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Louisville Region Demonstration of Travel Management Coordination Center: System Pre-Deployment Preparation

Final Report

MARCH 2013

Louisville Region Demonstration of Travel Management Coordination Center: System Pre-Deployment Preparation

Final Report

Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
^{o}F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^{o}C

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13. ABSTRACT

The purpose of the Greater Louisville Region Demonstration of Travel Management Coordination Center (TMCC): System Pre-Deployment Preparation grant was to further phased implementation of the region's TMCC design by focusing on two major components. One component is "Travel Management Information Integration" to design and build integrations with phone systems to improve customer service. Tasks chosen were to improve and increase ways customers can interact with the TMCC and to improve service efficiency. Activities centered on testing an interactive voice response (IVR) system, including automated "day-before reminder" and "10-minute alert" calls to a volunteer group of paratransit customers. The other major component was "Coordination Model Enhancement." The intent was to develop new procedures and/or streamline existing processes to improve efficiency and the ability of the TMCC to manage multiple transportation providers and funding sources. Activities included optimizing use of existing Trapeze PASS software by obtaining consulting services to identify issues and increase staff knowledge of the software programs' functions and features. Evaluation tools included surveys, performance monitoring, and customer and staff feedback. Pre-deployment results indicate that implementation of these changes can improve customer satisfaction, service efficiency, and the ability to coordinate services.

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FOREWORD

The Louisville, Kentucky, Region's Travel Management Coordination Center (TMCC) is conceived to offer one-stop, customer-based travel and trip planning service that supports coordinated human services transportation operations enhanced with the use of intelligent transportation systems (ITS).

The purpose of this Louisville Region Demonstration of TMCC: System Pre-Deployment Preparation final report is to provide information to interested parties regarding the approach and methodologies used and the results found during the pre-deployment phase of TMCC design implementation.

The audience for this report includes stakeholders who were involved in the design, implementation, operations, or funding of the TMCC and individuals and groups that will use the TMCC. It is also intended for other entities that may pursue similar projects in their communities. The report also is for the grantors who provided this opportunity to the Louisville community.

The Louisville Region's TMCC design was based on outreach throughout the entire design development process. The needs and issues of stakeholders continued to be the central tenet for the project team during the pre-deployment process and will continue to be a vital component for further implementation of the TMCC design in the Louisville Region.

ABSTRACT

The purpose of the Greater Louisville Region Demonstration of Travel Management Coordination Center: System Pre-Deployment Preparation grant was to further phased implementation of the region's TMCC design by focusing on two major components. One component was Travel Management Information Integration to design and build integrations with phone systems to improve customer service. Tasks chosen were to improve and increase ways customers can interact with the TMCC and to improve service efficiency. Activities centered on testing an interactive voice response (IVR) system, including automated "day-before reminder" and "10-minute alert" calls to a volunteer group of paratransit customers.

The other major component was Coordination Model Enhancement. The intent was to develop new procedures and/or streamline existing processes to improve efficiency and the ability of the TMCC to manage multiple transportation providers and funding sources. Activities included optimizing use of existing Trapeze PASS software by obtaining consulting services to identify issues and increase staff knowledge of the software programs functions and features.

Evaluation tools included surveys, performance monitoring, and customer and staff feedback. Pre-deployment results indicate that implementation of these changes can improve customer satisfaction, service efficiency, and the ability to coordinate services.

EXECUTIVE SUMMARY

This system pre-deployment project used a phased approach to initiate implementation of the region's Travel Management Coordination Center (TMCC) design. Tasks for pre-deployment were specifically selected from the TMCC design that could improve customer satisfaction, efficiency of service provision, and the ability to coordinate multiple agencies and funding sources.

Primary activities centered around two major components. The first involved testing an interactive voice response (IVR) system. Testing the IVR included implementation of automated "day-before reminder" and "10-minute alert" calls to customer volunteers and requesting their use of IVR "confirm" and "cancel" features. The purpose of the second major component was to improve the ability of the TMCC to manage reservations, scheduling, reporting and dispatch for multiple agencies and funding sources within the capabilities of the TMCC's existing software. Activities included analysis of current operational use of the software, recommendations for procedural changes, and training of TMCC staff.

Evaluation data were gathered during the course of the pre-deployment project. Customer testers responded to two types of surveys taken multiple times throughout the testing period. The customer surveys included a satisfaction survey and a survey to determine their use of automated features. Evaluation also included a comparison of the testers' late cancellations and no-shows for three months prior to the test with the last three months of testing. Customers' late cancellations and no-shows are factors that impact service efficiency; these factors were expected to improve as a result of the automated calls. TMCC staff completed an opinion survey regarding procedural changes that had been recommended and the training they received during pre-deployment.

Testers' overall satisfaction with the IVR and particularly with receipt of automated "day-before reminder" and "10-minute alert" calls remained consistently high throughout the pre-deployment grant period. Although use of the IVR "confirm" and "cancel" features was minimal, testers who used those features were highly satisfied. TMCC staff integrated procedural changes and demonstrated improved ability to generate reports, reduce manual reporting, and improve management of the varied requirements from multiple agencies and funding sources. These improvements enhance the ability to coordinate resources, furthering the implementation of the region's TMCC design.

Introduction

The Louisville, Kentucky, region has a design for a Travel Management Coordination Center (TMCC) that seeks to increase and simplify travel and mobility options for people in the region by improving efficiency of existing service delivery, leveraging community resources more effectively, and enhancing community education and awareness about available transportation services.

Fully implemented, the TMCC will provide a single point of access to customer-based travel information and trip planning services, especially for persons with disabilities, older adults, and individuals with lower incomes through the use of intelligent transportation systems (ITS). The TMCC will use a "no wrong door" approach and integrate all travel planning functions, including getting information about travel services, determining eligibility, arranging travel, scheduling trips, dispatching, monitoring trips, and funding procedures/fare collections. The TMCC was designed for development through a phased approach to implementation of software and hardware solutions, process change, and the addition of new partners.

Using the phased implementation approach, tasks were selected for the Louisville Region's system pre-deployment project based on the presumed ability to positively impact customer satisfaction, improve efficiency of service provision, and enhance the ability to coordinate multiple agencies and funding sources.

