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# **Evolution of The Knoxville Transportation Brokerage System**

Interim Report October 1976

Service And Methods Demonstration Program



U.S. DEPARTMENT OF TRANSPORTATION Transportation Systems Center

Prepared for

Urban Mass Transportation Administration Office of Transportation Management and Demonstrations

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PREFACE

This report is the synthesis of considerable information derived from meetings with the Knoxville project team and representatives of the Urban Mass Transportation Administration and the Transportation Systems Center.

We are particularly indebted to Dr. Frank Davis, Jr., Mr. John Beeson, and Mr. Kenneth Faulkner of the University of Tennessee Transportation Center, Mr. James Bautz of the Urban Mass Transportation Administration, and Ms. Carla Heaton of the Transportation Systems Center for their invaluable reviews and comments. METRIC CONVERSION FACTORS

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### LIST OF ABBREVIATIONS OR SYMBOLS

American Transit Corporation ATC CBD central business district DOT (U.S.) Department of Transportation ETDD East Tennessee Development District КТА Knoxville Transit Authority KTBS Knoxville Transportation Brokerage System KTC Knoxville Transit Corporation OST Office of the Secretary of Transportation Preliminary Application for Federal Assistance PAFA Public Service Commission PSC regional transportation authority RTA Service and Methods Demonstration SMD SMSA Standard Metropolitan Statistical Area TVA Tennessee Valley Authority Urban Mass Transportation Administration UMTA University of Tennessee UT vehicle-miles traveled VMT

### 1. INTRODUCTION

A federally sponsored demonstration is being conducted in Knoxville, Tennessee to test the feasibility and effectiveness of an innovative transportation concept involving a "transportation broker" who matches individual traveler demand and transportation supply across a wide range of user groups, providers, and modes. The brokerage concept is viewed as having special potential to improve transit service coverage and productivity by encouraging the efficient supply of new and expanded transit and para-transit services.

The Knoxville Transportation Brokerage System (KTBS) Demonstration Project is funded by the Urban Mass Transportation Administration (UMTA) as part of the Service and Methods Demonstration (SMD) Program. The SMD Program was established to develop, demonstrate, and evaluate new applications of current transit equipment and management techniques in providing improved quality and quantity of public transportation. This project addresses SMD Program objectives in developing and demonstrating new applications of existing transportation equipment through innovative management techniques.

The two-year demonstration project is being jointly sponsored by the City of Knoxville and the Tennessee Bureau of Mass Transit, within the Tennessee Department of Transportation. The project is under the overall coordination of the City, with planning, operational, and management activities performed by the University of Tennessee (UT) Transportation Center. Total funding for the project is \$1,116,539, consisting of \$997,959 in UMTA SMD funds, and \$118,580 in local inkind services.

The Knoxville demonstration emphasizes the promotion of all forms of ridesharing, including fixed route transit service,

express bus service, vanpooling, and carpooling. The brokerage function is being performed by a special organization within the UT Transportation Center, designated the Knoxville Commuter Pool. In addition to its primary function of identifying and coordinating existing and potential sources of supply and demand, the broker is attempting to reduce the institutional barriers to ridesharing and provides information and advice to potential ridesharers. An important component of the KTBS project is the establishment of an areawide vanpooling program promoted through the leasing of city-owned vans to groups of commuters traveling outside the transit service area.

This document is an interim evaluation report, primarily aimed at shedding light on some of the planning and implementation aspects of the project. Given the complexity and diversity of the KTBS demonstration project, an understanding of pre-demonstration activities (i.e., evolution of the project up to a time roughly representing operational status) is crucial to accurate interpretation of ultimate, post-demonstration project findings. Information was gathered through an in-depth review of existing documentation, and personal interviews with representatives of UT, City of Knoxville, and various legal agencies.

Chapter 2 of this report describes the transportation brokerage concept and the objectives and issues addressed by the demonstration project.

Chapter 3 describes KTBS service area characteristics, identifying features of the demonstration site which may have bearing on transferability of findings, including geographic, demographic, and existing transportation system characteristics.

Background factors and events that shaped the development of the transportation brokerage system concept and its eventual demonstration in the Knoxville area are documented in Chapter 4. Included are activities of key agencies, identification of

obstacles to implementation -- those overcome as well as those remaining to be overcome -- and an outline of proposed demonstration project activities.

Chapter 5 summarizes findings related to pre-operational implementation activities, emphasizing factors likely to be encountered by other locales considering implementation of a transportation brokerage system.

### 2. OVERVIEW OF DEMONSTRATION PROJECT

A description of the general transportation brokerage concept contributes to an understanding of the application of this concept in the Knoxville area, demonstration project objectives (both SMD and local), and issues of potential national significance.

#### 2.1 TRANSPORTATION BROKERAGE CONCEPT

A transportation broker performs the following functions:

1) Determination of transportation demand:

Identification of travel demands of commuters, employers, social service agencies, and other individuals or groups.

2) Determination of transportation supply:

Identification of: potential providers of transportation services, including publicsector institutions (e.g., transit authority) and private-sector institutions (e.g., charter bus companies, taxi companies); the gamut of vehicle types, including those under publicsector ownership (e.g., transit buses, cityowned vans) and private-sector ownership (e.g., private cars, vans, taxis); and fixedroute and demand-responsive operations.

3) Matching transportation demand and supply: Coordinating existing transportation facilities to meet expressed travel demands in the most effective, efficient manner. The implementation of a transportation brokerage system can assume many forms, based on a specific area's transportation "demand," "supply," and regulatory characteristics.

Administrators of the transportation brokerage system in Knoxville stress a "commodities" approach to transportation. The following factors seem to set this approach apart from transportation planning philosophies that emphasize fixedroute, single-mode service:

- Perception of transportation as a flexible commodity that is able to adapt to the diverse demands of a wide range of users.
- 2) Emphasis on marketing new transportation services.
- 3) Willingness to modify existing statutes discouraging para-transit operations in order to enable potential transportation providers to meet the full complement of expressed transportation demand in a situation closely approximating a free market. (Regulatory considerations constitute a key issue of potential national significance and are discussed in a later chapter.)

#### 2.2 DEMONSTRATION PROJECT OBJECTIVES AND ISSUES

The Knoxville demonstration project is intended to explore the institutional and operational feasibility, as well as the attendant transportation service impacts, of a transportation brokerage system. The transportation brokerage demonstration in Knoxville addresses three SMD Program objectives:

- increased transit coverage;
- 2) increased transit vehicle productivity; and
- 3) improved service for the transit dependent,

as well as several local objectives set forth in the demonstration grant application and subsequent project documentation. Local objectives include:

- 1) reduction in vehicle-miles traveled (VMT),
  with attendant improvements in environmental
  and traffic conditions;
- reduction in energy consumption;
- 3) provision of balanced transportation facilities for rural areas;
- 4) improved employment opportunity, especially for the rural poor;
- 5) improved goods movement, coordinated with passenger transportation facilities;
- 6) improved economic opportunities for small and minority businesses, primarily through provision of transportation services; and
- 7) improved coordination among planning agencies.

This project addresses a somewhat broadened set of SMDrelated objectives, in the sense that paratransit services, as well as traditional transit, will be considered. Transit coverage expansion is primarily anticipated in rural areas and in areas of Knoxville characterized by reverse commutes, where trip density levels do not justify conventional fixedroute service. In addition, feeder lines to express freeway buses and taxi coordination services are slated for introduction and should increase the range of public transportation beyond its present scope. Increased productivity is expected to come about through the more efficient matching of demand and supply, i.e., arranging for the most appropriate service to meet an identified need. Service improvements for the transit dependent -- the elderly, handicapped, and jobless -will be effected through the innovative approaches taken

toward providing services (e.g., midday uses of commuter vehicles) and the less restrictive insitiutional climate fostered by the brokerage system.

In order for this demonstration to have maximum national applicability, a carefully structured evaluation will be undertaken by the Transportation Systems Center of the U.S. Department of Transportation. The evaluation will focus on:

- 1) planning, implementation, and operational issues relating to the Knoxville brokerage system demonstration -- in particular, legal, institutional, administrative, technical, and coordination groundwork required to establish a brokerage system, and KTBS effectiveness in performing demand determination, supply determination, and coordination/service implementation function; and
- 2) an assessment of the transportation impacts resulting from the implementation of the brokerage system and its ride-sharing services -- for example, improvements in transit coverage and productivity. The measurement of service involves both actual changes in transportation system attributes, and individuals' and organizations' perceptions of the brokerage system.

