

CARR ITS Needs Assessment Project

System Requirements Specification

V4.0

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2.0	12-18-09	EPV	<ul style="list-style-type: none"> • Define enterprise data. <i>[Section 1.3]</i> • TEJAS definition missing. <i>[Section 1.3]</i> • Added algorithm definition. <i>[Section 1.3]</i> • Modified server and desktop configuration. <i>[Section 2.1.3.1]</i> • Modified requirement to support more than one rate per funding source. <i>[Section 2.2.4]</i> • Modified requirement to provide the ability for management to override and approve “same day” trip. <i>[Section 2.2.5]</i> • Added additional parameter (Load time) for mobility type. <i>[Section 2.2.9]</i> • Modified section to indicate that “No Show” and “Cancellation” rules may not apply for Medical Trips. <i>[Section 2.2.10]</i> • Added requirement to provide the ability to define notification recipients. <i>[Section 2.2.11]</i> • Modified requirement to confirm “no show” trip. <i>[Section 2.2.14]</i> • Modified requirement to verify that driver electronic signature is valid for pre-trip information. <i>[Section 2.215]</i> • Modified requirement to capture time sheet data based on driver time on bus. <i>[Section 2.2.16]</i> • Added requirement to provide a web-site where driver can generate time sheet. <i>[Section 2.2.17]</i> • Modified requirement to indicate that electronic signature not valid at this time, but in the future. <i>[Section 2.2.20]</i> • Modified requirement to include Medical Trip requirements for driver. <i>[Section 2.2.21]</i> • Modified requirement to indicate if driver belongs to contractor. <i>[Section 2.2.21]</i> • Removed Social Security number from requirement. <i>[Section 2.2.25]</i> • Modified requirement to include comment box. <i>[Section 2.2.25]</i> • Modified requirement to include Guardian Name. <i>[Section 2.2.25]</i> • Passenger issues should be associated to a specific trip in this requirement. <i>[Section 2.2.29]</i> • Modified requirement to include different types of complaints. <i>[Section 2.2.31]</i> • Modified requirement to include additional

			<p>information requirement when using a specific address. <i>[Section 2.2.32]</i></p> <ul style="list-style-type: none"> • Modified requirement to include confirmation number for Medical Trips. <i>[Section 2.2.37]</i> • Modified requirement to include the ability to Geo-code address. <i>[Section 2.2.39]</i> • Clarified requirement to prompt user for additional details for a specific address. <i>[Section 2.2.40]</i> • Included the ability to have Management override requirements for reassigning trip. <i>[Section 2.2.50]</i> • Modified requirement to clarify “add-on” trip. <i>[Section 2.2.51]</i> • Added requirement to provide the Dispatcher the ability to notify Driver multiple times that passenger is ready for pick-up. <i>[Section 2.2.50]</i> • Added requirement to integrate AVL to Odometer. <i>[Section 2.2.65]</i> • Added requirement to have the ability to generate PTN 128 report. <i>[Section 2.2.75]</i> • Added vehicle parameters to this requirement. <i>[Section 2.2.76]</i> • Modified requirement to include system access. <i>[Section 2.2.79]</i> • Added requirement for remote access. <i>[Section 2.2.88]</i> • Added requirement for hiring local resources for vehicle maintenance. <i>[Section 2.2.89]</i> • Added requirement for developing and implementing disaster/recovery plan <i>[Section 2.2.90]</i>
3.0	01-14-10	EPV	<ul style="list-style-type: none"> ▪ Added requirement for Trip Verification <i>[Section 2.2.91]</i>
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1 Introduction

1.1 Purpose

The purpose of the System Requirements Specification (SRS) is to specify the requirements for enhancing CARR's Intelligent Transportation System (ITS) by adding software and hardware components at the Scheduling and Dispatch Center, and "On-Board" Vehicles. The document will form the basis for development of a Request for Proposal (RFP) that CARR will use during their procurement process.

The intended audience for this SRS document is all stakeholders involved in the current ITS process. These include General Manager, Assistant General Manager, Fleet Manager, Operations Manager, and Driver Supervisors.

1.2 Scope

This specification includes all of the components and software needed to install, integrate and operate an ITS system as well as technical requirements identifying the operating parameters of each component. This document also includes specifications on equipment for the dispatch center, onboard the vehicle, and interfacing with the passenger. These hardware and software components will provide CARR the ability to meet their goals identified during a Needs Assessment Study performed by EPV Group (EPV).

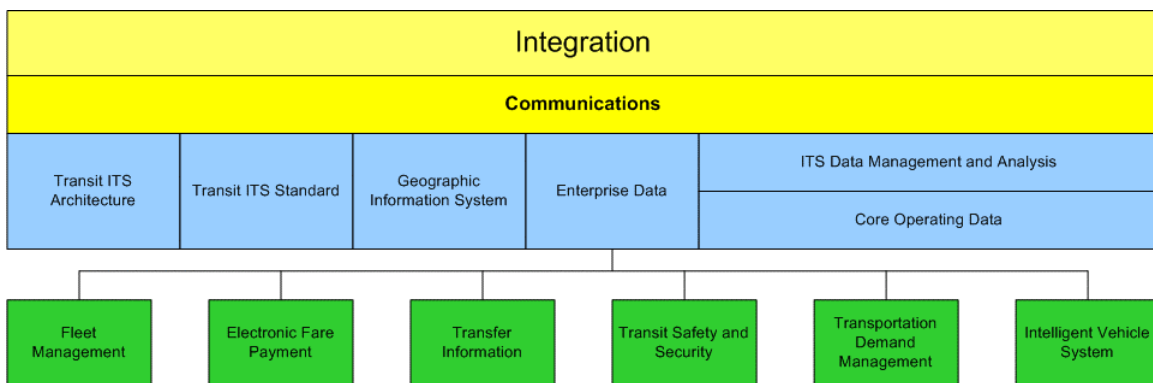
The following goals were identified;

- **Reduce Paperwork**
 - Faxing is used to send trip information, schedules, and Medicaid trips.
 - Multiple printouts multiple times for record-keeping and checking reports
- **Reduce Duplication of data entry (entered in application and hand-written)**
 - Hand-written notes on reports that need to be entered into system
 - Export of data from ATE application into ACCESS for generating reports
- **System Perform "Checks & Balances"**
 - Reduce having staff perform multiple checks

- **Visibility**
 - Schedulers, dispatchers or any staff member do not have a view to current status of trips or vehicles locations
- **Integration**
 - No integration of information between CARR and its contractors.
 - No integration of information between CARR and TEJAS Medicaid approved passengers.
- **Compliance with all MTP regulations and all other regulations for other funding sources.**
 - Continue to comply and follow all policies set forth by the Medical Transportation Program.

As referenced in Advanced Public Transportation Systems: State-of-the-Art Update 2006, the requirements included in this SRS, addresses certain areas assembled in the Transit ITS typology classification.

Transit ITS Typology



The system requirements will focus on the following areas:

- Computer Aided Dispatch Center
- Onboard vehicle
- Contractor Interfaces
- Passenger Interfaces
- TEJAS MTP Trip Download

1.3 Definition, Acronyms, and Abbreviations

Algorithm

A step-by-step problem-solving procedure, especially an established, recursive computational procedure for solving a problem in a finite number of steps.

API – Application Programmer’s Interface

Software development tool for building system and data interfaces, and customizing software.

AVL – Automatic Vehicle Location

System for tracking vehicles by using a GPS system and displaying results on a GIS map.

CAD – Computer Aided Dispatch

Transit agency dispatch center using computer systems to automate business processes

COTS – Commercial Off the Shelf

Software or hardware available to be purchased immediately through vendors, resellers, distributors, etc.

CTS – Cell Transceiver Station (Base Transceiver Station)

This contains the equipment for transmitting and receiving of radio signals (transceivers), antennas, and equipment for encrypting and decrypting communications with the Base Station Controller (BSC).

Enterprise Data - Data that is defined for use across a corporate environment such as accounting system data, human resource data, etc.

GIS – Geographic Information System

GIS is a system for capturing, analyzing and managing data with attributes. Vehicle locations can be identified on a GIS map which can include many layers of information including streets, landmarks, etc.

GPS – Global Positioning System

GPS is a fully functional Global Navigation Satellite System. Using satellites, the system enables the GPS receiver to determine its location, speed and direction. Therefore, a vehicle with a GPS onboard can be tracked.

ITS – Intelligent Transportation System

By deploying technology, data and system integration and efficient business processes, an Intelligent Transportation System is developed.

IVR – Interactive Voice Response

Passengers can automatically be notified on bus status through an automatic outbound calling system. The IVR will work with the Transit Management System to determine the bus schedule and status. Based on current information, the IVR system will be set-up to automatically call the passenger and notify them of the bus status. The IVR can also be set-up to automatically confirm scheduled trips.