Approach, Methodology, and Evaluation Strategy

Approach and Methodology

The following three overarching tasks and related activities were the focus for the Louisville Region's TMCC Phased Implementation Pre-Deployment Project:

- **Task 1 – Travel Management Information Integration**

  Primary activities for this task included the implementation of automated "confirm" trip and "cancel" trip features and "day-before reminder" and "10-minute alert" calls for a randomly-selected TMCC customer test group. The purpose of the automated calls is to improve customer satisfaction through access to information, improved communication, and improved service efficiency realized through the reduction of no-shows, vehicle dwell time, and late cancellations.

  These activities were implemented with a Trapeze interactive voice response (IVR) system (purchased through another funding source), increased TMCC phone line capacity, and through mobile phone distribution to a group of the TMCC customer testers. This project advanced integration of new Trapeze IVR functionality and Trapeze PASS reservation and scheduling functions for the TMCC. Customer-specific trip data, such as booking details located in the Trapeze PASS reservation and routing software, was accessed by the Trapeze IVR software tested during the pre-deployment project.

- **Task 2 – Coordination Model Enhancement**

  Primary activities included analysis of and improvement to the use of existing Trapeze software functionality for reservations, scheduling, reporting, and dispatch. A consultant analyzed current procedures and made recommendations for and trained staff on new and streamlined procedures. Based on those recommendations, operational changes were implemented to improve efficiency and enhance the ability to coordinate multiple transportation providers and funding sources through the TMCC.

- **Task 3 – General Project Management**

  Project management and administrative activities kept the pre-deployment project focused on the accomplishment of established tasks through ongoing monitoring and adjusting of activities, ensuring continued stakeholder involvement, evaluating, and reporting.

Pre-Deployment Project Participants

Participation of stakeholder groups in the pre-deployment project included the project team, call center and routing staff, the customer test group that volunteered to test the IVR/PASS system and automated calls, the TARC Elderly and Disabled (E&D) Advisory Council, and the Regional Mobility Council (RMC).

The project team managed activities necessary to increase the phone capacity of the call center, develop the scope and initiate testing of the IVR/PASS system and automated calls, develop a random sample of customers to test the system and train volunteer testers, conduct evaluative surveys, procure outside services, monitor progress, and evaluate and report on project activities.

Call center and routing staff updated customer data necessary for the implementation and evaluation of automated calls. They participated with the project team on development of call flow and scripts. In addition, they worked with the consultant to improve use of available Trapeze software functionality.

A 75-member customer test group was randomly selected and invited to participate on a strictly voluntary basis to test the IVR/PASS system including automated calls. They were divided into three sub-groups:

- Group 1 – A group of 25 customers without personal cell phones who agreed to use a cell phone provided to them for the pre-deployment project. The provision of a cell-phone enabled participants in this group (like those who had their own personal cell phone) to receive "10-minute alert" calls for trips both originating at home and away from home. Provision of cell phone service was for a test period, and the phones were blocked from use other than for 911 calls and calls regarding TMCC service. Cell phone training was provided for these participants at the time of phone distribution.
- Group 2 – A group of 25 customers who already had personal cell phones. This group received the "10-minute alert" calls for trips originating both at home and away from home.
- Group 3 – A group of 25 customers who did not have a personal cell phone and did not want one. This group received all calls on their home phone. Consequently, this group received the "10-minute alert" calls only for trips originating at home.

Participants in all three customer test groups received "day-before reminder" calls and were encouraged to use the IVR/PASS interactive "cancel" and "confirm" trip functions. The volunteer testers also responded to surveys every two weeks for evaluation purposes.

The TARC E&D Advisory Council is an independent, self-governing group that meets monthly with TARC management, staff, paratransit contractors, and interested consumers. Its role is "to serve in an advisory capacity and as a resource on accessible transportation for persons with disabilities or elderly citizens." E&D Council members, who are also customers, pre-tested the IVR and automated calls and went on to participate with one of the three customer test groups in the evaluation phase. The E&D Council also received regular progress reports and provided feedback to the project team regarding pre-deployment project activities.

The RMC, comprising representatives of human service agencies, transportation providers, public officials, and consumers, meets regularly as an advisory group for mobility, public transit, and human services transportation planning and coordination issues. It also received regular progress reports and provided feedback regarding pre-deployment project activities.

Research

Pre-deployment tasks were monitored and measured throughout the project. Surveys of the customer test group gauged progress made towards the successful deployment of an automated IVR/PASS phone system with auto call-out features. Performance monitoring included gathering and review of data specific to the customer test group's satisfaction with and use of the IVR features, including the automated calls. Complaint-feedback systems and input at meetings provided additional sources of evaluation data. Staff contributed to the evaluation of the consulting services, assessing how training and new knowledge improved efficiency, accuracy, and job satisfaction.

Evaluation Strategy

The project team developed an evaluation strategy using three major components to determine the effect of pre-deployment project activities on customer satisfaction, efficiency of service provision, and the ability to coordinate multiple agencies and funding sources.

Evaluation Component #1

Qualitative and quantitative analysis of input from the 75 customers testing the automated "day-before reminder" calls,"10-minute alert" calls, and the new IVR interactive "cancel" trip and "confirm" trip functions. Two surveys were developed by the project team to gather input from the customer test group tracking their experience with the IVR and automated calls. The two surveys were alternately administered through personal phone calls to each tester every two weeks during the test period.

The IVR Features survey gathered quantitative input about whether the customers testing the IVR and automated calls experienced or used all the system features. It was also used to capture problems the testers may have encountered.

The Customer Satisfaction survey gauged the satisfaction level (qualitative) of customers testing the IVR and automated calls had with the system. They were asked to rank their opinion of the new features using the terms "very helpful," "somewhat helpful," or "not helpful." The project team planned to use these rankings not only to evaluate customer satisfaction at the end of the test, but to see if satisfaction changed over time.

The IVR Features survey was conducted five times, and the Customer Satisfaction survey was conducted six times: one pre-test, four during the test period, and one at the end of the test. The project team hypothesized the following:

- Group 1 – those in the group receiving calls on a cell phone provided to them for the project would reflect mixed satisfaction with the IVR features and automated calls due to varied ability or interest in embracing cell phone technology.
- Group 2 – those in the group using their own personal cell phone to receive calls would use the IVR features more frequently and report high satisfaction with the system.
- Group 3 – those in the group receiving calls only on their home phone would not use the IVR features fully and might not report high satisfaction with the new system.

