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Paratransit at a Transit Agency: The Experience in Norfolk, Virginia

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The objective of this project was to test the feasibility of a transit agency's development and provision of alternative, lower-cost transportation services. Demand-responsive and fixed-route paratransit services were substituted for unsatisfactory bus services in low- to medium-density areas and introduced in unserved suburban and rural areas. Services were extensively monitored, and the results are reported. The new services failed in new service areas due to lack of riders. Where bus service was severely reduced or eliminated, substitute services were largely successful in continuing to attract a substantial ridership at lower cost (deficit) to the transit agency. Major problems, including opposition by the transit union and some private service providers, and also some operational problems are discussed.

The Tidewater Transportation District Commission (TTDC) is a government agency chartered in Virginia to plan, operate, and regulate public transportation services. Five cities--Chesapeake, Norfolk, Portsmouth, Suffolk, and Virginia Beach--are members of the Commission. About one-third of the 1,092 miles² encompassed by TTDC is urbanized (see Figure 1). Norfolk and Portsmouth are completely urbanized, as is the northern third of Virginia Beach and small portions of Chesapeake and Suffolk. The table below gives the population and population density for each city and the entire area:

Area	1980 Population	Population Density (persons/mile ²)
Chesapeake	114,486	335
Norfolk	266,979	5,037
Portsmouth	104,577	3,606
Suffolk	47,621	116
Virginia Beach	262,199	1,012
TTDC	795,862	729

TTDC provides public transportation services to each city under an agreement that stipulates that each city will pay for the service it requests. Costs are allocated according to vehicle hours of service, and revenues are allocated according to passenger fares. There are no other sources of local operating funding. The prevailing funding restrictions of the member cities, along with the high costs (including fare increases and service reductions) of doing business as usual, are the principal reasons why TTDC undertook state and national demonstration projects to test alternative, lower-cost ways of providing public transportation.

Figure 1. TTDC operating area.



In 1976 TTDC management reviewed its financing and service delivery program and found a situation where (a) the costs of its fixed-route bus services were high and were increasing; (b) fare revenues were low and were decreasing; and (c) subsidy amounts were too high to be financed by the local cities and were increasing each year. TTDC concluded that it was beyond its power in the near future to substantially reduce the costs of fixed-route bus services (due to the increasing wage and fuel costs) or to substantially increase ridership (due to continued dispersal of jobs and homes). Thus subsidies would continue to increase significantly each year if the existing bus service program was to continue. With the constraint of subsidy money available from the cities, the options before TTDC were to plan on an extended period of reduction in its service of fixed-route buses or develop a lower-cost way of providing public transportation services. TTDC chose to develop lower-cost services, and some results of that strategy are presented in this paper.

SCOPE OF PROJECT

The objective of this project was to provide an alternative mode of public transportation--at less cost to the rider (than driving alone) and the transit operator--in low- and medium-density areas where regular bus transportation was not economically feasible. Shared-ride taxi services were designed and operated for the work, shopping, personal business, school, and social-recreation trips to major activity centers and low-density areas. TTDC proposed to experiment with shared-ride taxi service as a new mode of public transportation. This type of service was less costly than bus service, used private providers of transportation, and was suitable for public transportation in low-density areas. TTDC was awarded a national ridesharing demonstration program project, sponsored by FHWA and UMTA, for the development of shared-ride taxi services in selected areas. An experimental state-aid project enabled TTDC to expand the shared-ride taxi concept to test a full range of alternatives.

Shared-ride taxi services can be used (a) as a substitute for regular route bus service where it is lightly patronized; (b) to institute new services in low-density neighborhoods; or (c) as jitneys, which are similar to small fixed-route buses in certain transportation corridors. The federal demonstration project concentrated on the initiation of Maxi-Taxi service to low-density neighborhoods that were not served by public transportation. The state-aid

project was to be carried out in conjunction with a comprehensive program of shared-ride services; it concentrated on the substitution of Maxi-Taxi services for lightly patronized bus service.

It was also proposed to substitute fixed-route Maxi-Taxi service for evening and weekend bus service. Ridership on some bus services operating after 7:00 p.m. drops significantly on TTDC routes. TTDC analyzed evening and weekend ridership statistics and selected several routes that warranted substitute, lower capacity, and lower-cost service. Also, because evening bus service was terminated in Portsmouth several years ago, it was proposed to reinstitute public transportation service in one or two corridors.

TTDC was to determine potential markets; remove institutional and legal barriers; market the service; develop the appropriate service arrangement, including coordinated dispatching; underwrite the startup and development cost of the service during the trial period; monitor the services; and report on the results.

It was anticipated that TTDC would institute contracts with local taxicab operators for the provision of Maxi-Taxi services. TTDC would plan the service, develop specifications, and solicit bids from qualified service providers. TTDC would then monitor the service contract and conduct appropriate data collection to evaluate the effectiveness of the service.

Promotion of these services was believed to be essential. Because the program would primarily serve specific neighborhoods, local advertising would be used, particularly direct mail, door-to-door, and newspaper. Also, personal selling by TTDC's transportation service representatives would be employed to inform neighborhood groups, businesses, and other interested parties. Brochures, posters, and other materials would be produced to support promotion activities.

