

DIAL-A-RIDE DEMONSTRATION IN HADDONFIELD

D. W. Gwynn

Director of Research, New Jersey Department of Transportation

Anthony U. Simpson

President, DAVE Systems, Inc.

The Haddonfield Dial-A-Ride Demonstration Project is sponsored by the New Jersey Department of Transportation under a grant from the Urban Mass Transportation Administration. Total funding for the project is approximately \$1.7 million; about 80 percent is provided by the federal government, and 20 percent is provided by the state. Revenues from operations are returned to the project and are used to offset costs.

The transportation department has primary contracts with 3 organizations: Highway Products, Inc., to supply 11 standard vehicles and 1 specially designed vehicle for invalids; Transport of New Jersey to supply drivers and maintenance for all dial-a-ride vehicles; and LEX Computer Systems and DAVE Systems to design, manage, and operate the project. In addition, MITRE Corporation is under contract to UMTA to evaluate the program. This evaluation includes analysis of survey data, analysis of operating and revenue data, and preparation of computer software.

The Haddonfield project is similar to earlier dial-a-ride projects, and, although bigger and more complex, it draws extensively on their experiences. In particular, several of the features of the Haddonfield project reflect the work that has been done by M. I. T., Ford Motor Company, and GO Transit.

Haddonfield, New Jersey, a suburban community, is located about 7 miles east of Philadelphia and has a population of approximately 15,000. The PATCO line (also locally called the Lindenwold Hi-Speed Line) runs through Haddonfield; a station is located in the center of town. The trip from Haddonfield to central Philadelphia takes 15 minutes on the Lindenwold Line.

The initial demonstration area includes the entire municipality of Haddonfield, portions of the boroughs of Cherry

Hill, Barrington, and Lawnside. The area is approximately $5\frac{1}{2}$ square miles and has more than 25,000 people. This relatively small initial area was chosen to minimize any start-up problems and yet provide capability for controlled expansion at a later date.

Work started in Haddonfield in August 1971, and service commenced on February 19, 1972, after a 6-month preparation phase. The drivers went out on strike on March 1; so, there were only 10 days of initial operation. The strike occurred during negotiation of a new contract between Transport of New Jersey and the Amalgamated Transit Union (it had nothing to do with the dial-a-ride project). The strike lasted 76 days, and service was resumed on May 15. To date, we have completed approximately 5 weeks of operation.

The principal objective of the Haddonfield Demonstration Project is to determine the public's attitude toward and its acceptability of dial-a-ride service; a second objective is to determine the economic feasibility of manually controlled dial-a-ride systems.

We provide 4 principal types of service: many-to-many, many-to-one, one-to-many, and shuttle. The many-to-many service operates 24 hours a day, 7 days a week, primarily because the Lindenwold Line also operates 24 hours, 7 days a week. The many-to-one service is designed to gather commuters in the morning and deliver them to Line-haul stations or their work places. The one-to-many service is used primarily to deliver passengers from the Haddonfield station to their homes in the evening. The shuttle service was instituted to handle high demands for service between 2 primary locations in the service area, e.g., from the station to the Music Fair. It is not a scheduled shuttle but implemented whenever this type of operation is the most

Figure 1. Dial-a-ride bus.



efficient method of handling the demand.

The buses (Fig. 1) seat 17 people and provide room for 10 standees. The vehicles are air-conditioned and have high-

intensity reading lights, perimeter seating, carpeted floors, and sizable storage racks. Their short wheelbases and tight turning radii are valuable features for maneuvering on side streets. One vehicle has been specially constructed for the handicapped (Fig. 2). The vehicle has a manually operated ramp in the rear of the vehicle and can accommodate 3 wheelchair passengers in addition to regular passengers. The vehicles have been filled to capacity several times during the first 5 weeks of service, and public reaction to the vehicles has been favorable.

The dial-a-ride office is staffed by controllers who have 4 principal functions: receive calls, schedule, dispatch, and perform clerical and accounting duties. Each controller is trained in several functions so that the system can be

Figure 2. Bus for passengers in wheelchairs.



Figure 3. Typewriter for preparing trip tickets.



operated by 1 or more persons depending on demand; the maximum required to date has been 3 controllers.