A trend toward higher satisfaction of customer testers for all IVR features was anticipated over time as testers became more familiar with the technology and features.

Evaluation Component #2

Qualitative analysis of input from call center and routing staff, including customer service representatives and routing specialists, was used to gauge the value of the consultation activities during the pre-deployment phase. Those involved in this component were front-line TMCC staff who must master new technology and increasingly complex instructions related to booking and reporting trips to implement a coordinated system of multiple contracts and contractors.

Consulting services were obtained to find solutions to current problems that had been identified in managing multiple contracts; to identify unused functions and abilities of the Trapeze software that, when used, would improve operational efficiencies; and to train routing and reservations staff to more accurately and efficiently manage reservations, routing, and reporting. Issues were grouped

as follows: fare assignment/collection and reporting, billing and reporting, and booking and scheduling trips.

The consultant made two three-day site visits to assess current operations and use of Trapeze PASS, Mentor mobile data terminals (MDTs), and other related reservation and trip administration software. A weekly webinar led by the consultant tracked each of the grouped issues sequentially and involved routing staff, call center leadership, the Paratransit & Customer Service Director, and contractors, as needed. The sessions clarified problems, tested implementation of new practices, and provided staff and/or contractor training on new policies and procedures.

Feedback from staff about implemented and proposed changes to their daily use of Trapeze PASS, Mentor MDT, Citrix, Voice Genie, and other software was captured at the end of the consultation phase. Evaluative questions included:

- How helpful was this training in teaching you a new process?
- How helpful was this session in making job processes more efficient?
- How helpful was this training to your job performance?
- How helpful was this training in improving your job satisfaction?

Although analysis was based on subjective opinions, the project team recognized that acceptance and use of new processes and technology features would be influenced by staff attitudes towards the consulting services and resultant changes to their jobs.

Evaluation Component #3

Mostly quantitative analysis revolved around impacts that the automated calls, software consultation, and the increased capacity of the telephone system had on system performance. This quantitative analysis of the automated calls centered on the expectation that customer no-shows and late cancellations would be reduced due to the implementation of the automated "day-before reminder" and "10-minute alert" calls. The evaluation process compared the customer test groups' no-show and late cancellation history for a three-month period prior to the test against their record of no-shows and late cancellations during the test. The customer test group was also surveyed to find out if the "day-before reminder" calls had reminded them of a trip that they had forgotten was scheduled.

The project team hypothesized that if there was a reduction in no-shows or late cancellations in the test group due to automated calls, then the calls would also reduce the no-shows and late cancellations overall for customers. Because valuable trip time would not be used waiting for customers who cancelled late

or who decided not to travel, routing staff and dispatchers could deploy vehicles more efficiently and system productivity (trips per hour) would improve.

The consultant worked with customer service representatives (CSRs), routing staff, and a paratransit contract service provider, MV Transportation, to resolve issues related to Trapeze and Mentor MDT integration for proper fare type reporting when using multiple funding sources. They worked with CSRs and routing staff to analyze their use of the existing Trapeze software and demonstrated ways to use Trapeze more effectively and efficiently.

Quantitative analysis of results from the consulting service was drawn from Trapeze reports. The project team hypothesized that staff would have increased ability to generate these reports as a result of this consulting service. The team also expected staff to have increased ability to track and manage data required for coordination.

The phone capacity of the TMCC call center was increased to enable the system to handle the higher volume of daily outgoing calls that began during the testing period and to accommodate the increased outgoing call volume that will occur with the full deployment of automated "day-before reminder" and "10-minute alert" calls. System monitoring occurred during the pre-deployment test period to ensure that the system had the capacity to handle the automated calls for the test group of customers.

Self-Evaluation

There were periods during pre-deployment that the IVR/PASS system worked well and the automated calls were handled smoothly. At other times, a software issue caused the SCHED server to go in a loop and be unresponsive. The PASS IVR server was shut down at various times to assist in troubleshooting and to minimize the impact on other systems. These temporary shutdowns affected the project, as the IVR/PASS system and automated calls were unavailable to the customer testers during those times.

During the first two months, the IVR/PASS system and automated calls were operational, and problems that were identified were typically user error or operator error, not system problems. However, system problems occurred late in the second month of testing, causing a shutdown that lasted nearly one month while the problem was identified. It was determined that a software bug caused the SCHED server to go in a loop and be unresponsive. Trapeze provided a patch. The lengthy delay impacted the project, and the project team chose to extend the testing of the automated system, including "day-before reminder" and "10-minute alert" calls, beyond the original planned end date.

Following that delay, there were two other shutdowns (shorter in duration) requiring system adjustments. One that lasted several days was due to the PASS IVR reporting shell causing the SQL server to hang, which caused the Scheduling server to hang up and caused operational issues. PASS IVR was turned off while the root cause was determined, which was that the PASS IVR markup was collecting data that the program that calculated the statistics and summary information could not handle. This caused the SQL server to hold open files too long, which caused co-dependent file open locks to cascade and bring the SQL server down. Adjustments to the database were made to eliminate the existing bad data. Summary Reporting was turned off until the markup was fixed (about two months). The fixed markup was installed on December 2010 and, as of March 2011, was still being tested.

The other outage requiring system adjustments lasted approximately one day. The PASS IVR Application server hard drive filled up with report raw data and logs, causing the application server to crash. Summary Reporting had been turned off (see above), and the raw data collected on the Application/Reporting server. As of March 2011, a plan was being implemented to split data collection off of the application server. The critical Text To Speech (TTS) server and application servers will no longer be collecting and processing report data. This is a reliability trade-off, in that the critical servers will no longer be affected by data

collection and processing issues and, thus, will have to support only their main functions of servicing the customer; however, if the data collection server goes down some historical data may be lost. The split off also allows quicker critical server recovery and spare TTS server switchover without data loss should a critical server crash. The overall functional system will be more stable, a major "plus" for our customers.

During the test period, there were instances of subscribers not receiving a "day-before reminder" call for their regular demand (non-subscription) trip because the "send reminders" flag was not being set. This was determined to be a PASS-related issue that had an IVR affect and was resolved.