The evaluation effort involves preparation of an evaluation plan, describing in detail the data requirements and methodology for collecting and analyzing data, and performance of the evaluation according to the approved plan, culminating in a series of interim and final evaluation reports.

### 3. PROJECT SERVICE AREA CHARACTERISTICS

The implementation activities for the KTBS demonstration project cover an unusually wide range and, for that reason, should be placed in their environmental context for the purpose of enhancing transferability of pre-operational-phase findings.

The KTBS service area was defined as the 16-county East Tennessee Development District (ETDD) (Figure 1) primarily because this region was already the subject of extensive analysis. The major thrust of KTBS services, however, will be aimed at the Knoxville Standard Metropolitan Statistical Area (SMSA), consisting of three adjacent counties (Figure 2): Knox, Blount, and Anderson.

Knoxville is the only major metropolitan center in eastern Tennessee. Other major cities in the KTBS service area are Alcoa/ Maryville (in Blount County) and Oak Ridge/Clinton (in Anderson County). There are no urban centers in the balance of the KTBS service area, though there are many towns with populations ranging from 3,000 to 10,000.

#### 3.1 DEMOGRAPHIC COMPOSITION

The Knoxville SMSA falls into the category of a "smaller urban area," with a population under 500,000. Key demographic data from the 1970 Census (with 1975 population updates) are presented in Table 1 for the City of Knoxville, the Knoxville SMSA, and the KTBS service area, respectively. While most data have changed in absolute number since 1970, it is felt that the demographic differences between urban and rural sections of the KTBS service area have remained fairly consistent.

Employment-related data from the 1970 Census (Table 2) indicate that managerial, professional, clerical, and service occupations generally account for a greater percentage of the work



Figure 1. KTBS Service Area





#### Table 1. Selected 1970 Census Demographic Data for Knoxville, Knoxville SMSA, and KTBS Service Area

DEMOGRAPHICS	KNOXVILLE	KNOXVILLE SMSA	KTBS SERVICE AREA
Population			
1970	178,991	400,337	700,985
1975	173,596	416,829	729,762
Annual growth 70-75	-0.8%	+1.0%	+1.0%
<u>Sex</u>			
Male & of population	47.0	48.0	48.3
Race	33.0	32.0	
White )	87.2	92.9	94.8
Black & of population	12.4	6.9	5.0
Other	0.3	0.2	0.2
Number of Families	45,380	105,888	186,136
Average Family Size	3.3	3.4	3.5
Number of Households	58,292	126,837	218,483
Average Household Size	2.9	3.0	3.1
Family Income			
Under \$5.000	28.1	26.4	32.8
\$5,000 - 9,999	36.2	36.8	37.7
\$10,000 - 25,000	31.9	33.7	27.3
Over \$25,000	3.8	3.1	2.3
Average	\$9,412	\$9,325	\$8,217
Median	\$7,982	\$8,236	\$7,168
Age			
0-20	37.4	38.3	38.6
21-39	24.3	24.7	24.7
40-64 % of population	27.5	27.6	27.0
65+ )	10.9	9.4	9.6
Median	27.8	28.8	28.7
Educational Level of Adults Over 25 Yrs.			
1- 8 years	30.1	32.2	41.5
9-11 years	18.2	17.0	16.4
12 years & of population	28.1	28.6	25.2
13-15 years	11.6	10.8	8.5
16+ years '	12.0	11.3	8.4
Household Auto Ownership			
None	20.9	15.1	16.2
One & of population	45.2	44.9	46.2
Two	29.2	34.4	32.3
Three or more	4.7	5.6	5.3

<sup>1</sup>CACI, Inc. proprietary SITE Program, forecasts based on methodology developed by National Planning Data Corporation, Ithaca, NY.

# Table 2.Employment Data From 1970 Census for Knoxville,<br/>Knoxville SMSA, and KTBS Service Area

	KNOXVILLE	KNOXVILLE SMSA	KTBS SERVICE AREA
Total Number Employed	64,968	142,927	240,943
Occupation	Percent	Percent	Percent
Managerial/professional	26.4	25.9	21.5
Sales	8.8	7.7	6.5
Clerical	18.0	15.8	13.5
Craft	11.8	15.0	15.8
Operative	14.9	17.2	22.5
Laborer	3.8	4.3	5.2
Farm	0.2	0.9	2.7
Service	13.8	11.5	10.7
Private	2.2	1.7	1.6

force in the City of Knoxville than in the SMSA, and a much greater percentage than in the aggregate KTBS service area. On the other hand, craft, operative, and labor occupations account for a greater percentage of the work force in the aggregate service area than in the SMSA or Knoxville. Surprisingly, only 2.7 percent of those employed in the service area -- land almost totally rural -- are in farm-related occupations.

#### 3.2 GEOGRAPHIC/LAND USE CHARACTERISTICS

Knoxville's location in relation to the United States' Southeast, Great Lakes, and Midwest regions has prompted the area's growth as a manufacturing and trade center; at the same time, its proximity to the Great Smokey Mountain National Park, to the south, has fostered Knoxville's growth in tourist industries.

Climate in the Knoxville area is fairly mild, with an average yearly temperature of approximately 60 degrees, a midwinter average temperature over 41 degrees, and few extremes of heat or cold.<sup>1</sup>

Topography is varied, typified by rolling hills and several bodies of water, including a series of lakes joined by the Tennessee River. The Knoxville central business district (CBD) is situated on a hill overlooking what is now Fork Loudon Lake. Topography has influenced development patterns in the City of Knoxville, as well as in outlying areas; due to the abundance of topographical "borders," transportation and development corridors are perceptible on the regional landscape.

Knoxville is a connecting point for both rail and interstate highway transportation corridors. I-40 (toward points west and east) and I-75 (toward points north and south) intersect adjacent to the Knoxville CBD, while I-81 (toward the northeast) joins I-40 at a point several miles further east. (See Figure 2.) Freight

<sup>1</sup>South Central Bell, Directory Insert, 1975.

train traffic is heavy in the Knoxville terminal; passenger train travel is almost nonexistent. Regional air travel needs are served primarily from the recently constructed McGhee Tyson Airport, approximately twelve miles south of the Knoxville CBD, in Alcoa, Tennessee.

Numerous manufacturing concerns, ranging from chemical to heavy machinery production, are located in Knoxville. However, as in many expanding metropolitan areas, there is a discernible trend toward suburban and exurban locations for light manufacturing and administrative business. For example, while the largest employment center in the region, the Tennessee Valley Authority (TVA), recently constructed new headquarters in the Knoxville CBD as part of an urban redevelopment project, the second largest employer, the Oak Ridge National Laboratories, is located approximately 30 miles west of the Knoxville CBD, in the City of Oak Ridge, Tennessee.

The larger centers of employment have been surveyed in preliminary ride-sharing research efforts. Narrative descriptions of these facilities, along with their impacts on commuting trends, are provided in the 1975 UT Transportation Center publication, <u>Ride-</u> sharing and the Knoxville Commuter.

The Knoxville CBD is characterized by high intensity retail, office, and service functions;<sup>1</sup> besides commercial uses, this area also accommodates educational institutions, such as the University of Tennessee, and cultural facilities. Around the Knoxville CBD is a "ring" of deteriorating housing, mixed with older commercial and industrial facilities.

Residential areas developed in the 1920s and '30s surround this ring, characterized by single-family residences and, along former streetcar lines, scattered commercial uses. Urban residential development after World War II was contiguous to past

Public Transportation in the SMSA: A Critical Review, East Tennessee Development District, 1973, p. II-24.

developments but, during the past ten years, has "sprawled" in leap-frog fashion into unincorporated areas of Knox County, especially toward the west and north.<sup>1</sup> Commercial developments have followed this suburban sprawl, oriented along commercial "strips" on major arterial highways.

#### 3.3 EXISTING TRANSPORTATION SERVICES

The Knoxville area features a complement of transportation services that is not unusual for a "smaller urbanized area." Prior to implementation of the KTBS, the following passenger transportation modes were available:

- public transit normal route and express service;
- privately owned buses;
- 3) employer-sponsored transportation programs;
- 4) commercial taxis and limousines; and
- 5) privately owned automobiles, vans, and trucks.

#### 3.3.1 Public Transit

Transit in Knoxville came under public ownership in 1967, when the former private transit bus company ceased operations. The City of Knoxville took over all transit properties and assumed responsibility for providing transit services. The Knoxville Transit Authority (KTA) was appointed to govern public transit policies and contract with a private operator, since the City of Knoxville had neither the personnel nor the inclination to operate the system itself.

