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TECHNICAL MEMORANDUM

Task Report ***Task 7 – Improving Rural Transit Service Delivery and Operations Using Practical Technology Applications***

TxDOT Project 0-5542, Integrating Regional Multimodal and Public Transportation Planning

DATE: Revised February 7, 2008

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TASK REPORT:

A range of computer hardware and software is available for rural transit and client service providers. The challenge for rural transportation managers is how to take advantage of the tools offered by technology without being overwhelmed by either the complexity or the cost. Many rural transit systems in Texas have explored the use of technology to improve service efficiency and to enhance the ability to coordinate transit services. Other rural providers are just now beginning to consider the application of technology.

This memorandum documents the experience of one rural provider to provide an example of best practices for the selection of technology solutions for rural public transportation application. Additionally, coordinating opportunities, tools, and resources are presented. The task was completed with cooperation from the Golden Crescent Regional Planning Commission.

Acknowledgments

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Case Study Background

The Golden Crescent region consists of seven mostly rural counties along the Texas Gulf Coast. The seven counties include Calhoun, DeWitt, Goliad, Gonzales, Jackson, Lavaca, and Victoria. The region is illustrated in Figure 1. The land area is over 6,000 square miles with a population of 187,000 in 2006. The largest city in the region is Victoria, with a population of 69,000 in 2005. All seven counties and 19 incorporated cities and towns in the region are active members of the Golden Crescent Regional Planning Commission (GCRPC).

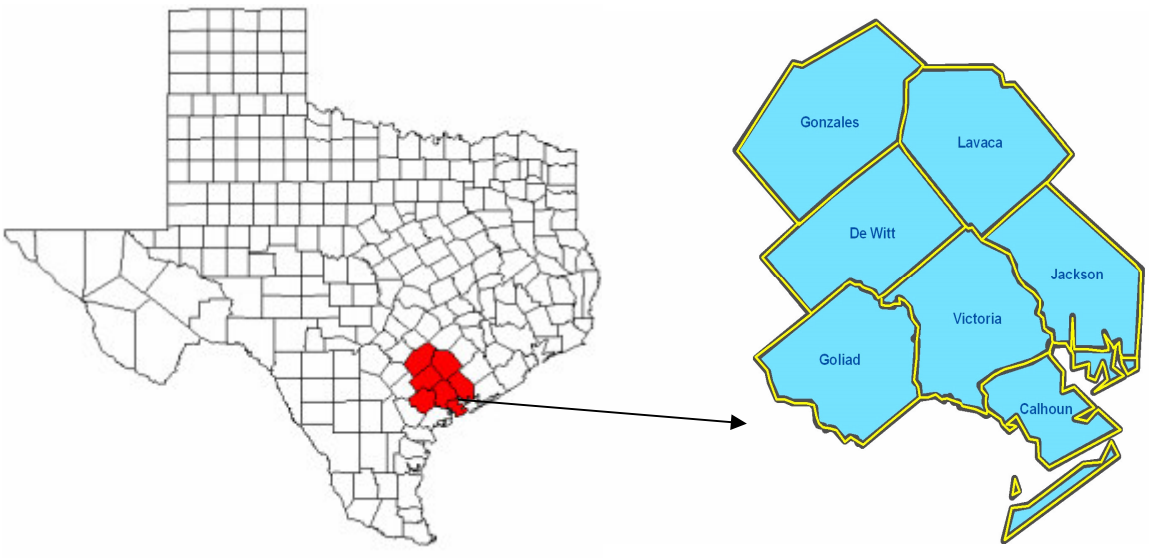


Figure 1. Golden Crescent Region

GCRPC is a regional voluntary association of local governments and other agencies. The basic responsibility of GCRPC involves planning for the development of the region and assisting local governments in carrying out regional plans and recommendations. Since its inception in 1968, GCRPC has grown to include comprehensive planning and service delivery in program areas such as aging, economic development, solid waste management, and public transportation.

GCRPC began providing public transportation services in November 1986. GCRPC currently provides directly or contracts with another agency to provide rural public transportation services called RTransit in the seven counties in the Golden Crescent region plus the adjacent Matagorda County. GCRPC also directly operates a small-urban system called Victoria Transit within the city limits of Victoria.

In 2005, GCRPC was designated as the Lead Agency for coordination of public transportation and client transportation services in the Golden Crescent region. The regional coordination project is guided by an advisory committee comprised of more than 25 representatives of agencies and organizations that are responsible for providing public transportation services or are interested in the coordination of transportation and client transportation services in the region.

The goals of GCRPC and the advisory committee are to improve delivery of transportation services, generate efficiencies in operation, enhance customer service and satisfaction, and encourage cooperation and coordination.

In December 2006, GCRPC published the *Regional Coordination Study* report for the region. In the report, five pilot projects were identified as the initial steps to achieve better coordination of transportation services in the Golden Crescent region. One of the pilot projects was to enhance rural transit service using technology to facilitate central dispatching.

The purpose of the case study is to document the GCRPC experience as an illustration of how one rural transit system in Texas explored the use of technology to improve service efficiency and to enhance the ability to coordinate transit services.

Technology and Small Urban/Rural Transit

Small urban and rural transit operators are challenged to improve passenger service while maintaining acceptable system productivity and containing costs. To meet this challenge, more and more transit managers are using advanced technology tools. To apply technology, the managers need guidance on the types of technology available, product information, case study experience, and sources for additional information. This technical memorandum provides this information in the context of the experience of one rural transit provider.

This memorandum is directed to the transit manager of a relatively small operation who faces the need to make technology decisions. The focus is on small urban and rural transit operators that provide traditional fixed route and demand response transit services but are also coordinating public transportation services for human service agencies, job access, and medical transportation.

