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COM-BUS: A Southern California Subscription Bus Service

Final Report
May 1977

Service and Methods Demonstration Program

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16. Abstract

The evolution and operations of the COM-BUS Subscription Commuter Bus Service are documented. COM-BUS is a privately owned organization operating at a profit without any form of subsidy. COM-BUS serves approximately 2,000 commuters per day on 47 routes which provide service in Ventura, Los Angeles, and Orange counties. A majority of the routes use chartered passenger buses with from 38 to 47 seats. A fleet of eight 13- to 16-passenger minibuses are used on routes where demand is insufficient to warrant the larger buses. Service provides a fairly personalized morning pickup, with major portions of the runs to work destinations being express and using freeways. In the evening, passengers are picked up at their work locations, and runs to their initial origins are accomplished. Because of its method of management operations, COM-BUS maintains subscription levels (weekly seat reservations paid for in advance) at better than 90 percent. COM-BUS was organized and now operates with a minimum of capital outlay, and is managed by essentially volunteer support.

Travel times using COM-BUS are only slightly longer than those for private automobiles making the same trips. COM-BUS fares are considerably less than corresponding costs to operate a private automobile for a similar trip. The success of COM-BUS is particularly important in view of current heavy subsidies required for most transportation systems, and in view of the tendency of Southern California commuters to reject mass transit and to use private means instead.

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PREFACE

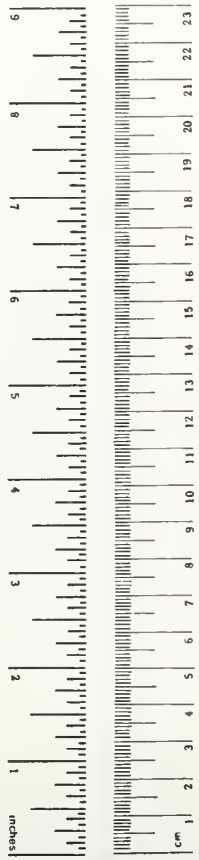
This report was completed under Task Directive DOT-TSC-1082-6 from the Transportation Systems Center (TSC), Cambridge, Massachusetts. Under that Directive, CACI, Inc. has gathered information in order to document the COM-BUS subscription commuter transportation service. It is hoped that observation and documentation of the successful COM-BUS system has uncovered approaches to transportation system organization and management that are transferable to other locales.

We are very grateful to Mr. Ronald J. Hoffman, President of the Southern California Commuter Bus Service, Inc. (of which COM-BUS is a division) for his willingness under subcontract to CACI to supply a thorough and candid discussion of the COM-BUS service. Mr. Hoffman did not hesitate to discuss frankly problems that were encountered and mistakes that were made in the development of the service nor to suggest ways in which other transportation systems might avoid these same mistakes. In addition, technical review at TSC by Ms. Carla Heaton and Mr. Robert Waksman have greatly enhanced the content of this report.

METRIC CONVERSION FACTORS

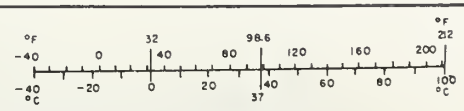
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius tempereture	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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EXECUTIVE SUMMARY

S.1 OVERVIEW

Within sections of Los Angeles, Orange, and Ventura counties, COM-BUS, a privately owned and operated, for-profit subscription commuter bus service provides morning and evening work-related transportation for approximately 2,000 passengers per day. This is an area in which there is a predominance of single-occupancy private automobiles used for commute trips and where extended travel times and numerous transfers are required to complete most work trips if public transit is used. COM-BUS is an outstanding example of private entrepreneurship entering the transit field and providing a service which continues to meet passenger demands at better than a 90 percent load factor and at a profit.

While the work trip commuter service provided by COM-BUS has not been sponsored by the Urban Mass Transportation Administration's (UMTA) Service and Methods Demonstration (SMD) Program, the success of COM-BUS prompted UMTA to have the operations and evolution of COM-BUS documented under the aegis of the SMD Program. This review was accomplished for the U.S. Department of Transportation through the Transportation Systems Center (TSC), which has programmatic responsibility for all aspects of evaluation associated with the SMD Program. The COM-BUS experience during its early and dramatic growth period (from 1968 through 1972) and its current stabilized operations provide useful documentation for other areas considering the potential of implementing a commuter subscription bus service.

S.2 REASON FOR SERVICE REVIEW

COM-BUS, as a self-sustaining subscription commuter bus service, has gained national recognition as one of two such services (the other being the Reston Commuter Bus Service from

Reston, Virginia to work destinations in the metropolitan Washington, D.C. area). An in-depth assessment of the COM-BUS organization, growth, and current operations provides useful information when characteristics of the service area and institutional developments are taken into consideration.

Although initially COM-BUS was not operated with the intent of making a profit, the events which occurred during the early years of service organization have led to a profitable, non-subsidized commuter subscription bus service. How such a service developed and why its operations are successful are of national interest.

In addition to studying COM-BUS's accomplishments as a subscription commuter bus service, it is also important to note that COM-BUS can be assessed in light of three of the SMD Program objectives:

1) Reducing travel time for transit users

2) Increasing transit coverage

3) Increasing transit vehicle productivity.

The word "transit" as used above is better interpreted as para-transit in the context of this report.

S.3 SERVICE DESCRIPTION

The COM-BUS service area is located in Southern California, covering more than 1,200 square miles, of Ventura, Los Angeles, and Orange counties. The areas are heavily populated, ranging from 3,700 people per square mile in the San Fernando Valley to 7,600 per square mile in central and west Los Angeles.

The most common mode of commuter transportation in the service area is the single-occupant private automobile with

between 85.9 percent and 92.5 percent utilizing the private automobile for transportation to work (as contrasted with 76.6 percent for SMSAs of 250,000 or more). While the greater Los Angeles basin maintains a large network of public transportation services, mass rapid transit for the public in the service area is not an acceptable alternative to the passengers traveling the COM-BUS routes because of extended travel times and the inconvenience of numerous transfers.

COM-BUS, incorporated as the Southern California Commuter Bus Service, Inc., operates under the laws of the State of California and is subject to the rules and regulations of the California Public Utilities Commission (PUC). COM-BUS provides daily work trip collection, line haul, and distribution commuter bus service on a schedule whose travel times are competitive with the private automobile. Approximately 5 percent of COM-BUS commuters are picked up at their residence in the morning; 70 percent park and ride within two miles of their residence; 25 percent gather at central pickup points immediately prior to initiation of express services. The objective with respect to collection and distribution is to board the largest number of passengers just prior to the line haul portion of the trip and to discharge the largest portion of passengers at the first work destination. It is not uncommon for some of the routes to discharge all the passengers at a single site.

The COM-BUS service utilizes large buses (with seating capacities from 38 to 47 passengers) and eight minibuses (with seating capacities from 13 to 16 passengers). While the large buses are obtained through contracts between Southern California Commuter Bus Service, Inc. and local charter companies (presently five in number), the eight minibuses are owned by Southern California Commuter Bus Service, Inc. The minibuses are utilized to satisfy short-term shifts in levels of demand, replacing large charter buses when a given route ridership decreases, and

serving as an initial introduction to COM-BUS service on new routes which have insufficient demand to warrant the larger buses.