The American Transit Corporation (ATC), a St. Louis-based transit management firm, was called in to manage and operate the

<sup>1</sup>Public Transportation in the SMSA: A Critical Review, p. II-25.

Knoxville bus system. It established the Knoxville Transit Corporation (KTC) as its wholly owned subsidiary and the local operating agency. Operations -- including personnel considerations, financial management, and implementation of routing and scheduling procedures (based on guidelines set forth by the KTA) -- are handled at the KTC facilities in Knoxville. Bookkeeping and analysis functions are performed at ATC headquarters in St. Louis. ATC is compensated at four percent of gross transit revenue.

The KTC presently operates 80 buses along eight regular routes that are all primarily within the Knoxville city limits. Ridership analyses indicate that the overall system operates at approximately 50 percent of capacity during peak commuting hours.<sup>1</sup> Occupancy is higher on inner-city runs than on longer suburban runs.<sup>2</sup> These low-ridership suburban runs are subsidized at 45 to 50 cents per rider, based on an operating cost of 84 cents per vehicle-mile.

Operating costs have risen fairly steadily (Figure 3). The stabilization through 1972 is probably due to the introduction of 40 new buses to the KTC fleet; repairs during their first year of service were covered by the manufacturer's warranty. Since expiration of vehicle warranties, operating costs have once again climbed. ("Operating costs" denote day-to-day operating expenses only; depreciation, interest, fees, taxes, etc. are not taken into account.)

During both peak and off-peak hours, KTC ridership has declined in the last several years (Figure 4), with the exception of the year in which the fleet of 40 new buses was introduced to the system. Surveys have indicated that transit users in Knoxville are primarily transit-dependent, i.e., persons for whom public

<sup>1</sup>Ridesharing and the Knoxville Commuter, p. 60.

<sup>2</sup>Ibid., p. 57.



Source: KTC Annual Financial Report

Figure 3. Average Operating Cost of KTC by Year



Source: ETDD, Public Transportation in the SMSA: A Critical Review, 1973, p. I-8.

Figure 4. KTC Transit Ridership, 1950-1972

buses are the only viable means of transportation. The following specific KTC normal route ridership characteristics have been noted:

- 1) 69 percent are female.
  - 2) 73 percent are not able to drive.
  - 3) 47 percent have no car in the household.
  - 68 percent have no other means of transportation.
  - 5) 39 percent are laborers or domestics.
  - 6) 30 percent are students or housewives.

KTC introduced express suburban commuter runs in fall 1973, in cooperation with Stanley Stokey of the Tennessee Valley Authority and Donald Mauldin of the Knoxville City Traffic Department. Express runs originate primarily at ad-hoc park-and-ride lots in suburban neighborhoods and run non-stop over the fastest route (usually the Interstate Highway system) to a CBD drop-off point in front of TVA headquarters. Afternoon buses queue along the same CBD arterial and run non-stop to morning pick-up stations. There are eleven express routes operated by the KTC.

Express bus patronage has increased (Figure 5), in contrast with normal route patronage. In fact, express bus demand has exhausted KTC supply, causing the TVA (which was highly instrumental in initiating express bus service) to turn to private bus companies for supplementary service. (Private bus company operations are discussed in a later section.)

Also in contrast to normal KTC route ridership characteristics, express bus riders are not primarily transit-dependent. The

Ridesharing and the Knoxville Commuter, p. 63.





following notes provide an indication of express bus ridership characteristics:<sup>1</sup>

- Only 5 percent fall outside the 20-55 age range; median age is 35.
- 72 percent have incomes over \$10,000; median income is \$18,000.
- 3) 77 percent are male.
- 4) 99 percent are licensed drivers.
- 96 percent have automobiles available to them for commuting trips.
- 6) The majority are professionally employed.

According to user surveys, the following three reasons for using express service were mentioned most often (in this order):<sup>2</sup>

- fuel conservation;
- 2) freedom from tension; and
- lower commuting cost (although fares are double those for normal KTC route service).

#### 3.3.2 Privately Owned Buses

Privately owned bus lines in the Knoxville area fall into four categories:  $^{3}$ 

<sup>1</sup>Ridesharing and the Knoxville Commuter, p. 69.

<sup>2</sup>Ibid., pg. 74.

<sup>&</sup>lt;sup>3</sup>UT Transportation Center, "Summary of Intercity Bus Operations in the State of Tennessee," for the Tennessee Department of Transportation, 1974, p.2.

- interstate common carriers, such as Greyhound and Continental Trailways, which have minimal impact on urban transportation;
- 2) <u>tour operators</u>, which offer service on a seasonal or irregular basis and thus have minimal impact on urban transportation;
- 3) intrastate carriers, which are, in general, small companies that serve primarily to transport commuters during peak periods; facilities are not extensive in most cases; rather, several intrastate bus carriers share facilities with each other or interstate carriers; and
- <u>occasional carriers</u>, which feature neither regular routes nor service; instead, they generally offer charter service in response to individual customer demands; they do not operate terminals.

An unknown number of church bus fleets exist, most in rural enclaves. For the most part, these fleets are used for local group transportation to religious events; however, operators have been known to provide transportation that amounts to nonsectarian charter service. The tax and insurance system favors church bus fleets over nonreligious bus enterprises, such as Greyhound, Continental Trailways, and independent charter companies, through non-profit institution tax exemptions and lower insurance rates.

#### 3.3.3 Employer-Sponsored Vans

Based on exemplary private-sector van pool programs in other areas (in particular, the Minnesota Mining and Manufacturing (3-M) Company's van pool program in the Twin Cities area), the Tennessee Valley Authority, the largest employment center in Knoxville,

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initiated a similar program in mid-1974 in response to the energy shortage. Since the TVA is a government agency and Federal law prohibits government vehicle use for employee commuting, the TVA credit union (a private agency) holds van leases and negotiates rider contracts.

Vans were leased, rather than purchased, to reduce capital requirements and allow the program to be aborted swiftly, should it prove unsuccessful. A van pool committee (composed of two TVA representatives and three credit union representatives) manages the operation, setting policies, determining subleasing rates and rider fares, and screening applicants for driving positions.

Van pool system vehicles are twelve-passenger Ford vans, leased for two-year periods. The fare structure is designed so that a van recovers all costs with ten paying passengers plus the driver (who rides free); fares vary in proportion to trip length.<sup>1</sup>

MONTHLY FARE
(\$)
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31

bource. Reaconating and the Rhonville commuter, p	<sup>-</sup> Source:	Ridesharing	and	the	Knoxville	Commuter,	p.	77
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Drivers are given complete authority to establish and maintain their pools -- leading to fairly high compatibility within commuting groups -- but must perform within defined parameters (e.g., reliability of pickup times, arrangement for alternate drivers, etc.). In addition to riding free, drivers are compensated by being allowed to use vans during non-commuting hours, paying only for personal mileage at seven cents per mile.

Riders sign contracts with the credit union, indicating that they will participate in the system for at least one month; after eleven months of regular patronage, the rider is entitled to free system use for the twelfth month. Payment is arranged through payroll deduction, credit union savings accounts, or cash transactions.

TVA van pool program patrons, like express bus patrons, are not comprised of the transit dependent, as exhibited by the following points:

- 95 percent commuted by automobile prior to van pool program initiation.
- 82 percent of former automobile commuters drove; the remainder car pooled.
- 3) Only 15 percent of van pool system users have family incomes below \$10,000; 41 percent have family incomes above \$20,000.
- 4) 92 percent are in the 20-55 age range.
- 5) 98 percent are licensed drivers.

Passengers seem to prefer centralized pickup points, rather than door-to-door service. Door-to-door service would entail excessive trip times for those collected early in the pickup sequence.

The Southern Athletic work bus program and South Central Bell taxi shuttle service are other examples of employer-sponsored transportation programs in the Knoxville area.

The Southern Athletic service was instituted following new plant construction in a suburban industrial park at significant distance from the former central Knoxville plant site. Rather than lose trained personnel who were either unwilling or unable to drive to the new facilities, Southern Athletic attempted to arrange a morning and evening KTC express run between new and old plant sites. Since no KTC buses were available, the company decided to purchase a used 40-passenger school bus and provide express service itself. A Southern Athletic employee drives the bus. Riders pay 15 cents per run; losses are covered by the company. Demand greatly exceeds bus capacity.