"Impact Areas" referenced in the following portions of Section 3 are summarized in the appendix.

Evaluation Component #1

As reported, due to the long shutdown late in the second month of testing, the project team extended customer testing of the automated system. Formal testing and surveying of the customer test group lasted three months beyond the planned end date, and the IVR/PASS system and automated calls continued. However, the provision of cell phone service to customer testers had been budgeted and offered for a minimum of two and a maximum of three months. Due to the delay, a decision was made to provide the service for the maximum-budgeted three months. Near the end of the three months, arrangements were made for individuals in this group to meet with a representative of the cell phone company and apply for their own service if they choose to do so. Some of the customers did obtain their own service plan, and the rest of the group continued to participate as testers without a cell phone. Consequently, the lengthy shutdown affected planned evaluative comparisons over time and across groups of testers.

As of January 2013, "'day-before reminder" calls had been rolled out to all customers. Testing of automated "10-minute alert" calls was suspended but is expected to resume this year. "No-show" alert calls were initiated and successfully implemented with full rollout. In addition, testing of automated next-day trip booking through the IVR began December 2012.

Impact Area 6

The IVR Features survey was very useful in capturing whether people were actually attempting to use a specific IVR feature such as changing passwords, canceling a trip, or confirming a trip. Results from this survey show that of the testers who responded, only about 30 percent reported using the IVR confirm/cancel features. However, 100 percent of those who used the "confirm/cancel"

features said "helpful or very helpful." Test Group 2 (owned personal cell phone) used the IVR "confirm/cancel" features most frequently (38%), confirming the hypothesis that Group 2 would be most comfortable using technology. Group 1 (loaned cell phone) or Group 3 (home phone only) reported low use of the "confirm/cancel" features (under 20%), as expected. However, lower satisfaction was expected from groups 1 and 3, but that was not the case. Those who did use the automated "confirm/cancel" features were 100 percent satisfied. Those who did not use the "confirm/cancel" features did not specify dissatisfaction or difficulty using the system, but seemed disinterested or unwilling to use those features. Inquiries as to why those testers chose not to use the features did not reveal any helpful strategies to promote use.

Comments for the Features survey were obtained by asking the testers whether or not they had encountered problems while using any of the IVR features. There were very few negative comments about the automated voice or the timing of "day before reminder" calls. There were some complaints about the interface of the automated calls with voice mail and some confusion from testers about passwords and ID numbers. The most frequent complaints through the test period were about the late arrival of "10-minute alert" calls.

Customer satisfaction survey results are reported for the month of November 2010, except where indicated. Results indicate overall satisfaction with the IVR for testers who used the features exceeded the expected target, which was that 80 percent would rate the features "very or somewhat helpful."

Impact Area 1

"Day-before reminder" calls received an overall rating of 95 percent helpful. Respondents from Group 1 (loaned cell phone) and Group 3 (home phone only) rated the "day-before reminder" calls as 100 percent helpful.

Impact Area 2

The "10-minute alert" calls were rated overall as helpful by 96 percent of respondents despite the fact that the accuracy of those calls was inconsistent. Tester satisfaction went up steadily from 89 percent in month one to 96 percent by month three. Even the Group 3 testers, who did not have a cell phone to receive a "10-minute alert" call for return trips, rated the "10-minute alert" as 100 percent helpful. Apparently, customers rated satisfaction with the "10-minute alert" based on the times the calls were accurate or available to them, as in the case of Group 3.

Impact Area 3

This area pertained to satisfaction with the "cancel" feature. Only 30 percent of testers used the IVR to cancel a trip; however, 100 percent of testers who used it (from all three groups) consistently rated the feature as helpful. The 70 percent of testers who did not use the cancel feature rated it as "not applicable." Those testers either did not want to try to use the "cancel" feature or did not need to cancel a trip.

Impact Area 4

The project team expected 80 percent of the testers to rate the "confirm" feature as helpful. Testers from all three groups who used the "confirm" feature rated it as helpful. This feature was rated by 90 percent as helpful in month one and 100 percent in months two and three. However, only 26 percent of the testers reported use of the "confirm" feature. Some of the testers discovered that they could call the IVR and use the automated "confirm" feature to stay updated on changing vehicle arrival times instead of calling the "Where's My Ride" line. Those testers were very enthusiastic about using "confirm" for that purpose. The 74 percent of testers who did not use it rated the "confirm" feature "not applicable."

Impact Area 5

At the end of the test period, testers were surveyed about the "overall helpfulness" of the IVR system. The target was 80 percent, but 98 percent of testers who responded rated the system overall as "somewhat or very helpful." Groups 1 and 2 (both with cell phones) rated the IVR system overall 100 percent as helpful. Group 3 (home phone only) rated it overall as 94 percent helpful, exceeding expectations of the project team.

Evaluation Component #2

Based on recommendations from the consultant, procedural changes occurred in the utilization of Trapeze software that enhanced performance and the ability to coordinate services. Improvements occurred in the following areas: accurate assignment and reporting of fare types and funding sources, a variety of reservation and routing efficiency improvements, assignment of appropriate vehicle type to meet special needs of customers, and entering during the reservation process the trip purpose and ambulatory status of customers, companions, and personal care attendants.

Impact Area 11

Results from staff surveys regarding the value of the consulting services and effectiveness of newly-instituted procedures show that only 40 percent found the consulting "somewhat helpful" in improving job performance and job satisfaction.

Although this was much lower than the 80 percent targeted, the Paratransit & Customer Service Director noted improved performance in multiple areas impacted by the consultation. The low rating may have reflected initial staff resistance to recommended procedural changes. However, the director noticed that some recommendations initially met by staff resistance were later adopted, leading to improved staff expertise in use of the Trapeze software.

Evaluation Component #3

The effectiveness of the IVR/PASS system, particularly of the automated calls, to enable more efficient routing and scheduling of trips and, therefore, improve system performance was evaluated based on multiple factors. Changes in customer no-shows, late cancellations, and dwell times prior to and after the test period showed that, overall, there was a decline of 15 percent in no-shows by testers and a decline of 43 percent in late cancellations, exceeding targets in both areas. Vehicle dwell times went up slightly rather than meeting a 10 percent reduction target.