Passengers subscribe for route seats on a weekly, paid-in-advance, reservation basis. They must abide by a strict set of rules which govern all passengers and are enforced by Bus Captains who serve as the liaison between COM-BUS passengers and COM-BUS management. The Bus Captains ride free, in exchange for their services, which include collecting fares, enforcing rules, coordinating appropriate vehicles and schedules for their particular route.

Fares on COM-BUS vary from $11.50 per week for the shortest route (20 miles one way) to $15.00 per week for the longest route (70 miles one way). Scheduled travel times range from 40 minutes to one hour and fifty minutes.

Average costs in 1976 were $86 per charter round trip. Because COM-BUS operates heavily with volunteers, costs are kept low. Contibuting to COM-BUS expenses are full-time clerical support from two people, fees paid to Area Coordinators (the intermediate management level between COM-BUS executives and the Bus Captains), and other miscellaneous administrative expenses such as printing.

According to COM-BUS management, during 1976, the average yearly cost per passenger-mile was 3.194 cents. In comparison, costs per capacity-mile were 2.875 cents.

Within the constraints of PUC regulations, COM-BUS's management attitude is to alter schedules and routes as necessary to satisfy changing demand. Routing and schedule changes are considered within the framework of the total system, rather than looking just at a change desired on one route.

S.4 SERVICE DEVELOPMENT

In the fall of 1968, McDonnell Douglas Astronautics Company transferred many of its employees from its Santa Monica facility to its new headquarters in Huntington Beach, California, some 40 miles to the southeast. Approximately 80 percent of the employees working at the Santa Monica plant lived close to the plant or lived in the San Fernando Valley, 15 or 20 miles in the opposite direction from the Huntington Beach facility. Employees making the transfer without moving their households were confronted with the potential of driving or riding anywhere from 40 to 60 miles or more each way daily. After assessing various alternatives (use of the private automobile, establishing carpools, and mass transit), a group of 45 employees decided to explore possibilities of chartering a commuter bus on a regular basis.

Initially, the commuters selected the one bus company out of five bidding that claimed to have exclusive PUC authority to operate between the Santa Monica and Huntington Beach facilities. Within three months of initiation of the first route, four other bus routes were independently organized utilizing the same bus company as the original 45 commuters.

An informal route management organization, consisting of passenger representatives from each of the five routes, called Bus Captains, was established using the fictitious operating name of "COM-BUS." Service from the original bus company deteriorated, and the commuters agreed that they must switch to another bus company.

In the process of selecting a second charter bus company to replace the first, lengthy hearings ensued before the Public Utilities Commission, due to protest from the first charter company. Nineteen months after the initial hearing, formal authority was granted to the second bus company to operate the

five commuter routes. The new bus company owner requested that one member of COM-BUS be selected to deal with the bus company management, for which a fee would be paid to compensate for the coordination service provided. The current owner of COM-BUS, Mr. Ronald Hoffman, was selected because of his continuing involvements since initial service began. At this point, COM-BUS became a profit-making service organization, still not yet a corporation.

As a result of the success of COM-BUS, other groups of employees at other companies in the Los Angeles area joined together in attempts to organize similar types of commuter services. As a consequence of various obstacles, most of these major employee efforts failed. Groups such as TRW, Fairchild, Hughes Aircraft, and Northrop Aircraft Company were among those joining the COM-BUS group.

During the first four years of COM-BUS service, the average number of routes grew from the initial single route to 30 in 1972, with annual passenger-trips increasing from 20,000 to approximately 600,000. Throughout this growth period, the average load factor remained at slightly above 90 percent. Load factors are computed by COM-BUS, based on paid subscriptions rather than on actual numbers of passengers by head count.

As COM-BUS grew to serve many companies in the Los Angeles and Orange county areas, the PUC took notice of it and informed COM-BUS that it could not solicit, organize, or manage commuter routes without becoming a passenger stage operation. (A passenger stage operation is an operation that carries paying passengers over a route more than once in nine days.) COM-BUS's first approach was to request that the charter bus companies obtain the necessary certificates. Since only two of the eight charter companies agreed to spend the time and money involved in filing applications, obtaining legal services, and participating in public hearings, COM-BUS decided that it must become a

passenger stage operation and obtain proper certificates for the route.

In 1973, COM-BUS incorporated as the Southern California Commuter Bus Service, Inc. under the laws of the State of California as a passenger stage corporation and filed three separate applications with the Public Utilities Commission for authority to operate within Orange County and Los Angeles County. Application to the PUC by COM-BUS was protested by the Southern California Rapid Transit District, necessitating a public hearing. The Orange County Transit District clearly stated that COM-BUS complemented the Orange County Transit District operations rather than competed with it.

Approximately one year after the last hearing, the PUC decided in favor of COM-BUS and granted the Certificates of Convenience and Necessity, carrying in them the authority to operate all the routes applied for. Commencing in 1973, COM-BUS reached a level of 47 average daily routes, a figure which it retains today.

As the number of routes and ridership expanded, COM-BUS administrative and management systems developed as a result of daily experiments rather than design. COM-BUS management experimented with different approaches to route determination, scheduling, and service rules.

COM-BUS ownership found that the most effective way to communicate with passengers was through information passed on verbally by Bus Captains about decisions made by COM-BUS management after passenger input. In addition, group meetings at which COM-BUS management attempted to answer questions from potential riders proved to be effective. A final method of communication was distribution, to all riders, of bulletins published by COM-BUS management covering topics of general interest to commuters.

Within the constraints of the Public Utilities Commission regulations, COM-BUS has determined that for a route to be viable it must: have between three and five stops, travel a direct route, pick up the most people at the last stop in the morning, drop the most people at work first in the morning, and pick up the most people at work last at night. As a matter of policy, when patronage growth allows for an additional bus to be put into service, the new bus is not added as a second unit on an existing route. Instead, all routes which might be affected by the addition of another bus are surveyed and several new routes are formulated to better serve all of the riders in a particular region.

While rules with respect to ridership were quite flexible initially, COM-BUS management found that the attitudes of the riders improved considerably when a uniform set of rules was developed and enforced on each bus.

In 1976, it is estimated that on the 47 average daily routes COM-BUS was making 700,000 passenger-trips annually over 2,300,000 passenger-miles while retaining an average load factor in excess of 90 percent.

S.5 SUMMARY AND CONCLUSIONS

The COM-BUS system is successful by many criteria:

1) It continues to operate at a profit, without any form of subsidy.

2) It continues to have high load (subscription) factors, in excess of 90 percent.

3) The system was organized and operates with a minimum of capital outlay.

4) The system is managed with a minimum of administrative and overhead expense, using primarily volunteer support from Bus Captains, Area Coordinators and executives.

As a subscription commuter bus service, accepting only advance, weekly payments for seats, COM-BUS currently serves approximately 2,000 people per day, transporting them to and from work in an area in which between 85.9 percent and 92.5 percent utilize the private automobile as their means of transportation to and from work. This approach eliminates day-to-day fluctuations in revenue and aids in predicting vehicle demand fairly accurately.

Availability of approximately 40 charter bus companies in the service area, coupled with contracts with five of these companies, promotes healthy competition and a consistent high level of service. Utilization of minibuses, while operating at a loss, allows for capturing passengers that will in the long run be placed on the larger coaches and would otherwise adopt use of their private autos as a permanent alternative.

