

**TTA PARATRANSIT  
SOFTWARE ASSESSMENT**

**FINAL REPORT**

**KYOVA INTERSTATE PLANNING  
COMMISSION**

**OCTOBER 2, 2006**

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## **INTRODUCTION**

The Transit Authority (TTA) provides public transportation for the Huntington, West Virginia area using the combined resources of Federal Transit Administration (FTA) Section 5307, West Virginia Department of Transportation (WVDOT) Public Transit Grant, and a local property tax levy. It operates fixed route and ADA Complementary paratransit service throughout its service area. TTA is the designated Section 5307 grant recipient for the West Virginia portion of the Huntington-Ashland-Ironton urbanized area.

The KYOVA Interstate Planning Commission desires to develop a Strategic Plan for TTA's paratransit services. This study of TTA paratransit operations represents an opportunity to improve current transportation services. It is part of Phase I of this Strategic Plan, and has the following purposes:

- ◆ Evaluate TTA call-taking, scheduling and dispatching systems and determine ways to improve them;
- ◆ Determine the feasibility of automating some or all of these functions;
- ◆ If feasible, define the functions to be automated using computer software or other means.

This document is the draft report describing the information, findings, and recommendations of the Paratransit Review. It includes relevant information describing existing transportation services. It also includes a critical review of these services, recommendations for improvement of these services, and a plan to implement these improvements. All information, findings and recommendations were presented to the TTA staff for review before included in the final document.

## **DESCRIPTION OF TTA PARATRANSIT SERVICES**

### **OVERVIEW**

TTA operates ADA complementary paratransit service for eligible persons making trips within  $\frac{3}{4}$  mile of a TTA bus route. A map of the TTA bus routes appears in Exhibit II-1.

As many aspect of compliance with the statutory requirements of the ADA place a burden on the scheduling and dispatch functions of the transit system, and on the fact that the ADA permits the transit system, in some circumstances, to exceed these standards, the first level of documentation of potential TTA needs is to define the system's policies with respect to the requirements.

### **SERVICE AREA**

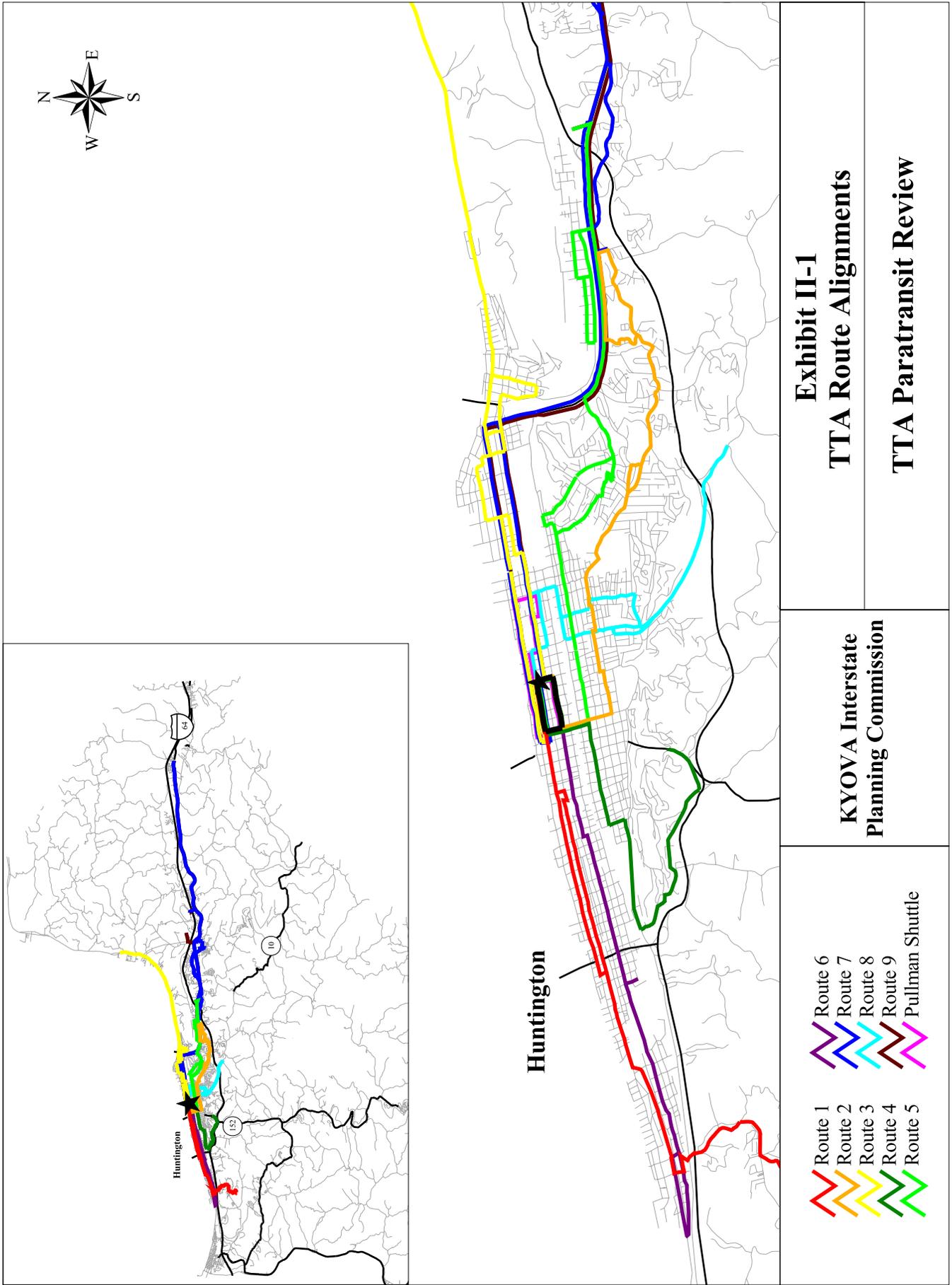
The Americans with Disabilities Act and the implementing regulations stipulate the required service area for the provision of complementary paratransit services. 49 CFR part 37.131(a) states that:

- ◆ TTA must provide complementary paratransit service to origins and destinations within corridors with a width of three-fourths of a mile on each side of each fixed route. The corridor must include an area within three-fourths of a mile radius at the ends of each fixed route.
- ◆ Within the core service area, TTA must also provide service to small areas not inside any of the corridors but that are surrounded by corridors.
- ◆ Outside the core service area, TTA may designate corridors with widths from three-fourths of a mile up to one and one half miles on each side of a fixed route, based on local circumstances.
- ◆ For purposes of this paragraph, the core service area is that area in which corridors with a width of three-fourths of a mile on each side of each fixed route merge together such that, with few and small exceptions, all origins and destinations within the area would be served.

TTA exactly follows the  $\frac{3}{4}$  mile standard in defining the ADA service area. The Authority has not opted to extend boundaries to 1.5 miles as

### **Overview**

### **Service Area**



**Exhibit II-1  
TTA Route Alignments**

**TTA Paratransit Review**

**KYOVA Interstate  
Planning Commission**

- Route 1
- Route 2
- Route 3
- Route 4
- Route 5
- Route 6
- Route 7
- Route 8
- Route 9
- Pullman Shuttle

**DESCRIPTION OF  
TTA  
PARATRANSIT  
SERVICES**

stipulated in 49 CFR part 37.131(a)(iii). Exhibit II-2 reflects the statutory service area.<sup>1</sup>

There is no map of the service area in the dispatch/reservations center. The Dispatcher, who is responsible for all call-taking, reservations, and dispatching, stated that he knew the service area and knew when a trip origin and destination was in or outside the service area. This may or may not be true; however, in the event of system personnel change, this could prove problematic. The ability to discern trips within the geographic service area from those that are beyond the ¾ mile boundary is critical to ensure that the system is not discriminating against an individual's ability to take trip authorized under the ADA.