When a request for service is received, a trip ticket is typed in duplicate on a specially constructed electrical typewriter (Fig. 3). Information recorded on the trip ticket includes pickup address, delivery address, telephone number, status and number of persons riding, estimated pickup time, and passenger's name. We take the telephone number so that we can inform passengers of any significant changes in their scheduled pickup times.

One copy of the trip ticket, referred to as the pickup ticket, is placed in a black magnetic holder with a pointer. The other copy, referred to as the delivery ticket, is placed in a white magnetic holder. A code is marked on the

pickup ticket to indicate the time that the customer expects to be picked up, and other critical data are indicated, such as whether the invalid vehicle must be used or whether an important appointment must be kept. These magnetic holders are then placed on an enlarged map of the service area (Fig. 4), oriented to show the vector from pickup to delivery point. Colored markers are later placed in the pickup and delivery holders to indicate which vehicle will be used. Each bus has its own color code, and the colored markers trace the route for each bus. As the bus travels along its route, the holders are taken off the board and are given to the dispatcher (Fig. 5), who relays the information to the driver.

The scheduler makes the decision about which vehicle to assign for each passenger on the basis of a number of algorithm and pattern recognition techniques. In essence, he is trying to maximize vehicle utilization while meeting the constraints of each passenger's expectations.

Communications are usually initiated by the drivers when they call in by 2-way

Figure 4. Scheduling map.



Figure 5. Dispatcher's console.



radio at each stop. The driver is then given and records the next stop and the next-but-one stop. Thus, if the driver gets to his next stop but cannot get through on the radio, he can go ahead without delay to his next-but-one stop. At all times, the control center knows which passengers are on each vehicle and the approximate position of each vehicle.

The system provides an exceptional level of security as a result of instant driver communications that can be relayed to police, identified passengers, position of each vehicle known to within a few blocks, locked fare vaults, and door-to-door service. In fact, at night drivers use high-intensity flashlights to illuminate paths to a customer's door if requested.

The drivers have between 20 and 35 years of experience as bus drivers. We were concerned that there would be re-training problems with drivers who had this amount of seniority. But that did not happen; they learned very quickly. They like their work, perform it well, and, in fact, have become our best public relations and sales staff. Numerous letters and phone calls have been received complimenting drivers on their politeness and considerate actions.

There are basically 3 fares: 60-cent cash fare, 50-cent discount ticket sold in books of either 10 or 40 tickets, and 40-cent senior citizen or group and family ticket sold in books of 10 tickets. Group and family tickets may be used by 3 or more persons traveling together to and from the same pickup and delivery points any hour on Saturday, Sunday, and holidays and between 9:30 a.m. and 4:30 p.m. and 7:00 p.m. and 6:30 a.m. on weekdays. Other tickets may be used any day and any hour.

Subscription service is also provided. A customer may call and make arrangements to be picked up each day at a

predetermined time and location. A card is made, and each day the request is automatically processed.

Service at the Haddonfield station does not always require a call to the control room. During the hours from 4:15 p.m. to 6:45 p.m., a commuter may simply look at a zoned map on the station wall (Fig. 6), determine the zone in which he lives, board the bus that has his zone marked in its front window, and inform the driver of his destination. The driver makes up a tour from the addresses given him by the passengers that board his vehicle and in this instance does not have to receive instructions from the control center. The dispatcher does, however, often insert many-to-many trips into the driver's tour, especially on his way back to the station.

Recently, one of our buses participated

Figure 6. Service area and zone map at station.



in an interesting contest between public transportation and the private automobile. Two reporters from a Philadelphia newspaper held a contest to see which one would arrive at the office in Philadelphia first, the one using public transportation or the one using a private automobile. We had no knowledge that this race was taking place. Both participants started out at the same time (midafternoon, non-rush hour) from an apartment building in the dial-a-ride service area. As one reporter left in his car, the other placed a call from a public phone for a dial-a-ride bus pickup, waited 11 minutes for the bus, rode to the Haddonfield station, waited 6 minutes for the train, and then rode to Philadelphia. Although the reporter using the car won the race by about 3 minutes, his costs were a dollar more in terms of bridge tolls and parking. In addition, he had to fight traffic, whereas the reporter on public transportation was able to organize his notes for the article en route.