Identifying Transit System Needs for Technology

A Guidebook for Planning APTS/ITS Applications for Rural Transit Systems from the Federal Transit Administration (FTA) Office of Research, Innovation, and Demonstration describes three steps to identifying transit system needs for technology. The three steps are to assess the existing system, predict future needs, and analyze current business processes. The following discussion is drawn in large part from that report.

The first step in identifying transit system needs for technology applications is to assess the existing system to recognize the strengths and weaknesses of the current operation. How can technology be used to leverage strengths and address weaknesses? Begin by documenting the goals and objectives for the transit system. Meeting these objectives may require changes in the quantity or quality of transit service. Technology applications may help to accomplish these changes. For example, an objective to improve efficient delivery of service may call for automated scheduling software, and an objective to track the cost of vehicle maintenance could be achieved by installing vehicle information management software for the garage superintendent.

The important next step to identify transit system needs is to look to the future. Consider how the transit system might change or expand. Relate future plans to the goals and objectives for the transit system. Keep in mind the transit system is part of a larger community. Other agencies and organizations could impact the transit system's direction in future years. A few examples of things to consider about future changes in the service area are the following: Will there be a need to expand service to new geographic areas? Is the population in the service area increasing or decreasing? Is there an increase in the number of a particular group needing transit services (seniors, for example) in the service area? Is service now focused on access to specific destinations or trip purposes, but there is an expectation service will expand to serve more transit markets? Will there be a need to coordinate with other transportation programs? Develop a list of future needs and system changes. Consider different technology applications that may help to meet these future needs. Determine if choices made about technology application now can help to accomplish plans for the future.

The third step in identifying transit system needs for new technology is to look at business processes. Examples of business processes are taking reservations, scheduling and routing trips, preparing manifests for drivers, billing, cash management, collecting and reporting data to funding agencies, and reporting performance. These business processes may be inefficient. Technology applications can help improve processes and enhance efficiency – leaving more time to manage and deliver transit services. Identify tasks that appear to take too much staff time and/or cost to accomplish. Some questions to consider are the following: Are the tasks involved unnecessarily complex? Are the tasks redundant or just plain unnecessary? A good idea is to develop diagrams or process charts to document and illustrate all the actors and the actions required for a particular business process. Then consider what technology applications could help to improve the processes and what the costs and benefits will be to switch to automated processes. All three steps are illustrated in Figure 2.

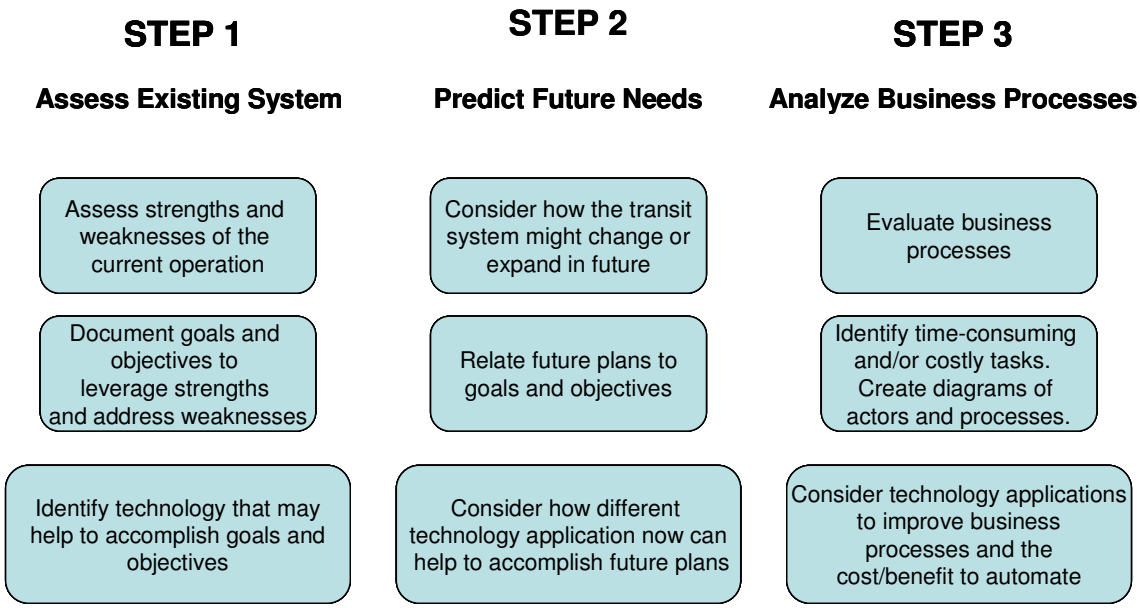


Figure 2. Steps in the Path to Technology Decisions

GCRPC Approach to Assessing Needs for Technology

The GCRPC case study illustrates one example of how a transit agency assessed needs for technology. GCRPC sponsors RTransit rural public transportation services in the seven counties in the Golden Crescent region plus adjacent Matagorda County. GCRPC directly operates services in two counties and contracts with five different providers in other counties of the region. GCRPC also directly operates Victoria Transit. Table 1 identifies the RTransit service providers by the county and city served. Figure 3 illustrates the same information.