COM-BUS one-way trip lengths vary from 20 miles to 70 miles, and travel times range from 40 minutes to one hour and 50 minutes. COM-BUS travel times are competitive with the private automobile. (The average COM-BUS route is 40 miles and takes 60 minutes; this same route takes 50 minutes by auto.) For an average weekly fare of $13.00, the cost to COM-BUS passengers would amount to $650 per year (assuming 50 work weeks per year). For the corresponding 40-mile one-way trip, a personal automobile would be driven 20,000 miles per year and, at 12 cents per mile, would cost the driver $2,400 to utilize for work trips.

COM-BUS management recognizes the need for high service reliability. Ninety-five percent of the trips arrive at their destination on time or ahead of schedule. Less than two percent arrive more than ten minutes late.

COM-BUS routing philosophy is aimed at providing service that is as near to express for the majority of riders as possible. Approximately five percent of COM-BUS commuters are picked up at their residence; 70 percent park-and-ride within two miles of their residence; and, 25 percent gather at central pick-up points for express service.

The personal involvement of the current owner of COM-BUS, Mr. Ronald Hoffman, from the beginning was a key factor in COM-BUS's formation and growth. This involvement, coupled with the existence of Bus Captains and Area Coordinators, all having a personal stake in seeing COM-BUS succeed, has been a key element in COM-BUS's growth and retention of its operational status today.

Sound management operational policies implemented through the Bus Captains and Area Coordinators make it possible to match supply to demand while maintaining high load factors. Since COM-BUS provides only work-related trips, the utilization of chartered buses eliminates the need for COM-BUS to keep the vehicles filled during non-commuting hours.

In assessing a COM-BUS type commuter subscription bus service for introduction to other locales, it is important to consider certain basic service area characteristics and key events during service development. The tri-county service area is characterized by fairly high-density residential areas and concentrations of major work destinations. The nature of the service area freeway system is such that most major residential origins and work destinations are within minutes of a freeway off-ramp. These factors, along with the fact that work trip

distances in the area range from 20 to 70 miles one way, provide COM-BUS with the ability to develop a service which provides travel times quite competitive with the private automobile. Shifts may occur in individual ridership, but clusters of origins tend to remain fairly stable. In addition, by the nature of the aerospace industry, when one firm has a cut-back, another firm, perhaps in the same general industrial area will be hiring. These factors lend a stability to the COM-BUS scheduling of routes.

While the conditions identified previously may be necessary for the development of a viable subscription commuter bus service, service implementation and expansion may be complicated and delayed by institutional and regulatory constraints. In addition to the needed leadership and individual involvements, an awareness of local laws and requirements is essential. In the opinion of COM-BUS management, understanding and complying with regulations is the most difficult and time-consuming problem with which COM-BUS management has had to deal. COM-BUS estimates that approximately 22 percent of operating costs are directly attributable to compliance with PUC regulations.

While COM-BUS evolved initially to meet an immediate need of a small group of aerospace employees, the manner in which the service expanded to meet increasing demands within the sprawling Los Angeles basin can serve as a guide to other locales considering the possibility of introducing a similar commuter bus service.

1. INTRODUCTION

This report describes the operations and evolution of COM-BUS, a privately owned and operated, for-profit, subscription commuter bus service that provides morning and evening transportation for approximately 2,000 passengers per day within sections of Los Angeles, Orange, and Ventura counties. Although detailed operating data are not available, it is clear that COM-BUS is an outstanding example of private entrepreneurship entering the transit field and providing a service which continues to meet passenger demands at better than a 90 percent load factor and at a profit.

This report analyzes current COM-BUS operations, service management, and evolution. Supply, demand, and attendant productivities are discussed, and COM-BUS service characteristics and their potential transferability to other locales are set forth.

1.1 REASON FOR SERVICE REVIEW

COM-BUS, as a self-sustaining subscription commuter bus service, has gained national recognition as one of two such services (the other being the Reston Commuter Bus service from Reston, Virginia, to work destinations in the metropolitan Washington, D.C. area). COM-BUS, which provides this weekday work trip service through contracts with several charter bus companies, is considered successful because:

1) It continues to operate at a profit, without any form of subsidy.

2) It continues to have high load factors (averaging slightly less than 95%).

3) The system was organized and operates with a minimum of capital outlay.

4) The system is managed with a minimum of administrative or overhead expense.

Continuing high load factors are particularly remarkable when considering the area in which COM-BUS operates (Southern California). This is an area in which there is a predominance of single-occupancy private automobiles used for commute trips and where extended travel times and numerous transfers are required to complete most work trips if public transit is used. Bond issues to permit expansion of the public mass transit systems have been repeatedly voted down.

For the preceding reasons, the Urban Mass Transportation Administration (UMTA) decided to conduct a review and an assessment of COM-BUS under the aegis of the Service and Methods Demonstration (SMD) Program. This review was accomplished through the Transportation Systems Center (TSC), which has programmatic responsibility for all aspects of evaluation associated with the SMD Program.

In addition to studying COM-BUS's accomplishments as a subscription commuter bus service, COM-BUS service can be assessed in light of three of the SMD Program objectives:

1) Reducing travel time for transit users

2) Increasing transit coverage

3) Increasing transit vehicle productivity.

A fourth SMD Program objective, increasing transit service reliability, can be discussed only in a qualitative fashion due to lack of data.

1.2 REVIEW METHODOLOGY

The primary source of information used in the review of the COM-BUS service was Mr. Ronald J. Hoffman, President of the Southern California Commuter Bus Service, Inc. (of which COM-BUS is a division). He has been actively involved in the formation, growth, and current operations of COM-BUS and, under subcontract to CACI, Inc., provided a written discussion of the evolution of COM-BUS and a description of how it operates today.[1]

Other service information was gained from lengthy discussions with Mr. Hoffman and a review and analysis of COM-BUS operational records by CACI personnel.

Finally, descriptive information about the service area was obtained from data available from the 1970 census and Statistical Abstracts of the United States, 1974, U.S. Department of Commerce, Social and Economics Statistics Administration, Bureau of the Census, Washington, D.C., 1974.

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[1] The COM-BUS Commuter Bus System, Southern California Commuter Bus Service, Inc., Huntington Beach CA, August 20, 1976.

1.3 REPORT OVERVIEW

The remaining chapters of this report consist of:

2 - Description of the current COM-BUS service area.

3 - Description of current COM-BUS service operations.

4 - Description of COM-BUS service and management evolution.

5 - Discussion of how supply, demand, and productivities have changed over the evolution of the service.

6 - Summary of COM-BUS service and transferable characteristics.

2. SERVICE AREA

2.1 GENERAL DESCRIPTION

The COM-BUS service area is that portion of Southern California indicated in Figure 1, covering approximately 1,200 square miles. The areas are heavily populated, ranging from 3,700 people per square mile in the San Fernando Valley to 7,700 per square mile in Central and West Los Angeles. The major origin areas for morning collection are also indicated in Figure 1.

For most routes in the service area, freeways are easily accessible. The weather is generally mild enough not to interfere with transportation. Weather is cool enough in the winters (sometimes as low as freezing temperatures in the mornings) to require heaters on the vehicles, and hot enough in the summers (into the 90s or higher) to require air conditioners.

2.2 SERVICE AREA DEMOGRAPHICS

Key 1970 demographics for the three major zones in the COM-BUS service area are given in Table 1. Since only a small portion of Ventura County is served, no demographics are shown.