BACKGROUND

Conceptual development of shared-ride taxi service at TTDC goes back to 1977. Dial-a-ride (DAR) transportation was then under active development and demonstration in a number of communities throughout the country. TTDC, in cooperation with the city of Virginia Beach and the Southeastern Virginia Planning District Commission [the region's metropolitan planning organization (MPO)], was considering ways to respond to the travel needs of suburban locations in Virginia Beach that did not have public transporta-

tion services. Some form of demand-responsive transportation was needed.

TTDC's first effort to understand travel demand was to survey potential users of the new service. Five suburban activity centers were selected, including a shopping mall, hospital, community college, and office park. At each activity center people were asked 11 questions, including origin and destination, mode, trip purpose, and demographics. It was concluded from the survey results that there existed only a small potential ridership group for shared-ride taxi, even under the best service conditions.

Although the results were discouraging, conceptual development was pursued. In early 1978 a request for proposal (RFP) was drafted to solicit the interest of taxi companies in providing shared-ride taxi service at a regional shopping center. The objectives included meeting the transportation needs of those people not served by other forms of public transportation and strengthening the taxi market. The RFP requested information on fare structure, service area, requests for service, level of service, and coordination among taxi operators. The fare was to be set so that the service was self-supporting and profitable for the taxi company.

TTDC received expressions of interest from two taxi companies in the city of Norfolk. Initially they thought the RFP concerned elderly and handicapped services, which they were interested in at the time. They appeared interested in the shared-ride taxi concept; but, as Norfolk-based companies, they would have difficulty operating exclusively in Virginia Beach. No Virginia Beach company had expressed interest.

Although no service was ever implemented at the shopping center, these early efforts did lay the groundwork for several arrangements with taxi companies in 1979. One was the contracting with three taxi companies to provide elderly and handicapped services. This arrangement lasted until mid-1980, when the cost of the monthly single-passenger, metropolitanwide trips became prohibitive and TTDC terminated the program in favor of its own limited, advance-reservation, demand-responsive service.

In May 1979 TTDC submitted a letter of interest for a national ridesharing demonstration program project. Although a contract was not signed until November 1980, TTDC proceeded in its development efforts. An opportunity arose as a result of complaints about congestion at Tidewater's largest shopping mall, Military Circle. Both the owners of the mall and city officials were concerned about improving traffic access. TTDC suggested that a shared-ride taxi service might help.

With the cooperation of the mall's management and merchants' association, an operational plan for service was developed and implemented. However, the final plan provided for services from the mall to an adjacent subdivision, Kempsville, which is located in Virginia Beach. This provided benefits to two cities and allowed a Norfolk taxi company to operate the service. The service was to be an experiment during the 1979 Christmas season. It began on November 15, 1979, with two taxis dedicated to the service Monday through Saturday, 9:30 a.m. to 10:30 p.m. The fare was \$1.00 each way. Because of inadequate ridership, one taxi was eliminated on December 4. Ridership never exceeded about 15 persons/day, and service was terminated on January 1, 1980. The taxi company charged \$8.00/vehicle-hr.

The Deep Creek area of Chesapeake is a low-density rural area adjacent to the city of Portsmouth that had several established and rapidly developing subdivisions in 1975 when the private bus system serving it was acquired by TTDC. It had two bus

routes that extended from Portsmouth that ran on approximately 60-min headways. One route was immediately terminated because of high deficits. Service on the other was later reduced to 2-hr headways and longer as declining ridership and increasing costs produced steadily worsening values of TTDC's principal performance indicator--deficit per passenger. After much public comment, an additional route was extended to the area to improve service in fall 1978. However, the deficit per passenger continued to increase and Chesapeake city officials asked TTDC for service alternatives to continuing bus service or terminating the service altogether.

TTDC and Chesapeake city officials had several discussions in early 1979 concerning ways to provide a basic level of public transportation in areas of Chesapeake where fixed-route bus service was not appropriate. TTDC suggested a shared-ride taxi service to replace the bus route. A presentation to the city council indicated that such service would be better because it could pick up people at their homes, and subsidy costs would be lower as a result of both lower costs of operation and a higher fare for the user. The city council did not agree that such a travel arrangement should be supported by city funds ("we are not going to pay for cabs") and decided to terminate the bus service and not replace it with an alternative.

After an interval of 6 months public requests to reinstitute the bus service built to the point where the city council agreed to restore fixed-route bus service over the old route. The performance on this bus route was worse than the previous one because costs were now higher and riders were fewer; thus the deficit per passenger was higher than the previously unacceptable high level. Faced with the dilemma of citizen demands for service and an unacceptable cost of continuing the current bus service, the city council agreed to try a new way of providing basic public transportation service in the area.

The major change was to terminate the current fixed-route bus service and operate a flexible service tailored to carry residents of the area to either a regular bus route in Portsmouth or to an activity center such as Tower Mall. The flexible service would (a) use a taxi or van-type vehicle, (b) be available on an on-call basis, (c) pick up at the home, and (d) cost the rider \$1/trip (twice the regular bus fare).