Table 1. RTransit Service Providers

County or City	Directly Operated	Subcontractor
Victoria County	GCRPC	
DeWitt County		
City of Victoria		
Gonzales County		Gonzales County SCA, Inc.
Lavaca County		Lavaca County
Goliad County		Goliad County
Calhoun County		Calhoun County SCA, Inc.
Jackson County		Friends of Elder Citizens, Inc.
Matagorda County		

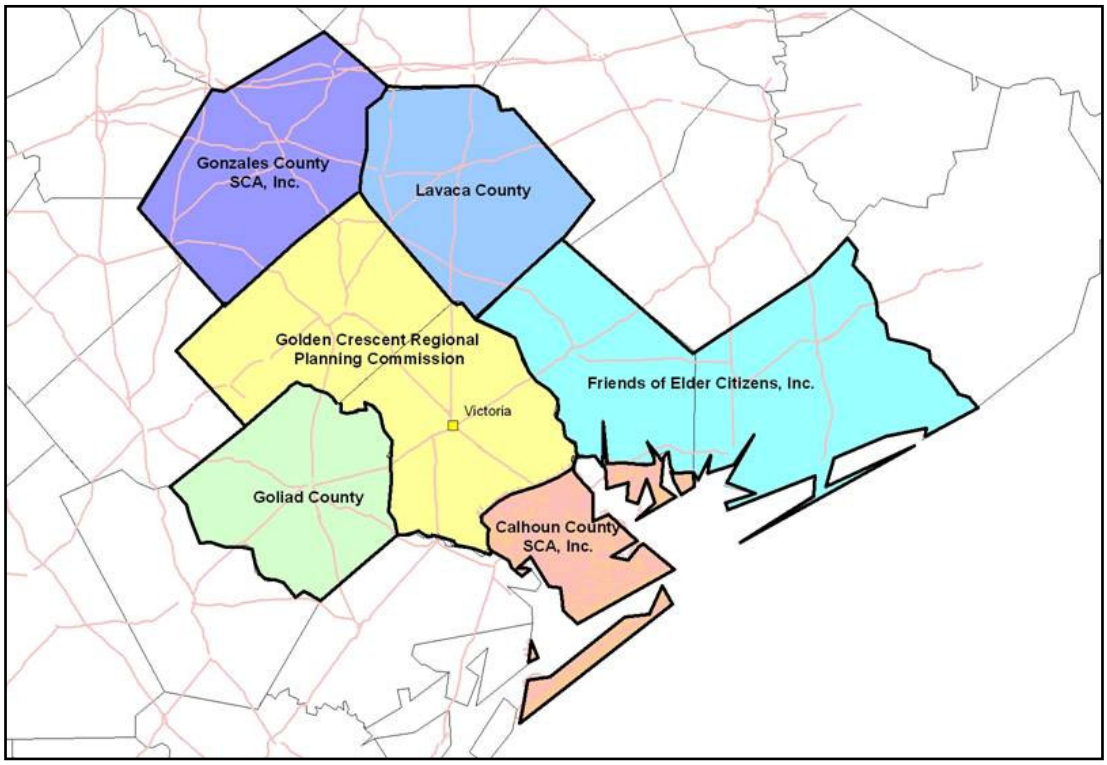


Figure 3. RTransit Service Provider by County

The first step in identifying transit system needs for technology applications is to assess the existing system to recognize the strengths and weaknesses of the current operation. During the regional planning study in 2005-06, GCRPC and the advisory committee conducted a comprehensive needs assessment for transit in the Golden Crescent region. The goals adopted by the region were as follows:

- Improve delivery of transportation services,
- Generate efficiencies in operation,
- Enhance customer service satisfaction, and
- Encourage cooperation and coordination.

While assessing the current service levels in the region, GCRPC and the Advisory Committee did not identify any overlaps in service areas. However, the regional stakeholders did identify inefficiencies in rural vehicles sitting idle waiting for passengers.

Each service provider schedules and dispatches services independently. Many destinations for trips are in Victoria where medical services, essential shopping, and many regional social and human services are located. Since each provider routes and schedules trips independently, vehicles often deadhead without revenue passengers to and from each county or wait for hours at the destination. GCRPC uses an automated routing and scheduling system for Victoria Transit and rural services in Victoria and DeWitt Counties. In the past, GCRPC has attempted to consolidate aspects of operations with the subcontractors. However, each subcontractor continues to do their own call taking, scheduling, and dispatching manually. Figure 4 illustrates the current organization for scheduling, dispatching, and operating transit services.