The manual scheduling system that we have devised can be replaced by a computer if the service area is expanded. The typewriter can be replaced by a teletypewriter or cathode ray tube terminal, and minimal retraining of personnel will be required. The dispatcher console now displays information similar to the type of information that will be presented by a cathode ray tube. We expect to have a computer later this year. It will be tested, debugged, and run in parallel with the manual system before being placed on line. After that, the computer will do the controlling and decision-making, and the manual system will serve as a backup system.

During the first 10 days of operation in February, there were a number of significant problems. The first day of fare collection occurred in the middle of the first serious snow storm of the year, and

we had a great number of inquiries. Although we were able to adjust to the high demand, the wait times in some cases were as high as 1 hour. (The local taxi company at the same time had wait times significantly longer.) We also had a lot of false calls during the first few days of operation. The youngsters found out how the system worked much faster than the adults did. Teenagers would place a request that sounded like a valid order. Later, control personnel started recognizing voices and the pattern of the calls and called back to verify the trip request. Now the problem is under control, but there are still a few false calls. Radio interference was also a major problem during the initial start-up. The frequency assigned to the project was shared with a trucking company in New York, 80 miles away. The same weather problems were also shared. Though interference was easily tolerated on ordinary days while drivers were being trained, when the snow storm hit the area the trucks from the trucking company had serious problems and used the radio for long periods. This created a critical situation for the dial-a-ride project. During the strike, a frequency change was requested and approved, and the problem is now entirely resolved.

The familiarity of the drivers with this new type of system also created a problem. The bus drivers were used to driving along a standard route. They had to be taught not only dial-a-ride procedures but names of all streets in the service area. The house numbers in the area are not marked on the curbs and, in many instances, are not marked at all. Thus, the drivers had to learn many individual addresses. They were provided with maps that had all the streets identified and all the house numbers in blocks. During the initial start-up, there were some problems with the drivers getting

lost, and this resulted in the dispatcher having to guide some of the drivers around by radio. To assist us in picking up and delivering passengers at night, the customers were requested to leave the lights on at their homes so that the pickup address could be identified easily.

Ridership has been increasing steadily. To date, there is no indication that the demand is leveling off. Weekly ridership at the end of the fourth week was 2,436 passengers. Demand has been primarily for many-to-many service. Shoppers and senior citizens have used the service far more than commuters. As a result, the advertising, which was initially aimed at the community as a whole, has now been shifted more toward the commuter. It is anticipated that many commuters will continue to use their automobiles until they are faced with the need to replace them, and then dial-a-ride, by eliminating a major capital outlay, will look much more attractive. This effect, however, will take several years before it develops fully.

INFORMAL DISCUSSION

Question: Do you not offer more service than you have a demand for?

Answer: At this time we are trying to ensure that capacity is ahead of demand. The overall funding for this demonstration—the \$1.7 million—assumes no revenues. All revenues are put into a separate account and returned to the government separately. Therefore, even if we did not take in a dollar, we are still fully funded. That is one reason why we can have the service level somewhat ahead of what the demand is. And we hope to keep it that way.

Question: What will happen after the initial demonstration?

Answer: We anticipate that there will be a computer-operated demonstration that will continue beyond this initial phase.

Question: What do you tell someone who asks whether service will continue after the demonstration?

Answer: We evade the question wherever possible. We imply that it is a continuing operation, and we try to imply that as long as possible so as to encourage people to change their modes. We do not lie, however; if we are asked the direct question, "How long are you funded for?" we tell them.

Question: Do you use a zone scheme for routing buses?

Answer: No, we try to route the buses completely without regard for zones except, of course, when we provide one-to-many service in the evenings. Then, of course, the vehicles are assigned temporarily to a zone.

Question: Do you take deferred and periodic requests?

Answer: We take both deferred and periodic requests. The deferred requests are put on a board and are processed a half hour before the actual pickup is needed. The periodic calls are put on a cardex system, and the tours are made up in the morning.