Impact Area 7

Instances of late cancellations among all of the testers dropped 43 percent over three months of IVR testing. The improvement, which exceeded the 10 percent target for all testers, was attributed to implementation of "day-before reminder" calls. Results for the testers who had frequent late cancellations at the beginning showed a decline in late cancels by 60 percent of the testers over the three months. This was a much greater reduction in late cancellations among that group of testers than the expected 25 percent target. The ability to accurately capture late cancellations dramatically improved as a result of the project consultation. Data were not available of the testers' late cancellation rates prior to the test for comparisons with the data during or after the test. Late cancellations were highest among testers in groups 1 and 2 (both with cell phones); however, the project team does not think there is a correlation between access to cell phones, late cancellations, and "day-before reminder" calls.

As of January 2013, there had not been a decline in late cancellations following full rollout of "day-before reminder" calls.

Impact Area 12

The project team hypothesized that automated "day-before reminder" and "10-minute alert" calls would reduce the occurrence of no-shows. Overall, tester "no-shows" declined 15 percent over three months, exceeding the target of 10 percent reduction. Given the spotty performance of the "10-minute alerts," the reduction in no-shows is attributed to "day-before reminder" calls,

which worked consistently. Eighteen percent of respondents said the "day-before reminder" calls reminded them of a trip they had forgotten.

As of January 2013, the percentage of "no-show" trips had declined slightly since full rollout of "day-before reminder" calls.

Due to the inconsistent accuracy of "10-minute alert" calls, evaluation of the impact from those calls was inconclusive, and it is difficult to draw conclusions as to why people with cell phones had higher no-show rates than those with only a home phone. During the test, Group 3 (home phone only) had the lowest average, a 1.03 percent no-show rate. Group 2 (owned personal cell phone) had a 1.23 percent no-show rate, and Group 1 (loaned cell phone) had the highest average percentage, a 2.65 percent no-show rate. It should be noted that the rate of no-shows for testers was 57 percent less than the rate of no-shows of the general customer population during the test period. However, the testers had lower no-show rates prior to the test period as well. Although selected randomly, it is possible that those who agreed to test the IVR generally are more motivated and informed passengers.

Impact Area 13

Implementation of "10-minute alert" calls was targeted to lead to a 10 percent reduction in dwell time; however, that did not occur for any of the three test groups. Average dwell time actually increased during the test period and was higher for the testers than it was for the general customer population. However, due to inaccuracy of the "10-minute alert" calls during the majority of the test period, the impact of those calls on dwell time remains inconclusive. Six factors were found to contribute to the inaccuracy of the "10-minute alert" calls. These factors included technical issues as well as simple human or operational issues:

1. The call notification table delayed calls when phone lines were busy. The "10-minute alert" call was then re-queued and arrived several minutes later. That problem was fixed with the activation of additional phone capacity.

2. The TMCC currently uses "Triangulation with Barriers" to route trips. In consultation with Trapeze, it was discovered that some "10-minute alert" calls were not timely because software was incorrectly estimating arrival times to be later, making the alert call late. Arrival time accuracy would be improved if "Street Routing" was used to route trips; however, Street Routing accuracy is dependent on a highly-accurate mapping system. As of January 2013, new map installation had been accomplished and testing of "Street Routing" will commence in 2013.

3. Dispatchers move trips within the 10-minute estimated arrival period. When dispatch adds or deletes trips to a route after the "10-minute alert" has been sent to the call notification table, it could make the alert early or late. There

is no fix for this factor, other than possibly using a 5-minute instead of a 10-minute alert.

4. If MDTs are not functioning properly, it affects timely delivery of the "10-minute alert" calls.

5. When a customer's phone line is busy and no voice mail available, the "10-minute alert" will be re-queued and sent again a few minutes later, making the call untimely.

6. The TMCC's Trapeze IVR and alert system updates vehicle location information based on the driver "performing" a trip on the MDT. If a driver performs a trip late (after leaving the prior location), the estimated arrival time may be incorrect. Trip pickups in a close geographic area are affected more by this factor.

Impact Area 16

Because they would receive "10-minute alert" calls for trips originating away from home, it was expected that testers with cell phones would have fewer no-shows for those types of trips than testers with home phones only. The number of no-shows for each group for trips originating away from home was not sufficient to evaluate during the test, but will be an important factor for review during further implementation. However, for all trips taken by testers, those without a cell phone had a lower percentage of no-shows (see Impact Area 12).

The full potential for overall improvement to productivity as a result of the IVR/PASS implementation with automated calls will continue to be evaluated as it is implemented to the general customer population.

Impact Area 8

Based on the consultant's exit report, Trapeze reports, and staff surveys, TMCC staff demonstrated improved ability to use Trapeze PASS software to generate reports and to manage multiple funding sources and agencies. The report manual was updated, and reporting procedures important to managing multiple contracts efficiently were updated in areas of funding source, optimizing, auto-batching, and trip purpose matrix. In addition, routing and scheduling processes were standardized. According to results from staff surveys, 75 percent found the consultation "somewhat helpful" and 25 percent found it "very helpful" in improving reporting functions.

Impact Area 9

TMCC staff had previously experienced difficulty meeting multiple requirements from contract partners for tracking specific data thought to be unavailable from the TMCC's Trapeze software. Manual spreadsheets were maintained to accommodate a different reservation period and other controls for one contract. Another contract was declined because the TMCC would have been required to

change driver wait times and make other deviations from current scheduling and dispatching procedures, and the ability to do so was not available through the TMCC's existing software. Although the consultant identified some new ways to reduce manual tracking with the TMCC's current Trapeze software, total elimination of manual tracking did not occur because of software limitations.

Impact Area 10

An essential aspect of successfully managing multiple contracts is accurate fare and funding source reporting of customer trips to each contractor. Prior to the consultation, the TMCC struggled with management of 13 fare types and 6 funding sources. Monthly reports were often less than 95 percent accurate in regards to booking and performed fare and funding sources. Accuracy was dramatically improved during consultation by reducing the complexity of fare types, making mass corrections of fare types/funding sources, training TMCC staff and drivers, and correcting technical issues with the interface between MDTs and fare types in the Trapeze database. Fare reporting as of March 2011 was 99.5 percent accurate, exceeding the target of 98 percent accuracy. Routing staff rated the consultation 80 percent helpful in improvement, and Customer Service staff rated training on booking as 90 percent helpful.