Originally conceived in the early 1950s as a personal security fringe benefit for night operators, the South Central Bell taxi shuttle system is essentially an informal agreement with a cab company to supply shared-ride commuter transportation to Bell night employees. A Bell supervisor contacts the cab company in the morning, detailing the number of employees to be transported that night and their destinations. The cab company dispatches the minimum number of vehicles to provide fairly direct transportation for participating Bell employees. Bell covers cab fares up to \$3.75 per passenger-trip; fare balance (if any) is covered by riders. Average cab occupancy under this program is 1.3 passengers. The average cost per passenger-trip is \$2.11.

#### 3.3.4 Commercial Taxis and Limousines

Commercial taxi and limousine services in the Knoxville area do not comprise a significant portion of overall area transportation. Limousines operate primarily between Tyson McGhee Airport in Alcoa and Knoxville CBD hotels. Taxi companies in Knoxville are owned by two corporations, each with central dispatch and maintenance facilities serving several subsidiaries.

Knoxville's taxi industry is regulated by the city government, which sets fares and specifies service areas. Recent increases in fuel, maintenance, and insurance costs have not been reflected
in fare hikes; therefore, taxi companies are in fairly precarious positions, with deteriorating equipment and high employee-turnover rates.

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## 4. PROJECT EVOLUTION

The KTBS is the product of numerous interrelated factors and influences, including transportation marketing theories, economic and political motivations, community support, legislative action, and multi-disciplinary involvement in implementation. Figure 6 provides a chronology of significant events in KTBS evolution. The time element is most instructive with regard to implementation activities that were not related to institutional and management activities. For example, the time element associated with van procurement would probably be applicable to a wide range of future brokerage sites. On the other hand, it is not possible to generalize that the time required for the KTBS to bring about regulatory change would be the same for other states or even other cities.

### 4.1 PROJECT ORIGINS

The KTBS demonstration project evolved out of a series of essentially independent activities from 1973 through 1975. Contributing to the background material that ultimately supported the City of Knoxville's "Preliminary Application for Federal Assistance. . ."<sup>1</sup> were developments involving public transit and employment centers, university research, and Federal government support.

### 4.1.1 Public Transit and Employment-Center Programs

In 1973, despite the fact that the KTC was undergoing ridership declines and cost increases, buses were being deployed in a manner that offered fairly uniform service to many Knoxville neighborhoods -- including low-ridership suburban neighborhoods. Buses serving inner-city areas were running at more than 100 percent

<sup>&</sup>lt;sup>1</sup>"Preliminary Application for Federal Assistance for the Implementation of a Public Transportation Brokerage Service...," City of Knoxville, 1975.

1973	1974	1975
MAMJJASONDJ	J F M A M J J A S O N	DJFMAMJJASONDJ
<ul> <li>TVA ride-sharing program ini</li> <li>State Bureau of Area</li> </ul>	itiated ea Mass Transit established	
• U.T. research	1 proposal submitted to Federal F	Highway Administration
	daryo; energy crisis [de-sharing research project fund	ding approved
•	initial contact with state regula	atory agencies
	Vare regratature subcommittee	d to TVA ride-sharing program
	<ul> <li>Funding approve</li> </ul>	ed for ride-sharing project implementation
Discussion o	of UMTA paratransit demonstration	ns
at Tran	sportation Research Board meetir	• Bu
"Preliminary Application" s	submitted to UMTA; 12-point task	outline prepared •
	Tentative approval of demonstrat	tion project funding •
		Bids for vans submitted •
		Demonstration project funded •
		10 vans ordered •
		Knoxville mayoral election •
		Delivery of 10 vans
	I	Bids for van insurance submitted •
	Hearing h	before Public Service Commission •
	First class,	van pool driver training course •
	Regional transportat	tion authority concept developed
County judges cont.	Knoxville City Council forn cacted regarding participation ir	<pre>mally approves brokerage operations • n regional transportation authority •</pre>
		15 additional vans ordered •
Oak Ridge approves brokerage	E operations: first van pool in se	Beginning of Tyree city administration • ervice between Knoxville and Oak Ridge •
M A M J J A S O N D J	JFMAMJJASON	DJFMAMJJASONDJ
1973	1974	1975
		LEGEND
		• indicates month of event
Figure 6. Mi	ilestones in Development of	Demonstration Project

of seated capacity; meanwhile, buses serving mainly nontransitdependent suburban areas were running almost empty. During peak hours, the KTC fleet was used at only about half its capacity. Thus, transit supply was not being allocated as effectively as possible. Not until late 1973 were innovations introduced to the KTC system, and those only through heavy public-sector and privatesector encouragement.

The TVA, the largest employment center in Knoxville and environmentally oriented since its establishment in the 1930s, had tended to be active in areas with strong environmental impacts. It had long advocated car pooling for employees. But, when considering the potential impact of its new Knoxville CBD headquarters, on parking and downtown circulation, more comprehensive ride-sharing efforts came into play, further fueled by the concerns of the Knoxville City Traffic Engineering Department.

In March, 1973, the TVA Division of Personnel designed a computer program, based on residential zip codes, that identified potential ride-sharing groups for express commuter service to the TVA. As expected, large numbers of TVA employees had common worktrip origins and all shared the same worktrip destination and hours, indicating that vehicles of higher occupancy than private automobiles might prove efficient for commuting.

High-occupancy vehicle types under consideration were buses (e.g., the existing KTC fleet) and/or leased vans (leased, rather than purchased, since this was an experimental demonstration and the TVA wanted both to reduce capital outlay and to be able to abandon the program quickly, should it prove poorly received). Each vehicle type entailed problems. The KTC was reluctant to cover territories beyond the Knoxville city limits, where a high proportion of TVA employees resided; furthermore, the KTC viewed the express bus program as financially risky, especially since it removed vehicles from routes that were at least known, if not

profitable.<sup>1</sup> Vans, on the other hand, presented the problem of government agency restrictions against supplying vehicles for employee worktrip arrangements (see previous chapter); moreover, by the time the program received in-house approval, the 1973-74 energy shortage had set in and leased vans proved unavailable.

The Community Affairs Department of the Levi Strauss Corporation, an independent Knoxville area garment manufacturing concern, demonstrated its support of the TVA ride-sharing program -- even though it had nothing directly to gain -- by pledging \$400 as collateral against potential KTC revenue losses for the first bus assigned an express route.<sup>2</sup> This allayed the KTC's fears regarding further deficits, but jurisdictional concerns remained.

Many TVA employees lived in post-war suburban subdivisions outside the Knoxville city limits, and thus outside the normal KTC service area. They exerted vocal support of express suburban bus service through their respective neighborhood homeowners' groups. The KTC finally agreed to allocate one bus to express suburban service on an experimental basis, bolstered by the Levi Strauss promise to offset potential revenue losses.

Levi Strauss was never called upon to "make good" its pledge. The first express bus to the Knoxville CBD received great TVA employee support and favorable publicity for the KTC, which proceeded to increase the number of buses assigned express commuter service. Citizens' advisory committees and neighborhood caucuses continued to provide the KTC with feedback on express operations.

By spring 1974, demand for express KTC service exceeded the capacity of the six to seven buses KTC felt it could reasonably remove from normal routes during peak hours. To increase further

<sup>1</sup>Conversation with Stanley Stokey, TVA, January 13, 1976.

<sup>&</sup>lt;sup>2</sup>Conversation with Thomas Platt, Community Affairs Department, Levi Strauss Corporation, January 15, 1976.

its commitment to the express program was perceived as being potentially deleterious to normal route service; <sup>1</sup> and, in the absence of further subsidies, the KTC could not purchase additional buses, since fares from even full peak-hour riderships would not cover fixed operational expenses, notably full-time drivers' salaries.

Given this situation and the fact that van production had been stepped up, the TVA supplemented the express bus program with six vans in June, 1974. The vans were leased through the TVA Credit Union, a private agency, to get around technicalities involved with government agency participation. They were leased for one year to demonstrate their feasibility. Since the program's introduction, the TVA has shifted to two-year leases and the van fleet has expanded to 22 vehicles.

An in-house analysis has shown van pooling to be most attractive as an alternative to driving private automobiles for one-way commuting distances exceeding 15 miles.<sup>2</sup> Both private cars and the KTC, whose suburban routes cater to white-collar CBD employees such as TVA personnel, compete with vans for shorter commutes. Few are willing to commit themselves to fixed-schedule van service for relatively short trips.