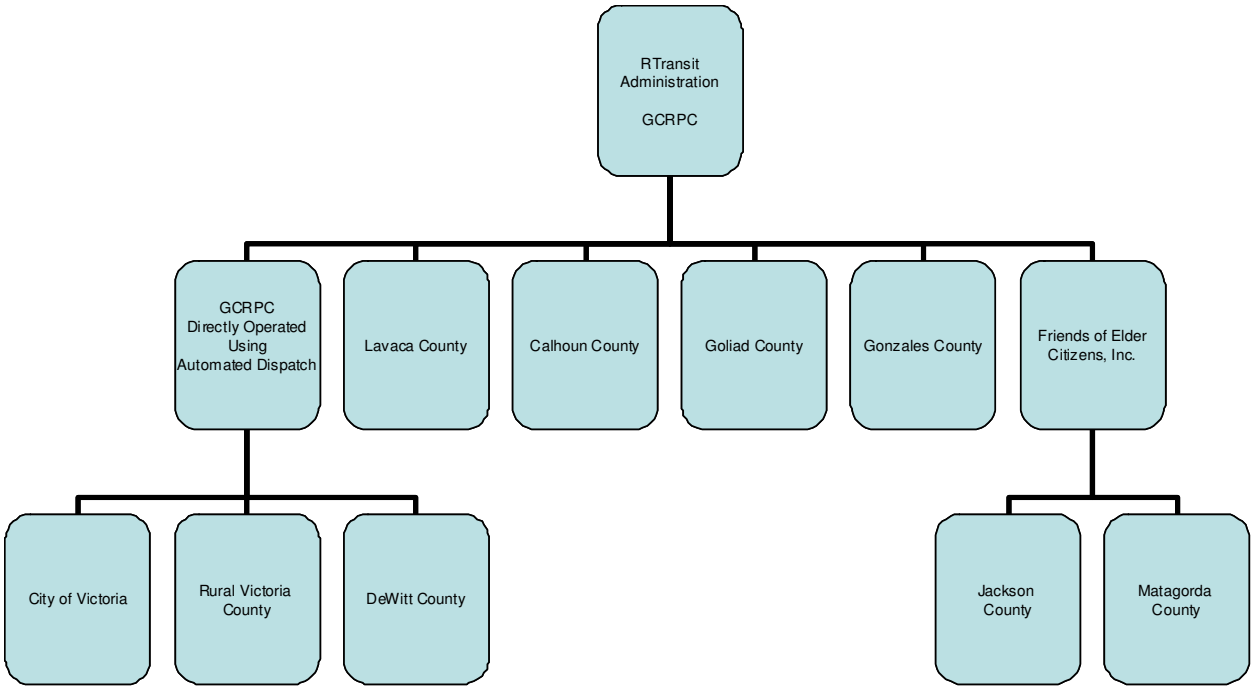


Figure 4. RTransit Current Organization

GCRPC and the advisory committee identified a pilot project to demonstrate how technology can enhance coordination between GCRPC and the various subcontractors in the region. The purpose of the pilot project for the Golden Crescent region is to provide a central dispatching function to route and schedule services for all subcontractors using the automated scheduling and routing software.

By using automated scheduling software and a central dispatch center, trips can be coordinated system-wide in a manner that will lead to increased productivity, increased efficiency, and reduced cost. Among the advantages that could be realized by consolidated dispatch are the following:

- Provide one number to call for mobility services within the region – better customer service;
- Schedule all trips by automated scheduling software to maximize service efficiency and reduce operating costs;
- Increase service productivity to allow more people to be transported with less resources;
- Maximize vehicle and driver productivity, especially when the vehicles are within the city of Victoria;
- Share trips while drivers are idle in the city of Victoria waiting for passengers; and
- Maintain local autonomy by making the current service provider the primary provider for service within the county.

GCRPC considered the pilot project in terms of both short-term goals and a long-term strategy. Following best practices, the transit system considered how the transit system might change or expand and how those future plans relate to the goals and objectives for the transit system.

GCRPC recognizes the transit system is part of a larger community. Other agencies and organizations could impact the transit system's direction in future years.

With these long-term considerations in mind, the transit program staff at GCRPC proposes to set up the pilot project for a designated period of time. The agreement will be that if the pilot works to the satisfaction of the county and GCRPC, then the central dispatch function will continue. In addition, Goliad County has volunteered to be the first county to participate in the pilot program. With a willing partner, GCRPC can develop Goliad County as a test site to work out all problems and adjustments before rolling the project out to the remaining counties.

Figure 5 illustrates how the central function would coordinate all rural transit services.

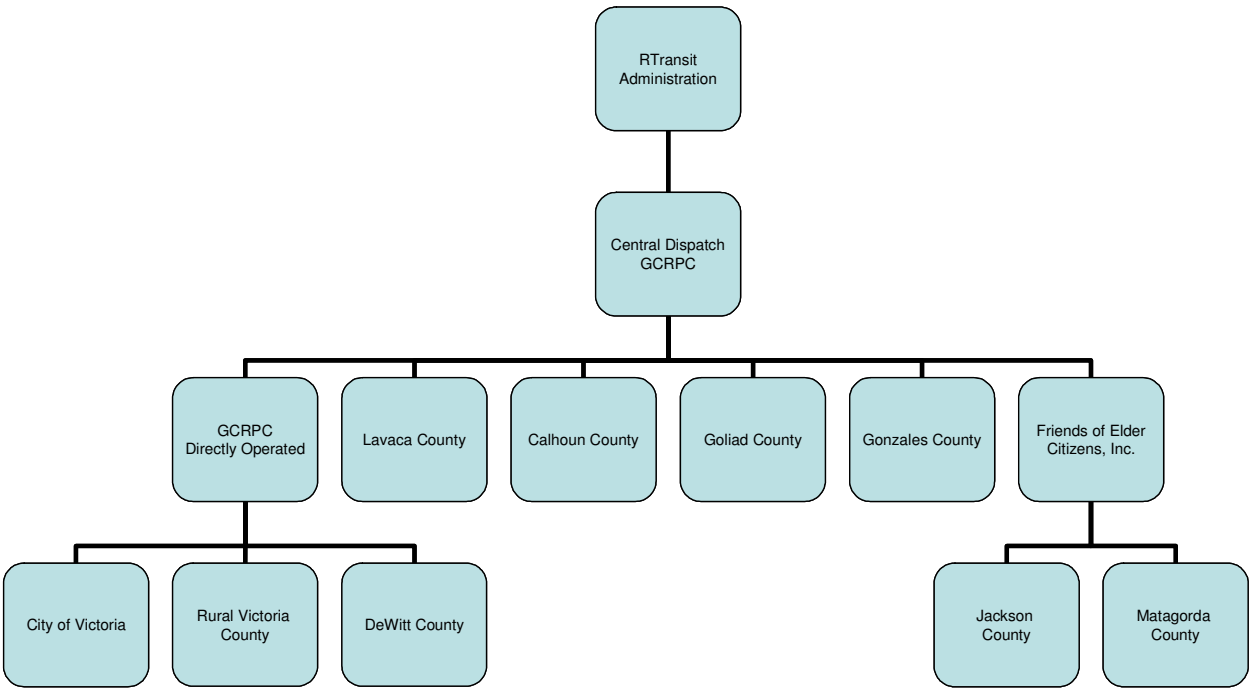


Figure 5. Proposed RTransit Organization with Central Dispatch

The third step in identifying transit system needs for new technology is to look at business processes that may be inefficient. Key staff with the RTransit program at GCRPC met for several hours and diagrammed the steps involved in central dispatch, starting with the customer's phone call to schedule services. The participants in the working session diagrammed the relationship of each step to the next and then discussed the business processes involved. The business processes identified for review were taking reservations by telephone, scheduling and routing trips, preparing and distributing manifests for drivers, communicating with drivers in the field, collecting and reporting data, reporting performance, and handling customer requests.
The GCPRC staff identified how business would need to change, what technology was already in place, and what additional technology would be needed to resolve the inefficiencies.