Impact Area 14

The TMCC has experienced a steady increase in no fare trips over several years. A trip is called "no fare" when a customer does not have the required fare when the vehicle arrives to pick him/her up. Billing customers was not a consideration because of the high number of errors in fare reporting. Driver training on "free fares" versus "no fares" will be ongoing but, based on improvement in fare booking and collection reports, the TMCC plans to initiate billing of customers with a high number of no fares.

Impact Area 15

Following the increase to phone capacity of the TMCC and the initiation of automated calls to customer testers, the system's handling of increased call volume was monitored. In the early weeks of testing, delays to the delivery of "10-minute alert" calls were traced to issues with phone system capacity because all new lines had not been activated. IT staff activated the lines and adjusted the timing of the "day-before reminder" calls to avoid peak periods, resolving the capacity issue during the test. The system is managing incoming calls to the TMCC as well as the automated "day-before reminder" and "10-minute alert" calls generated for testers. Full implementation of all IVR features to the 4,000 active paratransit customers was planned to occur in phases over several months in order to continue monitoring system functioning.

As of January 2013, "day-before reminder" calls had been fully implemented with roll-out to all customers as have automated "no-show" calls. The use of "10-minute alert" calls is on hold. The automated phone system continues to handle the call volume well with the increased phone capacity.

Pre-deployment implementation results for the Louisville Region's TMCC are preludes to what can be expected upon full deployment of the IVR/PASS system. Additional factors that influenced pre-deployment activities included development of the IVR/PASS functionality and automated call flow design; development, education, and retention of a customer stakeholder test group; procurement/contracting and customer training issues for cell phone service, procurement of consultation services; and the departure of the original project manager.

Conclusions and Recommendations

The deployment of a successful TMCC has basically a twofold and interrelated purpose: to improve customer satisfaction with the services provided by the TMCC and to increase efficiency and capacity throughout the system. These actions can occur through the deployment of ITS and using it to its full potential in a coordinated transportation system that provides more and efficient service with the same amount of resources, whether those resources are staff time or customer trips.

The Louisville Region's customer testers' satisfaction with "10-minute alert" and "day-before reminder" calls started high and, despite some fluctuations, stayed fairly high throughout the test period. Although satisfaction with the "10-minute alert" calls was high, accurate timing of the calls was sometimes a problem, with calls being received after the customer was on the vehicle. Trapeze recommended a change from triangulation routing to street routing to provide more accurate time and distance calculations that would improve the timing of the "10-minute alert" calls. As of January 2013, the map had been updated and testing of street routing is planned for 2013.

The project team found that only a small percentage of customer testers used the PASS IVR "confirm" and "cancel" features, but the ones who used those features liked them. Customer testers were surveyed regularly regarding the automated system with questions about confirming and canceling trips included in the surveys. Consequently, the project team knew that testers were aware of and were frequently reminded that the features were available for use. Still, the majority of participants in the test groups choose not to use those two features. Attempts were planned to improve TMCC customer use of the automated "confirm" and "cancel" features by exploring ways to make it more appealing for them to do so, such as promoting the "confirm" feature as a way to get updated vehicle arrival times and to avoid hold time on the "Where's My Ride" line. As of January 2013, customer use of IVR "confirm" and "cancel" features had continued at about the same level. Additional efforts to promote use have been undertaken, with targeted newsletter articles and information/directions added to the agency's website.

Cell phone use did not play a large part in expected reductions in no-shows and late cancellations. Although cell phones provide an advantage for people away from home, in that they can receive "10-minute alert" calls, the inconsistent

accuracy in "10-minute alert" calls made any conclusions difficult. People who had their own personal cell phone prior to the test period did use "confirm" and "cancel" features more than other testers. The hypothesis that the testers who already have their own personal cell phone are more comfortable with using technology appears to be accurate. However, the test groups with cell phones had more late cancellations and higher no-shows than the group without cell phones.

The TMCC phone system's capacity to handle increased call volume due to implementation of automated "day-before reminder" and "10-minute alert" calls was tested during pre-deployment with calls to the customer test group. The volume of calls was small compared to the numbers that will occur during full deployment. However, due to increased capacity, the phone system is expected to manage the higher number of automated calls that will occur during full deployment. Implementation was planned to be phased in first with deployment of PASS IVR to all customers, followed by "day-before reminder" calls and then the rollout of "10-minute alert" calls.

As of January 2013, PASS IVR has been deployed, and "day-before reminder" calls had been fully implemented with roll-out to all customers as have automated "no-show" calls. The use of "10-minute alert" calls is on hold. The automated phone system continues to handle the call volume well with the increased phone capacity.

The Louisville Region's TMCC design contains many facets beyond the tasks chosen for pre-deployment and described in this final report. Upon deployment of additional aspects of the TMCC design, the following operational factors could also be positively impacted:

- Total revenue miles
- Customers per mile
- Total revenue hours
- Customers per revenue hour
- Fare revenue generated
- Cost per mile
- Cost per hour
- Cost per customer
- Total trips
- Vehicle on-time performance
- Number of calls diverted from staff through use of PASS IVR "confirm" and "cancel" functions

Recommendations for those interested in installation and testing of an IVR system with similar features include the following:

- Seek consumer input.

  - Involve local advocates and advisory group members in testing new IVR system features. It is good public relations, and they are typically very motivated to help improve service and convenience for customers.

- Test the IVR in phases.

  - Phase 1 – Staff should test the system first to catch and correct obvious glitches in system functioning.

  - Phase 2 – Develop a customer test group of motivated, reliable consumers who are committed to providing feedback and invite them to test IVR features for functionality. This allows for additional corrections before deployment to a wider customer group. During this pre-deployment project, some randomly-selected customers did not report problems or did not report details of problems, so root causes of specific trips could not be traced. They were asked to report problems and details to a Help Line, but most testers waited for a survey call and, by then, many could not recall details of incidents.

  - Phase 3 – Once the IVR system is functioning well, expand testing to a larger group of customers. Test for customer satisfaction and for changes that will affect system efficiency such as reduction in customer no-shows and late cancellations.