MDC – Mobile Data Computer

The MDC unit will be used by the driver to receive and send information from/to the dispatch center. It will contain a screen to view information.

MTP – Medical Transportation Program

Program is designed to assist Medicaid recipients who need transportation to their medical appointments.

PC – Personal Computer

PC's will be used at the dispatch center to access the Transit Management System and other programs.

RDBMS – Relational Database Management System

A relational database is a set of tables containing data fitted into predefined categories. Each table contains one or more data categories in columns. The standard user and application program interface to a relational database is the structured query language (SQL). SQL statements are used both for interactive queries for information from a relational database and for gathering data for reports.

RFP – Request for Proposal

An invitation to suppliers, often through a bidding process, to submit a proposal on a specific commodity or service.

SRS – System Requirements Specification

The SRS will provide specifications that are required to develop and deploy an ITS system.

TEJAS – Transportation Electronic Journal for Authorized Services

The Medical Transportation Program (MTP) uses the TEJAS system for tracking services and expenditures.

TxDOT - Texas Department of Transportation

TxDOT, in cooperation with local and regional officials, is responsible for planning, designing, building, operating and maintaining the state's transportation system. This SRS has been developed for TxDOT and will be reviewed by everyone involved.

1.4 References

The following references have been used in the development of this document:

- Advanced Public Transportation Systems: The State of the Art Update 2006*
- National ITS Architecture; U.S. Department of Transportation; Version 5.1*
- Intelligent Transportation Real-Time System, System Requirement Specification, ITS Project Partners, November 2007(revised October 2009)*
- An Audit Report On The Medical Transportation Program, Texas, Department of Transportation, October 2007*
- West Central Texas Regional Transportation Final Report, A&R Consulting, The Goodman Corporation, June 2006*
- City and Rural Rides Policies & Procedures, Central Texas Transit District, August 2009*
- Artifacts, Sample Reports, Forms Provided by CARR, November 2009*
- CARR ITS Needs Assessment Project Concept of Operations Developed by EPV Group, November, 2009*

2 Overall Description

2.1 System Perspective

The following schematic diagram represents the proposed CARR ITS system described in this ITS Specification document and provides the framework for developing an integrated transportation system. The lists of components include Transit Management Software using Geographic Information System (GIS) and MDC/AVL Unit Onboard Vehicle. Interfaces to CARR contractors and to MTP TEJAS (Transportation Electronic Journal for Authorized Services) are also shown on the diagram.

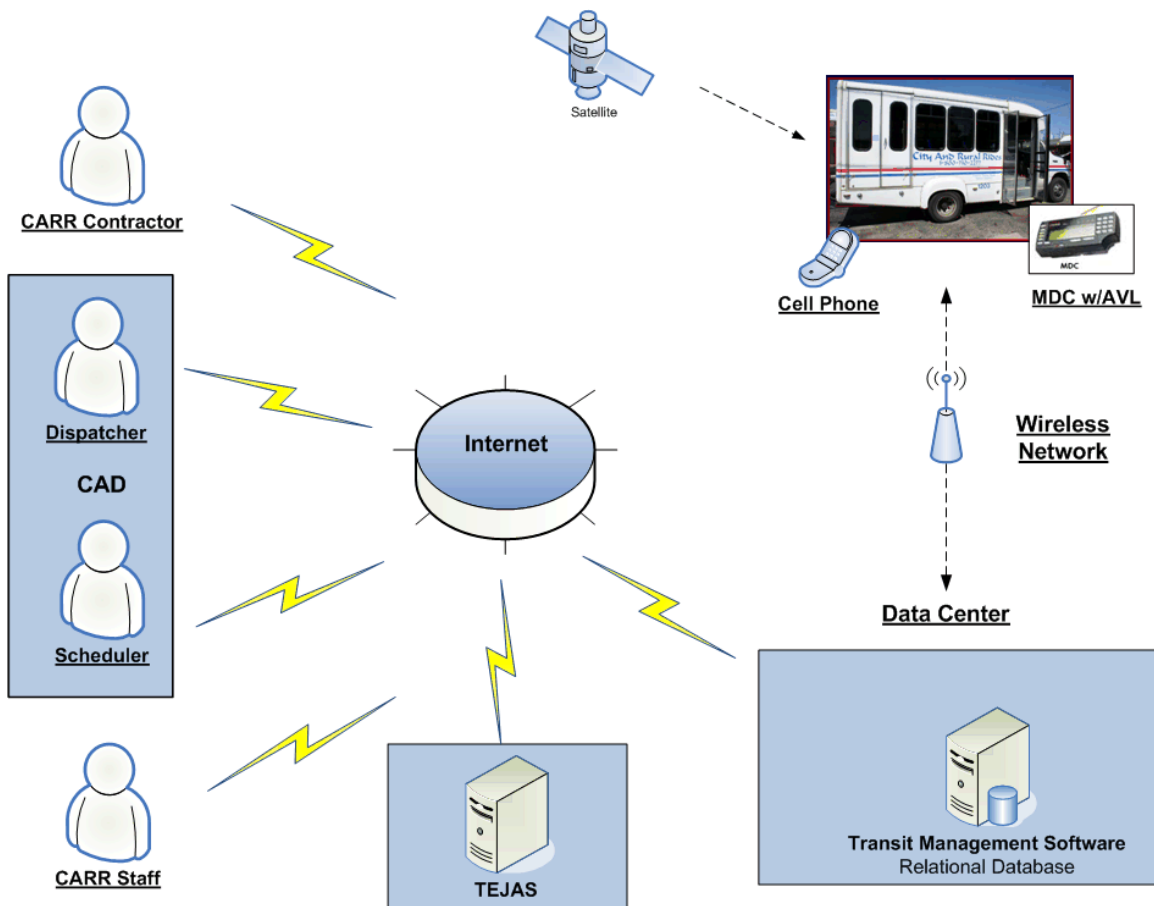


Figure 1: Conceptual CARR ITS Architecture

The diagram shows that CARR users would access the Transit Management Software through the internet. The type of architecture to be deployed will be determined during the procurement process. The types of architecture options include the following:

- Client/Server - Installing the software on a server and accessing the software locally on each user workstation
- Web-based System - Accessing software through the internet
- Software As A Service - Vendor hosted-software and data

Remote access to system is important to CARR Contractors and other locations such as Brownwood office. Each option will be analyzed during the procurement process to determine the best solution for CARR.

Computer Aided Dispatch (CAD) Center

The transit agency dispatch center is the center hub for all communications associated with the operation of a transit system. Incorporated into this center are the hardware, software, and communication technologies to interface between the operating vehicle and each individual client. The Dispatchers and Schedulers will use the Transit Management Software for entering/viewing/modify passengers and scheduling/viewing/modifying trips.

Transit Management Software

Transit Management Software incorporates advanced logistics algorithms and GIS to accomplish computer-assisted and automatic routing/scheduling for the paratransit and demand response industry. With integrated data management, scheduling, routing, dispatching, billing, reporting, and database maintenance functionality, Transit Management Software enhances customer service while providing greater efficiency and reduced operating costs. The software should be expandable to add additional modules, such as Automated Vehicle Location/Mobile Data Communications (AVL/MDC), fixed route display, Interactive Voice Response (IVR), and coordination.

Transit Management Software should include the following features:

Passenger Management

Document and manage customer information to include name, address, level of service required, passenger requirements (wheelchair, walker, etc.) and passenger ride history

Vehicle Management

Location and information of vehicles and maintenance schedule

Driver Management

Driver name, address, driver history, certifications and driver schedules

Trip Request Management

Ability to request trip via phone, e-mail, and Internet

Schedule Management

Ability to schedule passengers on-demand and optimize routes – passenger advisory as to the status of their scheduled trip(s)

Dispatch

Ability to modify schedules and automatically notify drivers of any schedule changes; view vehicle locations.

Billing

Ability to calculate trip costs based on specific rules for billing purposes

Reporting

Ability to generate reports for information in database about trips, routes for the day/week/month, passengers, status of vehicles and vehicle schedules, passenger histories, etc.

Relational Database

Data entered and imported from other databases, such as TEJAS and CARR Contractor systems, will be stored in the Transit Management Software database.

2.1.1 System Interfaces

The following sections list each system interface, identify the software functionality needed to accomplish the system requirements, and describe the interface to match the system.

2.1.2 User Interfaces

2.1.2.1 Transit Management System

The Transit Management Software will provide the users of the system forms for configuration, and data entry/modification.

2.1.2.2 GIS Maps

GIS Maps will display vehicle locations and geographic information to the users.