Current technology already in place is the automated routing and scheduling system that is used by GCRPC for paratransit services in the city of Victoria, and for rural services in Victoria and DeWitt Counties. Prior to the business process review, GCRPC had worked with the software vendor, Route Match, to resolve issues about reporting functionality. An additional enhancement that will be required for central dispatch is increased range for the geographic information system maps used by the software. Procurement of the maps was identified as an early action.

GCRPC determined in the business process review that additional data were needed to estimate current and projected customer calls to evaluate capacity of the telephone system and number of staff to take calls. Call takers were asked to keep detailed records on the number of calls and length of time required per call for several days to establish a baseline for evaluating the existing capacity and estimating future requirements. The outcome was a decision to expand the number of telephone lines and to plan acquisition of an automated call management system to queue telephone calls for reservation clerks and monitor performance statistics for customer service.

The communications system was also identified as critical to ultimate success of central dispatching. The existing provider for each county has a different communications system (i.e., radios, cell phones). At one point in the process, the lack of a central radio communications system was identified as a possible fatal flaw. However, GCRPC staff researched options for mobile communications systems and evaluated the technology options. After talking to technology experts and observing other system operations, GCRPC determined that the central dispatch concept could work with a mix of radios and cell phones. A long-term strategy will be to develop a coordinated system perhaps using mobile data computers (discussed further below).

Identifying Technologies to Address Needs

Technology applications are powerful tools for transit. Even a readily available technology application such as email and features of the Internet can be used to improve administrative efficiency and customer service. Not all technology applications that are available will be appropriate for a small urban or rural transit system. Many were designed originally for larger transit systems in urban environments. But there are more and more applications of technology that have been adapted for implementation in smaller transit systems.

The report *Best Practices in APTS/ITS Applications for Rural Transit Systems* is a companion document to *A Guidebook for Planning APTS/ITS Applications for Rural Transit Systems* and a good resource. The best practices report identifies the following ways to learn about transit technology:

- Read literature.
- Attend conferences.
- Visit other transit systems.
- Work with other systems.
- Develop a relationship with local educational institutions.
- Educate yourself about technology through training.
- Know your stakeholders and look at the possibilities.
- Work with and learn from your state and regional governments.
- Apply for grants.

The most important thing to know about a computer-based technology tool is what functions are performed. The answers to the following four questions essentially define the function of each technology: What data goes into the tool? What does the technology tool do with or to the data? What information does the tool provide? How will the information provided be useful?

Table 2 is a list of the major transit technology tools grouped by function.

Table 2. Major Transit Technologies Grouped by Function

Technology Tool	Function
Accounting Software	Electronically processes, stores, tracks, and reports accounting data. Produces financial reports. This information can be used to improve financial accountability.
Automatic Passenger Counters (APC)	Collects data on passenger boarding and alighting by time and location. Produces reports on boarding and alighting activity by stop or by time of day. This information can be used to increase operating efficiency through better service planning.
Automated Scheduling and Routing Software	Automatically routes and schedules transit services. For a fixed route system, produces schedules for most efficient assignment of vehicles and operators. For a demand response system, expedites call taking; automatically schedules trips and routes vehicles; collects and maintains client, service, and vehicle data; generates driver manifests; and generates standard and customized reports. This information can be used to improve overall system efficiency and productivity to manage and operate transit services.
Automated Vehicle Location (AVL) Systems	Measures real-time position of transit vehicles using onboard computers and positioning system such as global positioning system (GPS) or signpost. Relays the information to a central location such as a central dispatch center. This information can be used to know where each vehicle is located at any point in time and can be used to improve scheduling and dispatching to increase productivity.
Communications	Provides voice and/or digital communication among vehicles and between vehicles and the base station or central dispatch center. Communication maybe by radio, cell phone, or mobile data terminal.
Computer-Assisted Software for Demand Response Transit	For a demand response system, expedites call taking; collects and maintains client, service, and vehicle data; generates driver manifests; and generates standard and customized reports. Differs from automated routing and scheduling software in that it does not automatically schedule trips and route vehicles. Requires manual scheduling of trips and assignment of vehicles. This information can be used to improve efficiency and productivity in customer service, scheduling, and administration.

Table 2. Major Transit Technologies Grouped by Function (Continued)