2.3 SERVICE AREA TRANSPORTATION

Existing mass rapid transit for the public in the service area is not an acceptable alternative to the passengers traveling the COM-BUS routes, because of extended travel times and

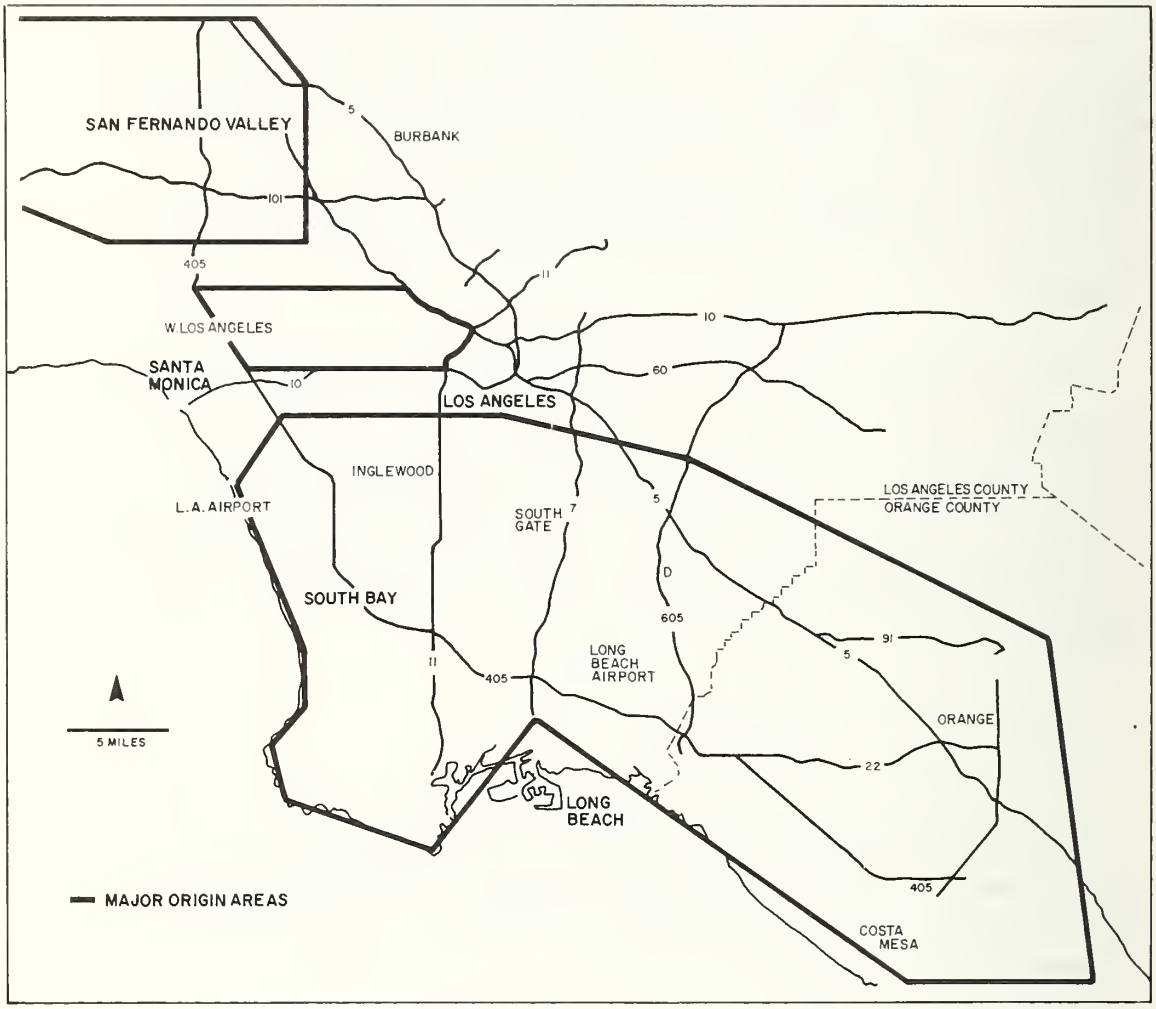

FIGURE 1. MAJOR COM-BUS SERVICE AREA ORIGINS

TABLE 1. KEY 1970 DEMOGRAPHICS FOR COM-BUS SERVICE AREA[1]

Census Characteristic	San Fernando Valley	Central and West Los Angeles	Northwestern Orange County
Population	1,210,000	3,905,000	989,000
Area in square miles	325	505	210
Population density per square mile	3,700	7,700	4,700
Median family income	$12,600	$10,300	$12,000
Median age	30.3	29.6	25.6
Percent persons 65 years and over	8.5%	9.9%	6.2%
Percent not completing high school	30.1%	41.3%	33.7%
Sex: (percentage)			
Male	48.5%	48.0%	49.0%
Female	51.5%	52.0%	51.0%
Race: (percentage)			
White	95.1%	78.2%	97.1%
Negro	3.1%	17.4%	0.8%
Spanish	11.8%	18.8%	12.9%
Other	1.8%	4.4%	2.1%

[1]CACI, Inc., proprietary program, SITE 74.

inconvenience of numerous transfers.[1] The main supplier of public transit in Southern California (Southern California Rapid Transit District, SCRTD) has no direct routes between the COM-BUS origins and destinations. In addition, on those SCRTD routes which do utilize major freeways for a portion of work-related trips, there are usually extensive pre- and post-freeway stops, considerably in excess of the number which have made COM-BUS quite acceptable to system users.

The most common mode of commuter transportation in the service area is the single-occupant private automobile, as noted in Table 2. The percentage of workers utilizing private autos for work transportation are much higher in the Los Angeles County area (85.9%) and in Orange County (92.5%) than in SMSAs[2] of 250,000 population or more (76.6%). While 8.9% in Los Angeles County and 7.6% in Orange County were passengers in private autos, the general life-style in the Los Angeles basin causes a vast majority of workers to prefer the freedom and flexibility of driving his or her own automobile. This is particularly true on Fridays, when many workers seek nearby recreational facilities in the mountains and at the beaches virtually year-round.

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[1] In testimony before the California Public Utilities Commission (in an attempt to obtain a Certificate of Convenience and Necessity for COM-BUS to operate legally), one commuting employee of the Huntington Beach facility testified that it would take him 3 hours and 42 minutes one way, and 4 hours and 3 minutes the other way. This trip required taking five buses on different lines, involving transfers. Travel for this individual on the same route, using COM-BUS, is 40 to 50 minutes each way.

[2] Standard Metropolitan Statistical Areas.

TABLE 2. DATA ON LOS ANGELES AND ORANGE COUNTIES AUTOMOBILE OWNERSHIP AND MODE OF TRAVEL TO WORK (1970 CENSUS)[1]

Automobile Ownership and Travel Modes	Los Angeles County	Orange County	SMSAs[2] of 250,000 or more
Automobile ownership (percent)			
None	15.1	5.5	19.3
One	44.0	39.0	45.4
Two	33.3	44.5	29.7
Three or more	7.6	11.0	5.6
Number of automobiles per household	1.3	1.7	1.2
Mode of travel to work (percent)			
Private automobile	85.9	92.5	76.6
Private automobile, driver	77.0	84.9	65.7
Private automobile, passenger	8.9	7.6	10.9
Bus or streetcar	5.4	0.3	8.1
Subway or train	0.1	0.0	3.7
Walk	4.5	3.1	6.3
Work at home	2.0	1.6	2.1
Other	2.1	2.5	3.1

[1] Statistical Abstract of the United States, 1974, U.S. Department of Commerce, Social and Economics Statistics Administration, Bureau of the Census, Washington DC, 1974, and CACI, Inc. proprietary program, SITE.