2.1.2.3 MDC Unit

The MDC Unit will display schedule information, messages from Dispatchers and Vehicle locations on GIS Map to the drivers.

2.1.2.4 IVR System

The IVR System will provide trip status and confirmation to the Passengers.

2.1.3 Hardware Interfaces

Hardware interfaces will be dependent on the ITS Architecture deployed by CARR. The ITS Architecture options are described in Section 2.1.

CARR is currently using an application developed by Advanced Tech Enterprises (ATE) for Scheduling and Dispatching. The application was developed using Visual Data Flex v11.0.77.0 and uses its own proprietary database (.dat).

The following subsections describe the hardware that CARR is currently using for their ATE application. New or upgraded hardware may be required for new system.

2.1.3.1 Servers

Transit Management Software – Server

Component	Hardware	Operating System Version
Processor	Intel Xeon CPU 3.06 GHz	Standard Edition Microsoft Windows Server 2003 Service Pack 1
Memory	1.00 GB of RAM	
Hard Drive	300 GB in raised size (3 Hard Drives) RAID 5	
Video Card	Intel RAGE XL PCI Family	
Network Card	Broadcom NetXtreme Gigabit Ethernet 1 & 2	
Monitor	Plug & Play on RAGE XL PCI Family – Ray tube	
UPS Battery Backup	APC – 1500	

Relational Database Management System - Server

All data generated by the ITS system will be stored in a relational database such as MS SQL or Oracle, allowing the user to generate reports and enable a very scalable system with a robust

database which can continue to grow with more data. Any database requirements will be determined during the CARR procurement process.

Transit Management Software – Workstation

New Workstation hardware specifications may be required depending on ITS Architecture selected during the CARR procurement process.

Component	Hardware	Operating System Version
Processor	Pentium D & 4 CPU	XP – Service Pack 3 (2002)
Memory	1.99 GB of RAM	
Hard Drive	80 GB	
Video Card	Intel 82945G Express Chipset Family	
Network Card	Broadcom NetXtreme Gigabit Ethernet 1 & 2	
Monitor	Plug & Play-Intel-82915 G/GV/910GL Express Chip 20 in LCD	
UPS Battery Backup	APC - 500	

2.1.3.2 “Onboard” Vehicle Hardware Components

Installed on the vehicle are the necessary hardware and software components to send and receive information from the Dispatch Center. These components provide up-to-the-minute trip status, messaging, vehicle/driver information, and scheduling changes.

Mobile Data Computer (MDC)

The MDC module enables wireless communication between mobile data terminals (installed in vehicles) and dispatchers, allowing for real-time updates and adjustments. This tool provides up-to-the-minute trip status, messaging, vehicle/driver information, and scheduling changes. The driver easily operates the MDC by responding to messages and selecting operational function keys during events. The MDC can also be set-up so that the driver will not be disrupted while driving. MDC functionality includes the following:

- Transfer of Electronic Manifests
- Electronic Trip Insertions
- On-the-Fly Schedule Modifications
- Automated Dispatch and ETA
- Automated Performance Monitoring

- Automated Stop Arrival
- Emergency Response
- Electronic Odometer Reading
- On-Board Navigation

Automatic Vehicle Locator (AVL)

The AVL module provides accurate positioning information, as received from vehicle-mounted GPS devices, to improve greater organizational productivity and vehicle safety. When used in conjunction with the MDC module, AVL helps to reduce costs, improve efficiency and security, and maximize customer service. By incorporating AVL/ MDC modules, organizations can extend the value and features of Transit Management Software.

Features include the following:

- Find Closest Vehicle
- Predict Late Vehicles and Service Disruptions
- Predict Estimated Time of Arrivals
- Locate All Vehicles
- Monitor Vehicle Speed
- Display Planned vs. Actual Route

CARR has purchased the MOTOTRBO™ XPR™ 4550 Mobile Radios including the GPS module. Refer to Attachment A for detailed specifications.

2.1.4 Software Interfaces

This subsection specifies the use of other required software applications and interfaces with external application systems.

2.1.4.1 Transit Management Software Integration

This interface provides integration between Transit Management Software and MDC Unit. This allows the vehicle driver to receive information and update trip and passenger information.

2.1.4.2 MDC/AVL Software Integration

Integrating the GPS system with the MDC / AVL systems provides the following features:

- Retrieve vehicle locations and GPS coordinates on demand
- Schedule regular updates of GPS coordinates
- Detailed maps to help dispatchers assist drivers

- Passenger updates dynamically reflected
- Track and monitor vehicles real-time

2.1.4.3 CARR Contractor Interface

Three other transportation providers provide Medicaid trips for CARR. The contractors are Spartan, CityLink and Double Mountain. CARR provides trip information to contractors and the contractors send logs that include “Cancelled” and “No Show” trips to CARR. There is a need to have a data interface to these contractors for transferring data directly and uploading to Transit Management Software.

2.1.4.4 TEJAS Utility

Currently, CARR prints all approved MTP trips from TEJAS website and manipulates the trips manually. A software interface needs to be available to download trips from TEJAS website and automatically perform the following:

- Download all TSAP 7 trips from the TEJAS Website
- Identify and separate each trip by the agency that will perform the trips (CARR, contracted agencies)
- Automatically email or electronically forward each contracted agency’s trips in a method that meets Medicaid security requirements. (encryption, secure ftp site, etc) and does not forward CARR sensitive data (trip cost)
- Automatically import trips that CARR will be performing into the new Transit Management Software for scheduling

2.1.4.5 Passenger Interfaces

The system will interface with the passenger through a Call Attendant or IVR system to either confirm Medical Trips or update the passenger on vehicle status. This allows the passenger to determine if the vehicle is on time or running behind schedule.

Passenger may also call the Dispatch Center for picks-ups and to request ETA. The Dispatcher will notify the driver that the passenger is ready to be picked-up.

2.1.4.6 Internet Access

Based on ITS Architecture deployed, the system may be accessed via the Internet. The Vendor selected will need to specify Internet Software required and version.

2.1.5 Licensing

2.1.5.1 Transit Management Software

Type of licensing will be dependent on Transit Management Software deployed. The Transit Management Software typically can be licensed as one the following:

- Number of concurrent Users
- Number of Trips per Day
- Number of Vehicles

2.1.5.2 MDC Unit Software

The software utilized by the MDC Unit to capture GPS information may require its own license. Typically, each MDC Unit would require one license for each.

2.1.5.3 AVL System

Using GPS, the AVL system may require its own license and may be based on the number of vehicles tracked.

2.1.5.4 Relational Database

A database license may be required depending on database deployed.

2.1.6 Communication Interfaces

Communication systems provide data and/or voice communications for transit planning, maintenance, operations, and incident management, including coordination with transportation providers and public safety organizations. CARR will utilize the following communication technologies:

- 2-way Digital Radio (voice and data)
- Text Paging
- Satellite Communications
- AT&T Cellular Data Communications
- Internet

2.1.7 Operations

The ITS solution will support two modes of operation; user mode and System Administrator mode.

2.1.8 Site Adaption Requirements

The deployment of the ITS system may require additional IT resources.

2.2 Application Functions

This subsection provides a summary of major software performance functions.

Requirement #	Short Description
System Configuration	
2.2.1	Allow the System Administrator to add new fields required
2.2.2	Allow the System Administrator to add additional items to pull-down list
2.2.3	Allow the System Administrator to define user, user security and functionality allowed
2.2.4	Allow the System Administrator to define/edit various Funding Sources with corresponding parameters for each to calculate trip cost
2.2.5	Allow the System Administrator to define criteria for "same day" trip creation
2.2.6	Allow the System Administrator to define Service Areas
2.2.7	Allow the System Administrator to configure traffic patterns
2.2.8	Allow the System Administrator to configure Underage Rider parameters
2.2.9	Allow the System Administrator to configure mobility types
2.2.10	Allow the System Administrator to define rules for passenger "No-Shows" and "Cancellation".
2.2.11	Allow the System Administrator to define notification recipients.
Driver Functionality	
2.2.12	Provide ability for driver to update trip information and trip status on MDC Unit.
2.2.13	Provide capability for drivers to send and receive two-way messages
2.2.14	Provide ability for driver to confirm "no-show" trip.
2.2.15	Provide ability for driver to enter pre-trip vehicle information
2.2.16	Provide ability to capture time sheet data
2.2.17	Provide a web-site to create complete driver time sheets
2.2.18	Provide ability to update passenger information with passenger issues.
2.2.19	System should track number of passenger issues.
2.2.20	System needs to capture signatures from passengers, in the future
Driver Management	
2.2.21	Provide ability to store driver information
2.2.22	System should check driver qualifications
2.2.23	Provide ability to document driver issues
2.2.24	System should check driver certifications renewal date
Passenger Management	
2.2.25	Provide ability to add passengers
2.2.26	Provide ability to edit passenger information
2.2.27	Provide ability to generate warnings for Underage Rider
2.2.28	System should have the capability to "auto-populate" or "auto-correct" passenger information
2.2.29	Provide ability to add any passenger issues
2.2.30	System should track number of passenger issues
2.2.31	Provide ability to enter any passenger complaints
Address Management	
2.2.32	Provide ability to add addresses
2.2.33	Provide ability to edit addresses
2.2.34	System should have the ability to Geocode addresses
2.2.35	Provide ability to Auto-Geocode in batch mode
2.2.36	Display addresses that are not Geocoded
Trip Management	