Electronic Payment System	Allows passengers to pay for transportation services with electronic fare media. This includes automated fare payment systems such as bar codes, magnetic stripe cards, and Smart Cards. Electronic payment systems may improve customer service and convenience and assists transit managers to report and collect fare revenues more efficiently.
Geographic Information System (GIS)	Computerized data management system in which databases are related to one another using a common set of location coordinates. GIS is used by dispatchers to display fleet and route data on a display map on a computer screen.
Interactive Voice Response (IVR)	Automates interaction with telephone callers. Historically, IVR solutions have used pre-recorded voice prompts and menus to present information and options to callers, and touch-tone telephone keypad entry to gather responses. IVR solutions enable transit users to retrieve information about routes, schedules, and more from any telephone. Additionally, IVR solutions are increasingly used for demand response transit to place outbound calls to deliver messages such as reminders of the time a scheduled transit trip will arrive.
Internet Web Site	Allows personal computer users to easily exchange or display transit service information such as trip requests, route schedules, and maps.
Vehicle Management Information System (VMIS)	Electronically processes, stores, and reports detailed vehicle maintenance and repair data, including parts and supplies inventories, and may also track fuel. Generates standard and customized reports. This information can be used to monitor vehicle preventive maintenance accountability.
Mobile Data Terminal (MDT) or Mobile Data Computer (MDC)	Serves as the information link between the control or dispatch center and driver to relay relevant information such as driver, route, trip, and rider information. Electronically stores and updates vehicle schedules (driver manifests). This can be mounted in a vehicle or can be a handheld personal electronic device. The terms MDT and MDC are often used interchangeably; however, an MDT may be used to refer to a terminal where data can be received and acknowledged only. An MDC typically refers to a device where important information can be sent as well as received.
Personnel Management Software	Processes, stores, tracks, and reports detailed payroll benefits, hours worked, and personnel information. Generates standard and customized reports. This information can be used to improve overall personnel management and financial accountability.
Signal Priority	Holds a traffic signal at green so that a particular vehicle may pass through the intersection more quickly.
Traveler Information Systems	When applied to transit, traveler information can take many forms, including pre-trip information, in-vehicle information, and in-terminal/wayside information. Examples are automated trip itineraries, in-vehicle annunciators, variable message signs and monitors, and interactive information kiosks.

Transit system needs for new technology can be compared to the functions of each of the technology tools listed. Additional opportunities may be identified by one of the best practice ways to learn about transit technology as discussed above.

Each technology can be applied to meet one or more needs of a transit system. There are a number of vendors or suppliers for software and hardware for every tool. Some technology applications can be purchased off the shelf (ready to use) while others require customization to meet the particular needs of the transit agency.

The rough cost of purchasing, installing, activating, maintaining, and upgrading new software or hardware should be known in order to assess if a particular technology tool is right for the agency. If cost exceeds available resources, the transit agency could evaluate lower cost technology tools to serve the same or similar function, look at off the shelf products rather than customization, consider phased implementation to spread costs over time, or search for additional financial resources to make the acquisition possible.

Before making a choice of software or a decision to acquire hardware, the transit manager must understand the implications the new technology will have for the transit system. In order for the new technology to operate properly and produce promised benefits, the transit system manager must be aware of the changes required in the entire system. These changes will encompass business processes, staff skills and training, job requirements, computers, related hardware, and all of the applicable costs, including maintenance contracts. The transit manager needs to know all of the costs (operating and capital) and the expected benefits in order to make a confident go/no-go decision about investing in new technology tools.

GCRPC Approach to Assessing Needs for Technology

GCPRC used the following best practices to learn about transit technologies:

- Visit other transit systems.
- Attend conferences.
- Develop a relationship with local educational institutions.
- Educate staff about technology through training.
- Know stakeholders and look at the possibilities.

One of the important steps that GCRPC took to learn about the essential functions of each technology was to organize a workshop with technology vendors to provide a chance to talk in depth about the particular objectives and needs of the transit agency. The workshop included participants from GCPRC, the Texas Transportation Institute, and vendors of software and hardware. The workshop was hosted by the Capital Area Rural Transportation System (CARTS), a peer rural transit agency with extensive experience with technology applications. GCRPC learned wireless communications systems will allow the agency to consolidate dispatch into one facility. Centralization will allow GCRPC to use the scheduling software more efficiently and to store all of the customer information in one centralized database.

As an outcome of the workshop, the GCRPC transit manager learned the costs (operating and capital) and the expected benefits in order to make confident decisions about investing in new

technology tools. The transit manager also learned which investments could be made in the short term that will leverage longer term enhancements to the system (after the pilot project proves successful and additional funds are identified).

The workshop also provided the transit manager the opportunity to discuss different options for organization of the basic functions of reservations, scheduling, and dispatch of the fleet. The transit manager had previously considered either decentralization or centralization of the three functions. Another option open to GCRPC is to maintain the reservations at the local level but centralize scheduling and dispatching. This approach would allow for decentralized reservations to maintain a local customer service element but centralized scheduling and dispatch to provide more efficient and effective service.

The three optional ways to organize and manage reservations, scheduling, and dispatch are illustrated in Figures 6 through 8. For each option, the advantages and disadvantages are summarized. The first option (Figure 6) is to decentralize all functions (reservations, scheduling, and dispatch of the fleet), much as GCRPC functions today. The second option (Figure 7) is to decentralize reservations but centralize scheduling and dispatch. The third option (Figure 8) is to centralize all functions under one primary operator.