**Service Area**

**RESPONSE TIME**

**Response Time**

The ADA regulations (49 CFR part 37.131(b)) require that:

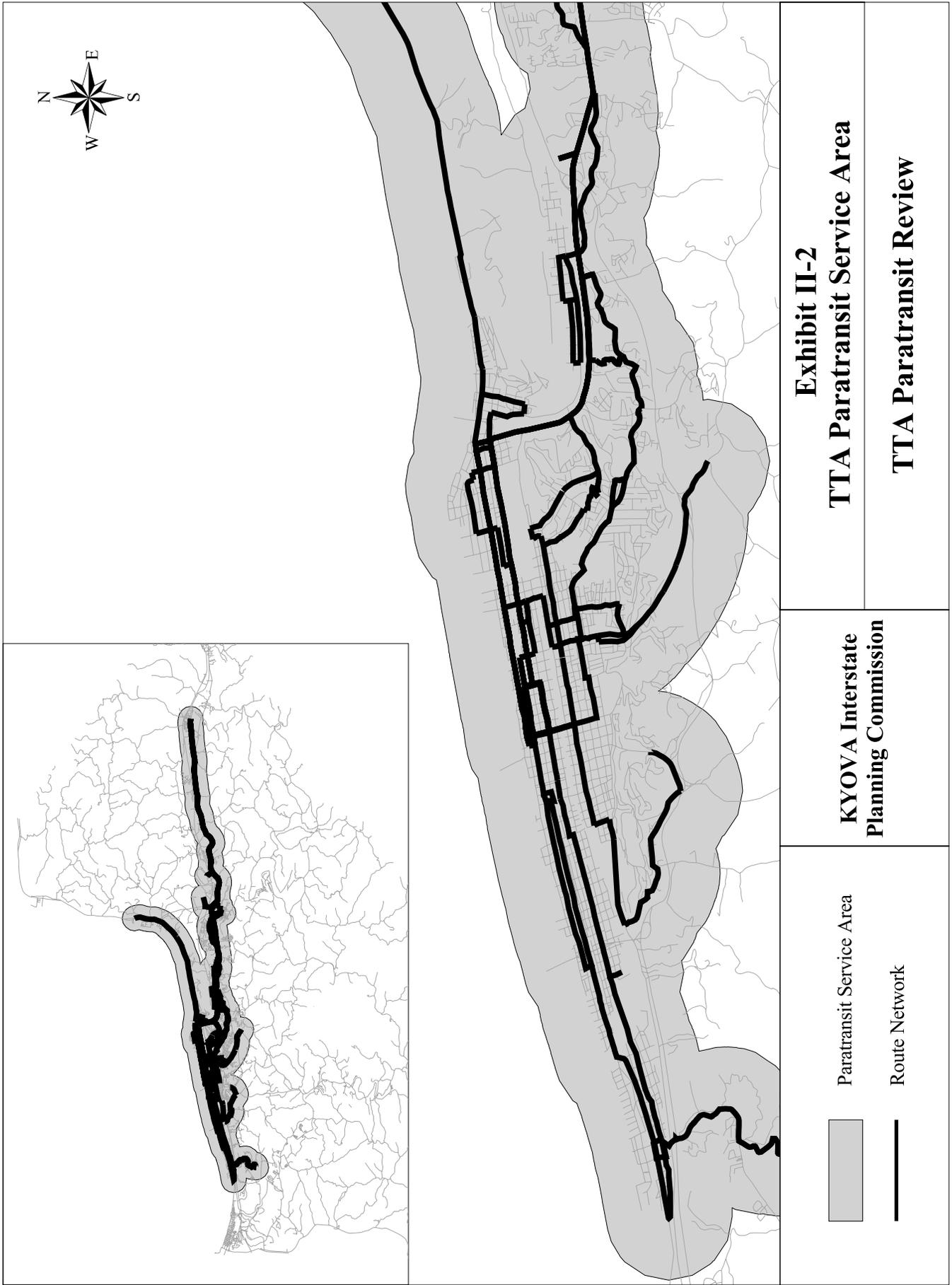
- ◆ TTA must use a “next day” advance reservation process.
- ◆ TTA must take reservations during all normal business hours of the entity's administrative offices, as well as during times, comparable to normal business hours, on a day when the entity's offices are not open before a service day.
- ◆ TTA may negotiate pickup times with the individual, but may not require an ADA paratransit eligible individual to schedule a trip to begin more than one hour before or after the individual's desired departure time.
- ◆ TTA may permit advance reservations to be made up to 14 days in advance of an ADA paratransit eligible individual's desired trips.

The regulations also require that if TTA were to make any changes to its reservations policies, it must follow the public participation requirements stipulated in 49 CFR part 37.137(b) and (c).

TTA uses a next day reservation system. The process is administered using manual means, with some computer assistance. This process is more fully described later in this section.

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<sup>1</sup> Fixed route service map based on service design in place as of August 15, 2006. At the time of this review, neither KYOVA nor TTA had developed a digitized version of the most recent route changes to the fixed route system. Based on route brochures, we have attempted to update this information for purposes of this report.



**DESCRIPTION OF  
TTA  
PARATRANSIT  
SERVICES**

TTA accepts reservations 14 days in advance. Trip reservations are accepted during all normal administrative hours. TTA will negotiate pick-up time within the allowed one-hour window.

**PARATRANSIT FARES**

The fare for a trip charged to an ADA paratransit user may not exceed twice the fare that would be charged to an individual paying full fare (*i.e.*, without regard to discounts) for a trip of similar length, at a similar time of day, on the entity's fixed route system. In calculating the full fare that would be paid by an individual using the fixed route system, a public entity may include transfer and premium charges applicable to a trip of similar length, at a similar time of day, on the fixed route system.

49 CFR part 37.131(c) also requires:

- ◆ The fares for individuals accompanying ADA paratransit eligible individuals, commonly referred to as “companions,” must be the same as for the ADA paratransit eligible individuals they are accompanying.
- ◆ A personal care attendant (PCA) may not be charged for complementary paratransit service.
- ◆ TTA may charge a fare higher than otherwise permitted by this paragraph to a social service agency or other organization for agency trips (*i.e.*, trips guaranteed to the organization).

The fare for paratransit services is twice the base adult fare for a comparable trip on the TTA fixed route system.

Eligible individuals are requested to identify if they need to travel with a Personal Care Attendant (PCA) at the time of certification. However, as all certifications are on paper, not in electronic format, this fact is not verified at the time any individual trip reservation is made. The Dispatcher/Scheduler indicated he knew who required the services of a PCA. Again, in the event of system personnel change, this could prove problematic to TTA.

Companions are charged the same fare as eligible ADA customers. Personal care attendants are not charged a fare. ADA customers must pay the cash fare at time of boarding. The Dispatcher is also responsible for cashing out drivers at the end of a work shift.