- Provision of cell phones for testers is not recommended.

  - Procuring and distributing cell phones for consumers in the test group who do not have one, training testers who received them, and providing ongoing help in using the cell phone was time-consuming. Based on evaluation results, this aspect of testing did not add sufficient value to justify the effort.

- Host a dialogue/focus group with testers.

  - In-person dialogue with the test group provides a different dimension to feedback. Although testers were asked about problems and rated their satisfaction numerically, the survey process did not probe why they liked the features. TMCC staff learned from testers about their use of the IVR "confirm" feature to obtain updated vehicle arrival times (instead of calling the "Where's My Ride" line) during open dialogue in a focus group.

- Ensure adequate phone capacity.

  - Phone system integration is important. Look at trip patterns and incoming call patterns when determining impact of "day before reminder" and "10-minute alert" calls on your phone lines. The TMCC adjusted the

call-out time period for reminder calls to avoid high-volume alert periods (peak trips) and peak incoming reservation calls.

• Reduce need for "trial and error."

- This project used a new IVR product of the TMCC's established software provider. Timing of "10-minute alert" calls was inaccurate during testing. Identifying the multiple factors impacting accuracy of the alert calls took much trial and error, some of which could have been avoided with established software and prior knowledge of best practices.

- If purchasing new IVR software, select a product with a track record for sending automated alert and reminder calls successfully.

- If using existing software, obtain guidance from an ITS professional with experience in IVR system deployment that includes automated callouts.

- With Trapeze software, "Street Routing" is recommended over "Triangulation with Barriers" for routing trips to improve accuracy of "10-minute alert" calls. However, "Street Routing" accuracy is dependent on up-to-date mapping in the system.

- Identify in advance how driver behavior may influence the accuracy of alerts. If manual performance on the MDT is required to update estimated vehicle arrival times, driver training and compliance monitoring will be needed for optimal results.

Louisville Region TMCC Pre-Deployment Project: Impact Area, Hypotheses, Outcomes

	Hypothesis	Measure of Effectiveness	Target	Data Sources	Outcome	Comments (March 2011)
Impact Area: Improve customer experience for arranging and tracking travel; improve customer travel experience.						
1	If test group rates "day-before reminder" call as helpful, then all customers will find "day-before reminder" calls helpful.	Test group response to Customer survey question #1.	80% "very" or "somewhat" helpful.	Customer survey	"Day-before reminder" calls overall rating 95% "very" or "somewhat" helpful; Group 1*–100%: Group 2–90%; Group 3–100%.	Overall tester satisfaction scores for "day-before reminder" calls improved slightly: 94% in September, 95% in November. Groups 1 and 3 found this feature more helpful than Group 2 (personal cell) testers.
2	If test group rates "10-minute alert" call as helpful, then all customers will find "10-minute alert" calls helpful.	Test group response to customer survey question #2.	80% "very" or "somewhat" helpful.	Customer survey	"10-minute alert" calls overall rating 96% "very" or "somewhat" helpful: Group 1–100%; Group 2–91%; Group 3–100%.	Ratings for "10-minute alert calls" steadily increased during test period, improving from 89% "very/somewhat helpful" in September to 96% in November. Note: Group 3 (no cell phone) rated these calls higher than did Group 2 (personal cell) although they could not receive alerts for trips originating away from home.
3	If test group rates automated trip "cancel" feature of IVR/PASS system as helpful, then all customers will find "cancel" feature helpful.	Test group response to Customer survey question #3.	80% "very" or "somewhat" helpful.	Customer survey	100% of those who used IVR trip "cancel" feature rated the feature "very" or "somewhat" helpful.	During test, overall satisfaction improved from 90% to 100% for testers using "cancel" feature. Group 1–15% of testers used "cancel" feature; Group 2–33%; Group 3–17%. Group 2 more inclined to use feature.
4	If test group rates automated trip "confirm" feature of IVR/PASS system as helpful, then all customers will find "confirm" feature helpful.	Test group response to Customer survey question #4.	80% "very" or "somewhat" helpful.	Customer survey	100% of those who used IVR trip "confirm" feature rated feature "very" or "somewhat" helpful.	Group 1–14% of testers used "cancel" feature; Group 2–31%; Group 3–24%. Group 2 more inclined to use feature.
5	If test group rates IVR/PASS system overall as helpful, then all customers will find IVR/PASS system overall to be helpful.	Test group overall response to Customer survey questions.	80% overall responses "very" or "somewhat" helpful.	Customer survey	98% rated IVR/PASS system overall as "very" or "somewhat" helpful: Group 1–100%; Group 2–100%; Group 3–94%.	Overall satisfaction rating higher than targeted. Group 3, as expected, rated slightly lower overall satisfaction. Group 1 results were mixed, as expected, with lowest use of "confirm" and "cancel" but high satisfaction with "day-before reminder" and "10-minute alert" calls.
6	If test group is comfortable with functionality of automated calls such as timing of calls, tone of voice, and number of rings, then all customers will be comfortable with automated call functionality.	Test group comments on Customer and Features surveys.	No more than 20% of comments made by test group are negative regarding functionality.	Customer and Features surveys	99% of comments were reports of problems encountered regardless of customer satisfaction rating.	"Comments" section asked testers what problems they encountered in order to investigate problems. Consequently, narrative commentary was mostly negative regardless of overall satisfaction with system. Complaints included a few about automated voice and timing; some about interface of answering machines and auto calls; many about timing of "10-minute alert" calls.
Impact Area: Improve routing and scheduling of trips.						
7	If "day-before reminder" calls reduce the occurrence of late (2 hours or less) for test group, then calls will reduce occurrence of late cancellations for all customers.	Number of late cancellations before and during test period compared for test group.	10% overall decrease in late cancellations among test group; 25% decrease in late cancels for testers with frequent late cancellations.	Trapeze reports	Testers' late cancellation rates improved: 3.54% of trips in September, 2.07% of trips in November. Testers' total late cancellations dropped: 82 in September, 47 in November (43% drop). Among testers with frequent late cancellations, 60% showed improvement over 3-month test. Group 1–highest percentage of late cancellations, 3.24%; Group 2–2.08%; Group 3–1.69%.	In August, TMCC consultants recommended adopting improved method to accurately capture late cancellations; therefore, comparison rates prior to test period not possible. Testers had a much lower percentage of late cancellations than general population, who had 4.4% in September, 4.1% in November.
8	If consulting service is successful at improving staff knowledge and use of Trapeze PASS software, then staff will have increased ability to generate new Trapeze reports.	Compare use of Trapeze reports before, during, and after consultation.	Manual updated with new procedures for use of 5 new Trapeze reports.	Consultant's exit report and staff surveys	Procedures updated for following reports: funding source; optimize; auto-batching; trip purpose matrix. Also, the routing/ scheduling process was standardized.	Helpfulness of consulting services towards improvement in reporting functions was rated by staff as 75% "somewhat helpful" and 25% "very helpful."
9	If consulting service is successful at improving staff knowledge and use of Trapeze PASS software, then manual tracking to manage data required for contracts will be reduced or eliminated.	Feedback from staff.	Elimination of manual tracking of contract data.	Consultant's exit report and staff surveys	Use of manual tracking was reduced but not eliminated. Staff remain unable to use software to schedule contracts with different reservation periods, different vehicle waiting periods, and several additional requirements of a previous contract; however, big improvement in fare type management, funding source accuracy, managing vehicle types.	Consulting services assistance in reducing manual processes was rated by staff as 20% "somewhat helpful" and 80% "not helpful." Outcome may reflect positively that staff had researched use of software thoroughly prior to consultation. Consultation took a "leave no stone unturned" approach.