2.2.37	Provide ability to create trips
2.2.38	System should validate trip date
2.2.39	Allow user to create new address and Geocode on the fly
2.2.40	System should prompt user for data specific to a destination address
2.2.41	System should calculate ETA (Estimated Time of Arrival)
2.2.42	System should automatically calculate trip cost
Scheduling	
2.2.43	Schedule all trips automatically
2.2.44	Allow user to override or accept schedule
2.2.45	Allow user to add to existing schedule
2.2.46	Allow user to manually un-schedule a trip
Dispatch Functionality	
2.2.47	Send information such as passenger, schedule or route changes to drivers
2.2.48	Provide ability to update trip for "ready for pick-up"
2.2.49	Allow Dispatch to update trip information and status
2.2.50	Provide ability to notify driver that passenger has called multiple times
2.2.51	Allow Dispatch to reassign trip to another driver
2.2.52	Allow Dispatch to "Add-On" Trip for any type of funding source
2.2.53	Allow Dispatch to view vehicle location on GIS Map
MDC Unit Requirements and Functionality	
2.2.54	Download of schedule and route information to MDC
2.2.55	Emergency button available on MDC Unit
2.2.56	Ability to view GIS maps and vehicle locations
2.2.57	Capture all trip related information using the MDC unit.
2.2.58	MDC Unit must integrate with MOTOTRBO™ XPR™ 4550 Mobile Radios
2.2.59	Communicate data to driver via MDC Unit
2.2.60	Provide ability to notify driver multiple times that passenger has called
AVL Requirements and Functionality	
2.2.61	Automatically track vehicle using GPS location in real-time
2.2.62	Ability to set-up AVL filtering for search capability
2.2.63	Update GPS points based on pre-determined time interval
2.2.64	Ability to playback captured data
2.2.65	Ability to integrate to vehicle odometer
IVR Functionality	
2.2.66	Automatically notifies passenger of any schedule changes or notifies passenger of vehicle status
2.2.67	IVR System should have to capability for custom messages
2.2.68	IVR System should allow passenger to confirm or cancel trip
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Billing Requirements	
2.2.70	Calculate trip cost for MTP trips
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Reporting Requirements	
2.2.73	Allow the user to generate reports – See Attachment B
2.2.74	Reports should be available in different formats
2.2.75	Ability to generate PTN 128 report
Vehicle Management and Maintenance	
2.2.76	Ability to add vehicle
2.2.77	Ability to edit vehicle information
2.2.78	Allow Driver or Fleet Manager to update vehicle status
2.2.79	Provide ability to update Vehicle Maintenance Schedule.

2.2.80	System should automatically send out a notification when vehicle maintenance is due.
GIS Map Requirements and Functionality	
2.2.81	Allow user to manually Geocode by selecting location on map
2.2.82	View vehicle location and routes on map
2.2.83	Maps must be kept current by vendor
Contractor Management	
2.2.84	Provide ability to create/edit Contractors
2.2.85	Provide ability to add Contractor issues
General Requirements	
2.2.86	Data stored in centralized data repository
2.2.87	Migrate current ATE data
2.2.88	Need to provide Remote Access to system
2.2.89	Ability to hire local resources to maintain and support "on-board" vehicle equipment.
2.2.90	Develop and implement disaster /recovery plan
Trip Verification	
2.2.91	Provide the ability to perform Trip Verification after trips have been taken

System Configuration

2.2.1 Allow the System Administrator to add new required fields.

Additional fields may be required throughout the system that are not included in the "out-of-box" software solution. The system administrator should have a method for defining custom fields such as 'escort name' for each passenger. This feature should be available for all data types (passengers, drivers, funding sources, etc.)

2.2.2 Allow the System Administrator to add additional items to pull-down list.

Additional items may need to be added to pull-down list that are not included in the "out-of-box" software solution. The system administrator should have a method for defining adding custom fields to pull down lists such as 'funding sources' for each trip. This feature should be available for all pull down lists (funding sources, mobility type, etc.)

2.2.3 Allow the System Administrator to define user, user security and functionality allowed.

System user access needs to be restricted with log-in and password. Restricted system access may need to be defined such as "read-only" for certain users.

2.2.4 Allow the System Administrator to define various Funding Sources with corresponding parameters for each to calculate trip cost

All CARR Funding Sources need to be added to the system. Each Funding Source record will have its own data including parameters for calculating cost per trip. There is also the need to

support more than one rate per funding source. Funding Source records should include the following data:

- **Name**
- Contact Info
- **Address 1**
- Address 2
- Address 3
- **State**
- **City**
- **Zip Code**
- **Phone Number**
- **Contract Start/End Date**
- **Billing Method** [Flat Rate, MTP, Per Mileage, etc] Additional field required for other entries such Flat Fee]

NOTE: Fields in bold text are defined as mandatory

2.2.5 Allow the System Administrator to define criteria for “same day” trip creation

Criteria needs to be defined for accepting a “same day” trip. This includes the following:

- Request for same-day service will be accepted from 8:00 a.m. to 3:30 p.m.
- System must identify vehicle that has seating/wheelchair space available.
- System must identify vehicle that may be in the near vicinity/location of the origin and destination in order to accommodate the request without disrupting the passengers already scheduled.
- Time must be available to allow the trip to be accommodated without disrupting the passengers already on the schedule.

Note: Management should have the ability to override and approve a “same day” trip not meeting the criteria.

2.2.6 Allow the System Administrator to define Service Areas

Allow the System Administrator to define Service Areas and specify the following information:

- District
- Active/Inactive
- Fixed/Non-fixed
- Schedule Days Available
- Time Constraints
- Days available

- Number of times per day rides are available
- Supervisor Approval Required (yes/no)
- Transfer Available at CARR office

Note: The system should automatically assign a Service Area Id.

2.2.7 Allow the System Administrator to configure traffic patterns

The system should allow the System Administrator to configure traffic patterns on specific routes such as rush hour. The system will identify that the vehicle will travel slower due to rush hour and impact ETA. This information should be used by the Transit Management Software when building schedules.

2.2.8 Allow the System Administrator to configure Underage Rider parameters

The system should allow the System Administrator to define Underage Rider parameters. The parameters include the following:

- Minimum age for child to ride alone
- Minimum age for forward facing child seat requirements
- Minimum age for rear facing child seat requirements.

The system will use this information when scheduling a passenger.

2.2.9 Allow the System Administrator to configure mobility types

The system should allow the System Administrator to define Mobility Types. Types may include the following

- Wheelchair
- Walker
- Car Required (instead of bus)

Mobility types should also have “load times” associated with each. “Load times” will be used as one of the parameters for generating schedules.

2.2.10 Allow the System Administrator to define rules for passenger “No-Shows” and “Cancellation”.

The system should allow the System Administrator to define rules for passenger “No-Shows” and “Cancellation”. Examples include the following:

- Two no shows within a one month period will result in a letter of notification and the passenger being placed on no show status
- A third no show within a one month period will result in a review of past services provided and a customer’s record on no shows. This review could result in a letter of notification that riding privileges on City And Rural Rides has been suspended. If determined

preventable, no-show will result in suspension of services for 1 week. A second occurrence of three no shows within a one month period will result in a 2 week suspension. A third occurrence of three no shows within a one month period will result in a month suspension.

The system should check number of passenger “No-Shows” and “Cancellation” when trip is being scheduled and warn the Scheduler based on pre-configured rules and type of trip being scheduled.

Note: Different rules and policies may exist for different funding sources.

2.2.11 Allow the System Administrator to define notification recipients.

The system should allow the System Administrator to define which users and management staff will receive specific or all notifications. For example;

- Driver and Fleet Manager are notified when vehicle is due for maintenance based on mileage.
- Scheduler is notified when booking a trip that a specific passenger has exceeded the number of cancellations or no-show.
- CARR Staff receives notification when driver’s certification or license is about to expire.