TTA does not provide complementary paratransit service to any other users other than ADA eligible individuals. TTA provides no third party contract services.

**Response Time**

**Paratransit Fares**

**DESCRIPTION OF  
TTA  
PARATRANSIT  
SERVICES**

**TRIP PURPOSE RESTRICTIONS**

The ADA requires that TTA may not impose restrictions or priorities based on trip purpose. There are no trip purpose restrictions on TTA complementary paratransit services.

**Trip Purpose  
Restrictions**

**HOURS AND DAYS OF SERVICE**

To be considered “comparable” service, TTA services must be available throughout the same hours and days as the TTA’s fixed route service. This standard recognizes that the shape of the service area can change. As some routes may end at various times during the span of an operating day, those routes, and their paratransit corridors, do not need to be served with complementary paratransit when the fixed route system is not running on them.

**Hours and Days of  
Service**

Like other transit systems, TTA individual fixed routes begin and end at various times during the course of the day. The ADA requires only that TTA operate complementary paratransit in these corridors during the same time periods in which the associated fixed route operates. TTA, however, has elected to operate complementary paratransit service throughout the full service area at all hours of TTA operation. This practice exceeds the requirements of the ADA.

While going beyond the regulatory requirements, this practice is common. Transit systems believe that time-based contractions of selected portions or corridors in the paratransit service area would ultimately be confusing to disabled customers who need to use such services. TTA operates throughout the entire service area during the hours shown in Exhibit II-3. Because TTA does not change the paratransit service area by time of day, the task of scheduling trips is made easier.

**Exhibit II-3.  
TTA Hours and Days of Operation**

<b>Days</b>	<b>Hours of Operation</b>
Monday through Friday	6:00 A.M. to 11:10 P.M.
Saturday	6:00 A.M. to 11:10 P.M.
Sunday	No Service

Source: TTA, August 2006

## **CAPACITY CONSTRAINTS**

The ADA requires that TTA cannot limit the availability of complementary paratransit service to ADA paratransit eligible individuals by any of the following:

- ◆ Restrictions on the number of trips an individual will be provided;
- ◆ Waiting lists for access to the service; or
- ◆ Any operational pattern or practice that significantly limits the availability of service to ADA paratransit eligible persons. Such patterns or practices include, but are not limited to, the following:
  - substantial numbers of significantly untimely pickups for initial or return trips;
  - substantial numbers of trip denials or missed trips;
  - substantial numbers of trips with excessive trip lengths.

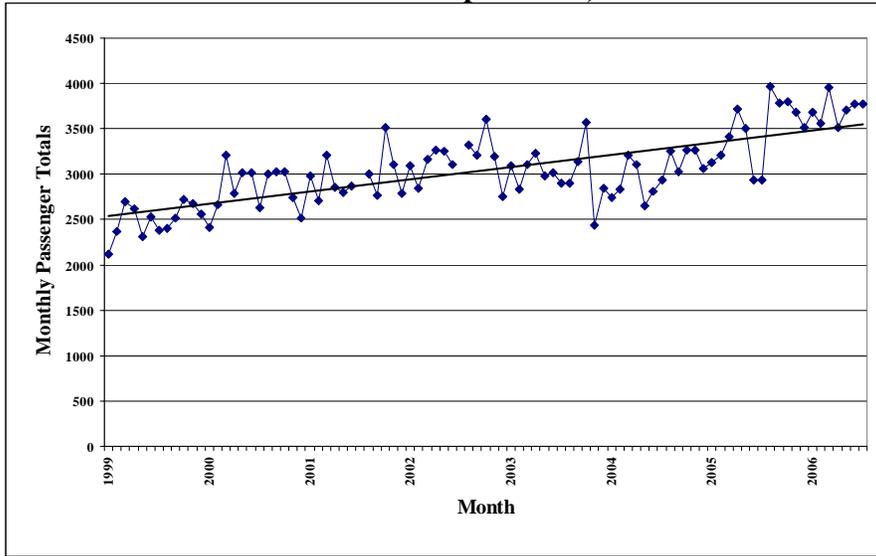
Operational problems attributable to causes beyond the control of TTA (including, but not limited to, weather or traffic conditions affecting all vehicular traffic that were not anticipated at the time a trip was scheduled) are not a basis for determining that such a pattern or practice exists.

TTA provides about 150 to 160 paratransit trips per day. Generally, eight (8) to nine (9) vehicles are operated in peak service. TTA maintains a fleet of 10 paratransit vehicles and has 10 paratransit drivers available. On Saturdays, about five to six vehicles are used in revenue service. TTA reported that at times when Marshall University is in session, demand during peak weekdays (e.g., during the beginning periods of the month) can be as high as 200 trips per day on weekdays.

At present, TTA does not experience trip denials that represent a pattern or practice of excessive denials. There are occasional trip denials. Recently, TTA began keeping a trip denial list, posted in the paratransit dispatcher's work area. However, during the site visit, this list was not available.

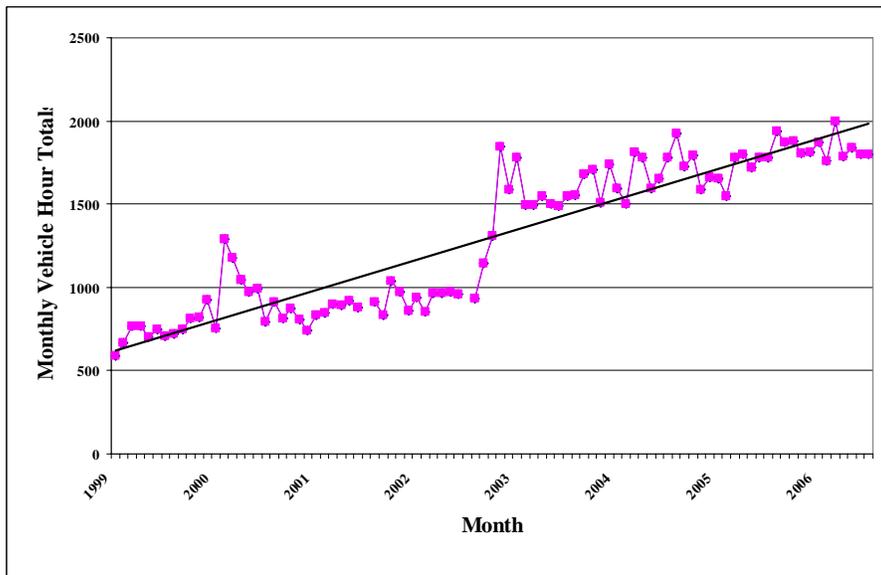
TTA does not use an "overflow" contractor (e.g., a contractor to handle excess demand that cannot be accommodated on TTA paratransit vehicles). While TTA handles current demand, the system is experiencing rapid growth in paratransit ridership. TTA paratransit ridership has increased significantly in recent years. Exhibit II-4 shows the monthly ridership totals from 1999 to the present day. As can be seen, there has been an upward trend with average monthly ridership increasing by some sixty (60) percent since 1999.

**Exhibit II-4  
TTA Paratransit Ridership Trends, 1999 - Present**



TTA paratransit service levels parallel the increase in ridership. Exhibit II-5 shows the monthly totals for revenue vehicle hours for its paratransit service since January 1999. During this time period service levels have doubled. It currently averages around 1,700 to 1,800 vehicle hours each month.