[2] Standard Metropolitan Statistical Areas.

Average commute distances to work in Los Angeles, (8.9 miles), are relatively long when compared to Chicago (6.6 miles), or Philadelphia (4.4 miles), although not as long as San Francisco (15.9 miles).[1] These comparison cities all have commuter-oriented public transit systems.

As an indication of distributions of travel distances for work sites similar to those served by COM-BUS, data, based upon surveys, are available in a recent report[2] for the Hughes El Segundo Division, the Rockwell B-1 Division, the Hughes Space and Communications Group, the Aerospace Corporation, and the Air Force Space and Missile Systems Organization. These data indicate that on the average better than 75% of the employees in those organizations live within 20 miles of their place of work. On the average, less than 5% travel further than 40 miles to their place of work. All current COM-BUS routes exceed 20 miles one way, with the extreme one-way travel distance being 70 miles.

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[1] Weber, Melvin, "The BART Experience: What Have We Learned?", The Public Interest, Fall, 1976, pp. 79-108.

[2] Schnitt, Arthur and Bush, Leon R., "Feasibility Study of the Employment Center Bus Service Concept," The Aerospace Corporation, prepared for the Urban Mass Transportation Administration, Washington, D.C., August 1976, Figure 6-2, page 6-7.

3. CURRENT SERVICE OPERATIONS

3.1 WHAT COM-BUS IS

COM-BUS is a privately owned, profit-oriented, non-subsidized, subscription commuter bus service operating in the greater Los Angeles, Orange, and Ventura County areas. COM-BUS is a wholly owned subsidiary of the Southern California Commuter Bus Service, Inc. (SCCBS). In addition, there is another wholly owned subsidiary of SCCBS which currently owns and leases minibuses. A division of the parent company performs research and analysis studies. Although privately owned, COM-BUS is subject to the rules and regulations of the California Public Utilities Commission (PUC).

COM-BUS, as a service, provides a daily work-trip collection, line haul, and distribution commuter bus service on a schedule whose travel times are competitive with the private automobile.

The objective of COM-BUS today is to provide commuters on work-related trips with an attractive mass transportation alternative to the single-occupant automobile, while doing so at a profit. This profit objective is different than when COM-BUS was originally formed, as will be seen in reading Chapter 4 of this report.

COM-BUS contracts with charter bus companies for supply, as a function of changes in demand, so that service costs are recovered (and a profit made) through individual passenger subscriptions for route seats on a weekly, paid-in-advance, reservation basis.

At present, COM-BUS serves approximately 2,000 commuters per day on 47 bus routes originating in Los Angeles, Orange, and Ventura Counties. COM-BUS passenger origins are concentrated in:

1) San Fernando Valley

2) South Central and West Los Angeles

3) Northwestern Orange County

4) Palos Verdes and Redondo Beach.

There are four major work destinations:

1) McDonnell Douglas, Huntington Beach

2) Federal Building in Westwood

3) Los Angeles Civic Center

4) Aerospace and defense firms clustered near the Los Angeles International Airport.

The Los Angeles Civic Center passengers originate in Orange County and South Central Los Angeles. The other three major destinations serve passengers from the San Fernando Valley and Northwestern Orange County. International Airport area serves passengers from Palos Verdes, Redondo Beach, and Malibu. The McDonnell Douglas Huntington Beach plant, the Northrop Corporation facility in the International Airport area and the Federal Building in Westwood provide service for the greatest number of COM-BUS users.

Work destinations and major pickup origins covered by COM-BUS routes during their morning collection segment are indicated in Figure 2.

Unlike other commuter services, riders of the COM-BUS system pay for reserved space on the system by weekly, advance increments; payments on a daily basis are not permitted nor are payments for partial weeks. (There are some allowances made for vacation, lengthy illness or business travel, and these are part of the Uniform COM-BUS Rules, Figure 4, discussed later.)

COM-BUS devotes its entire efforts to providing transportation for individuals to and from work only. Limiting the ridership market to commuters makes the marketing of service easier than marketing to the total population. According to the organization's president, Mr. Ronald J. Hoffman, the majority of new riders are attracted by favorable word-of-mouth "advertising" from fellow employees who are COM-BUS riders.

COM-BUS utilizes both large buses (with seating capacities from 38 to 47 passengers) and eight minibuses (with seating capacities from 13 to 16 passengers). The eight minibuses are owned by Southern California Commuter Bus Service, Inc.

The large buses are obtained through contracts between Southern California Commuter Bus Service, Inc. and local charter companies, presently five in number.

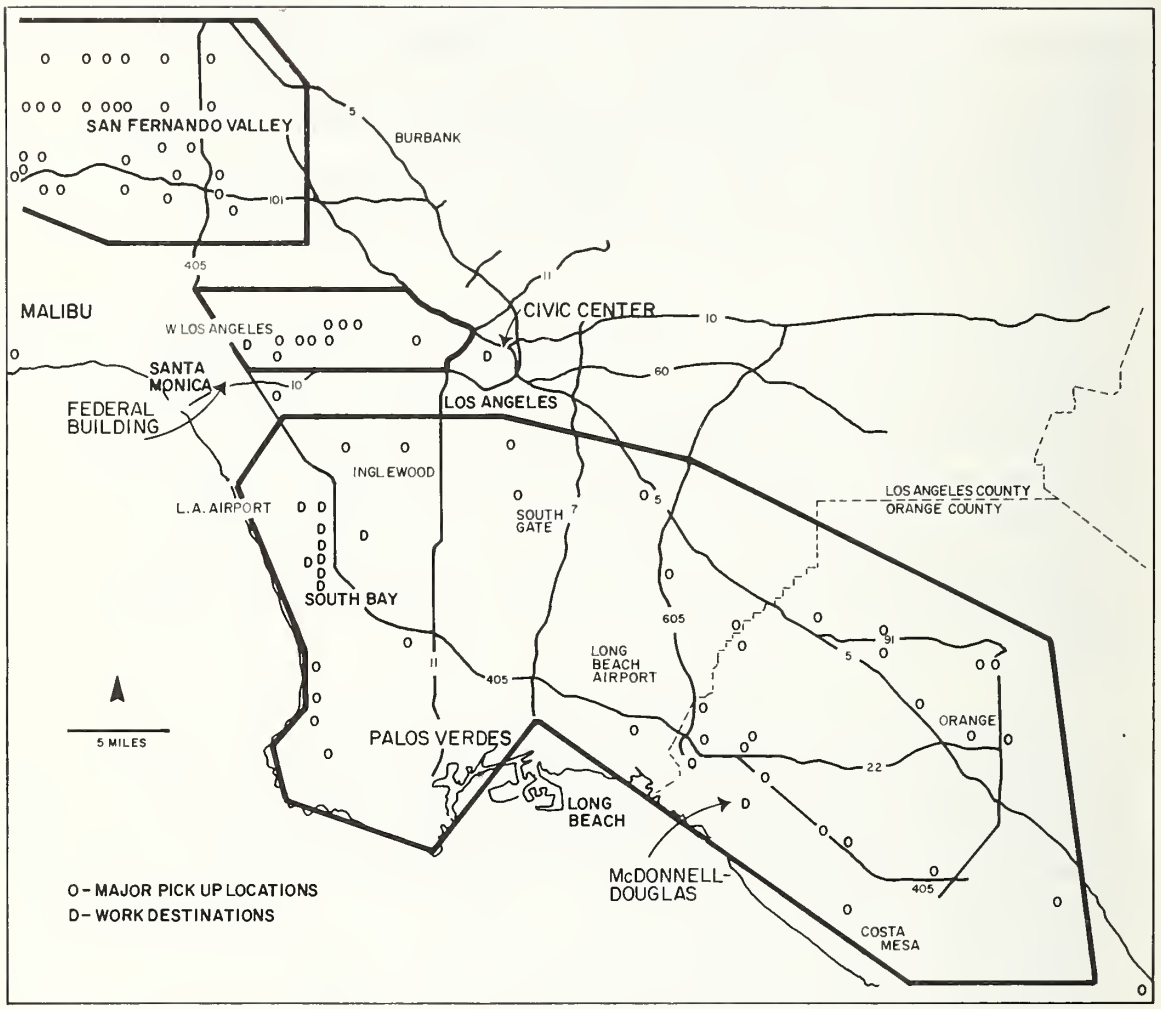

FIGURE 2. CURRENT COM-BUS SERVICE AREA ORIGINS AND DESTINATIONS

The advantages to COM-BUS in utilizing primarily chartered vehicles are:

1) Capital outlay for purchase, operation, and maintenance of vehicles is kept to a minimum.

2) COM-BUS management has the short-term flexibility of matching supply to changes in demand, both temporal and spatial, thereby maintaining high commuter vehicle productivities, with load factors at better than 90 percent.

3) It is not necessary for COM-BUS to be concerned with high productivity levels for the vehicles during the hours they are not being used for COM-BUS commutes.

4) It is unnecessary for COM-BUS to maintain a labor force of drivers, the major transit operating expense.

At the same time, the advantages to the charter bus company are:

1) COM-BUS contracts provide them with a stable, predictable source of income.

2) The vehicles are available to the charter companies for other income-generating runs during the non-commuting times.

Fares vary from $11.50 per week for the shortest route (20 miles one way) to $15.00 per week for the longest route (70 miles one way). Scheduled travel times range from 40 minutes to one hour and 50 minutes.

How COM-BUS manages to operate profitably, without subsidy, supported totally by rider subscriptions, is impressive in this day of heavy transportation subsidy, and has potential application to transportation systems across the country.

3.2 OPERATIONAL AUTHORITY

COM-BUS operates under the laws of the State of California, providing a passenger stage service. A passenger stage service is an operation that carries paying passengers over a route more than once in nine days. Attempts at sidestepping this regulation by varying the route slightly each day are not considered acceptable by the PUC. Details on how COM-BUS became classified as a passenger stage service are given in Chapter 4.

3.3 KEY ELEMENTS IN SERVICE ADMINISTRATION

COM-BUS employs two salaried people full-time for the clerical work required. Mr. Hoffman is, in addition to being President of Southern California Commuter Bus Service, Inc., a full-time employee of the McDonnell Douglas Astronautics Company and receives no direct salary for the administrative support he gives COM-BUS after working hours.

3.3.1 Bus Captains

There is one Bus Captain assigned to each of the COM-BUS routes. These individuals are passengers of the service, selected by COM-BUS management, and receive free rides in exchange for their efforts, which include:

1) Enforcement of bus rules (shown in Section 3.4).

2) Receiving requests from individuals wishing to subscribe. (Usually a potential passenger will have heard of COM-BUS from a neighbor or fellow worker or will have seen an announcement on a company bulletin board. If the route has available space on the bus, the Bus Captain will collect a week's fare in advance and add the individual's name to the list of regular passengers. If there is no space on the bus, the individual's name will be added to a waiting list.)

3) Working with the Area Coordinator when bus loads become too low or are full and have waiting lists.

4) Recording passenger reservations and payments. (A detailed description of this recordkeeping function is contained in Appendix A to this report, along with samples of completed daily and weekly forms.)

Mr. Hoffman emphasizes the need to select Bus Captains carefully. They must be able to deal firmly yet tactfully with the requests and the problems that routinely arise on the route.

One of the problems with which the Bus Captains have to deal is deteriorating service from a particular charter company. If service from that company has, in the past, been

good, efforts are made to have the service improved. In general, COM-BUS is able to work well with the charter companies in bringing poor service up to high levels again.

Bus Captains sometimes meet with pressure from passengers (with whom they are often neighbors or friends) to make exception to the rules. This is particularly true where the passenger has missed a day or two and wants a rebate on the week's subscription. Fortunately for the Bus Captains, they have the support of the Area Coordinator (described below) in arriving at decisions where interpretation of the rules is concerned. Because the Bus Captain has to "live with" the passenger every working day, it is sometimes better to have the Area Coordinator - who is one step removed - enforce the Bus Captain's and COM-BUS's position on a rule. In any event, firm enforcement of the rules has apparently not had a detrimental effect on subscription levels; they continue to be in the 90-percent range.

3.3.2 Area Coordinators

Area Coordinators are the focal point for information from a Bus Captain to COM-BUS management and from COM-BUS to the Bus Captain or the passengers. While Bus Captains have the prerogative of contacting COM-BUS management directly, it is generally more expedient to work with the Area Coordinator. There are four Area Coordinators for the 47 routes. Often the Area Coordinator works in the same company as the Bus Captain and, if not, works nearby. Contact between Area Coordinators and Bus Captains is usually daily.

Additionally, Area Coordinators are often the focal point for communication between COM-BUS and the charter companies.

Since the charter companies feel strongly about keeping contact with COM-BUS commuters confined to a minimum number of people, Bus Captains generally have no direct contact with the charter companies; and the Area Coordinators and COM-BUS executives split this responsibility approximately evenly.

Area Coordinators are selected by COM-BUS management and are paid $25 to $50 per week, depending on the number of routes served (from four to twelve). They also ride the service free. These individuals usually come from the ranks of the Bus Captains, since a thorough understanding of the COM-BUS system is essential, as is an appreciation of the passenger- and service-related problems encountered by the Bus Captains.

This middle level of COM-BUS management also relieves the COM-BUS president from having to deal on a daily basis with such a large number of individuals (the 47 Bus Captains) about operational problems. From the Bus Captain's point of view, this arrangement provides one easily accessible individual to work with in solving the day-to-day operational problems. When a Bus Captain encounters a problem in enforcing a rule with a particular passenger, it is helpful to take the problem to the Area Coordinator, who can often deal with the problem more objectively, less emotionally, since the Area Coordinator will not have been "worn down" by the constant contact and resultant pressure from the passenger.

Responsibilities of the Area Coordinators are:

1) Keeping track of the individual routes.
2) Collecting the passenger fare envelopes and passenger sheets from the Bus Captains each week.
3) Checking passenger sheets for correctness.

4) Transmitting a summary of passenger sheets to the COM-BUS office weekly.

5) Transmitting passenger revenues to the COM-BUS office weekly.

6) Aiding the Bus Captains in interpreting and enforcing bus rules.

7) Stimulating individual Bus Captains to engage in advertising campaigns to attract new passengers when a particular route is below capacity.

8) Dealing with the administration of a particular employer being served by COM-BUS, with regard to distribution of schedules and the support of the employer in stimulating employees to utilize the system.

9) Providing suggestions to COM-BUS with regard to additional service to a particular company or employment center, or with regard to altering existing routes due to shifts in passenger residence or employment locations.

10) Generally keeping COM-BUS management informed on existing or potential problems of any kind.