As the ride-sharing program attained greater popularity (consisting of van service for TVA employees only and express bus service for a growing number of general CBD commuters), the TVA decided to contract with private bus companies to supplement the existing KTC service, rather than increase the size of its van fleet. Since its inception, the TVA-sponsored ride-sharing program has attracted 30 percent of TVA personnel, with annual ridership estimated at 330,000 person-trips.<sup>3</sup>

<sup>1</sup>Stokey, January 13, 1976.

<sup>2</sup>Ibid.

<sup>&</sup>lt;sup>3</sup>As of March, 1975, "Preliminary Application. . .," City of Knoxville, 1975, p. 11.

### 4.1.2 University Research

While arrangements were being proposed for TVA express bus service, the UT Transportation Center was awaiting decision on a request for U. S. Department of Transportation (DOT) university research funding. UT's \$250,000 proposal would have covered development and implementation of a computer-aided methodology for matching commuters with similar worktrip patterns. The DOT's Office of the Secretary of Transportation (OST) approved a university research grant of \$155,000 (later augmented to approximately \$176,000) for the research aspects of the UT proposal. The project was to run two years, beginning in April, 1974.

Since it was felt that Knoxville provided an ideal proving ground for implementation of the ride-sharing methodology, the UT Transportation Center, in conjunction with the City of Knoxville, turned to UMTA for supplementary funding. A proposal for an 18month ride-sharing program in the Knoxville area was approved by UMTA, and the City of Knoxville was granted approximately \$93,000 in June, 1974.

Basically, the combined research and implementation phases of the project involved contacting the ten largest employers in the Knoxville area (including the TVA) and surveying employees to determine common trip origins. Unlike the TVA survey, the UT survey coded residential locations to a newly developed regional grid map. TVA computer facilities were provided cost-free for data synthesis.

Analysis procedures are described in the UT Transportation Center publication, <u>Ridesharing and the Knoxville Commuter</u>, August, 1975. Major project findings included the following points:

> The KTC was run fairly efficiently and vitally needed by the transit dependent; yet ridership was falling, costs were increasing, and deficits were rising (\$995,000 in 1975, excluding depreciation, interest, and user charges). KTC

buses were hauling only three percent of Knoxville's peak-hour commuters and were running well below capacity on major commuting routes. Overall, transit at that time was judged ineffective in inducing commuters out of their cars, except at a token level.

- On the other hand, car pooling was an acceptable, viable mode of public transportation, especially when encouraged through strong employer-oriented programs.
- 3) Strong local demand existed for new consumeroriented ride-sharing services, typified by the then-new TVA van pool program.
- 4) New ride-sharing services could be applied to a wide range of existing transportation modes, but would most likely require parkand-ride provisions and strong employer support.

Analysis of project findings and ride-sharing alternatives led to the following recommendations:

- Reorganization of the public transportation framework to provide an effective policymaking organization, e.g., a transportation authority or department (on a city, county, or regional basis); requirements included a problem-solving orientation, demanddetermination service, consultation and advice service, coordination and evaluation functions, and strong administration.
- Reevaluation of traditional transit to maximize service to the transit dependent,

maximize revenues, and offer incentives to attract commuters out of private automobiles.

The report, therefore, recommended the rudiments of a transportation brokerage system as the solution to traditional transit problems and a means for providing consumer-oriented ride-sharing services.

The TVA lent its support to UT's solicitation of further Federal funding with the visible popularity of its express bus and van pool program. The proposal for a comprehensive, multi-modal regional ride-sharing porgram that would be coordinated by a transportation broker was channeled through the City of Knoxville, since that was, to date, the common denominator between the essentially independent TVA and UT projects. The Knoxville mayor's office devoted considerable attention to promoting the ride-sharing concept, both locally and to the Federal government;<sup>1</sup> the mayor's executive assistant was appointed the city's transportation brokerage coordinator.

### 4.1.3 Federal Government Support

UMTA had been encouraged by the results of express bus and bus priority operation demonstrations. However, it had come to the realization that a single type of service -- fixed-route, fixedschedule bus operation -- could not handle all trip types in the most effective manner. Therefore, UMTA was anxious to demonstrate the effectiveness of a public agent, or broker, to identify transportation demands and match them with available providers, a major goal being the shift of sole automobile drivers to higher-occupancy vehicles.

<sup>&</sup>lt;sup>1</sup>Conversation with James Easton, Executive Assistant to the Mayor, City of Knoxville, December 18, 1975.

UMTA became aware of the ongoing UT Transportation Center study, undertaken through the OST University Research Program, whose findings and recommendations generally corresponded to UMTA's interests. The City of Knoxville was encouraged to apply for an UMTA Service and Methods Demonstration Program grant for implementation of a transportation brokerage system.

The "Preliminary Application for Federal Assistance for the Implementation of a Public Transportation Brokerage Service Serving Knoxville, Tennessee and its Surrounding Commuter Areas" contained descriptions of current transit operations, car and van pooling programs (primarily findings from the UT report, <u>Ridesharing and</u> <u>the Knoxville Commuter</u>), and the transportation brokerage system concept.

Demonstration project activities were summarized in a twelvepoint implementation task outline:<sup>1</sup>

- "Develop methods to increase traditional transit's ability to provide additional transit service": emphasis on serving each activity center during its peak demand period, as well as new activity centers located along interstate exits.
- 2) "Locate employee groups that can be pooled": use of commuter surveys to determine existing and potential degrees of commuter concentration and propose suitable ride-sharing arrangements based on the number of commuters with similar origin/destination patterns:

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2-9: car pool(s)
10-40: van pool(s)
over 40: express bus(es)
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<sup>1</sup>"Preliminary Application. . ," City of Knoxville, pp. 44-63.

- 3) "Determine needs of social service agencies": examination of potential for midday use of commuter vehicles/carriers by social service agency clientele (including handicapped).
- 4) "Determine needs of jobless who are dependent upon public transportation for job opportunities": emphasis on serving employment centers not located on traditional transit routes.
- 5) "Determine the feasibility of combining passenger and goods movement on multi-modal, multi-ownership public transportation service": liaison with potential clients to determine delivery needs and explore methods for serving needs.
- 6) "Develop an operational vanpool program": start-up activities include obtaining vehicles, identifying potential drivers, contracting with ridesharers (identified in Task 2), determining insurance needs, and developing procedures for maintenance.
- 7) "Develop an operational express bus program": involvement of private carriers as well as public carrier (KTC); elements include contracts, bidding forms, promotion, coordination.
- 8) "Develop programs to involve the private sector, especially small and minority businesses and existing paratransit firms": emphasis on providing service for rural areas and weekend or holiday charter service; activities could range from an ombudsman function to assistance in obtaining loans.

- 9) "Develop control and accounting procedures": emphasis on developing control mechanisms to prevent unauthorized use of and/or operating procedures for vans.
- 10) "Develop regulatory structure required to manage brokerage programs": issues include regulations, franchises, rate structures, liability, insurance.
- 11) "Determine effectiveness of ridesharing program": assessment of user acceptance, economic reliability, employer acceptance, impacts on energy, highways, and transit, savings to social service agencies.
- 12) "Coordinate with highway and traffic groups": coordination of public transportation service needs with facility planning, zoning, and traffic management.

A grant to the City of Knoxville in the amount of \$997,959 was approved in October, 1975. Implementation was to be phased according to the schedule presented in Figure 7. (In reality, demonstration project developmental activities commenced several months prior to formal grant approval, constituting a considerable head start.)

Approximately two-thirds of the funds were delegated to the UT Transportation Center, which was to be responsible for administrative and operational functions under subcontract to the City; the remainder went to the City of Knoxville for vehicle procurement and coordination. Local in-kind services in the amount of \$118,580 were to supplement the UMTA grant.