**Exhibit II-5  
TTA Paratransit Vehicle Hours, 1999 – Present**



**OTHER STATUTORY/REGULATORY ELEMENTS OF SERVICE**

**Subscription Services**

The regulations state that subscription service may not absorb more than fifty percent of the number of trips available at a given time of day, unless there is non-subscription capacity. Notwithstanding any other provision of the regulation, TTA may establish waiting lists or other capacity constraints and trip purpose restrictions or priorities for participation in the subscription service only.

TTA permits subscription trips. It was also noted that the system was attempting to adhere to a strict 50 percent limit on subscriptions. While TTA does not track the number of subscriptions by time of day, it was stated that when the system nears capacity, they discontinue the acceptance of new subscription orders.

**Establishment of an Eligibility Process**

Each public entity required to provide complementary paratransit service must establish a process for determining ADA paratransit eligibility.

**Definition of Eligible Individuals**

49 CFR part 123(e) specifically defines eligible individuals as:

- (1) Any individual with a disability who is unable, as the result of a physical or mental impairment (including a vision impairment), and without the assistance of another individual (except the operator of a wheelchair lift or other boarding assistance device), to board, ride, or disembark from any vehicle on the system which is readily accessible to and usable by individuals with disabilities. (Category 1)*
  
- (2) Any individual with a disability who needs the assistance of a wheelchair lift or other boarding assistance device and is able, with such assistance, to board, ride and disembark from any vehicle which is readily accessible to and usable by individuals with disabilities if the individual wants to travel on a route on the system during the hours of operation of the system at a time, or within a reasonable period of such time, when such a vehicle is not being used to provide designated public transportation on the route (Category 2).*
  - i. An individual is eligible under this paragraph with respect to travel on an otherwise accessible route on which the boarding or disembarking location which the individual would use is one at which boarding or disembarking from the vehicle is precluded as provided in Sec. 37.167(g) of this part.*

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SERVICES**

**Other Statutory/  
Regulatory Elements  
of Service**

- ii. *An individual using a common wheelchair is eligible under this paragraph if the individual's wheelchair cannot be accommodated on an existing vehicle (e.g., because the vehicle's lift does not meet the standards of part 38 of this title), even if that vehicle is accessible to other individuals with disabilities and their mobility wheelchairs.*
  - iii. *With respect to rail systems, an individual is eligible under this paragraph if the individual could use an accessible rail system, but--*
    - a. *there is not yet one accessible car per train on the system; or*
    - b. *key stations have not yet been made accessible.*
- (3) *Any individual with a disability who has a specific impairment – related condition which prevents such individual from traveling to a boarding location or from a disembarking location on such system (Category 3).*
- i. *Only a specific impairment-related condition which prevents the individual from traveling to a boarding location or from a disembarking location is a basis for eligibility under this paragraph. A condition which makes traveling to boarding location or from a disembarking location more difficult for a person with a specific impairment-related condition than for an individual who does not have the condition, but does not prevent the travel, is not a basis for eligibility under this paragraph.*
  - ii. *Architectural barriers not under the control of the public entity providing fixed route service and environmental barriers (e.g., distance, terrain, weather) do not, standing alone, form a basis for eligibility under this paragraph. The interaction of such barriers with an individual's specific impairment-related condition may form a basis for eligibility under this paragraph, if the effect is to prevent the individual from traveling to a boarding location or from a disembarking location.*

***TTA Eligibility Determination***

TTA's certification process is based on a medical doctor's statement that the individual is eligible under ADA regulations to use paratransit service. TTA has acknowledged that the process, while administratively simple to manage, may result in individuals being certified who may have some functionality to utilize accessible fixed route transit services.

Eligibility determinations are made within the required 21 days. TTA stated that they will begin providing complementary paratransit to an individual at the time of application, even though a determination has not

**DESCRIPTION OF  
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**Other Statutory/  
Regulatory Elements  
of Service**

been made. The ADA regulations only require that TTA provide such service to individuals whose applications have not been processed in twenty-one (21) days.

Once certified, a picture identification card is produced after the first trip following certification. This card is used on future trips, however, TTA also reported that the dispatcher knows virtually all of the passengers and, therefore, ID cards are not used at the time of boarding.

***Client Database***

The client database is currently kept in paper format. To assist in management of these files, TTA types the information into a WordPerfect document file. Information from this file is copied and pasted into a manifest template to build paratransit runs.

TTA officials realize that client information needs to be maintained and stored in an electronic format, and began to create one using Access software. This database contains the following data fields:

- ◆ Dial A Ride Contacts Identification Number
- ◆ First Name
- ◆ Last Name
- ◆ Address
- ◆ City
- ◆ State
- ◆ Postal Code
- ◆ Home Phone
- ◆ Wheelchair (Yes or No)
- ◆ Notes

During the database creation process, TTA purged the list of eligible individuals to delete persons who were deceased, moved away from the area, etc. From the previous WordPerfect file of 700 entries, the Access database now contains 468 entries.

The database entries are incomplete. It was observed that only 38 passenger records actually recorded a value for wheelchair use status. There are no entries in any record of the Notes field.

**SCHEDULING POLICIES AND PROCEDURES**

A manual scheduling system is used. Passenger trips are either (1) written into a slip of paper when the telephone reservation request is received; or (2) the dispatcher/scheduler will pull one of 14 sets of trip order sheets (one for each day of the 14 days advance reservations) and schedule the

**Scheduling Policies  
and Procedures**

**DESCRIPTION OF  
TTA  
PARATRANSIT  
SERVICES**

**Scheduling Policies  
and Procedures**

trip while the customer is on the phone. This is accomplished by making a manual entry on the trip order sheet. At the end of the day, the newly assigned trip orders are typed into the WordPerfect file.

At approximately 2:00 p.m., the dispatcher/scheduler will begin the process of preparing the next day's schedule. Any unscheduled trips are assigned to runs at this time. Final typed versions of the next day's work are then generated in WordPerfect. A copy is made for the driver while the original is maintained at dispatch.

Most return trips are scheduled at the same time as the originating trip. The one exception is medical trips, where passengers must call to schedule the return trips after the appointment is completed. About one half of all trips are subscription trips.

Same day trip requests are accepted but are not guaranteed. An on-time performance goal of a five-minute window is used; that is, pick-up times should be no more than five minutes earlier or later than the schedule time. However, on-time performance is not tracked.

A new no-show policy is being implemented. Passengers who have six no-shows in a month will have their riding privileges suspended for one month. The scheduling process is graphically depicted in Exhibit II-6.