An analysis of alternative services--fixed-route bus and shared-ride taxi--indicated that the taxi service would be less expensive, as illustrated in the table below (note that this table is an alternatives analysis for Deep Creek for July 1979):

Item	Bus	Estimated for Shared-Ride Taxi
Vehicle hours	239	338
Cost (\$)	4,660	2,704
Passengers	1,170	650
Revenues (\$)	526	650
Deficit (\$)	4,134	2,054
Deficit per passenger (\$)	3.53	3.16

Based on the above analysis, shared-ride taxi was selected for implementation in September 1979, which resulted in a substantial cost savings to Chesapeake.

PLANNING

From the winter through the fall of 1980, TTDC finalized development of the Maxi-Taxi services to be implemented, which included

1. Selection of areas to be served;
2. Detailed analyses of potential ridership,

hours of service, boundary lines, schedules, and costs for service areas;

3. Review and revision of detailed proposals with city officials;

4. Public hearings and formal TTDC approval; and

5. Development of RFP and contracts for private service providers.

This is the normal way of processing proposed changes to the TTDC public transportation system. The Maxi-Taxi proposals were combined with the transit service proposals for the annual processing of the transportation services program. The data in Table 1 describe the Maxi-Taxi services that were finally approved by TTDC in September 1980 for implementation on November 23, 1980. Many changes were introduced during the extensive review process. A map of each area is shown in Figure 2. The data in Table 1 also describe the service concept demonstrated and also characteristics of the service area.

CONTRACTING FOR SERVICES

Taxicab companies were solicited to bid on the provision of the various Maxi-Taxi services. There are two major cab companies and six smaller firms in the

area. The two dominant firms were approached by TTDC for comments and expressions of interest in shared-ride services. These firms were doing substantial Medicaid business and desired to do more business for the elderly and the handicapped, including contracting with TTDC to do all its special services for the handicapped at standard meter rates. However, both major firms perceived general shared-ride services provided on a contractual rate basis as a threat to their market and declined to bid on the services.

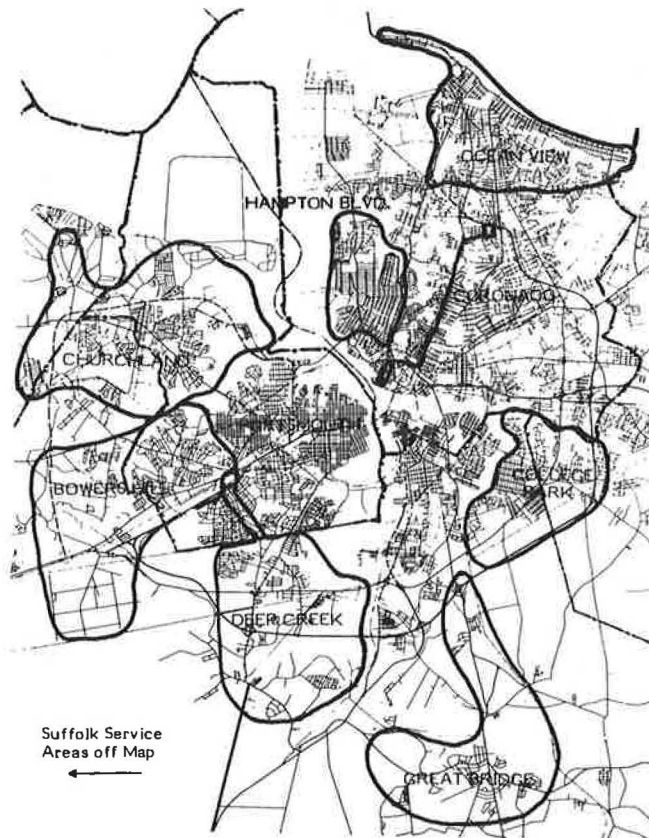
In meetings of a taxi study committee formed by TTDC, which was composed of taxi and city staff representatives, the major firms were represented by an attorney who repeatedly expressed concern over issues such as regional control, fare levels, and increased competition. The two major firms also retained a consultant to develop their position and present a report to the committee. The companies subsequently withdrew from participation on the taxi committee and ended all discussion of participation in shared-ride services.

Two smaller companies responded to the proposals and both were engaged to provide service. Yellow Cab of Chesapeake was contracted to provide all Maxi-Taxi services (except College Park) at \$14/vehicle-hr. Airport Limousine Company was contracted

Table 1. TTDC paratransit services.