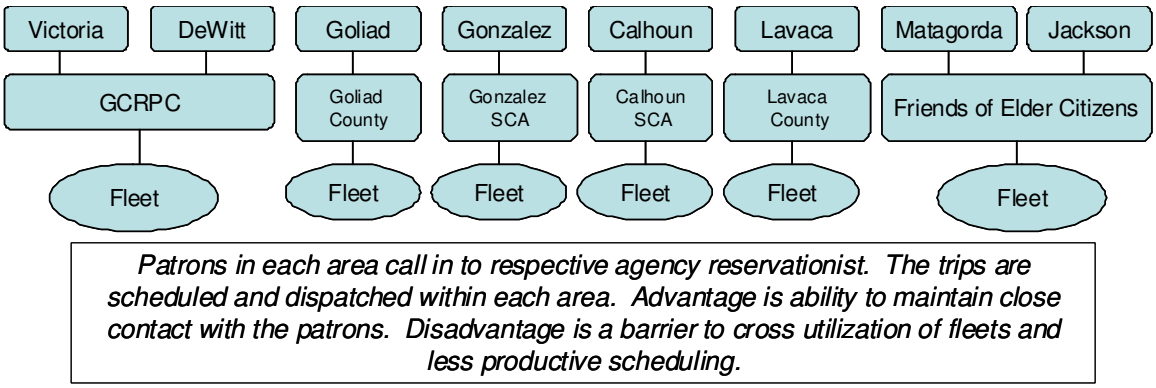
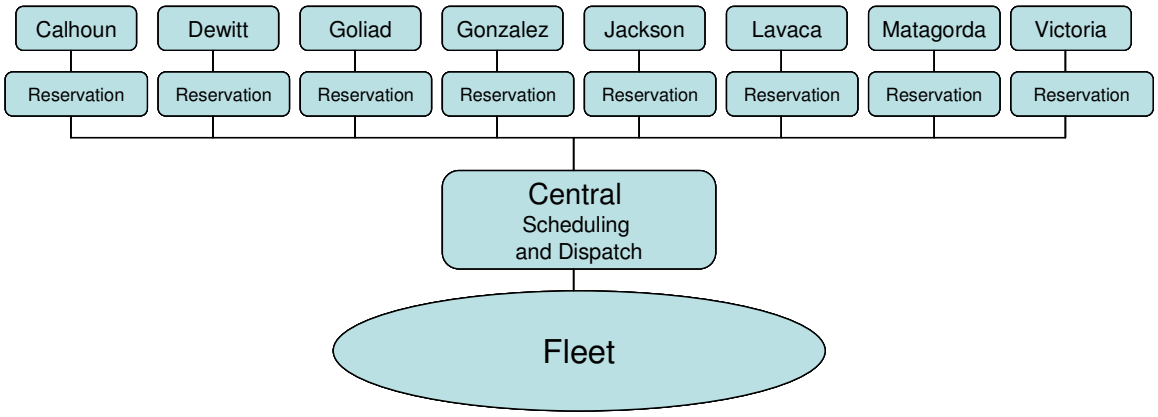
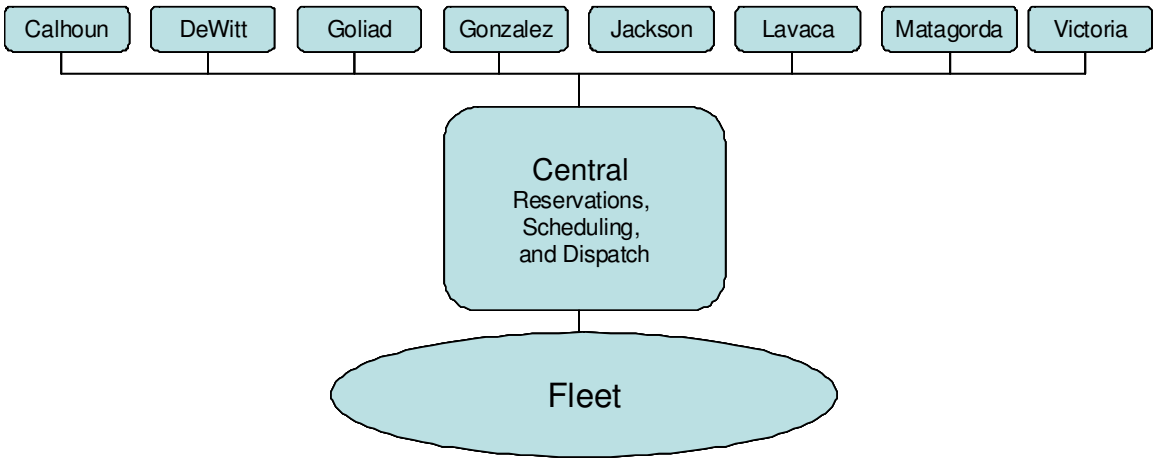


Figure 6. Option 1 – Decentralized Reservations, Scheduling, and Dispatch



Patrons in each area call into the respective agency reservationist. The trips are entered into a reservations database but not scheduled at the time of reservation. The reservation is transferred to a centralized scheduling system. The trips are scheduled centrally cross-utilizing all fleets and dispatched centrally. Advantage is local reservationist maintains contact with patrons, cross utilization of fleets allows productive scheduling and dispatch flexibility.

Figure 7. Option 2 – Decentralized Reservations with Centralized Scheduling and Dispatch



Patrons in each area call into the central reservationist. The trips are scheduled immediately cross-utilizing all fleets and then dispatched centrally. Advantage is patrons can be given immediate trip times. Cross-utilization of fleets allows productive scheduling and dispatch flexibility.

Figure 8. Option 3 – Centralized Reservations, Scheduling, and Dispatch

Planning Implementation of Technology

There are a number of factors to consider in making a decision on technology choice and then proceeding with implementation. In the discussion below, two topics are highlighted: availability of financial resources and considerations about project installation and implementation. As in early sections of this technical memorandum, much of the material in this section is taken from *A Guidebook for Planning Rural Transit ITS Applications.*

Funding for both the capital and operating expenses of small urban and rural transit systems is available at the federal, state, and local levels. The critical factor with any transit funding factor is whether or not it covers expenditures on computer hardware and software, technology consultants, and training. Any funding source should be researched to confirm eligibility and any limitations on amount, timing, or match requirements.

Investments in technology are generally eligible under all funding sources authorized from the Federal Transit Act. These sources include Section 5307 Urban, Section 5310 Elderly and Handicapped, Section 5311 Rural, and Section 5309 Discretionary Capital. Of course, funds for technology are subject to approval of project grant applications and execution of federal grant funding agreements. In addition, the Rural Transit Assistance Program (RTAP) sponsored by the Federal Transit Administration (FTA) and the Texas Department of Transportation (TxDOT) offers training materials, technical assistance, and other support services. Technology applications are also eligible under Texas state funds for urban and rural transportation.