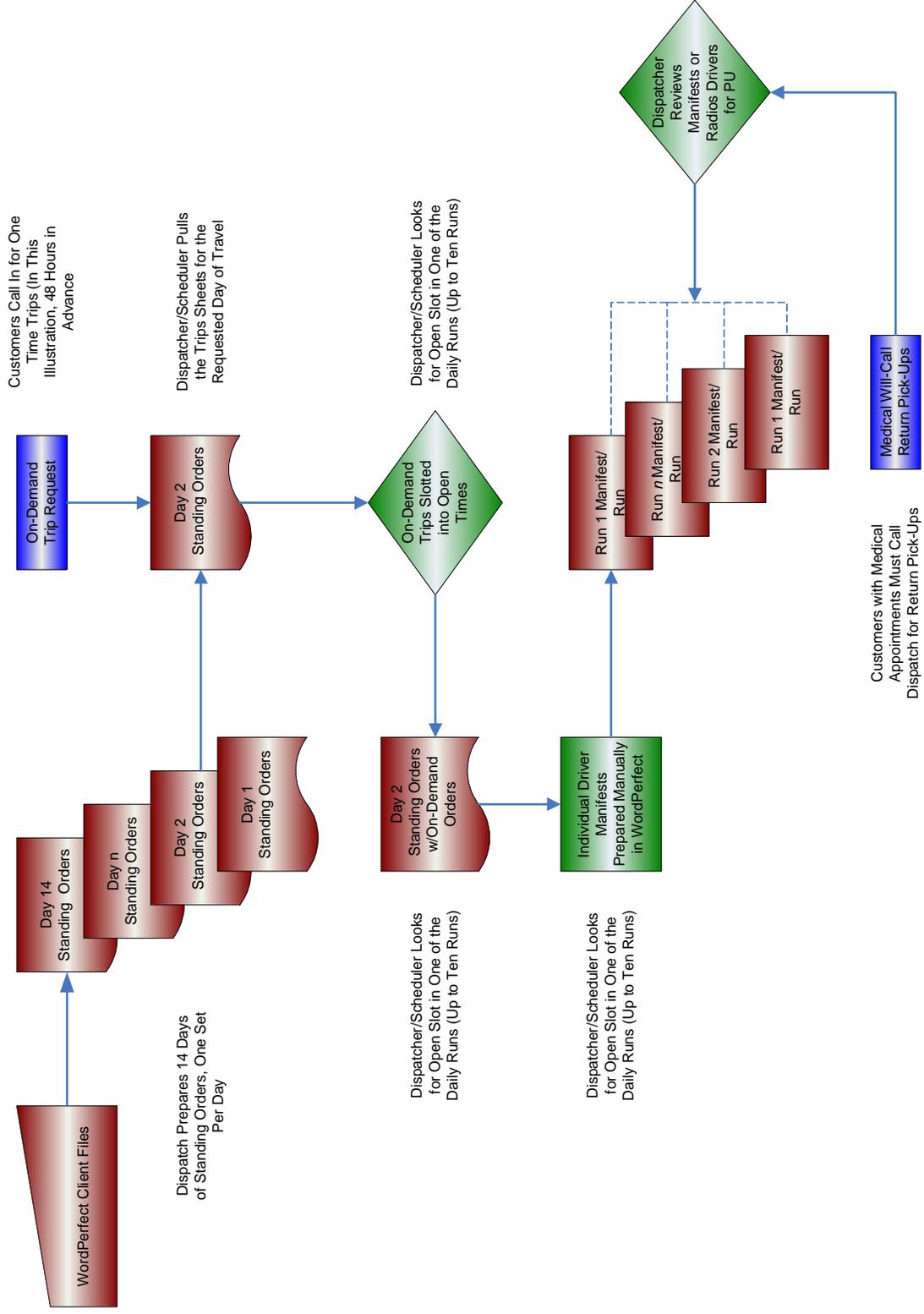
Following the day's work, post-trip data entry is performed manually. This information is typed in again into a spreadsheet to permit daily and monthly tabulation of data.

**PERSONNEL**

TTA uses ten full-time drivers to operate its paratransit service. All drivers have straight runs of about eight hours each. The paratransit dispatch office is staffed by one (1) full-time call-taker/dispatcher. This person is also responsible for scheduling passenger trips and assigning vehicles to drivers.

**Personnel**

## Exhibit II-6. TTA Paratransit Scheduling Process



Customers Call in for One Time Trips (In This Illustration, 48 Hours in Advance)

Dispatcher/Scheduler Pulls the Trips Sheets for the Requested Day of Travel

Dispatcher/Scheduler Looks for Open Slot in One of the Daily Runs (Up to Ten Runs)

Dispatcher/Scheduler Looks for Open Slot in One of the Daily Runs (Up to Ten Runs)

Customers with Medical Appointments Must Call Dispatch for Return Pick-Ups

**PARATRANSIT FLEET**

TTA currently has sixteen light transit vehicles available for its paratransit service. All of these vehicles seat fewer than sixteen (16) passengers. Exhibit II-7 shows the fleet of paratransit vehicles.

**Paratransit Fleet**

**Exhibit II-7  
TTA Paratransit Vehicles**

2003	FORD ECONOLINE
2006	BRAUN VAN
2006	GOSHEN PACER II
2006	GOSHEN PACER II
2006	GOSHEN PACER II
2006	GOSHEN GC II
2006	GOSHEN GC II
2006	GOSHEN GC II

**PERFORMANCE MONITORING**

Performance monitoring is conducted through the creation of monthly reports that include ridership and operating statistics. The data includes the total number of passenger trips provided, total vehicle miles and total vehicle hours. These reports are reviewed by management and the TTA Board.

**Performance  
Monitoring**

## **ELEMENTS OF TTA'S PARATRANSIT PROGRAM THAT COULD BENEFIT FROM AUTOMATION**

This section provides a critical review of TTA's paratransit program and the essential elements that could benefit from automation. This analysis is drawn from the information presented in the previous section along with the consultant's direct observation conducted on August 9, 2006. These elements are identified as follows:

- ◆ Passenger/client database management
- ◆ Service area definition/management
- ◆ Response time/No-show management/trip denial documentation
- ◆ Increasing reservations capacity
- ◆ Periodic re-optimization of standing orders
- ◆ Human response management/utilization
- ◆ Subscription management
- ◆ Will-call return management
- ◆ Performance monitoring/evaluation

### **PASSENGER/CLIENT DATABASE MANAGEMENT**

With close to 200 trips per day, and half of these trips being non-recurring demand response type trips, TTA staff have considerable burden with its present methods of call-taking and scheduling. This problem is exacerbated by two additional factors:

- ◆ The same person handles call-taking and scheduling;
- ◆ The bulk of medical will-call returns occur during the same time frame in which schedules are prepared.

These factors, combined with the repetitive manual writing, typing, and cut/paste operations, make the process of completing a reservation and scheduling a trip approximately two to three times longer than with an automated system. For example, the process may take the following steps:

1. Trip details may be written on a scratch pad;
2. Dispatcher has to manually peruse up to ten (10) sets of trip sheets for the requested day;
3. If the trip can be scheduled, the trip information is handwritten into a paper copy of the day's schedule for that run;
4. When preparing driver schedules, cut and paste passenger information from the client file to the manifest template;

### **Passenger/Client Database Management**

5. Print manifests;
6. Manually record trip information at time of delivery;
7. Manually enter post trip data into a spreadsheet at the conclusion of the trip;
8. Tally spreadsheets for the month in order to get ridership data.

The repetition of typing is time-consuming and would be unnecessary in a database environment. While use of WordPerfect has created a template for producing driver manifests, WordPerfect is not an appropriate software suitable to task.

Additionally, TTA is not capturing information that is maintained as a matter of routine in most other urban transit systems. TTA is only capturing passenger name, address, and in a limited number of cases, wheelchair status. Numerous other fields should be captured including but not necessarily limited to: emergency contact information, mobility aid used (other than wheelchair), need for a PCA, other information concerning the individual's disability that may relate to the transit service provided, and information notes that would be useful to the driver in finding/providing service to the passenger. The ability to tabulate this information only once, in a client record that can be "related" to a trip record (a common function in software that uses relational databases) would eliminate the need for repetitive, duplicative typing on the part of TTA staff and would provide infinitely more useful information than is presently able to be recalled in a cut and paste operation.