Service Area	Area Characteristics	Service Concept
Suffolk		Three small, rural satellite communities without public transportation to the Suffolk central business district (CBD); DAR service on a rotating basis 2 days/week from each area to Suffolk CBD from 9:00 to 11:00 a.m. and 12:00 to 2:00 p.m. for a total of 6 days/week; fare = \$2.00; service every 60 min; 1 vehicle
Holland		
Population	1,400	
Area (mile ²)	5.60	
Population density (persons/mile ²)	250	
Whaleyville		Suburban and rural community of Chesapeake adjacent to Portsmouth; replace low-patronage, long-headway bus service with DAR feeder service to major shopping center with bus connections; service from 6:00 a.m. to 7:00 p.m., Monday through Friday, about every 60 min; fare = \$1.00, with free transfer to bus (see section on Background); 1 vehicle
Population	700	
Area (mile ²)	6.40	
Population density (persons/mile ²)	109	Same as Deep Creek, except 2 vehicles
Chuckatuck		
Population	3,650	
Area	15.00	Same as Deep Creek
Population density (persons/mile ²)	243	
Deep Creek		
Population	19,222	Same as Deep Creek, except no bus service was replaced; attempt to increase ridership by expanding service area with new DAR service; service from 8:00 a.m. through 5:30 p.m. with 2 vehicles
Area (mile ²)	19.06	
Population density (persons/mile ²)	1,001	
Churchland		Suburban and rural community in Chesapeake adjacent to Norfolk without public transportation; DAR service to community shopping center with low-frequency bus connections; attempt to service new community from 6:00 a.m. to 10:00 p.m., Monday through Saturday; same as Deep Creek otherwise
Population	25,272	
Area (mile ²)	26.89	
Population density (persons/mile ²)	940	Urban community in Norfolk serviced by four bus routes; two parallel routes performed poorly at night and were replaced with DAR from 7:00 p.m. to 12:00 a.m. daily; many-to-many as well as distributor for replaced service; 2 vehicles; fare = same as bus fares: \$0.60 base, \$0.25 zone, and \$0.05 transfer
Bowers Hill		
Population	16,427	
Area (mile ²)	21.45	Bus route in Norfolk with poor performance at night; route was replaced with fixed-route jitney from 9:00 p.m. to 12:00 a.m. daily; fare = same as bus fare
Population density (persons/mile ²)	766	
Groat Bridge		
Population	31,441	With the exception of one route, all evening bus service in Portsmouth terminated in 1975 due to poor ridership and high costs; Portsmouth and TTDC officials felt that the national ridesharing program provided the opportunity to reintroduce some kind of public transportation service to test the market; DAR service from 7:00 to 11:30 p.m., Monday through Saturday, with 4 vehicles; fare = regular bus fare
Area (mile ²)	37.62	
Population density (persons/mile ²)	836	
College Park		Urban community in Norfolk with a low-frequency, highly circuitous bus route with poor performance for years; replace route with DAR service, many-to-many, and to several community shopping and activity centers from 8:00 a.m. to 6:00 p.m. daily; 1 vehicle; fare = regular bus fare
Population	25,560	
Area (mile ²)	6.55	
Population density (persons/mile ²)	3,905	
Hampton Boulevard corridor		
Population	33,428	
Area (mile ²)	5.52	
Population density (persons/mile ²)	6,053	
Coronado route		
Population	30,520	
Area (mile ²)	6.00	
Population density (persons/mile ²)	5,087	
Portsmouth night service		
Population	60,272	
Area (mile ²)	14.61	
Population density (persons/mile ²)	4,126	
Ocean View		
Population	47,031	
Area (mile ²)	7.88	
Population density (persons/mile ²)	5,968	

Figure 2. Service areas.



to provide the College Park service (the only one it bid on) at \$13/vehicle-hr. TTDC leased 12-passenger vans to the Yellow Cab Company at its standard rates from its inventory of vehicles used for vanpooling and other uses.

The RFP was easily written. The services were described as in Table 1 and a minimum of specifications were developed (1.5 pages). The proposals were solicited on the basis of low bid per vehicle hour. The contract contained provisions for insurance, facilities and equipment, supervision, fare collection, and so on.

MARKETING

Operating procedures for each service were finalized and incorporated into brochures. These brochures described the service area, fares, and pickup procedures, and contained a map of the service area.

A total of 116,000 brochures describing and promoting Tidewater Regional Transit (TRT) Maxi-Taxis were produced and distributed. Of this total, 80,000 were distributed door-to-door in the Maxi-Taxi service areas. The remaining 36,000 were distributed by TRT service representatives to merchants and civic groups also within the service areas. Individual merchants were also solicited to promote Maxi-Taxi to their customers.

In addition to these service-specific promotions, a general Maxi-Taxi ad was produced and placed in several editions of local newspapers. This ad extolled the general benefits of using Maxi-Taxi and encouraged readers to contact TTDC for further information.

MONITORING SERVICES

Maxi-Taxi services began operation on November 23, 1980. Operations were monitored extensively in several ways. The principal monitoring device was the monthly evaluation report.

Each month operational information, including in-service hours, cost, ridership, revenue, cost per hour, and average fare, was obtained and reported for each Maxi-Taxi service area. The performance indicators deficit and deficit per passenger--the principal measures of effectiveness used by TTDC--were derived and reported. This information was used to make decisions to add, delete, or modify services. Monthly evaluation reports for Deep Creek, Ocean View, and Coronado are given in Tables 2-4.

TRT service representatives monitored the operation of Maxi-Taxi services. Service representatives rode each Maxi-Taxi and interviewed both operators and passengers. The service representatives also compiled information gained from complaints that they received about the services. This information was used to help plan service changes and improve marketing efforts. Service representatives continued extensive marketing efforts with local merchants, civic groups, and major activity centers in the Maxi-Taxi service areas based on their analyses.