1976 I 1977 J	. FEB. MARCH APRIL MAY JUNE JULY AUG. SEPT. OCT. NOV. OEC. JAN. FEB. MARCH APRIL MAY JUNE																					VININUMINUMINUMINUMINUMINUM	UAL WORK AND ACCOMPLISHMENTS
1975	JULY AUG. SEPT. OCT. NOV. DEC. JAN																						LIME FRAME ACT
	TASKS	I. INCREASE TRANSIT	II. LOCAL EMPLOYEE GROUPS	COMPANY CONTACT EMPLOYEES IN COMPANY	SURVEY FORM IN	III. NEEOS SOCIAL SERVICE	IV. JOBLESS NEEOS	V. GOOOS MOVEMENT	VI. VAN POOLS PROJ OPERATION (CITY)	VAN OPERATIONAL ACTUAL CITY	VAN PRIVATE OWNED	TOTAL VAN POOLS	CAR POOLS	OEFENSIVE ORIVING COURSE	ADVERTISING & PROMOTION	VII. EXPRESS BUS	VIII. PRIVATE SECTOR BUS	IX. CONTROL PROCEDURE	X. REGULATORY	XI. EVALUATION	XII. COOROINATE HIGHWAY & TRAFFIC GROUP	ESTIMATE BROKERAGE EFFECTIVENESS	WWW BUDGET WORK

Task Flow Chart Figure 7.

Source: UT Transportation Center

### 4.2 REGULATORY AND INSTITUTIONAL DEVELOPMENTS

Since the KTBS is a regional system, regulatory and institutional considerations on both local and state levels had bearing on the project's implementation.

Transportation policies in Tennessee fall under the jurisdiction of incorporated cities, the state, or special authorities. The influence of an incorporated city over transportation policies extends a uniform distance beyond city lines, creating an amoebic "ring" corresponding to the city's shape, within which local rather than state ordinances take precedence. Ring width varies in proportion to the incorporated city's population; Knoxville's influence, for example, extends seven miles beyond its city limits. Outside the ring surrounding Knoxville, state regulations or those of other incorporated cities come into play.

A city (or, for that matter, any jurisdictional entity in Tennessee) can create a transportation "authority," providing that local agencies deem it a suitable means of providing for equitable transportation. In Knoxville, such an authority exists: the Knoxville Transit Authority, which is responsible to the City, governs local transit policy and acts as transit's representative in general transportation policy planning.<sup>1</sup>

State regulations concerning shared-ride transportation assume three forms:

- economic regulation through the Tennessee Public Service Commission (PSC);
- 2) taxing and subsidizing policies; and
- 3) insurance/liability policies.

<sup>&</sup>lt;sup>1</sup>It should be noted that, with the City in control of the transportation authority and taxis, the environment for implementing a brokerage system was considerably more favorable than a situation with an independent transportation authority.

Economic regulation is based primarily on the assumption that public transportation is a natural monopoly charged with maintaining equal (nonprejudicial and nondiscriminatory) transportation opportunity, regardless of specific demands. Competition in this framework is perceived as a threat to the strength of the existing "egalitarian" transportation provider. The PSC acts in accordance with existing state legislation to limit competition to the existing carrier's service through licensing, franchising, and other economic means.<sup>1</sup> In the event that the existing carrier does not adequately meet a particular transportation demand, there are two options:

- individuals must travel by private means or not at all; or
- another provider can go through the process of obtaining appropriate licenses, franchises, certificates of convenience and necessity, etc. from the PSC.

Obviously, the latter alternative would be time-consuming, inflexible in meeting evolving transportation demands, and virtually unconsidered by the private sector in the absence of a transportation advisor.

State taxing policies date from early years, and hence do not reflect contemporary demand patterns or financial situations. Taxes and fees for private common carriers were established at a time when large, full-time, profitable private-sector

<sup>&</sup>lt;sup>1</sup>Some state public service (or utilities) commissions are stricter than others in interpreting existing legislation. Usually the PSC has evaluated each application for regular ride-sharing arrangements on a case-by-case basis. However, a growing number of states (e.g., California and Connecticut) have already effectively "deregulated" worktrip ride-sharing arrangements through legislative change (by exempting vehicles with passenger capacities up to and including that of vans -- usually 15).

transportation suppliers existed. In the last few decades, as the provision of public transportation has become increasingly unprofitable for private companies, most have been taken over by public bodies. Subsidies have been introduced to offset revenue losses, and special legislation has exempted public bodies from normal common carrier taxation. However, these tax burdens have not been removed from those private sector carriers that still remain.

Vehicles used for business purposes (e.g., hauling commuters) are taxed more heavily than those used for private purposes, further discouraging private transportation entrepreneurship. And, finally, insurance/liability policies discriminate against privatesector transportation providers by requiring special insurance that is much more expensive than similar policies for private vehicular use.

For most of the project's formative months, the City of Knoxville was under the leadership of Mayor Kyle Testerman. His administration strongly advocated progressive public transportation and generally supported the brokerage demonstration, assuming a guarded posture only toward the possibility that the City's influence and priority in transit operations might be dissipated somewhat through the regional orientation of the KTBS.<sup>1</sup> In spite of this concern, the Knoxville City Council unanimously confirmed its support of the brokerage system December 9, 1975. The Knoxville mayorship changed hands to Randy Tyree January 1, 1976, and strong legislative support for the KTBS has continued in City Hall.

The KTC is unionized, as are virtually all metropolitan transit operations. Though unions often oppose public transportation innovations, fearing that anything but the status quo might adversely affect transit employees' job security, such was not the

Conversation with James Easton, Executive Assistant to Knoxville Mayor Kyle Testerman, January 14, 1976.

case in Knoxville. The union was assured through a 13(c) agreement<sup>1</sup> that the KTBS did not represent a threat to transit workers' jobs. As a further demonstration of continued reliance on transit workers, a contract stipulated that the KTC was to perform maintenance functions (with the exception of warranty items) on all city-owned vans.

KTBS administrators identified two alternative approaches to dealing with economic regulations and taxing policies in order that there would exist a state-level regulatory climate compatible with the free-market brokerage system concept: (1) establishment of a regional transportation authority and (2) state-level legislative modification. Both alternatives were pursued simultaneously, as discussed below.

Since the KTBS was to be a regional system, brokerage system administrators considered establishment of a regional transportation authority (RTA) under which would fall all decision-making processes in the area of transportation.<sup>2</sup> Presumably the RTA would elect to regard ride-sharing arrangements such as van pools in the same manner as current ad hoc car pools (i.e., essentially exempt from regulation).

Jurisdictional entities on any level could participate in the RTA, provided participation served the best interests of local citizens; thus, KTBS administrators simultaneously sought the support of both cities and counties in the KTBS service area. The

<sup>&</sup>lt;sup>1</sup>A 13(c) agreement is a requirement on Federal transportation projects, and assures that no transportation-related employment will suffer through implementation of the projects.

<sup>&</sup>lt;sup>2</sup>Special "authorities" and "districts" override other policymaking bodies within clearly defined spheres of governmental influence (usually dealing with technical matters outside the scope of general political expertise). They differ in that special districts are granted the power to levy taxes, while authorities are not.

RTA would ideally serve the 16-county brokerage service area, provided all counties wanted to participate. In the event that some jurisdictions in the service area chose not to participate, the brokerage service area would be amended accordingly.

Under this strategy, the person holding highest elected office in each county, typically a county judge, would be contacted by brokerage administrators. Benefits of the regional transportation authority concept would be spelled out, and two vital facets of RTA participation would be stressed:

- Participation in the RTA would have no financial impact, other than on individual commuters; no county institution would be committed financially to an institution in any other participating county.
- Participation in the RTA could be withdrawn at any time; there would be no time commitment either to the RTA or to the KTBS.

The spokesperson would then present the RTA concept to appropriate county legislative committees, from which a decision regarding participation would be forthcoming, often in a matter of weeks. In mid-January, 1976, the Knoxville City Council approved the City's participation in such an authority, should it come to be.

Based on the examples set by California and Connecticut, it was felt that state-level legislative modification to permit ridesharing without economic sanctions was preferable to the establishment of an RTA, if for no other reason than considerably less "footwork" in selling the brokerage system concept was required. Legislative modifications could take one of two forms: (1) limitedtime exemption from PSC sanctions for the KTBS demonstration project or (2) complete deregulation, as in California and Connecticut. In either case, appropriate resolutions had to be ratified by both houses of the Tennessee State Legislature.

KTBS administrators sought the support of two new state agencies: the Bureau of Mass Transit and the Legislative Subcommittee on Mass Transit (founded in mid-1973 and early 1974, respectively). The Bureau of Mass Transit (with members appointed by the Tennessee Department of Highways, part of the Tennessee Department of Transportation ) is responsible for planning and technical assistance for mass transit and has an interest in demonstration projects. The State Legislature established the Subcommittee on Mass Transit to conduct hearings and to appropriate capital funds, often in the role of matching funds to UMTA grants, for mass transit projects. Both of these agencies had been influential in the past in promoting progressive regulatory reforms for Federally approved projects. For example, the Bureau of Mass Transit had been instrumental in reinterpreting existing statutes to permit operation of express buses and car pools in the original UT ride-sharing research project. For this reason, it was felt that its support would be especially helpful in exempting the KTBS demonstration project from state regulations.