In addition to being able to recall more details for each client for purposes of trip booking and recordkeeping, most scheduling software will contain tools for client management, including the ability to periodically update eligibility and perform mass mailings on system newsletters, policy updates, etc. (a functionality that is currently available in WordPerfect).

#### **SERVICE AREA DEFINITION/MANAGEMENT**

Technically, the service area is a defining factor in TTA's in determining whether a trip is eligible for complementary paratransit. Yet, TTA has no mechanism, other than a dispatcher's sense of what the ADA service boundary is, to determine if any one given trip is eligible. And while the dispatcher is clearly exceptionally knowledgeable, this assessment does not substitute for the ability to match an  $x$  and  $y$  coordinates for a pick-up and drop-off location to verify that both locations lie within the statutory service area. By not performing such analysis, TTA could unintentionally be discriminating against some users by denying trips. If the individual is determined eligible by TTA, and the trip is within the ADA service area, it is discrimination on the part of TTA to deny the trip.

Most software has some mapping/GIS functionality that enables the transit system to determine, on a trip-by-trip basis, whether an individual's pick-up and drop-off points are within the ADA service area.

Additionally, the ADA service area can change anytime TTA makes a change in its fixed route structure. The ability to accurately update information and the service area when fixed route changes are made would be useful to TTA.

**RESPONSE TIME/NO-SHOW MANAGEMENT/TRIP DENIAL  
DOCUMENTATION**

At present, TTA uses a 14-day advance reservation standard when booking trips. This part of the ADA legislation has changed, permitting transit systems to adopt a smaller reservations window.<sup>2</sup> Systems that experience a high no-show rate have found that using a smaller reservation window helps reduce no-show rates (*e.g.*, customers forget previously booked trips on a less frequent basis). Given the present manual system, reducing the trip window can also work to increase the efficiency of the dispatcher/scheduler when booking trips as there will be fewer trip sheets to examine. When an entity proposes to change its reservations system, it shall comply with the public participation requirements equivalent to those of 49 CFR part 37 § 37.131(b) and (c).

TTA is currently recording trip denials on a summary tabulation sheet. During our on-site observations, this sheet was unavailable; the dispatcher/scheduler stated that he had not used the list in some time. Use of scheduling software could be used to maintain a contemporaneous trip denial listing. Software could track those trips that could not be scheduled within the +/- one-hour trip pick-up negotiation window. Additionally, establishing a paper trail on trip denials would improve the Authority's ability to respond to complaints of discrimination in the event a customer claimed discrimination due to a denied trip.

**Service Area  
Definition/  
Management**

**Response Time/No-Show  
Management/Trip  
Denial Documentation**

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<sup>2</sup> *Federal Register*, May 21, 1996.

### **INCREASING RESERVATIONS CAPACITY**

During our on-site observation, several incoming calls were abandoned due to the fact the dispatcher/scheduler was busy. Incoming calls to the paratransit office do not rollover to another workstation, such as the fixed route dispatcher, when the primary line is in use.

The ADA regulations also require that public entities maintain sufficient phone system capacity to ensure that customers with disabilities have unconstrained access to system personnel/reservations. Abandoned calls would be evidence of capacity constraints. This situation typically arises in the afternoon when a peak period occurs with medical will-returns at their peak.

With the time it takes to make a reservation being reduced using an automated scheduling software system, and with the scheduling process being an automated, rather than manual process, the dispatcher/scheduler will have additional time in the afternoon to field these calls and potentially eliminate excessive ring times, abandoned calls, etc. Additionally, TTA should study methods with the current phone system to roll calls over to another workstation to ensure calls are taken in a timely manner. Cross training at the staff level should occur. Once this occurs, TTA can resolve phone capacity issues, but creates another problem associated with manual scheduling. With two or more individuals making manual entries to trips sheets, it is possible to double book the same time slot. Again, a networked automated system can eliminate this possibility.

### **PERIODIC RE-OPTIMIZATION OF STANDING ORDERS**

While the ADA places limits on the number of subscriptions that a complementary paratransit service may have in order to ensure sufficient on-demand capacity, standing orders provide the transit system an opportunity to make paratransit runs more efficient.

Most methods of scheduling, including both automated and manual scheduling techniques, build an optimized schedule based on the existing set of standing orders. Trip assignment to the best route will result in more efficient utilization of paratransit vehicles.

In order to maintain schedule efficiency, these “base” routes need to be periodically re-examined. New subscription orders are added, other can be dropped, and over time, routes become less and less efficient. According to the dispatcher/scheduler, TTA’s runs have never been re-done to reflect these normal changes that occur over time. With

**Increasing  
Reservations  
Capacity**

**Periodic Re-  
Optimization of  
Standing Orders**

scheduling software, these runs can be recreated (re-optimized) on a periodic basis. The use of scheduling software will create this functionality for TTA and can result in greater operational efficiencies.

Additionally, automated software will give TTA management the capability to monitor capacity and subscription rates on a real time basis. The 50 percent cap on subscription service is not absolute; systems may exceed this rate *provided* sufficient capacity exists in the system to accommodate on-demand requests.<sup>3</sup> Generally systems seek to enhance subscription orders because it can bring more efficiency to the routes. TTA will limit new subscription orders during periods of high utilization for fear of violating the 50 percent rate. The ability to monitor this status on a real time basis will enable TTA management to make better informed judgments on new standing order acceptance.

#### **HUMAN RESOURCE MANAGEMENT/UTILIZATION**

There is little separation of functions in the call-taking, reservations, scheduling, and dispatch functions at TTA; one individual performs all tasks.

At 200 trips per day at peak periods, TTA may already be beyond the threshold where 1.0 FTE can handle all associated task (this excludes the post trip data entry process which is handled by staff in TTA's administrative office).

This report has previously documented the repetition of tasks, the time-consumption associated with manual inspection of up to 10 trip sheets to book a trip, etc. Increasing the efficiency in which the trip booking and manifest generation tasks can occur will continue to permit TTA to devote only 1.0 FTE to the call-taking, reservations, scheduling, and dispatch tasks. Additionally, the post trip data entry function will be significantly enhanced with the use of automated scheduling software. There will be no need to transfer information between software programs and no need to manually run tabulations each month. This should greatly facilitate TTA's ability to generate MIS reports to the board on a more efficient basis with less intensive labor resources.

**Periodic Re-  
Optimization of  
Standing Orders**

**Human Resource  
Management/  
Utilization**

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<sup>3</sup> As noted earlier, TTA was interpreting this provision as an absolute requirement and may have limited subscriptions unnecessarily.

## **SUBSCRIPTION MANAGEMENT**

As noted above, TTA permits subscription orders, but may limit new subscriptions orders (even if under the 50 percent cap) because the system does not have a means to monitor subscription usage on a real time basis. Yet subscriptions can increase the operational efficiency of daily paratransit runs.

It is permissible for TTA to exceed the 50 percent subscription cap provided that there is other capacity in the system at that particular time on that particular day. The regulations do not impose a single numerical standard for a year, month, or even day. Many complementary paratransit systems exceed the 50 percent standard because of the beneficial aspects of standard orders on system productivity.

TTA can monitor subscription capacity if it had additional tools to monitor system capacity on a real time basis. Software that can provide this functionality would be beneficial to TTA.

