managing change noted by a site was their perception of a reduction in scope at the last minute. In a misunderstanding of U.S. DOT's intent, the site thought initially that U.S.DOT had $10M to distribute to 2 sites for Phase 2, but it was actually $3.5M for 3 or 4 sites. For this site it became unrealistic to develop a design for a completely coordinated TMCC to be operational in one year given the available U.S. DOT funding.

These sites completed their design process despite the major changes they experienced. They are testimony to the need for project teams to have the coping mechanisms in place to adapt to the challenges that may come their way.

Adjusting Project Pacing and Schedule. The schedule for Phase 1 as required by U.S. DOT was a challenge to the sites. The time frame allotted, driven by the Phase 2 funding, was considered by the sites as a very short period of time to design a sophisticated project involving diverse stakeholders, i.e., human service and transportation.

The sites felt the schedule was particularly challenging toward the end of the process when many deliverables were due. Feeling rushed, sites were unclear on whether they should wait for comments or keep moving along in developing the next deliverable. Also, since the systems engineering process,

mandated by the DOT, involves a high degree of traceability and feedback, some sites felt that the schedule did not allow enough time to review and modify their documents.

The sites noted that instructions and templates were very helpful but that it may have been better to receive communications from the U.S.DOT a bit earlier in the process. When instructions were slow in coming, it complicated the process and sometimes required revisions of previous planning work and documentation that hadn't been anticipated. One site was under the impression that U.S. DOT added deliverables as the process progressed and that they had to spend time to provide deliverables they were not expecting (e.g., final report).

In spite of these challenges, all eight sites were able to complete their designs successfully and seven of them developed proposals for Phase 2. The one site which elected not to participate in Phase 2, Atlanta, had the following comments about the schedule and pacing of the project:

- Schedule of implementation proved faster than agencies could make decisions: As stakeholder discussions progressed, it became clear that the schedule for TMCC project completion and implementation was on a faster track than the human service transportation (HST) coordination efforts in the region. While all stakeholders agreed that the TMCC was much needed, there was simply not enough time to alleviate everyone's concerns and develop interagency agreements within the constraints of this project's schedule.
- Schedule for planning versus schedule for TMCC design: Additional time was needed for coordination planning and developing stronger ties among the various HST agencies in the Atlanta Region. While initial agreement on the benefits of the TMCC was evident, it did not translate to a sense of ownership for the TMCC as planning talks moved to systems engineering and implementation.

The following are some approaches for managing the schedule and pacing of coordination-related projects:

- Minimize the need for large group meetings (except for broad stakeholder outreach). Small groups are easier to schedule and obtain input from.
- Have a dedicated meeting organizer as part of the project team.

Summary. Effective project management is a key ingredient for project success, and the eight sites provided insight into how they managed the TMCC design process. At each of the sites the project manager at the lead agency, most frequently a transit provider or broker, served as the de facto champion of the project, responsible for achieving a TMCC design that was truly a regional initiative. Besides the day-to-day running of the project, gaining and maintaining support of senior management and policy makers in the region was important for ensuring sufficient resources and resolving issues was a critical aspect of the champion's role.

Project teams tended to be small, ranging from two to eight individuals, and consisted of public and private sector representatives. The public agency team members provided the transportation, human service and institutional knowledge of the region, while the private sector members usually provided technological know-how or a skill such as facilitation expertise. While inclusion of vendors on half of the teams might be viewed as a potential loss of objective perspective, the vendors' participation offered efficiencies for designs for which legacy systems were the basis.

Effective adaptation to changing needs and conditions was reflected in the project teams in several ways. For example, over the course of the design needed skills shifted from stakeholder outreach expertise for identifying requirements to engineering skills for translating requirements into a system design. Other significant challenges included the loss of team personnel and loss of a key function in the form of changes in Medicaid brokerage in some regions; however, site teams were flexible enough to achieve a TMCC design despite these obstacles. Hanging over all the sites was the pressure of schedule and deliverables imposed by U.S. DOT that at times seemed particularly onerous to the project teams.

4.0 STAKEHOLDERS – DEVELOPING CONSENSUS AND COLLABORATION

Throughout the TMCC design process, stakeholder involvement was crucial. Successful coordination of human service transportation ultimately rests on the cooperation of all key parties, who must be willing to work together to achieve a common goal. The project teams at each demonstration site fully recognized the important role that stakeholders played and undertook many activities to identify and involve stakeholders in the design of the TMCC.

Organizing Stakeholders. Stakeholders consisted of three broad categories—transportation providers, human service providers, and end users or their representatives—and an essential first step was to identify them and solicit their participation in the design process (see sidebar). The number of stakeholders to involve in the TMCC design was potentially large. Camden, for example, reported 46 in their final interview. Several sites used existing committees, forums, and groups as a means to engage the stakeholder community, thereby providing a "running start" by quickly identifying and engaging the appropriate personnel for the TMCC project. Examples include:

- Aiken used the Regional Transportation Management Association (RTMA), which is a group of regional transportation providers, and the Systems Transformation Grant Working Group, a very active stakeholder group with representation from consumers and advocacy groups.
- Louisville tapped the Regional Mobility Council (RMC), a variety of human service and transportation providers, to serve as an advisory arm to the TMCC project. The RMC had already brought together human service and transportation providers in the region for collaborative projects, including a travel-training program for seniors supported by the Transportation Authority, Area Agency on Aging, American Association of Retired Persons (AARP), and Senior Center Network.

"The TMCC design process has been inclusive, which has the advantage of broadening the potential for success, especially in rural areas where new subdivisions have been built but there is no fixed-route service to build on. The project team involved advocacy groups for different disability groups (e.g., blind). They've been contacted and invited to meetings, and they also could provide input by e-mail if they couldn't attend."

Orlando

Louisville used its Regional Mobility Council to send letters of invitation for focus group discussions to transportation providers, who in turn gave them to riders. About 15 riders attended the focus groups, which proved very beneficial. In addition, the project team held one-on-one meetings with key activists and advocates of human service transportation in the region.

Louisville

"We have tried to include riders extensively in project planning. The open public hearing forum was well attended and useful to the project team. We are considering having another forum as part of this project. To invite riders, the project team put out advertisements on newspapers and public service announcements (PSAs) on local cable, and had notices on PATs buses."

Paducah

- In Orlando, an existing committee of transit users called the Transit Advisory Committee, hosted by Lynx, was used to gather input for the TMCC project.

Atlanta was a site that did not have a ready-made organization of stakeholders and, thus, the project team's initial stakeholder effort focused on organizing a Human Service Transportation Summit in June 2007, which brought together over 170 stakeholders involved in transportation in the region. While the summit helped to broaden support for the notion of the TMCC and establish new relationships in the region, the late start for stakeholder involvement delayed the project team's progress in the overall project schedule.

Following a local kick-off meeting with their stakeholders, most of the demonstration sites enlisted stakeholders for technical or steering committees as mechanisms for on-going stakeholder participation. One of the challenges of this project was to ensure that the stakeholders were engaged through the lifecycle of the project and see that the initial enthusiasm was nurtured throughout the project. Some sites established advisory committees to guide and shape the region's policies and address institutional and organizational barriers specifically. Alternatively, some sites reported that, in lieu of a formal committee structure, they collected input from stakeholders by conducting detailed interviews.