Ridership was extensively analyzed in several ways. Maxi-Taxi trip manifests were analyzed to determine origin-destination information, average trip length, and passengers per vehicle hour. Tables 5 and 6 and the table below give information on trip length and passengers per vehicle hour (note that the total excludes Coronado because it has jitney service):

Service Area	Passenger Trips	Avg Trip Length (min)
Churchland	167	15
Deep Creek	376	29
Bowers Hill	128	18
Ocean View	156	19
Hampton Boulevard	117	14
Portsmouth	245	28
Total	1,189	21
Coronado	33	28

These analyses provide useful insights concerning travel patterns, major activity centers, travel time, vehicle productivity, and vehicle scheduling.

Riders were also surveyed by TTDC staff who rode the vehicles and administered questionnaires. The survey obtained information on trip purpose, origin and destination, rider demographics, rider satisfaction with the service, and how the rider learned about Maxi-Taxi. These analyses are valuable in planning marketing strategies and in obtaining the rider's perspective on service operations.

In short, the survey found that most Maxi-Taxi passengers were frequent users of the system, were females between the ages of 21 and 30, and were not disabled. The majority of riders were transit dependent and used Maxi-Taxi to go shopping or to work. Almost half of the riders were employed full time, but a large proportion were from households that earned less than \$5,000 annually. The ridership data can also be analyzed in other ways to discover specific information, such as transferring between Maxi-Taxi and bus service and also fare collection.

Another type of monitoring is an operations analysis. TTDC conducts a covert check of Maxi-Taxi operations by using staff or a contractor who pose as riders. This information is invaluable in spotting operational problems such as theft of fares, driver

Table 2. Deep Creek: 1981 monthly evaluations.

Month	In-Service Hours	Cost (\$)	No. of Passengers	Revenue (\$)	Deficit (\$)	Deficit per Passenger (\$)
January	426	5,964	1,672	1,672	4,292	2.57
February	588	8,342	2,274	2,274	6,068	2.67
March	522	7,681	2,356	2,356	5,325	2.26
April	462	6,736	2,171	2,171	4,565	2.10
May	463	6,732	2,090	2,090	4,642	2.22
June	428	6,224	1,689	1,689	4,535	2.69
July ^a	439	6,355	1,364	1,773	4,582	3.36
August ^a	486	7,059	1,331	1,863	5,196	3.90
September ^a	462	6,464	1,281	1,793	4,671	3.65
October ^{a,b}	435	6,090	1,316	1,382	4,708	3.58
November ^{a,b}	380	5,323	1,199	1,259	4,064	3.39
December ^{a,b}	399	5,584	1,245	1,307	4,277	3.44

^a Fare increased from \$1.00 to \$1.50 on July 5, 1981.^b Revenue from bus transfer riders allocated to bus route of origin. Therefore, the average fare was reduced.

Table 3. Ocean View Maxi-Taxi: 1981 monthly evaluations.

Item	In-Service Hours	Cost (\$)	No. of Passengers	Revenue (\$)	Deficit (\$)	Deficit per Passenger (\$)
Bus route No. 14	300	8,940	1,680	570	8,370	4.98
Maxi-Taxi 1980						
November 23-December 31, 1980	370	5,698	1,556	653	5,045	3.24
January 1981	300	4,200	1,242	522	3,678	2.96
February	280	4,312	1,085	434	3,878	3.57
March	310	4,991	1,223	428	4,563	3.73
April	300	4,830	1,461	511	4,319	2.96
May	310	4,991	1,460	511	4,480	3.07
June	300	4,830	1,617	566	4,264	2.64
July ^a	310	4,991	1,323	1,323	3,668	2.77
August ^a	310	4,991	1,361	1,361	3,630	2.67
September ^{a,b}						
Maxi-Ride	531	7,433	2,246	2,246	5,188	2.31
Jitney-Ride	94	1,315	1,207	604	712	0.59
Total	625	8,748	3,453	2,850	5,900	1.71
October ^{a,b,c}						
Maxi-Ride	613	8,588	2,698	2,050	6,538	2.42
Jitney-Ride	121	1,694	1,540	462	1,232	0.80
Total	734	10,282	4,238	2,512	7,770	1.83
November ^{a,b,c}						
Maxi-Ride	562	7,864	2,471	1,878	5,986	2.42
Jitney-Ride	109	1,523	1,397	419	1,104	0.79
Total	671	9,387	3,868	2,297	7,090	1.83
December ^{a,b,c}						
Maxi-Ride	589	8,245	2,588	1,967	6,278	2.43
Jitney-Ride	121	1,694	1,453	436	1,258	0.87
Total	710	9,939	4,041	2,403	7,536	1.86

^a Fare increased from \$0.50 to \$1.00 on July 5, 1981.^b Service area expanded to cover Willoughby; vans increased from 1 to 2, hours extended in morning and evening, and Jitney-Ride available in peak periods.^c Revenue from bus transfer riders allocated to bus route of origin. Therefore, the average fare was reduced.

Table 4. Coronado jitney: 1981 monthly evaluations.