3.3 Charter Bus and Minibus Alternatives

The COM-BUS system today utilizes a combination of large buses (38 to 47 passengers) and minibuses (13 to 16 passengers). Presently, all the large buses leased from the charter companies are air-conditioned and have reclining airline type seats. Most provide stereophonic music and refreshment bar (after work).

The cost of operation of a highway-coach type bus, such as those utilized by COM-BUS, is fairly constant and is independent of the number of seats available on a particular

bus. Driver wages and driver-related payments, such as taxes and pension benefits, amount to approximately one-half of the cost of operating a bus. The other half is divided between those non-capacity items such as tire wear, fuel costs, insurance, and maintenance. Very little additional operating expense is incurred by having a bus with more seats. Because of California restrictions deriving from highway engineering, bus lengths are limited to forty feet and widths are limited to eight feet. The number of passenger seats that may be fitted within this size constraint is determined first of all by the distance between seats, which is a passenger comfort factor; secondly, by the width of the seat back. With modern material, seat backs can be made much thinner while still providing considerable comfort even in a reclining seat. The restroom usually takes the place of four passenger seats.

In most cases, the number of seats on a highway coach varies from 38 to a maximum of 49. COM-BUS has found that it is not economical to operate a 38- to 40-passenger bus, but that a passenger seat capacity must be approaching 45 or greater in order to optimize profit while charging a reasonable price. In most cases, this has meant that COM-BUS prefers those coaches without restrooms (which are not needed for the commuter routes), which allows adding seats without sacrificing legroom between the seats. If one considers the profit margin a commuter bus system is operated on, it becomes obvious that two to three additional seats may double the profit being made by the commuter bus company, or, to look at it another way, may lower the risk being taken.

A separate contract is made for each route, and must be approved by the PUC. The contracts specify the hours during which service is to be provided by the charter company (typically 6 A.M. to 8:30 A.M. and 4 P.M. to 6:30 P.M.), and the maximum number of miles to be driven each way on the

particular route. COM-BUS pays a fixed dollar amount for each day of service, based on mileage. Current costs range from $80 to $95 per day. COM-BUS has a policy of paying the same amount for the same run, regardless of the supplier involved. (A sample contract is provided in Appendix B.) The charter companies utilized range from small, local-operations-only companies, to large companies such as Greyhound.

There is fluctuation (considered normal by COM-BUS) in passenger loads on individual routes. The typical situation is that, while one aerospace company is hiring employees, another is laying them off in the same area. Commuter routes to one company will be full and, in fact, have waiting lists, while commuter routes to another company will decrease to a point where profitability is in question. In the former situation, a Bus Captain in charge of keeping track of the people wanting a ride on his bus is under tremendous pressure by those employees not able to get a seat. In the latter case the Bus Captain is put under pressure by COM-BUS to build the passenger loads back up and make the route profitable again or to allow COM-BUS to discontinue the operation. This type of fluctuation - adding new routes and dropping other ones - is considered normal, and the minibus provides COM-BUS with a convenient means of meeting the needs of passengers while keeping the buses full.

All eight of the minibuses are owned by COM-BUS and are driven by commuters who have obtained the necessary chauffeur's license required by California law. In exchange for administrative duties, for driving the bus, and collecting fares, the driver rides free and, in some cases, has the possibility of receiving a slight profit if the bus is kept entirely full. Passenger fares are the same on the minibuses as on the larger buses.

Initial analysis of operations of minibuses, even those that are passenger-driven, indicated that a minibus would be just marginally profitable if the same fares were charged for the minibus as were charged for the high-capacity, highway-type coach.[1] If the minibuses were full to capacity, a very small profit, possibly on the order of $20 a week, might be made. If, however, the normal situation existed, where people were not riding every week and one or two seats were left vacant on the minibus, the profit margin would decrease to zero.

While the minibus is financially not an attractive alternative to the large commuter bus, the greatest advantage is that it relieves the pressure on the commuter system. A group of ten or twelve people on the waiting list of a large-capacity bus can be given a minibus to use in the interim. A commuter bus which has decreased in patronage from, say, 45 passengers to 30 passengers can be provided with two minibuses rather than having the entire route cancelled. Sometimes the minibus will be provided to as few as five or six people waiting for a large-capacity bus even though the minibus will have to be operated at a loss. This is done in order to, first of all, meet a responsibility that a commuter bus company has to the public, and secondly, to keep these people thinking about commuting to work in a mass transportation mode rather than going back to their personal automobile. The minibus is also necessary, since COM-BUS may not cease service on an authorized route without permission of the PUC.

In selecting a vehicle used in the minibus system, COM-BUS settled on the Dodge Maxivan because of its reliability

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[1] COM-BUS analysis was based on information contained in "The 3-M Commute-a-Van Program Status Report," by Robert D. Owens and Helen L. Sever of the 3-M Company, St. Paul MN, May 1974.

and size. The Dodge Maxivan was the only vehicle whose length was large enough to fit 15 passenger seats in a standard configuration. Upon purchasing the first Dodge Maxivan in the 15-passenger configuration, it was found that the legroom was inadequate for adult passengers, so COM-BUS decided to modify the vehicles to their own specifications. Figure 3 illustrates the COM-BUS modifications to a Dodge Maxivan with a four-passenger bench seat in the extreme rear, two bucket seats over the rear wheel wells facing inward, a three-passenger bench seat facing aft: a total of nine seats surrounding a removable card table. Forward of the reversed seat is a forward-facing, three-passenger bench seat. The front passenger seat and a driver's seat were replaced with lounge type chairs rather than the standard bucket seats that come with the Dodge Maxivan Sportsman Royal. This, therefore, provided 14 adult passenger seats with very adequate legroom and with a convenient arrangement in the rear of the van for conversation, socializing, or playing cards. Stereo speakers were added in the aft compartment as well as additional overhead lighting independently switched to provide a camper type atmosphere conducive to socializing.

New, each maxivan cost $8,100. Conversion costs for each were approximately $450.

Until recently, COM-BUS owned four large highway coaches. Drivers of these buses were former charter bus drivers and were paid full-time salaries even though COM-BUS commuter runs required only a few hours per day. During off-peak periods, COM-BUS offered the buses and drivers to charter companies for overflow. Usually, the drivers would drive the buses to the nearest charter company and park. About half the time, the drivers were able to get fees ten to 15 percent less than the charter company itself usually got for the same trip.

a. Exterior View

b. Interior View - showing special COM-BUS 14-passenger configuration with 9 seats around central card table

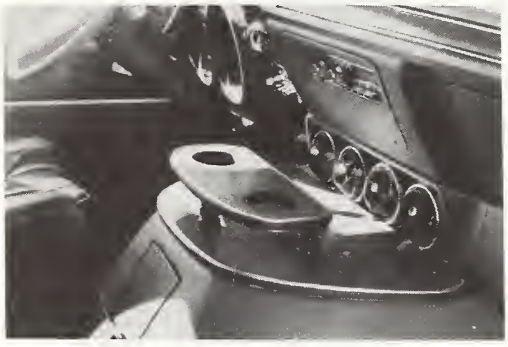
c. Original front bucket seats removed and placed sideways over wheel well

d. Lounge type front seats installed

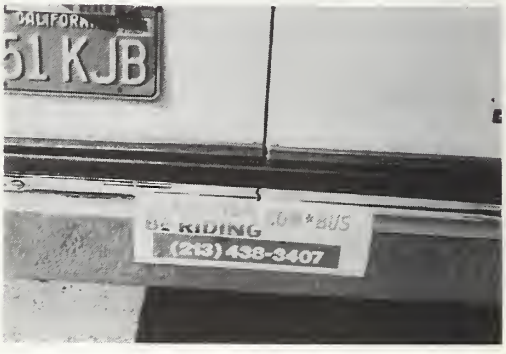
FIGURE 3. DODGE ROYAL SPORTSMAN MAXIVAN USED BY COM-BUS IN SPECIAL 14-PASSENGER CONFIGURATION

c. Dual doors for easy passenger entrance/ egress

d. Forward view of 14-passenger configuration



e. Inexpensive yet important amenities; for example, a wood-grain front drink holder (cost: $16)



f. Bumper Stickers - Very effective form of local advertising and method of getting commuters involved (stickers on their private cars)

FIGURE 3. (CONTINUED)

Mr. Hoffman personally supervised the hiring and routine activities of the drivers, and recently decided to eliminate this responsibility from the COM-BUS operations, along with the attendant responsibility and expense of maintaining the vehicles.