Develop a Stakeholder Strategy by Asking the Right Questions:

- Are there existing groups of stakeholders in the region?
- What is the geographic size and scope of the project?
- What is the level of awareness among the stakeholders?
- What are the human service and transportation service considerations in the region?
- What is the vision of the project?
- Is there a need for a TMCC?
- How open is the project team to the stakeholder input?
- What is the current inventory of processes and technology?
- What is the political context and history of previous efforts on similar projects?
- What resources or budget is available?

Listening to the End Users. End users are at the heart of the vision of a one-stop TMCC that serves all the transportation needs of their target customers. To achieve a customer-centric design listening to the voice of the customer is essential, and the project teams used a variety of approaches to obtain the end-user perspective. In addition to seeking direct contact with individual end users, the sites also heard from advocacy groups and mobility managers, who draw on experience with many end users and provide a broad perspective of the customer. All the sites actively sought end user input using several of the following approaches:

- Including end-users and/or advocacy groups in large stakeholder meetings or subcommittees
- Holding focus groups with current human service transportation riders
- Conducting surveys of targeted groups of end users
- Meeting with a pre-established transit user advisory committee
- Participating at town meetings to get user feedback
- Meeting with seniors at senior centers
- Discussing TMCC with case workers and social service agency representatives.

Stakeholder Participation and Commitment. From the outset the demonstration site project teams recognized the importance of engaging stakeholders so that, ultimately, they would be committed to implementing the design. Maintaining stakeholder interest was not an unexpected challenge for most project managers, but over the one and a half years of the project it required a significant investment of time and effort. When asked about potential stakeholder issues, most project managers at the beginning of the design process not surprisingly found the sheer number of stakeholders a challenge, and for half of the eight sites it was still a concern at the halfway mark. Midway through the project, turf issues and perceived loss of control became the most prominent concern, as illustrated in Table 5. As one site noted, "Turf issues are usually a part of changing a system." According to another site which hadn't yet experienced turf issues, "I'm sure it will arise as we get more specific with system requirements, etc." Some of the most important design decisions at the sites were driven by concerns about "turfism." The centralized/decentralized approach to TMCCs with virtual centers located at transportation providers in Aiken and Paducah as well as the "no wrong door" approach in Orlando squarely intended to minimize concern about loss of control of operations. With this one exception, stakeholder issues tended to ease as time went on.

Table 5. Change in Stakeholder Issues Over Time by Number of Sites Reporting

Stakeholder Issues	At Beginning of Project	Midway Through Project
Complexity in dealing with large number of stakeholders	✓✓✓✓✓	✓✓✓✓
Getting and maintaining interest among stakeholders	✓✓✓✓	✓✓
Turf issues and perceived loss of control between agencies	✓✓✓	✓✓✓✓✓✓
Cultural or attitudinal differences about service and coordination	✓✓✓	✓✓
Transportation providers willingness to be involved and to change	✓✓✓	✓✓

The sites tried a wide range of approaches successfully, but they had problems sometimes, too. For example, one site tried an on-line survey to gather stakeholder input, but came to realize that some stakeholders had limited technological capabilities for completing the survey. Another site found the logistics and advance notice needed to have large group meetings was too difficult, and the project team shifted to one-on-one interviews and small group meetings. Another problem was that new attendees at recurring meetings slowed the momentum because they needed to be educated about the

project, or as one project manager put it: "The problem was you would take two steps forward and one step back." On the other hand, stakeholders who came late to the TMCC project just as often brought new ideas and resources that benefited the project.

Obtaining stakeholder commitment to the TMCC was a key objective of the project teams. The concept of operations for the TMCC, produced about nine months into the project, was an early test of how well the stakeholders' input had been captured and the level of commitment that the project team could expect. All but one of the sites held stakeholder meetings to discuss the concept of operations, and typically informal commitments, show of support, or handshake agreements resulted, but one site obtained letters of commitment. At the end of the project, the commitments were more tangible. Most project teams included letters of commitment from key stakeholders in their Phase 2 proposal. In one instance the commitment was already being demonstrated, because work had begun on implementing parts of the TMCC from existing sources of funds. Still commitment was not universal:

- A transportation provider at one site indicated that senior management support is uncertain without knowing how that provider's funding will be affected by the TMCC.
- At another site the human services agencies did not appear to be fully on-board. Instead, the project was considered to have taken "steps in the right direction" by providing a concrete understanding of what the TMCC plan could do for the region, but it fell short of commitment needed to move forward.

Stakeholder Collaboration. The TMCC design process fostered collaboration among providers and human service agencies. All the sites reported success in this area. Some built on existing relationships forged through previous collaborative efforts. Other sites began interactions with organizations they had never needed before and, in some cases, didn't know existed. The benefits included:

- Initiating a dialogue where none previously existed
- Better relationships with other similar agencies
- Transportation agencies gaining a better understanding of unmet needs in the region
- Human service agencies realizing the potential that the TMCC represents.
- Helping establish new contracts that saved money while enhancing service in the region.

Tips for Successful Stakeholder Participation

- Schedule meetings around stakeholders' schedules and locations, such as a lunch meeting on Friday at their office.
- Hold meetings at stakeholder locations.
- Stress the benefits in communication with stakeholders, such as saving each partner money.
- Educate partners, especially about the transportation needs of the human service agencies.
- Excite human service agencies and end-users about the project so that they become advocates for the project.
- Use one-on-one interviews to become informed about a stakeholder's technology and operating environment.
- Conduct focus groups with users to gain valuable perspective on their technological needs and capabilities.
- Stress how this project differs from the other similar projects in the past that might not have been successful.
- Enlist community leaders by having meetings at their locations so they can help organize their coalitions.
- Hold discussions in different parts of the community to assess how needs may vary by geographic regions and demographic groups, such as the need for security or willingness to transfer.
- Remember that initial contact with stakeholders can be short. Get five minutes on the agenda of agency meetings to talk about the TMCC and distribute a survey to solicit input.
- Use table-top exercises to overcome stakeholder fears about technology, costs, and moving toward consensus.
- Take advantage of other planning efforts. A state DOT was involved in two major programs and the site was able to coattail their efforts.
- Identify groups that are not usually involved, such as potential transit riders, and conduct focus group to understand their needs.
- Take advantage of large groups meetings that can be scheduled using existing partnerships in the region.
- Develop ice-breaker activities in group meetings to engage the participants.
- Use surveys to gather information, but be sure the right person fills it out and do follow-up with that person.
- Engage stakeholders by focusing on their specific expertise and their relationship to the project.

In all sites the emphasis was on first securing the participation of the traditional human service transportation providers in the TMCC design process. Sometimes broader public transportation providers (e.g., faith-based organizations, taxi operators) were invited but they tended not to participate. Even some of the smaller traditional transportation providers were absent in one site because of their reluctance to team up with the much larger agency in the region. Another site focused on achieving "the big bang" focusing on the larger providers rather than spending time trying to engage the many small, private providers in the region, but they didn't rule out adding them in the future. An exception to the norm was Camden, which developed a unique approach with faith-based transportation providers (see below).