Item	In-Service Hours	Cost (\$)	No. of Passengers	Revenue (\$)	Deficit (\$)	Deficit per Passenger (\$)
Bus Route No. 16	112	3,024	1,858	651	2,373	1.28
Maxi-Taxi						
November 23-December 31, 1980	185	2,590	714	300	2,290	3.21
January 1981	155	2,170	714	300	1,870	2.62
February	112	1,946	738	310	1,638	2.22
March	124	2,163	822	288	1,875	2.28
April	120	2,100	844	295	1,805	2.14
May	124	2,170	1,024	358	1,812	1.77
June	120	2,079	929	325	1,754	1.89
July ^a	124	2,170	924	416	1,754	1.90
August ^a	124	2,170	606	273	1,897	3.13
September ^a	104	1,456	609	274	1,182	1.94
October ^{a,b}	124	1,736	614	356	1,380	2.25
November ^{a,b}	116	1,624	546	317	1,307	2.39
December ^{a,b}	120	1,680	600	348	1,332	2.22

^a Fare increased from \$0.50 to \$0.60 on July 1, 1981.^b Revenue from bus transfer riders was allocated to bus route of origin.

Table 5. Passenger trips per vehicle hour for daytime routes.

Time Period	Passenger Trips				
	Churchland	Ocean View	Deep Creek	Bowers Hill	Avg
6:00-7:00 a.m.	—	—	6.2	1.6	4.1
7:00-8:00 a.m.	4.2	—	3.6	1.6	3.1
8:00-9:00 a.m.	5.6	2.6	5.2	3.8	4.1
9:00-10:00 a.m.	3.6	3.5	3.3	3.4	3.5
10:00-11:00 a.m.	2.3	5.6	4.2	1.6	3.6
11:00 a.m.-12:00 p.m.	3.0	5.3	3.5	3.2	3.9
12:00-1:00 p.m.	4.3	4.3	4.5	1.6	3.7
1:00-2:00 p.m.	5.3	5.2	3.2	2.8	3.9
2:00-3:00 p.m.	2.8	4.0	4.2	2.4	3.4
3:00-4:00 p.m.	6.3	5.6	5.2	1.8	4.7
4:00-5:00 p.m.	0.8	5.0	5.8	2.4	3.8
5:00-6:00 p.m.	2.5	1.8	5.3	3.8	3.5
6:00-7:00 p.m.	—	—	4.0	2.6	3.4

Table 6. Passenger trips per vehicle hour for nighttime routes.

Time Period	Passenger Trips			
	Hampton Boulevard	Portsmouth (night)	Coronado	Avg ^a
6:00-7:00 p.m.	—	1.9	—	1.9
7:00-8:00 p.m.	2.3	2.7	—	2.6
8:00-9:00 p.m.	4.2	2.9	—	3.2
9:00-10:00 p.m.	3.8	3.9	9.8	3.9
10:00-11:00 p.m.	6.3	3.1	11.8	3.9
11:00 p.m.-12:00 a.m.	3.3	0.2	6.5	1.0
12:00-1:00 a.m.	—	—	3.8	—

^aDoes not include Coronado because it has jitney service.

discourtesy, inadequate dispatcher and driver coordination, inefficient routing and scheduling, improper vehicle speeds and layovers, and physical problems with vehicles and at stops.

Many operational problems were spotted. Drivers took fares from passengers and did not deposit them in the fare box. Fare boxes were broken and pilfered. Drivers carried friends and their family members free. Riders had difficulty identifying Maxi-Taxi vans, especially at night. Dispatcher and driver coordination was often lax and riders sometimes waited hours for pickups. Vehicles were not always clean, and drivers went out of the service area or took unexcused breaks.

A number of actions have been taken to remedy these problems. TTDC increased its supervision and assigned an individual to manage paratransit and other contract and special services. Closer monitoring has been implemented, and some drivers have been dismissed. Specifications for more appropriate vehicles have been developed, and other contractors have been solicited to provide additional services.

SERVICE CHANGES

It became evident that, based on the monthly evaluations and budget constraints, changes in service level were required. The following statements summarize the analysis and changes.

1. As part of a bus service reduction, it was decided to expand the service area of the Bowers Hill Maxi-Taxi to include an adjacent neighborhood in Portsmouth. Bus service was terminated by truncating a route at the shopping center. The new Bowers Hill-Simonsdale service area, which provided transfers to bus service at the shopping center, was implemented in September 1981.

2. The College Park service was terminated March

1, 1981, due to inadequate ridership, which never reached more than 80 riders/month.

3. The Great Bridge service showed promise in developing ridership; however, only one van was required according to ridership (721 riders/month) during the first 60 days of service. Therefore, one van was eliminated March 1, 1981. This service was again evaluated after several more months. At that time service was terminated because of the high deficit per passenger (\$4.33) and because of funding limitations from the demonstration project and the city of Chesapeake.

4. The Hampton Boulevard Maxi-Taxi serves riders who formerly used TTDC buses. Two vans served this area, but ridership (885 riders/month) warranted only one van. One van was eliminated March 1, 1981.

5. Ridership in the Ocean View service area was satisfactory, and the potential market is large. It was proposed to add one van in combination with expanding the service area. The service area was expanded to cover a neighboring community where bus service was terminated. A fixed-route jitney service was provided during the morning and evening peak periods, with demand-responsive service in between. This service expansion became effective September 6, 1981.