Driver Functionality

2.2.12 Provide ability for driver to update trip information and trip status on MDC Unit.

Allow the driver the ability to update a trip, through the MDC Unit, by entering the following specific information

- Pick-up time
- Drop-time
- Trip Status – No show, Cancellation, Add-on
- No Show Origin
- No Show RTO
- No Show Both
- Reason for No Show
- Mileage
- Money collected
- Ticket # (if applicable)

2.2.13 Provide capability for drivers to send and receive two-way messages

Provide the capability for drivers to send and receive two-way messages. The message selected is sent to the Dispatch Center with GPS and a time stamp. The following are examples of messages [**Refer to CARR Radio 10-Codes**]:

- Flat Tire
- Require Supervisor
- Send Mechanic
- Off-Duty
- On-Duty
- Refueling
- Emergency Codes

2.2.14 Provide ability for driver to confirm “no-show” trip.

For a “no-show” trip, the system needs to provide the driver the capability to confirm that the trip was not made and update trip information. The driver will confirm to indicate that a “no-show” slip was left. Data for “no-show” trips include the following:

- Driver ID Number
- Vehicle ID Number
- Arrival Time
- Departure Time
- Trip Scheduled Time
- Passenger Name

Once the driver has confirmed that trip was not made, the system should cancel the return trip.

2.2.15 Provide ability for driver to enter pre-trip vehicle information and track vehicle maintenance

Driver will perform pre-trip vehicle assessment each day and report any issues. Provide the driver the capability to enter vehicle issues through MDC unit.

Pre-trip data includes the following:

- Driver ID Number
- Driver Name
- Vehicle ID #
- Issue
- Mileage

Note: Need to verify that a driver electronic signature will qualify for pre-trip report. If electronic signature is acceptable, then paper work is not necessary when there are no issues with the vehicle.

2.2.16 Provide ability to capture time sheet data.

Based on driver log-on and log-off of the system, a time sheet report will be created to reflect bus driver's on board vehicle time.

2.2.17 Provide a web-site to create complete driver time sheets

Drivers should have the ability to generate complete time sheets via a web-site. The web site should provide the driver's recorded times from the MDC unit and allow the drivers to enter additional time that was not captured on the vehicle (meetings, paperwork, etc.). The times recorded from the MDC unit will be read only and cannot be altered by the drivers.

2.2.18 Provide ability to update passenger information with passenger issues.

The system should allow the driver to document through MDC Unit any passenger issues. Issues can include:

- Refusal to sign manifest for MTP Trips
- Inability to obtain signature for MTP Trips
- Passenger under influence
- Passenger refusing to wear seat belts.

2.2.19 System should track number of passenger issues.

The system should automatically track the number of passenger issues and notify CARR Staff when scheduling trips.

2.2.20 System needs to capture signatures from passengers, in the future.

The system needs to capture electronic signatures from passengers for MTP trips, in the future. A "signature-required" trip report can be generated for the drivers. A MTP trip only manifest will be printed and provided to drivers to collect signatures

NOTE: MTP regulations do not allow electronic signatures at this time. However, this may be accepted in the future and is being investigated.

Driver Management

2.2.21 Provide the ability to store driver information.

The system should allow CARR Staff the ability to store driver information including the following:

- **First Name**
- Middle Name
- **Last Name**
- **Address 1**
- Address 2
- **State**
- **City**
- **Zip**
- **Home Phone**
- Cell Phone
- **Driver License Number w/expiration dates**
- **Certification w/expiration dates**
- **Assign vehicle to driver**
- External training completed w/dates (CPR, wheelchair set-up)
- CARR Training completed (Policies and Procedures, Safety Policies Procedures, Radio/Emergency Procedure, etc.)
- Violations (no more than 2 moving violations for previous 12 months)
- Background check
- Drug/alcohol testing
- Medical Trip Requirements
- Contractor Driver (yes/no) *[Need to assign Contractor to driver]*
- Comment Area

Note: The system needs to allow multiple selections for specific categories such as certifications and training

2.2.22 System should check driver qualifications

The system should check on all driver qualifications to determine if MTP trips can be assigned to them. Qualifications include the following:

- Class C with passenger endorsement
- No more than 2 moving violations for previous 12 months
- No DUI/DWI
- Criminal background checks - 7 yrs
- Annual background checks
- Drug/alcohol testing

Note: System should not allow drivers to be assigned to MTP trips unless they meet Medical Trip Requirements

2.2.23 Provide ability to document driver issues.

The system should provide CARR Staff the ability to document and report on any driver issues.

Issues include the following:

- Late arrival
- Early arrival
- No collection on passengers
- Did not use proper procedure (did not collect signatures)

2.2.24 System should check driver certifications renewal date.

The system should track all drivers, including Contractor drivers, certifications and automatically notify CARR staff when driver certifications or license are due for renewal.

Note: Non-CARR drivers should not be scheduled for CARR trips.

Passenger Management

2.2.25 Provide ability to add passengers to system.

The system should allow CARR Staff based on user security the ability to add new passengers to system. Each passenger record would contain the following fields:

- **First Name**
- Middle Name
- **Last Name**
- **Address 1**
- Address 2
- Address 3
- **State**
- **City**
- **Zip**
- **Home Phone**
- Cell Phone
- **Date of Birth**
- Age [*Auto Calculate and display in non-editable field*]
- Default Funding Source [*Select from list of funding sources*]
- Medicaid # (if applicable)
- Confirmation # (medical trips)
- Mobility Type (walker, wheelchair, car required, etc.)

- Attendant Required (yes/no)
- Service Animal Required
- Active/Inactive
- Suspension Reason/Start/End Dates
- Comment Area
- Guardian Name [*Power of Attorney, Nursing Home Coordinator, etc.*]

NOTE: Fields in bold text are defined as mandatory

2.2.26 Provide ability to edit passenger information.

The system should provide CARR Staff the ability to edit any passenger information. This functionality will be restricted to users having the proper security levels

2.2.27 Provide ability to generate warnings for Underage Rider.

The system should display warnings for Underage Rider requirements such as car seat required. For example, the system should warn when:

- booking a trip
- confirming a trip
- passenger boards vehicle

Requirements will be defined during system configuration.

2.2.28 System should have the capability to “auto-populate” or “auto-correct” passenger information.

The system should auto-populate or auto-correct data as user enters information to avoid duplication of data in different formats.

2.2.29 Provide ability to add any passenger issues

The system should allow CARR Staff to document and report on any passenger issues for a specific trip. Issues can include:

- Intoxicated or Disruptive
- Belligerent/rude
- Unreasonable personal hygiene
- Poses a safety or health threat to themselves or others
- Operating any audio or visual equipment, which infringes upon other passengers' comfort or safety or impairs the driver's ability to transport passengers safely

2.2.30 System should track number of passenger issues

The system should have the ability to track number of issues per passenger and notify Scheduler when creating trip for the passenger.

2.2.31 Provide ability to enter any passenger complaints

The system should have the ability to enter and report on complaints. Complaints can be reported by a passenger for a specific trip or vehicle or from the general public such as vehicle observed speeding. Each complaint may contain the following data, if available:

- Complaint Date
- Date of Incident
- Time
- Location
- Driver ID or Name
- Details of Complaint
- Action Take
- CARR Staff Receive Complaint
- AVL Playback Available (y/n)

Address Management

2.2.32 Provide ability to add addresses

The system should allow CARR Staff based on user security to add new addresses. Each address record should contain the following fields:

- **Common Name** [*example: Central Dialysis Center*]
- Contact Name
- **Address 1**
- Address 2
- Address 3
- **State**
- **City**
- **Zip**
- **Phone**
- Fax
- Prompt user for additional information required for this address (yes/no) [*Associate an address with additional specific address location i.e. Emergency area at hospital*]
- Comment Area

NOTE: Fields in bold text are defined as mandatory

2.2.33 Provide ability to edit addresses

The system should provide CARR Staff the ability to edit any address information. This functionality will be restricted to users having the proper security levels.

2.2.34 System should have the ability to Geocode addresses

The system should have ability to Geocode address and display on a GIS Map.

2.2.35 Provide the ability to Auto-Geocode in batch mode

The system should have the ability to Auto-Geocode addresses in batch mode. The locations will be displayed on GIS Map.

2.2.36 Display addresses that are not Geocoded

The system should highlight addresses that are not Geocoded so that users can Geocode manually, if necessary. The system must allow the user to manually select a point on the GIS map and Geocode that point to the address.