"Several positive events occurred at the end of the project. The team developed a concept for Faith-Based Collaborative and now the region has about 19 vans and buses committed along with 11 houses of worship already supportive of the concept. A for-profit provider has made a commitment that he will mentor all the future partners in terms of running a transportation business."

Camden

PARTA and other agencies benefited from the collaboration required by the TMCC design process. For example, collaboration brought PARTA together with other transportation companies that have lower operating costs. They benefit by getting more riders and PARTA can give them trips that PARTA loses money on. Geauga County Transit and others in the region are excited about the concept.

Kent

The project manager had not previously worked with the Polk County transit person assigned to the TMCC work and hadn't worked with Citrus Connection at all before, and, therefore, there were benefits to the collaboration for the project manager and Lynx. Since the design has been completed, there has already been an occasion for a call from Citrus Connection to discuss a transportation question.

Orlando

The project team greatly benefited from the Central West Regional Employment Solutions Team (CWREST) and University of Massachusetts, who are looking at employment issues. CWREST's mission is to enable people to get to job sites, especially the mentally disabled, so they can have meaningful jobs. The participation of CWREST helped guide the design to focus on employment-related needs.

Fitchburg

"The United Way—we don't work with them usually. This project really highlighted what possibilities exist."

Paducah

"We have been able to leverage other grants to access organization and agencies that we would have never talked with such as state hospital associations, AARP, state association of independent centers, and others."

Aiken

Summary. Stakeholder coordination and consensus building was a primary element of the TMCC design at all sites. Typically, stakeholders' involvement included transportation providers, human service agencies and end-users at various points during the project. Over the course of the design, the sites successfully engaged a broad spectrum of stakeholders across their regions.

Sites with existing committees and forums effectively leveraged them to discuss the TMCC design. In some cases, the existing committees and forums were directly related to human service coordination, but some site teams participated in forums discussing mental health or employment where they were able to discuss the case of the TMCC. At most sites communication with a large group of stakeholders occurred at specific milestones of the project, but only a small subset of stakeholders, primarily those on the project team, was most actively engaged in the design process.

End-user involvement was viewed as essential especially as the concept of operations was being developed. Sites reported a wide variety of approaches including focus-groups, transit user committees, participation in town halls and meetings at senior centers to seek out end-user involvement. Also important was the role of advocacy groups and case workers in concept of operations development. Sites reported benefiting from working with unfamiliar groups, as they opened new avenues for collaboration in the region.

Sites found the sheer number of stakeholders a challenge throughout the project. The project teams also had to deal with the changing nature of the stakeholder group meetings, since different groups and personnel attended the meetings which created a loss of forward momentum as the newcomers needed to be brought up to speed. As the design progressed, stakeholder concerns (specifically loss of control, turf issues and funding concerns) began to emerge. Various strategies for successful stakeholder involvement were identified by the sites based on their practices and hindsight. Overall, the sites felt that they had really engaged their region in the TMCC design leading to tangible commitments from their stakeholder group for the final design.

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5.0 TECHNOLOGY AND TECHNICAL ISSUES – FOLLOWING A STRUCTURED APPROACH

The use of technology to improve coordination was the primary motivation for this project and the TMCC design. A wide variety of ITS technologies existed in some manner among the sites. Table 6 shows the technologies that the demonstration sites identified as existing in the region at the outset of the project.

Table 6. Baseline Technologies Reported by the Sites

Baseline Technologies	Demonstration Sites							
	Aiken	Atlanta	Camden Co.	Fitchburg	Kent	Louisville	Orlando	Paducah
Automated Routing and Scheduling System (GIS-based)	X	X	X	X	X	X	X	X
Wireless Communications/Radio Systems	X	X	X	X	X	X	X	X
In-vehicle Mobile Data Computers	X	X	X	X	X	X	X	X
Electronic Fare Collection System (Smart Card Technology)	Planned	X					X	
Customer Service Center/Support		X		X		X	X	
Electronic Bus Routes/Schedules		X						
Real-time Vehicle Tracking (AVL)	X	X		X	X	X	X	X
Real-time Traveler Information		X					Planned	X (participating in KY 511)
Automated Reservation Management		X		X				
Web-based and Telephone-based Travel Planners	X	X		Planned			X	
Accounting/Billing Software	X	X		X	X			
Help-line/Call Centers	X	X		X				X
Interactive Voice Response (IVR) System for Reducing Call Volume	X			X				
Web-reservations				Planned				
Automated Client Eligibility Verification				X				X
Computerized Complaint Management System				X				
Portable Computer-based Driver Training Simulator								X

A major portion of a site's technology assessment was information gathering about the systems used by the various stakeholders. Several sites conducted detailed inventories of technologies (see sidebar). For example, Atlanta developed a detailed inventory of Intelligent Transportation Systems in the region focusing on identifying and differentiating between agency-specific and regional (like integrated electronic fare collection) technologies.

Four of the demonstration sites (Paducah, Kent, Fitchburg, and Aiken) had a common technology platform available across most of their systems which was reflected in the final designs.

When a common platform was not present, integration was mentioned as a challenge especially with legacy systems. Two sites, Atlanta and Camden identified integration of the existing legacy systems as a challenge, as most agencies have their own systems in the region.

One of the areas on which the design team spent quite a bit of time was identifying and addressing legacy systems in region.

- *NJ Transit has a paratransit system (Access Link) with existing technology, and there is a centralized dispatch and regional operators who can tweak the runs as they see fit. NJT use Trapeze software, which has been refined for NJ.*
- *When stakeholders heard that Web-based was the way of the future, they did not want a client-service model and that was when another systems was identified as a candidate for the design.*
- *There were some other customized proprietary systems in the region's service providers for which interface software will need to be developed. For example, Sen-Han is funded by the county to provide paratransit operations and some of Medicaid transportation, and they have a customized system that will take time to phase in.*

It was noted that a more focused technical workshop on several of these issues during the design stage would have been beneficial.

Camden County

A summary of the technological barriers was prepared by the Kent project team. While not specific to Kent and its region, the list represents the superset of issues that Kent expected to encounter based on their experience with similar systems.