At the same time, the KTBS launched a major direct lobbying effort toward members of the State Legislature, advocating deregulation of worktrip ride-sharing arrangements. The efforts proved successful. The Tennessee State Legislature passed, and the governor signed into law March 28, 1976, legislation permanently exempting commuter vehicles with passenger capacities of 15 or fewer from regulation by the PSC (see Appendix A).

Two amendments were added to the bill: (1) the PSC was permitted to levy a nominal (\$5) annual fee for commuter pool vehicle inspection, and (2) one county not in the KTBS service area (Davidson County) was exempted from the bill, as per its request. Thus, the KTBS totally achieved its aims in bringing about legislative reforms allowing the full complement of KTBS services, notably van pools, to function legally.

Insurance/liability considerations for van pools remain somewhat in flux, even after the brokerage system has become operational. Originally, insurance coverage that would permit shared use of vans by commuters (peak-period) and social service agencies (off-peak) was desired. Through "shopping around," the KTBS has been able to obtain reasonably priced coverage for use of the cityowned vans by commuters. However, coverage of the vans for use by social service agencies (whether for shared-use with commuters or dedicated use by the agencies) has not yet been obtained. The KTBS is currently working with the insurance industry to obtain a broader range of insurance coverage options for various kinds of ride-sharing arrangements. Clearly, this is a difficult issue to resolve in the absence of historical accident data pertaining to ride-sharing.

### 4.3 PROJECT MANAGEMENT

While advances on the regulatory front are vital to brokerage system implementation, administrative procedures and the development of internal subsystems are no less essential to effective brokerage operations. Project management is being handled by the UT Transportation Center, under subcontract with the City of Knoxville.

### 4.3.1 Staffing

A program coordinator was selected in late October, 1975, with responsibilities covering all KTBS operational functions, public relations, financial management, and reporting to UMTA. A project coordinator was selected shortly afterwards. The project coordinator position entails regulatory aspects of KTBS implementation (modification of pertinent legislation and subsequent compliance) and liaison with other public agencies.

Throughout the development of the KTBS, the UT Transportation Center has had at its disposal the contributions of part-time

UT graduate students with expertise in such fields as law (contractual and legislative), business (marketing and accounting), computer science, and transportation planning.

Due to the multi-faceted nature of this demonstration project, implementation schedule adherence has had to be somewhat flexible. Strict adherence to the schedule presented in Figure 7 has thus not been an overriding concern among UT project administrators. Instead, it has been felt that "momentum," or continuity of progress, is the critical factor with regard both to public perception of implementation activities and to enthusiasm of the inhouse staff.

Since certain aspects of the project are in full operation while others remain in a developmental phase, project activities have been restructured into developmental and operational components, cross-referenced to the original task outline that appeared in the City of Knoxville's "Preliminary Application for Federal Assistance. . . " (PAFA).

## 4.3.2 Developmental-Phase Activities (keyed numerically to Figure 8)

This phase entails seven specific activities, each of which will have bearing on subsequent operational-phase activities.

 Modify regulatory/institutional structure (PAFA Task 10).

This activity involves obtaining local, regional, and state support for policies enabling the KTBS to function. Transportation-related regulations would ideally be modified on a permanent basis, rather than for a fixed period of time as a direct response to the demonstration project. Special insurance for ride-sharing vehicles will be addressed.



Figure 8. KTBS Developmental-Phase Activities

### 2) Develop liaison with KTC (PAFA Task 1).

(Since the relationship of the City of Knoxville to the KTC is unusually close, this activity is fairly site-specific.) A high level of communication between the KTBS and the KTC, a major transportation "supplier," is essential. Schedule and route modification procedures will be coordinated between the KTC and the KTBS. In order to avoid possible conflicts with the KTC's franchise, the KTBS will not assign city-owned vans for commuting patterns originating and terminating within the Knoxville city limits (the KTC service area). Moreover, the KTC will be responsible for maintaining the fleet of city-owned vans.

3) <u>Coordinate with planning, traffic, highway groups</u> (PAFA Task 12).

Since the KTBS is likely to have impacts on a wide range of transportation and urban development factors, communication and coordination with transportation and urban planning agencies will be maintained.

4) & 5) Develop procedures for identifying potential ridesharing groups and transportation suppliers (PAFA Tasks 2-4).

> These activities entail the development of strategies and necessary programs and instruments to ascertain the transportation demand and supply elements in the KTBS service area, including rosters and timetables for employment center contact, questionnaire design, etc.

 <u>Develop computer program to identify common</u> origin/destination patterns (PAFA Task 2).
 Due to the size of the data bank anticipated in

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Knoxville as a result of developments undertaken

in Activities 3 and 4, a computer program will be required for data compilation. In order to maintain a high degree of personal attention to individual client needs, this computer program would not be expected to perform demand/supplymatching functions. Rather, it would identify transportation demand and supply components that, through an organized set of criteria (see Activity 7 below), would be matched by the transportation broker.

# 7) Develop guidelines for demand/supply-matching procedures (PAFA Task 2).

As the computer program identifies potential ride-sharing groups and is cross-referenced with inventories of transportation suppliers, the broker will suggest appropriate vehicle types and/or participation in specific brokeragesponsored service programs. It is expected that these guidelines will be oriented around such factors as size of ride-sharing group, distance covered, and availability of public transit services.

## 8) Develop operational services and appropriate control and accounting procedures (PAFA Tasks 5-9).

Based on the number and complexities of KTBS services, various control and accounting procedures will be required, including record-keeping forms, fare structures, etc. These control and accounting procedures will serve dual functions: (1) to monitor brokerage-sponsored services, such as the van pool program, and (2) to aid in the ongoing internal evaluation of specific services, so as to improve and refine them to be more responsive to transportation demand.

### 4.3.3 Operational-Phase Activities (Figure 9)

Operational-phase activities will be introduced in a flexible time frame, but generally serve to implement services and programs designed in the developmental phase.

1) Implement brokerage system "exposure" plan.

This activity covers the implementation of exposure programs designed to inform the public about the existence of the transportation brokerage system and related services and encourage ride-sharing.

 Operate brokerage switchboard service to receive calls in response to introduction of exposure plan.

A switchboard will be operated to receive calls from potential riders, potential providers, and individuals requesting transportation information.

3) Operate information service.

This activity ties in closely with the preceding activity, since it deals with the establishment of close communication links among the brokers, riders, and suppliers. The broker will provide information on such issues as public transit route schedules, legal matters involving transportation, basic guidelines for car pools, insurance, etc. In addition, the broker will act as liaison between the public and, for example, the KTC or taxi companies.

### 4) Operate survey programs.

This activity deals with the active solicitation of potential ride-sharers and suppliers. Two types of survey are planned in order to determine



Figure 9. KTBS Operational-Phase Activities

commuter and social service agency needs. The broker will systematically contact employment centers (common worktrip destinations) and establish commuter coordinators responsible for distributing survey forms and encouraging employees to complete these forms.

5) Identify groups of potential ride-sharers.

Information will be synthesized by computer to identify potential ride-sharing groups, composed of individuals with similar origin/destination patterns for regular trips.

6) Assemble inventory of transportation suppliers.

This inventory will be composed of private and public suppliers. It will also identify potential ride-sharers with vehicles at their disposal and the inclination to offer transportation to others.

### 7) Implement demand/supply-matching process.

Data from Activities 5 and 6 will be compared by the transportation broker. Based on such factors as size of potential ride-sharing groups, distance to be covered, availability of public transit services, etc., the transportation broker will suggest transportation arrangements compatible with individual needs and existing transportation suppliers and equipment.

If both trip origin and trip destination are within the Knoxville city limits, the brokerage client will be given transit route and schedule information.

Based on criteria that are discussed in Activity 7 and provided that existing public transit service does not cover the particular origin/ destination combination in question, the transportation broker will suggest an appropriate ride-sharing arrangement.

### 8) Operate service programs.

In most cases, the appropriate vehicle for potential ride-sharing groups will be found in the private sector, e.g., private automobiles for car pooling, private vans for van pooling, independent bus companies for express bus services, etc. However, the demonstration project also features two service programs involving publicly owned vehicles: a van pool program utilizing city-owned vans, and a KTC express bus program, utilizing the existing KTC transit bus fleet, and route/service modifications. (Descriptions of these service programs are presented below.) The brokerage system, by operating two service programs, will become not only the demand/supplymatching agent, but a transportation supplier as well. The actual services themselves will be subject to ongoing management assessments in order to improve and/or refine service performance.