TTA also does not have a systematic way of recording subscription orders. Standing orders that are five days per week are relatively simple to cut and paste into the daily trip sheets. However, subscriptions that are more complex (*e.g.*, first and third Wednesdays of every month) can prove problematic. Most software applications have wizards or other convenient tools to assist the transit system easily identify all possible combinations of subscription orders and to temporarily suspend a subscription order. At present, all of these actions are done by memory or done manually by TTA personnel.

## **WILL-CALL RETURN MANAGEMENT**

TTA requires all individuals to book the return trip at the same time as the original trip reservation is made. The exception to this policy is for medical appointments; customers need only book a trip to the medical facility and are to call TTA to book the return trip. These so-called “will-call” return trips are then scheduled in the order in which they are received.

TTA continues to have an obligation to respond to these trips within one hour of the requested pick-up time. The dispatcher/scheduler indicated that TTA sometimes cannot respond to will-call return trips within the one hour timeframe. TTA views such trips as trip denials and is a factor in considering whether or not TTA is engaged in a pattern or practice of excessive trip denials.

### **Subscription Management**

### **Will-Call Return Management**

**Will-Call Return  
Management**

One of the issues in scheduling will-call returns is that TTA does not have a systematic way of projecting how many will-call returns are pending during a given day's work. Some systems require even medical appointments to book a specific time for the return trip; if the patient runs late, the system is forced to readjust schedules.

Many automated software systems have the capacity to show a trip as booked but not scheduled/assigned. These trips can then be displayed to the dispatcher so that some idea of the unscheduled work at any hour of the day is known. This can greatly assist the assignment process of these unassigned trips.

Additionally, many software systems can be integrated with Automated Vehicle Location (AVL) technology. This can provide a real-time, on-map display of the exact location of all system vehicles at any give point in time. TTA staff interviewed stated that knowing where system vehicles were would be an exceptionally useful tool in assigning will-call return trips. AVL is typically viewed as an "add-on" technology to an automated scheduling and dispatch software system. In the absence of AVL technology, most software systems can approximate the location of a vehicle based on the current time and the time of the last known time point in the schedule (*e.g.*, last pick-up or drop-off point). For smaller systems that maintain a relatively on-time schedule, this methodology can provide acceptable results. At present, TTA has no means of visually displaying the locations of vehicles in relation to a will-call return point of pick-up. This results in the dispatcher having to put the trip out to all vehicles to see if any vehicle will take the trip. This may or may not be the optimal assignment.

**PERFORMANCE MONITORING/EVALUATION**

Effective performance evaluation is a critical factor in efficiency paratransit operations. Particularly given the rapid growth in demand for these services, and on the fact that FTA provided no special for complementary paratransit service delivery, it is critical for transit systems to operate service as efficiently as possible.

TTA routinely reports the following information to its board on its paratransit service:

- ◆ Cost
- ◆ Revenue
- ◆ Revenue cost ratio
- ◆ Passenger miles

**Performance  
Monitoring/  
Evaluation**

- ◆ Passenger hours
- ◆ Hours
- ◆ Passengers
- ◆ Cost per mile
- ◆ Cost per hour
- ◆ Cost per rider
- ◆ Revenue per hour
- ◆ Revenue per mile
- ◆ Revenue per passenger
- ◆ Subsidy per mile
- ◆ Subsidy per hour
- ◆ Subsidy per passenger
- ◆ Vehicle miles
- ◆ Fuel consumed and vehicle miles per gallon

As noted earlier, completed trip sheets or manifests are processed for post trip data entry by an individual in the administration office. This means that data on the printed sheet is retyped into the computer with all appropriate data regarding the individual trips transported that day. A spreadsheet template is used to record daily data. This data flows into a separate worksheet that contains the monthly summary tabulation. At the end of each month, the data is deleted the next month's tabulation begun.

#### **ASSESSMENT OF BENEFITS TO TTA WITH INTRODUCTION OF SCHEDULING SOFTWARE**

##### **Benefits**

Based on the foregoing assessment, we believe that TTA would benefit from automated scheduling software in the following areas:

1. **Implementation of Client Database.** TTA could reduce its labor burden in many routine, basic tasks associated with client database management with acquisition of automated scheduling software. The limited nature of our examination cannot quantify the specific labor and cost savings associated with migrating from a word processing option to a scheduling database option; however, can conclude that multiple data entry actions done upwards of 100 times a day could be eliminated.
2. **Provision of Better and More Detailed Data on Driver Manifests.** The current WordPerfect contains insufficient information for drivers regarding a passenger's disability, need for a PCA and other critical details necessary for the driver to render an appropriate level of passenger assistance. While most of the

#### **Assessment of Benefits to TTA With Introduction of Scheduling Software**

current drivers are very familiar with the regular customers and there is little turnover in the workforce, such information would be invaluable to a new driver. Even with an experienced workforce, at several times during our observations, drivers had to call dispatch for clarifications on directions, resulting in more timely passenger pick-ups and better passenger assistance.

3. **Provision of Compliant Service Within the Statutory Service Area.** TTA has no specific means of “testing” whether a trip request is in or outside the ADA statutory service area other than the dispatcher/scheduler’s very competent understanding of the service area. However, as the passenger volumes grow, as the service design changes, the ability of any dispatcher/scheduler can be tested. Since TTA **must** provide service to any eligible individual that originates and terminates in the service, it is critical for civil rights compliance and paratransit cost containment that **only** eligible trips are served. Failure to provide a trip that is within the ADA service would constitute a violation of the nondiscrimination provisions of 49 CFR part 37.5.
4. **Creation of Consistent Trip Denial Management.** The greatest number of civil and administrative complaints filed under the ADA in the transit area focus on capacity constraints and denials of service. It is critical for transit system to maintain data that can be used to substantiate that the system does not engage in a systematic pattern or practice of trip denials. While TTA experiences few trip denials at this time, it does not appear that Operations is maintaining a trip denial log. Additionally, FTA considers a trip that is not undertaken within the +/- one-hour pick-up window to be a trip denial. TTA sometimes cannot accommodate will-call medical returns within this window, but has no means of tracking how extensive this practice is in the community.
5. **Establishment of Enhanced Customer Service/Telephone Response Capability.** During our observations, some incoming calls were abandoned when the dispatcher/scheduler was attempting to book trips and handle will-call returns. During peak periods, there may be constraints on customer access to reservations, a violation of the ADA’s capacity constraints criterion. To the extent the trip booking process can be simplified, TTA can avoid such constraints.
6. **Re-Optimization of Standing Orders.** TTA does not routine re-schedule its base of standing orders to ensure that the current run assignment represents an optimal routing. The runs change over time due to changes to the standing order, new standing orders

being added to the run, and older standing orders being terminated. If a transit system does not periodically re-examine and re-optimize (re-schedule) its standing orders, it is likely that some efficiency has been lost.

7. **Enhanced and Faster Execution of Routine Functions.** Many tasks associated with the trip reservation function are duplicative and redundant in the current manual system of scheduling. Any method that could reduce the burden of information transfer from client file to trip record to manifest generation to post trip data entry would enhance the scheduling operation and improve the dispatcher/scheduler's ability to handle peak periods.
8. **Enhanced Subscription Management.** Subscription service or the acceptance of standing orders can help improve paratransit productivity. TTA does not have any means to effectively manage subscription orders.
9. **Enhanced Will-Call Return Trip Management.** TTA does not have a good process to assess the number and timing of will-call return trip needs on a daily basis.
10. **Simplification of the Data Collection Process for Performance Reporting.** The performance reporting process also involves redundant procedures in the transfer of data from completed trip manifests to the input files used to prepare performance reports.