Technical issues to consider during the design – KENT PROJECT TEAM

- **ITS Hardware:** Are mobile data computers (MDCs) in each vehicle, even providers? What happens if they are not? Are the same MDCs being used? Same protocols? Are GPS accuracies the same between fleets?
- **Communications:** Are fleets sharing same MDC communications backbone? How does system know which database/site to send messages? How do you deal with different protocols? How do you deal with different system timings? What happens when there are dead spots/down time? What happens when there is an emergency?
- **GIS Engine – Very likely different map sources/GIS engines:** How do you deal with different GIS reference points? How often will the maps be updated? Can each agency make map data changes? What happens when geocodes don't match between datasets?
- **Data Exchange:** How do you send and merge data? Rider eligibility systems and issues? What if different sites are using different database engines? Multi-modal data exchange? Providers may get trips/data from different agencies? Integrating with 211 and 511 systems?
- **Data Control:** Who owns data? What if there are conflicts between agencies? Many more possibly and issues? Client ID numbers, eligibility dates, etc.?
- **Security – Who do you want to see the data?** Should competitors see each other's information? What about sensitive client data?
- **Internet Connectivity – Speed of internet connectivity depends upon data exchange needs:** What are the bandwidth issues for each agency? What will bandwidth cost?—operations expense/budget? What of future bandwidth needs?
- **Contingency Plans:** Data backup and redundancy issues? Disaster recovery plans?
- **Politics:** Different operational requirements? Data control issues? Data liabilities? Operational liabilities (i.e., accidents, transfers, driver training)? Revenue/cost sharing? Faring differences? Unions? Providers combining with their other business?
- **Reporting Needs – Much Greater needs and issues:** How do they differ? Billing Needs? Statistic Calculation?

Several sites reported that it was quite a challenge to be a translator of the technical approach between the lead agency and the stakeholder group. Communicating technical issues to the stakeholders with different technological capability was a challenge within the project schedule. While the use of technology was quite advanced at the larger paratransit agencies participating in the project, human service agencies and other smaller providers were limited in their understanding of the technological alternatives.

One of the implications of the TMCC designs is that the transportation agencies and human service agencies will need to advance technologically to fully benefit from the design. Thus, the challenge will be to interface the platform required for the TMCC design with the systems that the agencies currently have (which in some cases is none). Several human services agencies will be experiencing automated scheduling and dispatch technologies for the first time due to the TMCC design at the project sites.

After many discussions, the technical team and Advisory Committee agreed on a "centralized-decentralized" model that allowed telephone-based services at all individual provider locations instead of one single call-in location. PATS agreed to be the TMCC's lead agency and serve as call center for Paducah/McCracken County local calls and those to an "800" toll free telephone number from across the region. The four primary providers came up with the concept of providing a satellite TMCC at each of their locations which would be linked to the central TMCC in Paducah. The TMCC will also offer its services in person at all provider locations and on the Internet via website.

Paducah

TMCC phasing was uniformly a concern as well as a strategy at most sites. In Camden, for example, phasing implied starting with the Medicaid and faith-based communities first and expanding to other communities later. Also, within the faith-based initiative, the region will be phasing in different organizations as they become ready.

The selection of a hybrid centralized/decentralized approach to the TMCC was a significant design decision at a couple of sites (see the above sidebar from Paducah). In addition to a central TMCC center, the design also offered options for incorporating satellite centers with "virtual agents" that will help keep their expertise and local literacy for scheduling, routing and dispatch, whenever desired. The approach was dictated by the need to be flexible to accommodate growth as well as allaying fears about loss of control of operations among the providers.

Following the Systems Engineering Approach. For most of the sites, the systems engineering approach was a new and unfamiliar concept for designing the TMCC. The U.S. DOT required the sites to follow a structured approach to designing the TMCC by developing a concept of operations, followed by system requirements and culminating in a high-level design for the TMCC. Initial reviews of the sites' project management plans and proposals showed only a rudimentary understanding of systems engineering principles and practices.

Throughout the project, U.S. DOT and the technical assistance teams appointed by U.S. DOT strove to increase the sites' understanding of the structured systems approach to design through webinars, focused assistance and review of documents. The sites adapted to the requirements and were able to produce project deliverables which met the requirements of the systems engineering process.

At the end of the process, most sites felt that the systems engineering process had provided some benefit but acknowledged a steep learning curve. Several sites clearly noted that the process had

opened their eyes. One site reported that the level of technical expertise required by the systems engineering process necessitated hiring of a technical consultant to help with the design process.

An important point noted by an interviewee was that while the systems engineering approach focused on the technical aspects of the system, the non-technical aspects (which were just as, if not more, important in enabling coordination, especially in the initial planning stages) could not be cleanly captured within the templates provided by the U.S. DOT.

Several sites reported that more time to talk about organizational and business aspects would have been helpful. It was difficult to talk about levels of risks and the sharing of resources because the design was focused on the technology side. Non-technology ideas were addressed but that did not always seem like the main purpose of the project. Stakeholders assumed that trip coordination was the main objective, but they had different objectives and priorities. For small providers operational issues such as fuel, insurance, and driver training tend to be more important. Thus, it was difficult for stakeholders to imagine the TMCC design and imagine how it would work in reality. To gain end-user (or the traveler) input, it would have been helpful to develop several totally different scenarios for how the TMCC might work and have consumers react to them.

In some ways, the schedule of the project combined with the deliverables required by the systems engineering process did not account for the nebulous and often protracted approach that a site needed to go through with their stakeholders to achieve consensus on what coordination meant to each of the stakeholders. In other words, defining the concept of operations, in reality, lasted the entire duration of the project. Due to the ambitious schedule, several sites had to progress along with their design while their concepts were still being refined. While the systems approach is iterative, the sites were focused on a very linear approach to getting the project done.

Ultimately, from a process standpoint, it is recommended that the U.S. DOT work with future sites in ensuring a sound and robust concept of operations, one which includes institutional, policy, and technology considerations and has a broad stakeholder consensus. Only after the site and the broader site team are comfortable with the concept of operations should they proceed to requirements stage. U.S. DOT should consider development of appropriate tools to help the development of concept of operations, such as documenting the material provided by the TA webinars on the topic and conducting systems engineering webinars in the future that involve project teams similar to the MSAA demonstration site teams.

Use of National ITS Architecture. The use of the National ITS Architecture in the TMCC design process has been strongly encouraged by the U.S. DOT. All sites were required to review their regional architectures and identify how the TMCC design fit into the region. The resulting documentation produced by the sites—the ITS Architecture and Standards Gap report—identified differences between

the sites' designs and the regional architectures. Two sites reported that there was no regional architecture present and compared their design to the statewide (higher-level architecture).

While the documents show gaps in stakeholders, system elements and other aspects of the regional architectures, the value of this exercise to the project sites was not apparent. The gap report seemed to be a product required by the U.S. DOT as opposed to being a useful step in the design process, at least so far. No site seems to have used information in this gap report further in any significant design changes. Conceivably, the information in the report might still be relevant as the selected Phase 2 sites progress with their TMCC design.

Communicating Technical Issues to Stakeholders. From the stakeholder's viewpoint, the complexity of the design meant that they were being asked to digest and comment upon large and complex documents. It was also noted that the design meetings were very time-consuming and a lot of information was presented at once. It was overwhelming and exhausting to review and analyze all system requirements in one session. Stakeholders could have provided better content or been more focused if the meetings were organized with smaller pieces of information to digest.

Two sites noted that providing regular updates on the design process was essential. Monthly newsletters and e-mail updates were critical in maintaining the engagement of stakeholders and having the group understand the evolution of the TMCC design. Another site successfully reported using task forces to manage the complexity of the design.

The following are some approaches for managing and communicating the technical complexity to stakeholders during the design.