### 4.3.4 Van Pool Program

The van pool program is intended to provide brokerage system visibility and promote ride-sharing. Brokerage system planners felt that public interest would be aroused through observation of the service in action.

Of the \$997,959 UMTA grant, \$318,000 is for the purchase of a fleet of 51 twelve- and 15-passenger vans for this demonstration project. These city-owned vans are to be leased to individuals who contract to use the vans in commuter pools. As an incentive

for participation in this program, these individuals will have free access to the vans (within specified limits) on weekends, paying only for non-commuting mileage on a per-mile basis.

The lease rate structure covers operating costs, vehicle amortization over three years, and a small contingency "cushion." Money from lease revenue is left to accumulate in a bank account, and will eventually be used to purchase additional vans and/or cover brokerage system operating expenses.

### 4.3.5 KTBS/KTC Transit Bus Program

Besides the fleet of city-owned vans, the demonstration will involve public-sector supply in the form of the transit bus fleet, operated by the Knoxville Transit Corporation. A high degree of coordination will be maintained between the transportation broker and the KTC administration. It is expected that, through the brokerage system demand/supply-matching process, transit buses can be deployed to address more effectively the needs of the transit dependent and to maximize farebox revenues.

It should once again be noted that these two public-sector vehicle supply components are to be complemented by large numbers of private-sector for-profit and non-profit transportation suppliers, including privately owned bus companies, private van and car owners, freight carriers, and church bus fleets. It is hoped that <u>all</u> vehicles, especially those already on the road at low rates of occupancy, will be used more efficiently through the brokerage mechanism.

## 5. FINDINGS

Briefly recapping the perspective presented in its introduction, this document has attempted:

- to describe KTBS objectives and issues (Chapter 2);
- 2) to present a base line of site-related information for purposes of reference during project implementation and subsequent assessment of transferability potential (Chapter 3); and
- 3) to trace activities and events which led to KTBS demonstration project implementation (Chapter 4).

Rather than assess aspects of KTBS performance at a time when conclusions would likely be premature, specific summary statements highlight the pre-implementation "scenario" and Knoxville's approach toward organization of implementation activities:

- Strong community and political support for innovative transportation programs preceded Knoxville's application for UMTA funding. In fact, the level of community receptiveness, as demonstrated by the stance taken on transit by neighborhood groups and the popularity of the TVA van pool and KTC express bus programs, may have substantially contributed to implementation progress to date.
- 2) The KTA's early support of, and continuous participation in, KTBS development has been crucial to project implementation. Brokerage system advocates in the UT Transportation

Center and Knoxville City Hall recognized that coordination with the existing public transit authority was vital to the initial groundwork for, and subsequent implementation of, brokerage system operations.

- 3) A major component in KTBS transportation demand assessment is active employment-center participation. KTBS administrators cite strong employment-center support for ridesharing, exhibited in gestures such as priority parking for car pools and "commuter coordinator" assignments, as a major reason for the acceptance of early ride-sharing programs.
- 4) The support of labor organizations, particularly the transit workers' union, was sought early in KTBS development. Knoxville was fortunate in having a strong local transit workers' contingent that was willing to embrace a new philosophy toward transit's role in a coordinated transportation system. Its acceptance of the 13(c) agreement was a requirement for Federal funding.
- 5) KTBS administrators were cognizant of germane local, regional, and state legislative mechanisms and their role in effecting regulatory modifications. Access to these mechanisms was through active lobbying and personal relationships between key legislators and local Knoxville figures (primarily UT Transportation Center personnel). The nature of these relationships may be somewhat site-specific in that inter-institutional communication in Tennessee appears (subjectively) to be unusually candid and casual; such may not be

the case in other areas -- which would have potential ramifications on transportation regulatory reform.

- 6) It was recognized that events and the time factor in the institutional/regulatory arena tend to be unpredictable. Therefore, KTBS administrators approached institutional and regulatory issues with contingency plans that took into account the variability of exogenous factors. An example is the dual effort to establish either legislative modifications or a regional transportation authority.
- 7) The KTBS utilized a low-cost, high-energy labor pool of UT graduate students. The multidisciplinary expertise drawn upon in Knoxville had an unquantifiable impact, especially with regard to background research and documentation, as well as undoubtedly resulting in monetary savings with regard to system implementation.

### APPENDIX A. TENNESSEE HOUSE BILL NO. 2184

AN ACT to amend Tennessee Code Annotated, Sections 6-3802, 65-1503, and 65-1601, to clarify existing law concerning the regulation of motor vehicles used primarily for the transportation of passengers to and from their places of employment.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF TENNESSEE:

SECTION 1. Tennessee Code Annotated, Section 6-3802, is amended by adding the following new paragraph between the present first and second paragraphs of the section:

Neither this chapter or Tennessee Code Annotated, Title 65, Chapter 16, shall be construed as allowing a municipality, county, metropolitan government, or combination thereof to regulate any motor vehicle engaged primarily in the hauling of fifteen (15) or fewer passengers to and from their regular places of employment, taxicabs and airport limousines excepted, or to regulate the organizers, sponsors, or promoters of motor vehicles engaged primarily in the hauling of passengers to and from their regular places of employment but regulation by the appropriate government shall be permitted, however, if the motor vehicles excluded from regulation, and the organizers, sponsors, and promoters of such vehicles, are specifically defined and regulated as a class separate and distinct from other existing common carriers and contract carriers.

SECTION 2. Tennessee Code Annotated, Section 65-1601, is amended by adding the following new paragraph at the end of the present section:

Neither this chapter or Tennessee Code Annotated, Title 6, Chapter 38, shall be construed as allowing a municipality, county, metropolitan government or combination thereof to regulate any motor vehicle engaged primarily in the hauling of fifteen (15) or

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fewer passengers to and from their regular places of employment, taxicabs and airport limousines excepted, or to regulate the organizers, sponsors, or promoters of motor vehicles engaged primarily in the hauling of passengers to and from their regular places of employment but regulation by the appropriate government shall be permitted, however, if the motor vehicles excluded from regulation, and the organizers, sponsors, and promoters of such vehicles, are specifically defined and regulated as a class separate and distinct from other existing common carriers and contract carriers.

SECTION 3. Tennessee Code Annotated, Section 65-1503, is amended by changing the period at the end of the subsection (k) to a semi-colon and by adding the following new subsections:

(1) nor to any motor vehicle, except taxicabs or airport limousines, used primarily for hauling fifteen (15) or fewer passengers to and from their regular places of employment, or to the organizers, sponsors, or promoters of such vehicles under Tennessee Code Annotated, Section 65-1517; provided, however, that the Public Service Commission may inspect these motor vehicles as it deems necessary for purposes of safety under the provisions of Tennessee Code Annotated, Section 65-1515, and may establish a minimum level of insurance coverage to be required of all vehicles operating pursuant to this subsection. Provided, however, that vehicles operating pursuant to this act shall be subject to the inspection, control, and supervision fee as provided in Tennessee Code Annotated, Section 65-1518;

(m) nor to any motor vehicle operated pursuant to public service commission approved demonstration projects conducted by state, local municipalities, counties, or metropolitan governments when said demonstration projects are of limited duration and will meet transportation needs in the hauling of passengers to and from their regular places of employment; provided, however, that the Public Service Commission may inspect said vehicles for purposes of safety, and said vehicles shall be subject to all the provisions of

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Section 65-1515, provided further that the Public Service Commission may establish a minimum level of insurance coverage to be required of all vehicles operating pursuant to this subsection. Provided, however, that vehicles operating pursuant to this Act shall be subject to the inspection, control, and supervision fee as provided in Tennessee Code Annotated Section 65-1518.

SECTION 4. The provisions of this act shall not apply in any county having a metropolitan form of government.

SECTION 5. This act shall take effect upon becoming a law, the public welfare requiring it.

## APPENDIX B. REPORT OF INVENTIONS

This report highlights events which led up to the initiation of an urban transportation project designed to assess the effectiveness of a transportation brokerage service, a concept which has significant national implications. A diligent review of work performed under this contract has revealed that state-of-the-art methodologies have been employed in the preparation of this report.

## APPENDIX C. BIBLIOGRAPHY

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