Trip Management

2.2.37 Provide the ability to create trips

The system should have the ability to create trips by CARR Staff based on user security. The trip record should contain the following:

- **Passenger Information**
- **Trip date** [*Default to next day*]
- **Pick-up Time**
- **Pick-up Origin Address** [*Default to passenger home address*]
- **Pick-up Destination Address** [*Default to last destination client was driven to, if available*]
- **Service Area**
- **Trip Type** (e.g. Medical)
- **Vehicle type** [*If medical trip, may require car instead of bus*]
- **Funding Source**
- Confirmation Number
- **Attendant check box** [*No charge for attendant*]
- Display passenger trip history

NOTE: Fields in bold text are defined as mandatory

2.2.38 System should validate trip date

The system should validate trip date as follows:

- trip is less than 60 days in advance and not same day – book trip normally
- greater than 60 day advance – do not book
- “same day” trip - send notification to dispatch

2.2.39 Allow user to create new address and geocode on the fly

Allow CARR Staff to create a new address when booking a trip. This is necessary if the passenger’s origin or destination address is not already in the system. The user should also have the ability to Geo-Code address.

2.2.40 System should prompt user for data specific to a destination address

The system should allow the system administrator to specify additional information required from the passenger when booking a trip for a specific address. For example, an address for an airport may be configured to require airline/terminal/flight information. The additional information will be requested when the user is scheduling the trip and will be available to the driver when they perform the trip.

2.2.41 System should calculate ETA (Estimated Time of Arrival)

Based on origin address and destination address, system should automatically calculate ETA based on GPS points, or route distance. ETA should be displayed on trip view.

2.2.42 System should automatically calculate trip cost

Based on funding source and associated parameters, the system should automatically calculate trip cost and display on trip view. The calculation will be based on parameters set-up during the system configuration.

Scheduling

2.2.43 Schedule all trips automatically

The system should schedule all trips automatically using a standard scheduling algorithm such as Point to Point, Street Routing or Triangular method. Any parameters set-up during system configuration should be considered when creating schedule. For example:

- Passenger load times
- Maximum on board vehicle times
- Time allowed to drop passenger off prior to appointment time
- Service Area parameters

- Traffic Patterns
- Road speed, direction
- Other

2.2.44 Allow user to override or accept schedule

System should allow the user to override or accept the schedule. If the user overrides the schedule, the system should flag any issues or discrepancies.

Note: The user should have the ability to view routes on map before accepting schedule.

2.2.45 Allow user to add to existing schedule

System should allow user to add a trip to an existing schedule. The system should flag any issues or discrepancies.

2.2.46 Allow user to manually un-schedule a trip

System should allow user to manually un-schedule a trip. The system should flag any issues or discrepancies.

Dispatch Functionality

2.2.47 Send information such as passenger, schedule or route changes to drivers

Dispatchers need the ability to send canned and free messages to an individual driver or broadcast messages to the entire fleet. The message can include any schedule or route changes.

2.2.48 Provide the ability to update trip for “ready for pick-up”

The system will allow Dispatch to update trip data with “ready for pick-up” information and notify the driver automatically. Information includes the following:

- Date
- Call Time
- Location for Pickup (if different)
- Dispatcher Name or ID
- Comments

2.2.49 Provide ability to notify driver that passenger has called multiple times

The system should provide the ability for Dispatcher to notify driver multiple times. The passenger may call multiple times for pick-up and the system should track the number of times the passenger called and the number of times the driver was notified.

2.2.50 Allow Dispatch to update trip information and status

The system should allow the Dispatcher to update any trip information and status and automatically notify assigned driver. Information can include the following:

- Trip status – Cancellation
- Reason for Cancellation
- Driver ID
- Dispatcher ID

The system should also provide reports on this information.

2.2.51 Allow Dispatch to reassign trip to another driver

The system should allow the Dispatcher to reassign trip to another driver. The system will use the following rules for reassignment:

- The vehicle must have seating/wheelchair space available.
- The vehicle must be in the near vicinity/location of the origin and destination in order to accommodate the request without disrupting the passengers already scheduled.
- Time must be available to allow the trip to be accommodated without disrupting the passengers already scheduled.

The system will notify the Dispatcher if trip does not meet requirements.

Note: Management should have the ability to override and approve reassignment.

2.2.52 Allow Dispatch to “Add-On” Trip for any type of funding source.

The system should allow the Dispatch to “Add-On” Trip with the same information defined in Section 2.2.35. An “Add-On” trip could be an additional segment to the existing trip i.e. passenger leaves doctor office and has doctor orders to go for blood test.

2.2.53 Allow Dispatch to view vehicle location on GIS Map

Using GPS location, the system automatically tracks vehicle location, with scheduled route and actual route indicated on the GIS map display. Dispatcher should be able to see a specific vehicle or all vehicles.

MDC Unit Requirements and Functionality

2.2.54 Download of schedule and route information to MDC

When the driver logs in to the Transit Management System on the MDC, the system downloads an entire days worth of work schedules and number of trips. Each trip record summary is displayed, and the driver can select a trip to obtain detailed trip information.

2.2.55 Emergency button available on MDC Unit

MDC Unit should contain Emergency button to send codes for emergency purposes. The alert will be sent to a designated receiver or receivers such as 911, CAD Center, etc

2.2.56 Ability to view GIS maps and vehicle locations

MDC Unit system should have the ability to display all vehicle locations and routes using GIS maps.

2.2.57 Capture all trip related information using the MDC unit.

All trip related information which is required to be verified or captured is performed on the vehicle using the MDC. The trip record includes arrival, departure, no show, etc. Through the MDC, the driver will select function that the passenger has arrived at destination. This captures the time/date stamp, location and automatically transmits data to the CAD center. This information will be used for verification reports.

2.2.58 MDC Unit must integrate with MOTOTRBO™ XPR™ 4550 Mobile Radios

CARR has purchased the MOTOTRBO™ XPR™ 4550 Mobile Radios including the GPS module. MDC Unit needs to integrate with this system. Refer to **Attachment A** for detailed specifications.

2.2.59 Communicate data to driver via MDC Unit

Data associated with Vehicle ID number will be made available to driver via MDC Unit.

2.2.60 Provide ability to notify driver multiple times that passenger has called

The system should provide the ability to notify driver multiple times that passenger has called "ready for pick-up".

AVL Requirements and Functionality

2.2.61 Automatically track vehicle using GPS location in real-time

Using GPS, the AVL system will track vehicle on route. The user will determine information about the vehicle based on the vehicle id number. Information includes:

- Passengers
- Destination
- Vehicle status (on-time, late, etc.)

2.2.62 Ability to set-up AVL filtering for search capability

AVL system should allow the user to define filters to do specific searches on passengers, trips, drivers, etc. Filter capability should include:

- Date/Time
- Driver
- Route
- Passenger
- Vehicle status (On-time / Late)
- Vehicle closet to a specific location

2.2.63 Update GPS points based on pre-determined time interval

GPS points will be updated based on a pre-determine time interval defined by System Administrator.

2.2.64 Ability to playback captured data

AVL system should have the ability to playback captured data to determine vehicle locations and investigate passenger complaints.

2.2.65 Ability to integrate AVL to vehicle odometer

AVL System should have the capability to interface to vehicle odometer and capture odometer readings for recording mileage.

IVR Functionality

2.2.66 Automatically notifies passenger of any schedule changes or notifies passenger of vehicle status

Through an IVR system, a passenger can be notified via telephone, e-mail or Internet as to the status of their scheduled vehicle/trip, allowing passengers to adjust their plans accordingly.

2.2.67 IVR System should have to capability for custom messages

The system should have ability to create customized messages based on funding sources and passenger information. Examples include:

- Message – Underage rider needs to follow car seat requirements

2.2.68 IVR System should allow passenger to confirm or cancel trip

The IVR system should automatically call passengers to confirm scheduled trip and allow passengers to confirm or cancel via telephone buttons i.e. press 1 to confirm; press 2 to cancel. The system needs to be configured for time of day to place calls.

2.2.69 IVR System should allow passenger to call for pickup

The IVR system should allow passengers to call for pickup. The system should enter the return trip and flag dispatch.

Billing Requirements

2.2.70 Calculate trip cost for MTP trips

The system should automatically calculate MTP trip cost based on actual trips completed.

2.2.71 Calculate trip cost for trips based on mileage

The system should automatically calculate trip cost based on funding source and mileage. Distance traveled should be calculated by system using GPS points or calculate miles from point of origin to destination. Rate will be defined in system during system configuration.

2.2.72 Calculate trip cost based on flat fee

The system should automatically calculate trip cost based on service providers agreements and pre-determined rate. Rates and service providers will be defined in system during configuration of system.

Reporting Requirements

2.2.73 Allow the user to generate reports – See Attachment B

The system should have the ability to generate adhoc reports from data stored in relational database. A list of reports is included in **Attachment B**.

2.2.74 Reports should be available in different formats

The system should allow the report to be generated and output in the following formats:

- Screen
- PDF
- Word
- EXCEL
- Printer

2.2.75 Ability to generate PTN 128 report

The system should provide the ability to generate PTN 128 report.