- Establish a technical core working group comprised of key stakeholders which will be responsible for drafting the system design documents.
- Engage the services of an editor to develop monthly summaries and outreach material to disseminate to the larger body of stakeholders to keep them engaged in the design process.
- Use table top exercises to illustrate and discuss concepts for the TMCC, thereby enabling the stakeholders to discuss technical concepts in an operational setting. These exercises will also help allay fears of cost, loss of control, etc.
- Limit the amount of material covered in a single meeting.

Scalability and Replicability. Scalability and replicability of the sites' TMCC designs were key requirements from U.S. DOT to ensure that the TMCC designs remain non-proprietary and relevant to other sites around the country attempting human service coordination models. HST coordination can be described in four dimensions with the scalability and replicability aspects in each. Table 7 shows the four dimensions of integration and the relation to scalability and replicability.

Table 7. Dimensions of Human Service Transportation Coordination[1]

Dimension	Scalability	Replicability
Institutional	System to add (or remove participating agencies/organizations)	Other institutions to adopt same model or process
Functional	Expand (or reduce) system functionalities	Other functional areas to adopt the same model/process
Geographical	Expand (or contract) geographical coverage of service	Other communities to adopt the same model/process
Operational	Add or change the operations of transportation providers	Other transportation providers to adopt the same model/process

Scalability was a requirement that was more easily understood and incorporated into the design process than replicability. Implementation realities made scalability a necessity. Sites have created phasing plans to address the four dimensions of scalability. Sites also recognized the value of scalability to encourage participation. One site reported that scalability was important in the region so that smaller providers ("mom and pop") might be able to adopt the design in the future. By thinking about small agencies, the project team developed a design which could accommodate their needs. (For example, a small agency might not have the resources for a dedicated T1 connection to the system but it might be able use a web-based technology).

The most common technical approach to scalability was to provide open interfaces to the system design so other agencies can plug into the TMCC system easily.

[1] *Scalable and Replicable,* Presentation at UWR/MSAA Kick-Off meeting, March 19-20, 2007.

From a technical standpoint, one site reported the following practices for ensuring scalability:

- A decision to go with an Oracle Enterprise Server instead of a less functional SQL server. If a system is to be scalable, the system needs to handle a large data set (gigabytes of data). Distributing applications across geography and agencies was facilitated by use of a control system that is web-based on the front end. This eliminates the need to install any software on a participating agency's system. Joining the system would imply getting a log-in and password.
- Mapping software was an impediment because of fee (~$7500/agency in a county by county basis). The team was able to get a mapping system to support all partners at no additional agency cost with a national scope (incl. Canada and Mexico).
- Dispute resolution policies and security policies are important to ensure that all providers are satisfied when they join and are a part of the design.
- The design included a function for human contact with a call center. However, the call-center can be located anywhere in the country as the team selected a Voice over Internet Protocol (VoIP) technology which can allow a decentralized call-center operations.
- The design identified text-based and chat-based communication as the preferred method of interaction between agencies allowing for collaboration over a large area but also preserving an audit trail.
- Interface with third-party is enabled with open-architecture interface database that could be implemented using any technology.

The notion of replicability was more difficult for the sites to accomplish primarily because the sites felt that their approaches reflected conditions unique to their site. However, most sites believed that their designs were replicable to a limited extent, if the conditions at other sites or agencies match. They also noted interest from other parts of the state in products from the TMCC design effort (see sidebar).

Other parts of the state might use the Aiken model, and another part of the state (Charleston) is working on partnerships similar to LSCOG. Already half of the regions in the state have Aging and Disability Resource Center's (ADRC) operating, and the potential for replication is high both in the state and out of the state. Outside of the state, a representative of the Agency on Aging (AoA) New England Region office recently called asking for information that could be shared with agencies in his region. LSCOG has shared work products with other locations, which are "starving for information." Other sites would like Aiken's future RFPs and proposals so they don't have to re-invent the wheel when beginning their own work.

Aiken

In some cases, statewide replicability was facilitated by geographical and institutional conditions. For example, the notion of replicability was simple for the Camden New Jersey site since New Jersey Transit (NJT) is a statewide transit agency. It is important for NJT to have the TMCC scalable and replicable across the state. New Jersey Transit has put in another funding proposal to the I-95 Corridor Coalition to take advantage of this project and replicate it to other parts of the state.

From a replicability standpoint, it was also noted that customizing commercial-off-the-shelf (COTS) hardware and software was inevitable, since every agency around the country is built on a unique combination of community needs, policies, and cost allocation formulae. Thus, it is important to focus on replicability at the process and design level rather than the software level.

One site reported the replicability requirement posing a constraint on how far the site could go with the high-level design. The site felt that the U.S. DOT requirement that the design be applicable to other regions in the country impeded them from fully identifying site-specific details in their design. They ended up with a high-level modular approach for a core system that consisted of: 1) Common schedule planning (back office), 2) interactive voice response (IVR), and 3) Web function for the public which was a highly replicable concept around the country.

Summary. To apply ITS technology to improve coordination of human service transportation, the structured systems engineering approach was required by U.S. DOT, which presented a steep learning curve for most sites who were unfamiliar with the approach. Nevertheless, the sites made use of the technical expertise on their team and training offered by U.S. DOT to follow the approach and produce the required documentation, including the essential concept of operations. Looking back on the experience many project managers realized the benefits of the structured approach to developing their TMCC design.

A fundamental step for the sites was obtaining a clear understanding of what technology was already in place among the transportation providers and human service agencies that could serve as a possible basis for their TMCCs and what new technological capabilities would be required. Technology inventories often revealed significant disparities in technological capabilities among local partners, such as use of scheduling and dispatch software and equipment on vehicles, which would need to be taken into consideration in the TMCC design or phasing of the implementation plans.

Sites succeeded in meeting U.S. DOT's requirement for scalability of their designs, given that they all wanted to have the capacity to add partners, geographical coverage or functions in the future. The most common approach to scalability was to provide open interfaces to the system design. Replicability of the design to other regions was a more difficult requirement to meet, as most sites felt their design reflected conditions that were to a large extent unique to their site, and even using commercial-off-the-shelf technology would require some degree of customization.

Finally, throughout the design process project teams and their stakeholders struggled with communication over technical issues. Not only was it time consuming but for many stakeholders the level of detail to comprehend and respond to could be overwhelming. Out of the experience emerged useful practices, such as monthly newsletters or e-mails to stakeholders that helped keep stakeholders engaged and communicate the evolution of the TMCC design in understandable terms.

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6.0 FEDERAL ROLE IN THE DESIGN PROCESS

This section assesses the site teams' experience with the Federal process and support mechanisms. It first focuses on the overall two-phased approach. Next it examines the various types of support available to the demonstration sites, which included two workshops for the demonstration site representatives, an on-line community website, Federal liaisons assigned to each site, and U.S. DOT-sponsored contractors serving as technical assistants to each site.

Two-Phased Approach. U.S. DOT's decision to structure the MSAA demonstration as two phases enabled them to select the sites whose TMCC designs were most appropriate for the technical criteria and available funding in the Federal program. Thus, eight sites were selected for Phase 1 design funding and three of them received the Phase 2 deployment funding.