Additional federal resources include health management and social service agencies that offer various programs requiring transportation. Another opportunity is the possibility of sharing costs with other organizations. The basis for sharing costs is the common use of facilities or services. In several communities rural or client transportation services are supported from private contributors. Private sector funding sources may be supportive of investments in technology to enhance operating efficiencies. For rural transit operators that provide subscription services to clients of human or social service organizations, it may be possible to share the costs of installing computer and Internet-based systems that lower the cost or improve the efficiency of billing and payment. Agencies can also be creative and innovative in obtaining funding for technology deployment. For example, multiple funding sources may be combined for a project.

Some research and background work may be required to identify what funds are available and when they are distributed to ensure the dollars can be used for the technology application. Once sources of funds are identified, determine the following:

- The level and timing of funding available, and
- The requirements for plans and other information in order to qualify for the various sources of funding.

Any implementation of new technology should be carefully considered in light of the goals and objectives for the transit system. Will the investment in the software or hardware result in benefits that improve the transit system in terms of efficiency, capacity, or reliability? Will the

benefits exceed costs? The following are things to consider about installation and implementation of technology:

- Make sure all of the stakeholders are involved in the project, especially in the initial planning and design stage.
- For projects that involve multiple agencies, developing a memorandum of understanding can help clarify each participant's responsibilities.
- Identify how the project will benefit participants. It may be necessary to demonstrate to participants that the technology application will benefit them directly. Although it may be difficult to quantify these benefits, providing at least a description of how participants can use the system to improve operation can greatly increase their willingness to participate in the project.
- Implementing transit technology will affect the entire staff. It is important that the staff is oriented to these technologies and understand how these changes will affect their jobs.
- Implementation should include a pilot phase, in which hardware is installed on only a portion of the fleet and fully tested before full installation is completed, or new software is run on a parallel system while existing processes continue to function as a backup until the installation is successful.
- Be flexible and patient. Seldom does everything go as smoothly as planned with technology deployments. It may be necessary to stray from the original project implementation plan in order to move ahead more quickly and efficiently.
- Establish a formal process to track problems and resolutions during implementation and operations.
- Conduct outreach to ensure the project accomplishments and successes are well publicized.

GCRPC Approach to Assessing Needs for Technology

GCRPC currently receives federal and state funds for transit from the Section 5307 Urban, Section 5310 Elderly and Handicapped, and Section 5311 Rural programs to support RTransit operations and capital cost of vehicles. There is a need for basic public transportation in the region, and an ongoing goal of GCRPC is to successfully capture funds from these programs to sustain ongoing services.

GCRPC has identified the need to pursue additional resources to support the expansion of transit services, implementation of technology, capital replacement of equipment, and development of an intermodal transit terminal to accommodate the interface between urban, rural, intercity bus, local taxi, and other modes of transportation. To accomplish the capital and operating needs of GCRPC beyond state and federal formula funding, the agency will pursue the following additional resources:

- Intercity bus funds for development of the intermodal transportation terminal,
- Section 5309 Discretionary for capital replacement of equipment,
- Local financial support via the City of Victoria and the Victoria Economic Development Corporation to support future transit initiatives, and
- Job Access/Reverse Commute (JARC) and New Freedom funds for pilot projects.

In the short-term, GCRPC has funding from the State of Texas for upgrade of the automated software and new system maps to implement the pilot project for central dispatching; however,

the agency will need to identify new sources of funding to implement additional technology such as MDC, AVL, and a coordinated communications system.

GCRPC recognizes the success of a central dispatching system will require that all stakeholders are involved in the project, especially in the initial planning and design stage. For this reason, the transit manager decided to spend the time required to visit each county in the region to talk with elected officials and the transit service managers about what is involved and how the project will benefit each of the participants.

From the beginning, GCRPC has involved the staff in the planning for new technology. GCRPC plans to expand training opportunities and review business processes in the scheduling and dispatch areas. Staff will be encouraged to more fully utilize the software by providing them with more training or implementing a change of procedures. Drivers will be involved in the installation and implementation of the system.

GCRPC is also thinking ahead about the impact of technology changes on users of the system. Many regular RTransit customers are very comfortable with the current way of doing business and may find change disconcerting. GCRPC has already begun to think about the human factors in making the changes in operations that are planned. If operations change only slightly from the customers' perspective, GCRPC's reservation staff, dispatchers, and/or drivers may be trained to provide the information or assistance that customers need to learn the new "routine." If that routine (again, from customers' perspective) will be significantly different, GCRPC might want to consider offering customer education sessions during, and for a short time following, the transition period.

Other lessons learned include the following:

- Technology changes fast, so make sure the system can be easily upgraded. It is important to ensure that the technology application can be easily expanded as technology evolves.
- Perform a comprehensive communications/radio analysis. Agencies should do a comprehensive communications analysis prior to implementing a technology application that will depend heavily on a communications backbone.
- Web-based solutions may be appropriate for rural areas that are spread over a larger geographic area. Using web-based solutions, staff can provide support from a remote location.
- Learn from the experiences of other systems of similar size and complexity. Find out if the selected tools met the system's expectation. Learn about the system's experience with the vendor.
- Do not rush installation. By trying to install and implement new technology too quickly, problems may be created that will be difficult to correct in the future. Additionally, if implementation is too rushed, staff or stakeholders may not fully realize its potential benefits.
- Incremental start-up seems to work well. By implementing components of technology one at a time, problems can be addressed more easily than if staff had been trying to integrate multiple components all at once.

Resources

1. Harvard Design and Mapping Company, Inc., *A Guidebook for Planning APTS/ITS Applications for Rural Transit Systems,* prepared for FTA Office of Research, Demonstration, and Innovation, June 2001.
2. Harvard Design and Mapping Company, Inc., *Best Practices in APTS/ITS Applications for Rural Transit Systems,* prepared for FTA Office of Research, Demonstration, and Innovation, June 2001.