Vehicle Management and Maintenance

2.2.76 Ability to add vehicle

The system should allow CARR Staff based on user security to add vehicle records. The vehicle record should contain the following data:

- **Vehicle name**
- **VIN**
- **Make**
- **Model**
- **Color**
- **Year**
- **Capacity** *[including flip down seats]*
- **Wheelchair equipped**
- **Insurance Coverage**
- Fuel type
- **Garage location**
- Status-own/lease/loan
- **Funding source use restriction**
- Cost/Mile
- Vehicle Cost
- **Vehicle Special Needs – First Aid Kit, Oxygen Tank, Special Signs**
- **Status** *[In-Service/Out-of-Service]*
- **Disposal Method and Date**
- Acquisition Date
- Funding Source used for acquisition

Note: The system should automatically generate a Vehicle ID Number. Fields in bold text are defined as mandatory

2.2.77 Ability to edit vehicle information

The system should provide CARR Staff the ability to edit any vehicle information. This functionality will be restricted to users having the proper security levels.

2.2.78 Allow Driver or Fleet Manager to update vehicle status

The system should allow Driver or Fleet Manager to update vehicle status as “out-of-service” or “in-service” with corresponding dates.

2.2.79 Provide ability to update Vehicle Maintenance Schedule

Driver or Fleet Manager should be able to update Maintenance Schedule for each vehicle using MDC unit or system access.

2.2.80 System should automatically send out a notification when vehicle maintenance is due.

The system should automatically send out a notification to Driver, Fleet Manager and CARR Staff when vehicle maintenance is due based on mileage and/or date of last service.

GIS Map Requirements and Functionality

2.2.81 Allow user to manually Geocode by selecting location on map

Allow user to manually Geocode address by selecting approximate location on map.

2.2.82 View vehicle location and routes on map

The system should provide the ability to view all vehicle location and routes on maps.

2.2.83 Maps must be kept current by vendor

All maps must be updated frequently in order to have current maps in the areas that are serviced by CARR.

Contractor Management

2.2.84 Provide ability to create/edit Contractors

Allow CARR Staff based on user security to create/edit Contractors and the ability to upload any documentation.

2.2.85 Provide ability to add Contractor issues

Allow CARR Staff based on user security to add any Contractor issues pertaining to service requirements. Requirements include the following:

- On-time delivery of services
- Operator Training and Performance
- Vehicle reliability
- Accurate claims preparation and submission
- Numbers and types of accidents/incidents
- Monitoring and resolution of complaints

General Requirements

2.2.86 Data stored in centralized data repository

All data generated from the Transit Management Software need to be stored in a centralized data repository managed by a Relational Database Management System.

2.2.87 Migrate current ATE data

Passenger, addresses and history data must be migrated from the ATE database into the Relational Database deployed.

2.2.88 Need to provide Remote Access to system

The system needs to be access remotely by staff management and other locations such as Brownwood.

2.2.89 Ability to hire local resources to maintain and support “on-vehicle” equipment.

With adequate training, CARR should have the ability to hire local resources to maintain and support “on-vehicle” equipment including MDC Unit and AVL system.

2.2.90 Develop and implement disaster/recovery plan

As part of the ITS system, a disaster/recovery plan needs to be developed and implemented. The plan should include procedures to fully restore and recover that application and data in the event of fire, flood and any other type of disaster. The plan should also minimize any system down-time by providing system redundancy.

Trip Verification

2.2.91 Provide the ability to perform Trip Verification after trips have been taken

The system needs to provide the ability to verify trip and update trip information if applicable. Any additional information will affect the reporting data.

2.3 Dependencies

The successful implementation of the ITS system described in this SRS is dependent on the following factors:

- Service providers' budget and funding constraints;
- Staff resources to ensure that data and information are kept up-to-date;
- Dispatch center infrastructure;
- GIS-based software requires an accurate base map;
- Availability of cell or radio communications to collect and transmit timely information;
- Management support and commitment to populate systems with timely, accurate and usable data;

2.4 Training Requirements

Each installation requires training. The amount of training will be dependent on the nature of the system involved and the existing expertise of the transit or demand-response personnel charged with operating the system. The following basic training will be required for successful operation of the system:

- Computer knowledge;
- Familiar with different technologies – GPS, Video CAM, Networks, MDC;
- Ability to trouble-shoot issues; and,
- Internet knowledge.

Competence in each area should be determined in advance of the purchase of any ITS system and/or provisions should be made for training as part of the purchase, installation, and operations process.

2.5 Maintenance

The management and maintenance of the hardware and software outlined in this SRS is critical to the operation of the system. Resources will be required to maintain the system along with maintenance contracts on each hardware and software component. Maintenance fees should be included as part of the bid and contract.

2.6 Performance Measures

CARR must follow performance measures and report to TxDOT, the PTN 128 Notebook, quarterly, which includes trips by type, revenue miles versus actual miles, and revenue hours versus actual hours. CARR also needs to break down expenses versus income from capital and funding sources. The system should have the capability to cost allocate and be able to collect other performance measurements listed below:

- Operating Cost per Passenger Trip
- Operating Cost per Vehicle Hour
- Operating Cost per Vehicle Mile
- Operating Cost per Passenger Mile
- Passenger Revenue per Total Operating Cost (Farebox Recovery Ratio)
- Passenger Trips per Vehicle Hour
- Passenger Trips per Vehicle Mile
- Accidents per 100,000 Vehicle Miles
- No-Shows per Scheduled Trips
- On-Time Pick-Ups to Total Pick-Ups (On-Time Performance)
- Complaints per 1,000 Passenger Trips
- Average Trip Length
- Average Vehicle Travel Time
- System Speed
- Response Time (as measured by the minimum time between when service is requested and when provided)
- Trip Denials per Trips Requested

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Attachment A
MOTOTRBO™ XPR™ 4550 Mobile Radios

SPECIFICATION SHEET



MOTOTRBO™

XPR™ 4500/4550/4300/4350 Mobile Radios



Mobile radios available in Display and Numeric Display, **GPS and Non-GPS models**

Uses Time-Division Multiple-Access (TDMA) digital technology which **doubles the number of users** you can have on a single licensed 12.5 kHz channel

Integrates voice and data to increase operational efficiency

Supports **integrated applications** including MOTOTRBO Text Messaging Services and an integrated GPS module for use with third-party location-tracking applications

Provides **clearer voice communications**, in

digital mode, throughout the coverage area as compared to analog radios

Enables additional functionality including dispatch data, enhanced call signaling, basic privacy-scrambling and option board expandability

Enhanced call management features include call alert, emergency, remote monitor, push-to-talk ID, radio check, private call, all call and radio disable

Four programmable buttons (two buttons for XPR 4300/4350) for **easy access to favorite features**; Replacement Button Kit offers customized feature-specific buttons

Emergency button (or footswitch) **alerts supervisor** or dispatcher in emergency situations

Multi-colored LED indicators for **clear, visible feedback** of calling, scanning and monitoring features

Allows **easy migration** from analog to digital as all units operate in analog and digital modes

Meets U.S. Military Standards B10 C, D, E, and F; and **Motorola standards** for durability and reliability

Newly designed and durable IMPRES™ keypad microphone supports unit to unit **short form and quick text messaging**

Utilizes the IMPRES Audio System for **enhanced audio functionality**

Backed by a two-year Standard Warranty plus one-year **Repair Service Advantage** (US) / Extended Warranty (Canada) and at least a one-year warranty for accessories

Send short free-form (requires keypad microphone) and quick **text messaging** via programmable buttons

XPR 4500/4550 contacts list accommodates up to **256 contacts**

Accelerate performance.

The next-generation professional two-way radio communications solution is here, with more performance, productivity and value—thanks to digital technology that delivers increased capacity and spectrum efficiency, integrated data communications and enhanced voice communications.

MOTOTRBO offers you a private, standards-based, cost-effective solution that can be tailored to meet your unique coverage and feature needs. This versatile portfolio provides a complete system of portable radios, mobile radios, repeaters, accessories and data applications.