From the sites' perspective, the two-phased approach had its pluses and minuses. On the plus side, the sites felt fortunate to have been selected for Phase 1 and knew from the outset that only some of them would graduate to Phase 2. On the other hand, the competitive environment of Phase 1 put a damper on communications among the sites, when the sites could have perhaps benefited from discussing common problems and sharing good ideas more openly.

From a technical design standpoint, the procurement process used by DOT was viewed as a good approach compared to the standard practice used for technology deployments. A vendor working with one site felt that it was very beneficial to the TMCC design to get Phase 1 funding to work with the transit agency and other team members, because the various parties were able to engage in an in-depth dialogue to produce the system requirements and other elements needed for the design. In his experience that doesn't happen with a standard RFP.

Thus, for both U.S. DOT and for demonstration sites, the two-phased approach offered advantages. In future procurements U.S. DOT can build on the success while mitigating the negative aspects of a competitive Phase 1 environment.

Workshops and Other Site Interactions

Workshops: U.S. DOT organized two workshops for the demonstration sites, a kickoff workshop near the start and a "midway" workshop about two-thirds into program. The workshops were meant to provide an opportunity for U.S. DOT to communicate information to the sites and for the sites to communicate to U.S. DOT and each other. Both workshops received mixed reviews from the site representatives. They appreciated the opportunity to hear what the other sites were doing, but the packed agenda and, in the case of the first workshop, logistical challenges of the venue limited networking opportunities. Moreover, simply hearing what other sites were doing did not mean that the information was transferrable to one's own site, as two participants pointed out. One site wished that U.S. DOT had devoted more time to communicating technical knowledge rather than having the sites simply share what they were doing.

We were active in communicating "off-line" with other sites by reaching out to most other sites at least once or twice. The conversations provided Aiken a sense of belonging to a "greater effort." However, mindful of the competitive aspect of the program, LSCOG tended to call other sites after a deliverable was completed so they could talk about the experience "after the fact." These contacts with other sites didn't actually influence Aiken's design, and the phone conversations never revealed many details on either side about models. However, information about document expectations or dates or help from the Technical Assistance was shared.

Aiken

Site-to-Site Communications: Sites were encouraged by the USDOT to communicate with each other, and some were in touch after meeting at the first workshop. One site in particular was active in contacting other sites, although the contacts were tempered somewhat by the competitive aspect of the design process (see sidebar). One site reported a feeling of being isolated from other sites, and information about how other sites were doing was not shared by the Federal liaison and the technical assistants.

On-Line Community Website: One opportunity for more sharing among the sites was the U.S. DOT-sponsored on-line community website. However, it was not fully functioning at the time of baseline interviews, and only two sites reported using it at that time. One project manager who tried using the site to pose questions did not get many responses. Later on that same manager found that the website was never updated. In fact, U.S. DOT had decided to abandon the website due to complications in managing it through a third-party arrangement. Apparently, that decision was not communicated to the sites.

Lessons for future demonstration programs include:

- Allocate resources for active Federal support over the course of the program to heighten program success and performance of the award recipients.
- Plan workshops with adequate time and space for networking among demonstration site participants.
- Consider methods for sites to share their experience on a regular basis, such as holding quarterly conference calls with all sites.

Federal Liaison. Each demonstration site was assigned two Federal agency representatives to serve as liaisons to offer assistance about the Federal program, Federal policies, encouragement, and other forms of non-technical assistance. From the outset, most of the demonstration sites viewed the Federal liaisons as a valuable form of assistance, although some sites used them more extensively than others. Some were in regular contact with their liaisons and others less so. However, the experience was not always positive for some sites. One site had not heard from their Federal liaisons in the last six months of the project and felt a lack of Federal support. Another site expressed frustration with what they perceived was a change in size and scope of the Phase 2 implementation program for which their Phase 1 design was intended. For example, "just 3 months before the proposal was due, guidelines were distributed to the sites and that is where the 12 month deployment was first mentioned," and these late changes necessitated a change to the site's Phase 2 plans. Earlier and better communications from U.S. DOT would have benefited the sites.

We asked our Federal liaison for a policy directive or a letter to show that the Federal agencies have no problems with shared-rides or vehicles. This has been a problem in the region during audits, and there is reluctance within the community to try any coordination for the fear of getting called up by auditors for misappropriation of funds. They need a participation indemnity letter from the Federal level.

Kent

The project team held monthly conference calls with the Federal liaison and the technical assistance team (TAs), including the last one in June (the month the design document was submitted). There were also e-mail and impromptu calls. The team used their resources extensively, especially for project advice. The meetings with the Federal liaison and TAs helped keep the project on track and not go far afield.

Fitchburg

The Federal liaisons visited their respective sites and communicated by phone and e-mail. The sites reported a variety of assistance from the Federal liaison, including:

- Assistance on Medicaid transportation issues
- Assistance on policy issues, such as cost allocation formulas and shared vehicles
- Making sure that deliverables they submitted were satisfactory
- Site visits to meet with the local team and, in some instances, to attend stakeholder meetings.

Lessons about the Federal liaison role to benefit future projects include:

- Federal liaison should engage in a similar level with all sites throughout the project.
- Site visits by Federal officials add legitimacy to the project in the eyes of local stakeholders.
- Clear policy directives from Federal agencies at the outset can help site teams overcome local stakeholder resistance.
- Communication of project requirements as early in the project as possible will avoid frustration and inefficiency on the part of the project team.

Technical Assistance. A team of two technical assistants (TAs) were assigned to work with each site on a non-exclusive basis. The TAs were U.S. DOT contractors who were selected for their expert knowledge in areas such as transit technology, human services transportation, and systems engineering. Communication between the project teams and their TAs was by phone and e-mail, as well as a training webinar on the systems engineering process. Following a site visit early in the project, the TAs prepared a technical assistance plan for each site. However, the TAs found that the kind of assistance sites wanted was not very site-specific but was more uniform across sites, such as webinars, how-to guides, and checklists. Throughout the project most sites made regular use of help from the TA team, including the following types of support:

- Review of project deliverables, such as the project plan and concept of operations.
- Information on technology, such as interfacing with the 511 system, data communications between vehicles and the TMCC, linking two proprietary software systems, and data warehousing and management.
- Technical training workshops and webinars, such as the systems engineering process
- Advice and information on coordination, such as technical committee composition, information on insurance issues, information on cost savings from coordination of trips, and brokerage systems for Medicare trips.
- Advice on project management issues, quarterly reporting to Federal Transit Administration (FTA) and budgetary questions.
- General discussion of concepts and ideas.

The reviews of the draft Concept of Operations were very useful and what seemed like harsh criticism ended up really improving the document. The TA team helps in ensuring that issues don't linger and are quickly addressed.

Fitchburg

The TA team has been great with quick feedback especially during the development of the Concept of Operations phase.