6. Ridership on the Suffolk rural Maxi-Taxi was extremely light—never more than 6 riders/day—and significant market potential was not detected. This service was terminated March 1, 1981.

7. Ridership on Portsmouth night service was sufficient, as was the market potential. However, after the first 60 days of service, the data indicated that four vans were not required to serve this area, which had a ridership at 1,375 riders/month. Therefore, one van was terminated on March 1, 1981. But because of funding constraints from of this project and the city of Portsmouth, and because of the continued high deficit per passenger (\$7.64), this service was terminated November 1, 1981.

8. Churchland Maxi-Taxi was assessed after 60 days of service and it was determined that neither ridership (994 riders/month) nor market potential warranted two vans. One van was eliminated March 1, 1981. After almost a year of service, the data indicated that only a few people rode the Maxi-Taxi before 7:00 a.m. and after 6:00 p.m. Service was reduced to 7:00 a.m. through 6:00 p.m. on November 1, 1981.

9. TTDC held five public hearings throughout the Tidewater area during spring 1981 concerning service and fare changes for the entire TTDC transit system. At this time the name of the service was changed from Maxi-Taxi to Maxi-Ride as a result of objections by some private taxicab operators. New fares for Maxi-Ride became effective July 5, 1981, as follows:

Service Area	Old Fare (\$)		New Fare (\$)	
	Flat	Zone	Flat	Zone
Churchland	1.00		1.50	
Bowers Hill	1.00		1.50	
Deep Creek	1.00		1.50	
Portsmouth night service	0.50	0.20	1.50	
Hampton Boulevard	0.50	0.20	1.00	
Ocean View	0.50	0.20	1.00	
Coronado	0.50	0.20	0.60	0.25

The new fares have had a substantial effect on ridership, which was reflected in the monthly evaluations for Deep Creek, Ocean View, and Coronado.

UNION LABOR AND INSTITUTIONAL ISSUES

The initiation of paratransit services generated concern by a variety of groups that provide transportation in the Tidewater area. Actions taken to implement a new service are generally met with at least an equal reaction by those who will be affected by the service. This reaction process then produces a final implementation program that has been tempered by competing or opposing interests. Reflecting this process, paratransit services were accepted into TTDC's regular service delivery program for public transportation.

One implementation issue was the impact on bus operator jobs. The regular transit bus operators and mechanics of TTDC are represented by a collective bargaining agent, Local Division 1177 of the Amalgamated Transit Union, AFL-CIO. During the public hearing on the proposed paratransit services, an attorney for the union presented a prepared statement in opposition to the new services and in favor of continuing regular bus services. The union also wrote to the state funding agency to protest funding of the new services.

During the term of the project, union officers observed the new operations closely and reported any difficulties, such as appearance of drivers, off-route trips, cleanliness of vehicles, or possible mishandling of fares. In addition, union officers talked steadily about widespread concern among the employees about the loss of jobs if the new services were successful. Although no employees were furloughed as a result of the new services, or were any employees furloughed for any reason during the term of the project, job security was presented by the union as a major fear of the employees.

Another implementation issue was the impact of the new services on existing providers of similar services; i.e., the private taxicab companies. During the early stages of project planning, TTDC staff assumed that the taxicab companies would welcome the type of services to be provided by the project, as they would represent a new market and possible expansion of their business. During the public hearing before beginning the services, a representative of a cab company spoke against the new services on the grounds that they would result in a loss of jobs for cab drivers because the project services would attract riders who were currently using cabs and thus result in less cab business. This concern was presented even though it was widely advertised that the new services would be provided through contracts with private taxicab companies. Further, the owner of a large taxi company wrote the state to protest funding of the project as a subsidized intrusion against private enterprise.

The major taxicab companies in the area declined to bid for the services to be provided by the project. During the course of the project the major taxicab companies sought and obtained through the Virginia General Assembly approval of a bill that

clarified the enabling legislation for transportation district commissions to ensure that taxicab services shall not be regulated by the district commissions. In response to this concern, TTDC changed the name of project services from Maxi-Taxi to Maxi-Ride as a way to distinguish the group of shared-ride services included in the project from the regular, exclusive-ride services provided by private taxicab companies.

It is curious to note that both the bus and cab operators perceived the new services to be a threat to their job security, even though one group would clearly receive more jobs.

At the conclusion of this project, only one taxi operator was providing all the Maxi-Ride services. Subsequent to the conclusion of the project, TTDC expanded substitute services in other service areas. The union objected, saying that the Section 13(c) agreement of the Urban Mass Transportation Act of 1964, as amended, does not permit contracting for these services. As of this writing, the union is attempting to have the federal district court order arbitration of contracting out services.

OBSERVATIONS AND CONCLUSIONS

Continuation of current transit services and patterns can be carried on without generating new concerns by users or providers of the services. Developing new services can generate many impediments that need to be overcome. Some of TTDC's experiences in implementing alternative services are presented in this section.