EPV Group: **CARR System Requirements Specification**
Last Updated: 02/24/10

General Specifications	Category 1 (DPM 4500) / DPM 4500			HomeKit Category 1 (DPM 4500) / DPM 4500		
	W/F	W/F (S1)	W/F (S2)	W/F	W/F (S1)	W/F (S2)
Channel capacity	N/A			32		
Typical RF output	1.25 W 25-45 W	1.25 W 25-45 W	---	1.25 W 25-45 W	1.25 W 25-45 W	---
Frequency	128-126 MHz	400-470 MHz	400-470 MHz	128-126 MHz	400-470 MHz	400-470 MHz
Dimensions (height)	2.07 x 6.08 x 1.71 (51.8 x 154.9 x 43.0 mm)			2.07 x 6.08 x 1.71 (51.8 x 154.9 x 43.0 mm)		
Weight	4.0 (88.1 g)			4.0 (88.1 g)		
Current drain:	0.01 A (100 mA)	0.01 A (100 mA)	0.01 A (100 mA)	0.01 A (100 mA)	0.01 A (100 mA)	0.01 A (100 mA)
RF / Noise Audio	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.40 W, 15.5 A, 100 mA (12.5 A, 100 mA - CW)	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.40 W, 15.5 A, 100 mA (12.5 A, 100 mA - CW)
ICC description	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.40 W, 15.5 A, 100 mA (12.5 A, 100 mA - CW)	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.40 W, 15.5 A, 100 mA (12.5 A, 100 mA - CW)
IC description	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.40 W, 15.5 A, 100 mA	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.25 W, 12.5 A, 100 mA 25-45 W, 15.5 A, 100 mA	1.40 W, 15.5 A, 100 mA

Receiver	Category 1 (DPM 4500) / DPM 4500			HomeKit Category 1 (DPM 4500) / DPM 4500		
	W/F	W/F (S1)	W/F (S2)	W/F	W/F (S1)	W/F (S2)
Frequency	128-126 MHz	400-470 MHz	400-470 MHz	128-126 MHz	400-470 MHz	400-470 MHz
Channel spacing	12.5 kHz / 25 kHz			12.5 kHz / 25 kHz		
Frequency stability	±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)			±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)		
Audio sensitivity (noise floor)	-130 dBm (12.5 kHz) -130 dBm (25 kHz)			-130 dBm (12.5 kHz) -130 dBm (25 kHz)		
Audio sensitivity (TIA/EIA)	-130 dBm (12.5 kHz) -130 dBm (25 kHz)			-130 dBm (12.5 kHz) -130 dBm (25 kHz)		
Adjacent channel rejection (TIA/EIA)	-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz			-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz		
Spurious rejection (TIA/EIA)	-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz			-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz		
RF Noise	-130 dBm (12.5 kHz) -130 dBm (25 kHz)			-130 dBm (12.5 kHz) -130 dBm (25 kHz)		
Audio calibration @ noise floor	-130 dBm (12.5 kHz) -130 dBm (25 kHz)			-130 dBm (12.5 kHz) -130 dBm (25 kHz)		
Audio frequency	100 Hz - 4000 Hz			100 Hz - 4000 Hz		
Conductive spurious emission (TIA/EIA)	-47 dBm			-47 dBm		

Transmitter	Category 1 (DPM 4500) / DPM 4500			HomeKit Category 1 (DPM 4500) / DPM 4500		
	W/F	W/F (S1)	W/F (S2)	W/F	W/F (S1)	W/F (S2)
Frequency	128-126 MHz	400-470 MHz	400-470 MHz	128-126 MHz	400-470 MHz	400-470 MHz
Channel spacing	12.5 kHz / 25 kHz			12.5 kHz / 25 kHz		
Frequency stability	±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)			±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)		
Power output	1.25 W 25-45 W	1.25 W 25-45 W	---	1.25 W 25-45 W	1.25 W 25-45 W	---
Modulation (limiting)	±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)			±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)		
RF Noise	-130 dBm (12.5 kHz) -130 dBm (25 kHz)			-130 dBm (12.5 kHz) -130 dBm (25 kHz)		
Conductive / Radiated Emission	-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz			-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz		
Adjacent channel power (TIA/EIA)	-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz			-30 dBm < 12.5 kHz -30 dBm > 12.5 kHz		
Audio frequency	100 Hz - 4000 Hz			100 Hz - 4000 Hz		
Audio calibration	-130 dBm (12.5 kHz) -130 dBm (25 kHz)			-130 dBm (12.5 kHz) -130 dBm (25 kHz)		
RF Modulation	±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)			±1.0 ppm (DPM 4500) ±0.5 ppm (DPM 4500)		
RF digital modulation	12.5 kHz (DPM 4500) only, 25 kHz (DPM 4500)			12.5 kHz (DPM 4500) only, 25 kHz (DPM 4500)		
Digital Modulation type	GMSK, 4PSK			GMSK, 4PSK		
Digital Protocol	BT/1.2, 102, 301-1, -2, -3			BT/1.2, 102, 301-1, -2, -3		

GPS	
Accuracy (static)	±100 meters (horizontal), ±100 meters (vertical)
TTFF (Time to First Fix) Cold start	< 1 minute
TTFF (Time to First Fix) Hot start	< 10 seconds
Horizontal Accuracy	< 10 meters

Environmental Specifications	
Operating temperature	-20°C (-4°F) to 60°C (140°F)
Storage temperature	-40°C (-40°F) to 100°C (212°F)
Humidity	5% to 95% (non-condensing)
Shock	1000g, 10ms
Operating voltage	3.0V to 4.2V
Power consumption	100mA (typical)

Texas Communications
4309 Maple
Arlington, TX 76010
325-695-6962
325-695-6841

texascom.com



Specifications subject to change without notice. All specifications shown are typical. Radio meets applicable regulatory requirements. Version 7.0100

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Attachment B
Report Types

Sample Reports

Contractor Medical Trip (Verification) Report

Fields include Passenger Name, Origin, Destination, Date, # IC Trips, # OC Trips, # LD Trips, #NS Trips, Total Trip Cost.

CARR Medical Trip (Verifications) Report

Fields include Passenger Name, Origin, Destination, Date, # IC Trips, # OC Trip, # LD Trip, #NS Trip, Total Trip Cost

Late Trip Report

Fields include County, Driver ID #, Date, Appt. Time, Arrived Time, Destination, Supervisor Notified, Comments.

Public No Show Report

Fields include Date, Passenger Name, Driver Action (Honked, Knocked, Courtesy Call, Left Slip, etc.), Driver ID #, Dispatch ID, Doc. Comp.

MT No Show Report

Fields include Service Date & Time, Recipient Name, Destination, Medicaid #, Original Confirmation #, Driver ID #

MT Cancellation Report

Fields include Appt. Date, Client Name, Medicaid #, Confirmation #, Driver ID #

MT Add On Report

Fields include Transportation Service Area Provider (TSAP) Name, TSAP Number, TSAP Address, TSAP Telephone Number, Date, Client Name, Medicaid #, Original Confirmation Number, Service Date & Time, Destination Name & Address, Destination Telephone Number, TSAP Signature & Date

Driver Issues Report

Fields include Driver ID, Late/Early, Pre-trip, SLIP, Comments

Passenger Issues Report

Fields include Date, Name, Address, Phone Number, Complaint, Vehicle ID #, Driver ID #

Pre-Trip Vehicle Issue Report

Fields include Report Submitted To, Date, Driver ID #, Vehicle #, Date of Pre-Trip, Driver ID #, Issue, Corrective Action, Corrective Action Date

Confirmed CARR Medical Trip Report

Fields include Route(Service Area), Full Name, Time, Origin Address, Origin City, Dest. Name, Dest. Address, Dest. City, Origin Phone, Comments

Vehicle Inventory

Fields include ID#, VIN#, YR-Model, Description, W/out W/chairs, W/Chair, Location, License.

Passenger/Public Complaint Report

Fields include Date, Name of Complainant, Address, Telephone Number, Comments

Contractor Issue Report

Fields include Date, Contractor Name, County, Driver ID#, Complaint

Pick Up Log

Fields include Call Time, Passenger Name, Pick-up Location Driver Notified, Dispatch ID

Fare Collection Worksheet

Fields include Date, Cash Fare, Fares paid by Check, Cash Amount from Pre-paid tickets, Pre-paid tickets sold by check, Daily Totals, Driver ID#, Driver Signature.

Same Day Trip Report

Fields include Date, Passenger Name, Time, Origin, Destination, Trip Type

Time Sheet

Fields include Week(M-S) Date, Time In, Time Out, Total Hours, Employee Signature

Driver Time-In/Time-Off

Fields Include Date, Route, Out Time, Start Time, End Time, In Time, Vehicle Revenue Time, Vehicle Total Hours

Vehicle Travel Mileage Report

Employee Name, Month, Year, Date, From, To, Purpose, ODM Start, ODM End, Total Miles, Total X .585, Employee Signature

Service Allocation

Fields include Funding Source, Boardings, Passenger Miles, Passenger Hours, Administration, Average Passenger Mile per Boarding, Average Passenger Hours per Boarding, Maintenance Expenses, Operating Expenses, Administration Expense, Total Cost, % of Total, Cost per Boarding.

Radio Call Log

Fields include Date, Time, Driver Id, Message