Louisville

The sites found the TAs very beneficial to the design process, because assistance was readily available on a wide variety of issues. Most of the sites made regular use of the TAs. Some sites drew on them heavily during the first half of the project as they were organizing themselves and developing their ideas for transportation coordination. Other sites used them heavily in the last six months as system requirements were translated into the final design. A concern expressed by one site was that, while the TA help was always appreciated, it sometimes was not clear if the TA team was there to judge or actually provide assistance. This does not seem to be a general concern across the sites. One project manager stated that the project team did not like every answer provided by the TA team, but they nevertheless valued the assistance.

While the availability of TAs during the design process was judged as beneficial by the sites, they offered suggestions for improvements. One site recommended that the TAs be assigned to just one site, because it seemed that their assistance was too tempered by the need to maintain such a neutral position in that they were helping other sites, too. On the other hand, another site felt that the TAs could share more about status of other sites. That site learned more about what other MSAA sites were doing through a regional FTA monthly conference call. This was not a call that was part of the MSAA project, but the site felt it was more useful to his site than much of the official MSAA communication. One site also felt that toward the end of the project, the TAs provided limited help because U.S. DOT had changed the instructions to the TAs on reviewing documents in advance of submittal to FTA. This apparent change in direction was troublesome, because at the mid-term workshop the sites were encouraged to send deliverables in advance to the TAs. Since no change in TA direction had been made by U.S. DOT, a possible explanation is that the TAs assigned to that site may not have had sufficient time to perform the review prior to the due date. In any event, better communication between the site and the TA could have avoided misperceptions.

Summary. Federal support through the Federal liaisons and the technical assistance teams were critical to and valued by the sites. Assigned technical assistance staff contributed significantly to the sites' designs reviewing documents, providing expert opinion on technological and technical issues, and conducting training workshops and webinars. Some sites mentioned being unclear on the role of the technical assistance team—were they on the site's team or were they on the DOT side to judge them? However, this was not a general concern across all sites, and the sites regularly used the technical assistance teams especially during the early part of the design. Some sites also would have liked more clarity on what they could and could not use the technical assistance for during the project.

Federal liaisons were also a valuable form of assistance, although their use and value varied among the sites. Sites strongly recommended an active Federal role, including participation in local meetings to heighten the importance of the program regionally. Site to site communications were limited through the first phase of the study primarily to interactions at Federally organized workshops. A site suggested that there be more of a focus on sharing and providing information on a regular basis during the design phase, including identifying and focusing on a few common technical and institutional challenges. A good example of such information sharing mentioned by the sites was the systems engineering webinar which the sites appreciated for the design phase.

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7.0 PHASE 2 AND PHASED IMPLEMENTATION FUNDING: WHAT'S NEXT FOR THE SITES

This section discusses the activities and plans of the seven MSAA sites that remained in the program. Three sites—Aiken, Camden, and Paducah—were awarded Phase 2 funding s based on proposals submitted to U.S. DOT in July, 2008. The funding was to be used by sites to implement their TMCC designs over a one-year time frame. U.S. DOT awarded $100K for Phased Implementation to each of the four other sites that submitted Phase 2 proposals but were not selected. The $100K awards to Fitchburg, Kent, Louisville, and Orlando are intended to enable the sites to build on their Phase 1 achievements by providing "seed money" to begin implementing at least some parts of their TMCC design.

7.1 PHASE 2 SITES

Below is a brief description of what Aiken, Camden, and Paducah plan to accomplish with their Phase 2 project.

Aiken

In Phase 2 Aiken will deploy a TMCC that will serve the consumers in a six-county region under the leadership of the Lower Savannah Council of Governments. The design offers consumers a single phone number and internet address to access transportation services, as well as information and referral services to all TMCC callers. This design is a hybrid of a centralized and de-centralized TMCC model. It will use a centralized TMCC that merges existing human service functions of the Aging & Disability Resource Center (ADRC) center, but will also feature the option for participation by established local transportation staff at partnering agencies to serve as "virtual agents" when needed. The Aiken TMCC will link together existing regional ITS technologies and expand and/or update the technology to create efficiency, improve transportation coordination services, and human service information and referral.

Camden

Led by the Camden County Workforce Investment Board (WIB), Camden proposed a TMCC rollout over three years, with the first year focused on implementing a one-stop call center for customers; developing a basic trip reservation, scheduling and dispatching system; and a basic billing system. The initial use of the TMCC would be to optimize the reservations and scheduling among participating providers for Medicaid Title XIX eligible seniors. To accomplish this goal, the TMCC design would leverage one of the local partner's existing call center operations for information and referral on health and human services programs, for which interfaces would be developed to the existing transportation information sources for the region. The result would be a robust database of transportation and human services information available to Camden County residents. A unique aspect of Camden's TMCC was the development of a Faith-Based Foundation Collaborative (FBFC) for community transportation that would use their vehicles to address service needed by residents that are not served by the statewide transit agency. Since the Phase 2 award, the WIB has encountered difficulties with some stakeholders for the proposed design and is in the process of modifying their plans under U.S. DOT auspices. Issues that did

not surface during Phase 1 are requiring the WIB to focus on a smaller number of stakeholders and TMCC features than originally intended.

Paducah

Under the leadership of the Paducah Area Transit System (PATS), the Purchase Area TMCC will provide customers with a single point of access to receive regional transportation, human service agency, and other community information and services in an eight-county area. The TMCC will provide customer access by telephone, Internet, community location kiosks, and walk-in services. Using a centralized/ decentralized design, the primary TMCC location will be housed at PATS but customers will also have access at three satellite locations in the region. The TMCC will build on existing technology in the first year by adding new components such as scheduling and dispatch software, AVL and MDT in all vehicles, a new telephone system, and a high speed internet connection.

7.2 PHASED IMPLEMENTATION SITES

The project managers of the four Phased Implementation sites were interviewed in August and September of 2009 to discuss their implementation plans, which are discussed in this section.

Changes to Implementation Plans

At all the sites, the lead agency was the primary decision maker on what aspects of the design would be selected for the phased implementation. Three of the sites are modifying both the scope and the timing of features of their TMCC. Only one site, Fitchburg, felt they could achieve their entire design by stretching out the work over a longer period. Over the 12-month period, each site expects to accomplish the following portion of their original design:

- Fitchburg will focus on a trip portal for coordination among transportation providers and service agencies and on a study of a central repository for cost allocation.
- Kent will focus the $100K on software development of an open interface to make their system scalable and replicable. They also have $900K from other sources that will spread over more years and cover some but not all of what they had planned for Phase 2.
- Louisville scaled their TMCC to focus on non-Medicaid trips of three major providers. Other Phase 2 features are being postponed but two features were eliminated: a comprehensive driver training and service program and a centralized eligibility program.
- Orlando will focus on web access for trip reservations and an electronic customer identification card. The Phase 2 billing and customer service won't be implemented, but the IVR will be deployed as part of a separate project.

Sustaining Stakeholder Involvement

None of the sites has lost stakeholders as a result of not getting the Phase 2 awards, and stakeholders are still interested in what is happening under the current TMCC effort. Nevertheless, this phase of the work does not require the level of contact with stakeholders needed during Phase 1. Through e-mails

and meetings planned for other purposes, such as Orlando's monthly meeting of human service agencies or Louisville's meetings of the Regional Mobility Council, stakeholders can be kept informed.