	Hypothesis	Measure of Effectiveness	Target	Data Sources	Outcome	Comments (March 2011)
10	If consulting service is successful at improving staff knowledge and use of Trapeze PASS software, then staff will book trips in multiple contracts more efficiently and accurately.	Compare accuracy of trip booking in multiple contracts before and after consultation.	98% accuracy in trip booking in multiple contracts.	Trapeze reports	TMCC staff are able to book different funding sources and fare types more accurately. Booking error rate was 10% on a booking report for September 1, 2010. Booking error rate was 0.004% on sample of days reviewed in mid-February 2011. Trip booking accuracy exceeded targeted 98%.	Improvement to booking accuracy was obtained by correcting customer files, reducing complexity of fare types, removal of confusing fare types, trip purpose matrix training. Routing staff rated related training as 80% "somewhat helpful" and 20% "not helpful"; CSRs rated training on aspects of booking 90% " very or somewhat helpful."
11	If consulting service is successful, then staff will evaluate consultation as positive towards improving job performance and satisfaction.	Evaluation rating on staff surveys.	80% overall responses "very" or "somewhat" helpful.	Staff surveys	40% of staff rated consultation "somewhat helpful" towards improving job performance and satisfaction.	Director subsequently noticed improved performance in multiple areas and functions, indicating improved job performance was realized. This may have positive impact on job satisfaction after the fact.

Impact Area: Balance cost and resource demands.

	Hypothesis	Measure of Effectiveness	Target	Data Sources	Outcome	Comments (March 2011)
12	If automated "day-before reminder" and "10-minute alert" calls reduce occurrence of no-shows for test group, then calls will reduce occurrence of no-shows for all customers.	Test group response to question 7 on Features survey and number of no-shows before and during test period compared for test group.	10% overall decrease in no-shows among test group.	Features survey and Trapeze reports	18% of testers were reminded by a "day-before reminder" call of a trip they had forgotten during month of November. Tester "no-shows" declined 15% from 1.64% of trips in September to 1.39% of trips in November.	Rate of no-shows for testers was 57% less than for general customer population during 3-month period September–November 2010. During 3 months prior to test period, this group had 48% lower rate of no-shows than general customer population. This shows that testers had fewer no-shows to begin with and still had some improvement.
13	If "10-minute alert" calls reduce average dwell time of vehicle at pickup for test group, then calls will reduce average dwell time at pickup for all customers.	Dwell time at pickup for test group compared to dwell time at pick-up for all customers.	Average dwell time at pickup for test group is 10% less than average dwell time at pick-up for all customers.	Trapeze reports	Average dwell time for testers was 2.68 minutes in November compared to 2.56 minutes for all customers.	Alerts were not accurate on a consistent enough basis to draw conclusions about impact on dwell time.
14	If consultation is successful, then staff will have ability to accurately bill customers for "no fares."	Comparison of fare reports generated prior to and following consultation.	Initiate billing of customers for "no fares."	Trapeze reports	Currently book trips with a 99.9% accuracy rate. Prior to project, often had 90-95% accuracy in booking with different funding sources and fare types. Have continued driver training to improve performed trip accuracy in no-fares, which drivers confuse with "free fares," which are prepaid contracts. Initiation of billing customers for no fares will begin before Summer 2011.	It appears most of remaining errors are driver training issues, in that they get confused and perform "free fare" types on MDT as "no fare" for some customers.
15	If phone line capacity of call center is increased, then automated calls will be able to be implemented through the IVR/PASS system successfully.	Tester responses to customer surveys; phone line capacity before and after install and stress test results.	Phone system can manage incoming calls and 100% of automated calls generated by IVR/PASS system.	IVR reports	Following activation of all phone lines, phone system accommodated 100% of existing call volume.	Phone system is expected to accommodate additional call volume that will occur upon full implementation of automated calls to all customers.
16	If customer has a cell phone and therefore can receive "10-minute alert" calls away from home, then no-shows will be reduced.	No-shows compared for three test groups on trips originating away from home both before and during test period.	From test group, cell phone users will have fewer no-shows on trips originating away from home than those without cell phones.	Trapeze reports	Number of no-shows within test groups was insufficient for evaluation of no-shows for trips originating away from home. This factor will be watched following implementation of automated calls to the total customer population. However, rate of no-shows for all trips (not just those originating away from home) was reviewed for each test group, with the following results: Group 1 had highest no-show rate of 2.65%; Group 2 had no-how rate of 1.23%; Group 3 had 1.03% no show rate.	Hypothesis that people with access to cell phones would have fewer no-shows was not found to be true; however, inconsistent functioning of "10-minute alert" calls does not allow for a conclusion.

* November ratings of respondents: Group 1 – loaned cell phone; Group 2 – owned personal cell phone; Group 3 – no cell phone (home phone only).