In summary, these benefits are significant, enhance use of existing human resources dedicated to the transit function, and, in some cases, work to ensure that TTA provides compliant services under the Americans with Disabilities Act.

#### ***Factors That Mitigate the Need for Scheduling Software***

There are, however, some arguments that can be cited against the acquisition of automated paratransit scheduling software. These factors include:

1. **No Contraction of the Service Area.** TTA uses a set definition for the ADA service area; under the regulations, it was envisioned that the service area would contract and expand at various times throughout the service day, as routes/services were added or withdrawn from the schedule. ADA trip eligibility would vary accordingly. As TTA does not change the service area boundary throughout the day, there is no need to depend on GIS based technology to determine trip eligibility by time of day.

2. **No Conditional Eligibility.** Once certified as eligible for complementary paratransit services, a customer is able to ride at anytime. TTA does not employ conditional eligibility as envisioned in the regulations. Automated scheduling software is generally necessary to successfully implement conditional eligibility.
3. **No Third Party Billing for Paratransit Trips.** TTA does not provide any complementary paratransit on behalf of clients of human service agencies and does not have third party billing functions to address. Typically, an organization that has extensive third party billings can justify software acquisition for this purpose alone. This is not the case with TTA.
4. **Cost.** Funds used to acquire hardware and software could be used for some other transit purpose.

### **Conclusion**

The process to determine whether the acquisition of paratransit scheduling software is an economic benefit to the transit agency is, in large measure, a subjective assessment. There is little in the transit literature that demonstrates specific operational cost savings in the implementation of automated or computer assisted scheduling software.

Based on this assessment, it is recommended that TTA undertake the procurement of paratransit scheduling software. The size and scale of existing paratransit service delivery approaches the limits of manual scheduling capabilities. Additionally, the current manual process contains multiple duplicative and redundant data entry and transfer tasks, limiting the skills of the respective personnel. Finally, some elements of current operation could potentially lead to inadvertent violations of the nondiscrimination and capacity constraints criteria that are at the foundation of U.S. DOT's ADA regulations for public transit. For these reasons, it is our conclusion that TTA should move to acquire and install complementary paratransit scheduling software.

## **RECOMMENDED SOFTWARE FEATURES**

### **SOFTWARE FUNCTIONS**

Based on the previous assessment, the following seven (7) key features should be included in any specification or requirement employed by TTA in the procurement of paratransit scheduling software. These elements are not designed to be a functional specification, but rather define elements that are most critical to TTA in the selection of a vendor who can best address the TTA's needs.

#### **Client Database**

TTA should ensure that the software contains features that enable the transit system to establish a client database with all necessary pre-defined fields necessary for safe, efficient, and compliant ADA complementary paratransit services. These features should include the necessary fields to discern conditional eligibility, in the event TTA should change its eligibility process in the future.

The field definitions should be sufficient detailed to address the following client attributes:

- ◆ Client identification number
- ◆ Client name
- ◆ Date of birth
- ◆ Sex
- ◆ Client addresses
- ◆ Address geocoding
- ◆ Address comments
- ◆ Telephone number
- ◆ Certification date/expiration date
- ◆ Disability code
- ◆ Personal care attendant requirements
- ◆ Emergency contact information
- ◆ Client comments/notes

This list is meant to be illustrative and not exhaustive.

The client database should be related to the trip orders database(s) so that client information is readily available during the trip booking process. Pull-down menus, auto-fill techniques, or other methods should be used to pull client data into the reservation screen with a minimal amount of typing and look-up time.

The system should also be able to schedule visitors to the service area on TTA's complementary paratransit system.

### **Subscription Trip Booking**

TTA requires a convenient method to book and record subscription trip orders. The selected software should have a template where subscription orders of any combination of days can be recorded readily and booked on system vehicles.

### **Subscription Trip Management**

In addition to establishing a method for recording subscription orders, TTA requires a method to manage existing subscription orders. Two elements of functionality are required.

First, TTA requires a way to manage temporary changes or suspension of subscription orders. The dispatcher/scheduler should be able to "turn off," on a temporary basis, a customer's standing order. System shall permit entry of both a start date and end date of the time period when the client will not take the standing order trip.

Second, TTA could benefit from real time management/monitoring on the level of subscription service being provided. The software system should be capable of monitoring the level of standing orders, as a percentage of all trips to ensure compliance with ADA regulations (40 CFR part 37.133(b)).

### **Batch Processing of Subscription Trip Orders**

As noted in the previous section, TTA has never revisited the original run assignment of its standing orders. Experience has shown that these orders change over time, degrading the initial efficiency and effectiveness of trip assignments.

The software system should permit the establishment of base runs or subscription templates based on existing standing orders. TTA should be able to evaluate base runs in order to optimize run in terms of least distance and travel time, based on network factors.

### **Real-Time Scheduling of On-Demand Trips**

Current TTA practice is to schedule an on-demand trip while the customer is on the phone. The software system should be capable of adding trips to a previously generated schedule, similar to the current manual system now in place.

Thus the software must be capable of evaluating individual trip parameters and select runs that best satisfy the requirements of the reservation and maintaining the integrity of existing reservations on the same run. If

**Software Functions**

possible, the software system should generate a range of alternatives, in rank order with the highest ranked alternative indicating the “best” selection.

**GIS Capabilities**

Discussions with TTA staff indicate that GIS functionality is a critical component of the desired software system. At a minimum, the software must be capable of assessing trip origins and destinations in comparison with the TTA fixed route system and determine if the trip requested by an ADA eligible person is within the ADA paratransit service area.

Additionally, the software should permit updates and adjustments to the fixed route system and corresponding ADA service area when such changes occur.

**Standardized Reporting**

One of the key features of the software system should be to generate standardized management reports without the need for staff to retype and transfer information from application to application. The software should be capable of generating standard reports on the following topics:

- ◆ Ridership, including passengers and passenger-miles;
- ◆ Service, including total miles and hours of service, revenue miles of service, deadhead miles, etc.;
- ◆ On-time performance, by day, month, run, and system;
- ◆ Passenger travel time, by run or day;
- ◆ Complaints; and
- ◆ Service turn-downs.

The system should be capable of generating preformatted reports that include all management information currently reported to the Board of Directors. This data should be capable of being exported into other Windows compatible applications.

**PROCUREMENT ISSUES**

TTA is under a deadline to obligate funds under this project in order to avoid funds lapsing to the Federal government.

Given the limited timeframe, and on the fact that TTA, as a relatively small transit system with a limited budget, will have relatively little likelihood to purchase other than the software vendor’s standard product. Customization of the software product to suit TTA specifications will not be a major factor in the procurement.

**Procurement Issues**

Given that TTA's essential needs have been identified earlier in this section, it is recommended that these elements be included in a very basic set of specifications and the competitively negotiated method of procurement be used (RFP).

**RECOMMENDED PROCUREMENT SCHEDULE**

A recommended procurement schedule is described below.

Draft RFP	August 31, 2006
WV DOT Approval of Procurement Documents	September 15, 2006
RFP Issuance	September 19, 2006
RFPs Due	October 16, 2006
Presentations by Vendors	October 26, 2006

**Recommended  
Procurement  
Schedule**