The provision of new and innovative services represents a change in the status quo and therefore generates reaction from existing providers of transportation services. As a specific example, several large taxi companies viewed the neighborhood bus substitution services as an infringement on their market and resisted expansion of these services. They declined to bid on operating the services under contract and sought changes in TTDC's enabling legislation to restrict the scope of services.

New services are outside the experience of the transit unions and are resisted because the results are unknown and they are perceived to threaten job security. For example, substituting low-capacity neighborhood services for regular bus services meant that the transit system needed fewer bus drivers, and the union reacted strongly (including lawsuits) to a decrease in the size of the bargaining unit, even when no employees were laid off as a result of the service changes. Drivers perceived new services as an eventual threat, even though they may not be furloughed, because the new services may affect wage and benefit levels in the long run by permitting the operation of services at lower wage costs.

Developing new services requires a great deal of policy board and management insight and initiative because most new services are starting for the first time. New services will need substantial revision between the time something is proposed and when it is implemented. Developing a dependable, useful, and timely monitoring system has been a significant, difficult, and important task of this project. The purchase of public transportation services, as well as the Maxi-Ride concept, is new to TTDC, and this has presented organizational problems. These problems include control of fare revenues, supervision of non-TRT-operated services, coordination of rider complaints, acceptance by union officials and TTDC planning and operating staffs, and development of working relations with service providers. It is anticipated that additional refinements will be made to the monitoring system.

The major accomplishments of this project are

1. Introduction of a low-cost alternative to bus service in low-bus-ridership areas,
2. Purchase of service from private providers,
3. Acceptance by public officials, and
4. Heightened awareness of changes by the transit union and the public.

The major problems encountered are

1. Challenges by the transit union;
2. Opposition by some private service providers;
3. Public resistance to change; and
4. Lack of experience in planning, marketing, monitoring, and evaluating the service.

The major impacts of this project with respect to the service provided to Tidewater citizens are that

1. Bus service would have been discontinued without alternative service, thereby leaving riders without any public transportation, and
2. Maxi-Ride failed in new service areas due to the lack of riders.

One can understand that change comes hard. Changing the traditional fixed-route public transit system into a variety of services tailored to people's travel needs is definitely hard. However, with the outlook for restricted and even reduced public funding for transit, transit operators must change their ways of doing business if they are to continue to provide services.

TTDC's service delivery program incorporates the belief that there is a high potential for payoff in less-costly and more useful services through offering a wide range of public transportation services. The effort required to change will be repaid many times over if TTDC can continue to provide services that would otherwise be discontinued because they are too expensive to fund. In the example of substituting neighborhood van-type services for bus routes, both taxi company and transit system employees have been noted as resisting the change. However, if transit is to continue in many neighborhoods for the benefit of all citizens, new ways must be found to provide at least a basic public transportation service. As the agency responsible for the public transportation in Tidewater, TTDC must balance the needs of the people for transportation with the difficulties involved in providing the appropriate service.

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Urban Bus Transport in Buenos Aires: The Colectivos

JOHN HIBBS

The urban bus system in Buenos Aires, which carries more than 50 percent of all trips and is provided by profitable medium-sized companies, is discussed. The developments of urban transport in the city, and the nature and organization of the component companies that have evolved there, are reviewed. Particular attention is drawn to the combination of medium-sized buses and high frequencies that is characteristic of Buenos Aires, and information is given about one particular company. It is concluded that the Buenos Aires experience has relevance for urban bus operation in Europe and North America. Conventional wisdom, which assumes that large business units and large vehicles are the optimum solution to the problems of urban transport, is questioned.

Conventional wisdom, at least in Europe, holds that urban passenger transport in public transport modes can only be provided through a subsidy out of public funds. In the course of research into the licensing and control of public road passenger transport in various countries, reference was found to the colectivos of Buenos Aires, and that city was visited in order to examine this bus system. It must be stressed, however, that this paper represents only a brief examination of the system.

It may come as a surprise that urban bus services can be operated at a profit, especially in a city as established and sophisticated as Buenos Aires. Because the city is more similar to cities in Europe and North America than to those of Third World countries, examination of the transport pattern of Buenos Aires makes for a relevant critique of the conventional wisdom—more so than many Oriental

cities, whose paratransit systems might not transfer well to western countries.

Buenos Aires has rail commuter services, a metro, and a large number of taxis, but, as seen in the table below, the colectivos provide the majority of trips by all modes (note that this table gives the 1970 modal split):

Mode	No. of Trips (000s)	Percentage
Bus	9,458.0	54.3
Rail	1,216.4	7.0
Private car	2,680.5	15.4
Taxi	1,177.0	6.7
Metro	948.1	5.4
Walk	1,410.0	8.1
Other	537.6	3.1

The routes lie close together, and the services run on headways often between 1 and 3 min, with bus stops about 275 m apart. There is no prohibition on getting on or off the bus between stops when speeds permit. People do not have to stand in line. The buses seat about 25, and there is room for at least 30 more passengers. Most buses are built locally by Mercedes (with locally built bodies) and are painted in bright colors. Route numbers, destinations, and route details are painted on the exteriors. The services are shared among 142 firms that run 172 routes; and the average fleet size is about 55. Al-