Added Value of the Phased Implementation Awards

Beyond the dollar value, the sites saw additional value to the awards. This included validation of their effort with stakeholders, a potential match for other funding programs (e.g., Job Access and Reverse Commute Program or stimulus funds), and an opportunity to communicate with peers outside the state. All the sites felt that in some ways the smaller award removed pressure that the full Phase 2 funds would have entailed, thereby enabling a site to focus on aspects of the project where attention is needed and to work at a more comfortable pace.

All but one site—Orlando—would have continued their TMCC activities without the Phased Implementation award. In Orlando the phased implementation award appears to have been instrumental in enabling the site to continue with the TMCC effort. They were able to use the funding as a match to obtain a Florida DOT grant. If there had been no Phased Implementation funding, FDOT would most likely have spent their funds on other higher priority needs.

Adjustments to the Project Team

Two of the sites are making changes to the project team for the phased implementation, whereas the other two sites did not feel change was needed. In Kent a new staff member with decades of experience in human services was hired to serve as project manager to translate the project to the human services community. In Louisville, Phase 1 required a marketing or outreach orientation to the team, but now that they are in the implementation phase more involvement of the information technology and operations staff (i.e., scheduling and customer service staff) is needed.

Lessons Learned from Phase 1

Looking back over their experience in Phase 1, one or more of the project managers noted the following things they would have done differently or will do differently in the phased implementation:

- The site would allow more time for document writing for each of the deliverables. In Phase 1, the site got too deep into the details and fine points at each stage, increasing the timelines for gathering information and preparing to put together documents, which shortened the time to actually put the documents together. It might be helpful for future projects of this type to provide some additional technical support with regards to the level of detail and specificity needed in various project documents.
- There is a need to work more effectively with stakeholders. This includes engaging people, keeping the process transparent, maintaining a positive tone, and using communication tools such as newsletters and e-mails to keep them informed. Valuable lessons can be learned from the larger community about technology and processes. Participation in meetings such as the Rural ITS conferences afforded these opportunities to engage with peers on issues relevant to the TMCC.
- The systems engineering process, at first intimidating, is now viewed as a useful approach that can be applied to other projects.

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8.0 SUMMARY AND CONCLUSIONS

The institutional process evaluation documented the challenges and success of the demonstration sites to develop a TMCC design. The evaluation also assessed the process used by the U.S. DOT for conducting the demonstration. USDOT structured the demonstration as a two-phased competitive approach: system planning and design (Phase 1) and system deployment (Phase 2). The two phased approach mitigated the risk to U.S. DOT by spreading the design activity across eight sites and, thereby, increasing the probability that a few good designs would result at the conclusion of Phase 1. U.S. DOT further increased the likelihood of successful designs by providing various support mechanisms to the sites over the course of Phase 1, including technical assistants who provided advice on a variety of matters. Of the eight Phase 1 sites, seven competed for Phase 2 funds. Three received Phase 2 funds to implement their designs and four sites were provided modest funds to help them progress toward implementation. This section summarizes and draws lessons from the experience of the demonstration sites and U.S. DOT.

The TMCC Design during Phase 1 was a truly collaborative effort at each of the sites. The information collected from the detailed interviews with the project managers, the transportation and human service representatives, the technical leads and the users revealed promising approaches to a complex program as well as the challenges and issues that the sites attempted to address.

Led by a project champion, the sites organized themselves into teams ranging from two to eight team members. Most frequently (at five sites) the lead agency was a transit provider or broker but three sites were led by regional entities (one regional planning agency, one MPO, and one Workforce Investment Board). While a single teaming model was not identified, several common skill sets were identified and procured as part of this task.

Phase 1 of the TMCC design involved extensive involvement with stakeholders for all the sites. All sites sought to gather information across their region on needs for transportation coordination and focused significant effort on developing regional partnerships and approaches to TMCC design. A regional perspective of coordination was hard to come by in some sites but existing coordination models, regional partnerships and outreach paved the way for sites to come up with a viable TMCC design.

Guided by the technical assistance team and the Federal liaisons through workshops and technical consultation, the sites followed a structured systems-driven approach to TMCC design. Most of the sites were unfamiliar with the systems engineering process recommended by the U.S. DOT and struggled initially to adapt their design process to the systems engineering steps. However, interviews with the project managers revealed an increased appreciation and understanding of the systems engineering process and the benefits afforded by it. The role of the technical assistance teams in providing expertise and technical consultation was valued and utilized effectively by the sites throughout the project. While reconciling some of the institutional and non-technical elements into the design was still a challenge, overall the project managers noted that the systems engineering process served them well during the design.

The two-phased competitive approach used by DOT was viewed as a good approach compared to the standard practice used for technology deployments. A vendor working with one site felt that it was very beneficial to the TMCC design to get Phase 1 funding to work with the transit agency and other team

members, because the various parties were able to engage in an in-depth dialogue to produce the system requirements and other elements needed for the design. One drawback to the competitive process was the limited exchange of ideas between the sites themselves. A potential approach noted by the sites to increase communication between sites for future procurements was to have topic-specific technical workshops which would allow sites to exchange information on a particular topic.

Overall, at each site the TMCC design process fostered collaboration between transportation providers and human service agencies. All the sites reported success in this area. Some built on existing relationships forged through previous collaborative efforts. Other sites began interactions with organizations they had never needed before and, in some cases, didn't know existed. One site decided to take more time to strengthen their stakeholder interaction and move forward at a slower pace than continue their participation on Phase 2.

The ultimate measure of success in this phase of the project is a TMCC design that has been ratified by the stakeholders in the region and commitment for its implementation obtained. By that measure, the overall project has been a resounding success. All eight sites submitted complete TMCC designs with seven of the eight sites submitting a proposal for the implementation phase. Several of these sites were able to leverage local and state monies to support the TMCC implementation. As the three Phase 2 sites proceed towards full implementation of their design, and the phased implementation awards support the other four sites in progressing along their TMCC, the collaboration and relationships created during the design phase will come to fruition and provide the sites with a more coordinated cost-effective approach to human service transportation coordination. The eight sites are pioneers and torchbearers for coordination of human service transportation coordination in the country. Other agencies around the country can greatly benefit from the lessons learned at these sites and this process evaluation provides a summary of their best practices and approaches over the design phase.

Conclusions to be drawn from this evaluation of the institutional process include the following:

- The two-phased approach used by U.S. DOT achieved the intended results of fostering a range of TMCC designs and advancing a subset of those designs toward full implementation as rapidly as possible to serve as models to other locations.
- While each site brought unique perspectives and capabilities to the design effort, they all faced many of the same challenges in the design process. By disseminating information about strategies, both successful and not-so-successful, tried by these eight sites, U.S. DOT can shorten the learning curve of other locations interested in using technology to advance human service transportation coordination.
- Demonstration projects that don't simply provide funds to sites but that also use other mechanisms to help the sites succeed in reaching their objectives benefits all parties. U.S. DOT's on-going support through the TMCC design phase, in particular that provided by the technical assistants assigned to the sites, was especially helpful.

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EDL 14504

FHWA-JPO-10-003