3.4 COM-BUS DAILY SERVICE AND PASSENGER RULES

The current COM-BUS philosophy regarding route operations considers the need to have few stops in both the collection and distribution mode and to provide as personalized service as possible. Typically, many of the routes pick up the first few passengers at their door and then proceed to pick up a few more passengers at each street corner (say, until the number of passengers reaches ten to twelve). To this point, while these passengers are required to ride a little longer (about five or six minutes), they receive personalized service in exchange. As more passengers are boarding the bus, it becomes necessary to make fewer stops, since more persons (those already riding) will be inconvenienced by additional stops and, therefore, greater transit time. At the last stop, usually 30 or 40 percent of the passengers board the bus. For them the ride is express to work, via freeway, with no stops.

The same philosophy holds for a commuter bus going to more than one company in a particular employment center. For example, if three companies located in the same general area are to be served by a single commuter bus, it is important that the company being served with the majority of people on the bus be the first stop in the morning, to drop passengers off, proceeding from there to the company with the fewest passengers on the bus. This assumes, of course, that the route between these companies is fairly direct. For the evening pickup the reverse, of course, would be true. The first

COM*BUS • 16782 Bolero Lane • Huntington Beach, California 92649 • (714) 846-3711 (Business)
• (714) 522-1500 (Messages)

Effective Date April 29, 1974

UNIFORM RULES FOR ALL *COM-BUS* COMMUTER BUSES

The following rules have been established for all COM-BUS commuter buses.

These rules are not arbitrary - they represent the result of our experience over several years in trying to provide the best available service at a reasonable price and to assure a continuing operation. These rules will be enforced.

FARE: Weekly fares based on Public Utilities Commission approved rates or pending applications.

PAYMENT: Make checks payable to COM-BUS. Check or money order is due on or before Thursday of the preceding week. Checks will not be deposited in bank until at least the following Monday.

SKIPPING WEEKS: In order that we may provide personalized service and advanced reservations without the need for tickets or passes,each passenger must take on the responsibility of informing the Bus Captain of your intention to skip a week (without paying) before Friday afternoon of the preceding week. If you get sick over the weekend you can still skip without paying if you get word to your Bus Captain before noon on Monday. If you do not get work to the Bus Captain, then you are presumed to be riding and must pay for the week. There will be no exceptions. Valid reasons for skipping include company business, vacations, sickness, jury duty, and transfer. Driving for personal reasons is not valid.

In addition to the above, COM-BUS reserves the privilege of imposing a limit of five (5) skipped weeks (for valid reasons) per year. This does not include long term illness, paid vacations, or long term transfers. If you skip five weeks, you may then be asked to pay for any additional weeks skipped. This restriction has become necessary to maintain a consistently high passenger load which is required if we are to continue the service.

PARTIAL WEEKS: There will be no partial week fares except for recognized common holidays (see HOLIDAYS below). Passengers wishing to ride less than a full week will have to pay the full week's fare.

HOLIDAYS: On those routes serving only one company, the bus will not run on holidays recognized by that company. On those routes serving more than one company the bus will not run on common holidays and on any other days agreed to by a majority vote of the passengers. Passengers may deduct for a holiday only when the bus does not run.

VACATIONS: If you take a vacation of one or more weeks, you do not pay for those weeks. If you split up vacation weeks, you can still get credit for them provided that you can predict your days of vacation in advance. Credit can be given only in multiples of full weeks. You must give the Bus Captain a check for your return week.

SMOKING: Smoking (cigarettes only) will be permitted in the rear of the bus only. This rule may be modified by unanimous vote of all permanent passengers, as determined by the Bus Captain. This rule considers the rights of both smokers and nonsmokers in light of the recent medical evidence that smoke from someone else's cigarette may be dangerous to your health.

REBATE FOR LATE BUSES: Occasionally there will be mechanical or driver problems that prevent the bus from picking up on time. The agreement we have with the bus equipment supoliers is that if the bus is 1/2 hour late at any pick-up in the morning or evening, passengers who elect to drive are entitled to a rebate of 1/2 day's fare. You are encouraged to take other riders with you in which case you (the driver) should receive the rebate for yourself as well as your passengers.

Individual buses may elect (by voting in advance) to cancel the afternoon pick-up following a morning failure, in which case each passenger may dedeuct a full day's fare.

If on occasion a passenger has to stand due to unexpected passengers returning from vacations, company business trips, etc., or because of a breakdown requiring off-loading onto another bus, the passenger is entitled to a prorated rebate of the weekly fare (i.e., one-tenth week).

All rebates must be approved by COM-BUS. Please do not deduct a rebate from your check until told to do so by your Bus Captain.

COMPLAINTS: Your Bus Captain has a form for submitting complaints if a problem cannot be solved by the Captain or driver. Also, if you have any suggestions concerning routes, schedules or rules, please communicate them to your Bus Captain.

Ron Hoffman

Ron Hoffman, President
COM-BUS Division
Southern California Commuter Bus Service, Inc.

a division of

Southern California Commuter Bus Service, Inc.

FIGURE 4. UNIFORM COM-BUS RULES

people to get on the bus would be those from the company having the fewest employees riding the bus, and the last people to get on the bus should be from the company having the most people on the bus. This, therefore, provides the most express service for the most people. On many of the routes, all passengers are discharged at a single work site.

Approximately five percent of COM-BUS commuters are picked up at their residence; 70 percent park and ride within two miles of their residence; 25 percent gather at central pick-up points for express service.

In providing its daily commuter bus service, COM-BUS passengers are obliged, by their subscription, to live by a set of rules which evolved during COM-BUS's growth. These rules appear as Figure 4. Details on how these rules developed appear in Section 4.9.

One of the rules over which problems arise is smoking. The decision to allow smoking in the last four rows of the bus was reached after many discussions with passenger groups and Bus Captains. On many of the buses this rule is not enforced until a passenger complains.

The section of the Uniform Rules that causes the most problems for COM-BUS staff is "Late Buses." COM-BUS has negotiated with the charter bus companies that, if they are half an hour late in the morning, the passengers are entitled to a rebate for that half day. While this resolves the financial end of the problem, it does not always sufficiently satisfy the passenger who feels he or she can wait no longer for the bus and must hurriedly find an alternate means of getting to work. Because having late bus service endangers many individuals' jobs, they are understandably intolerant of such situations. Charter companies that repeatedly supply late service are not retained long by COM-BUS.

3.5 MARKETING OF COM-BUS

Marketing of COM-BUS services is done to maintain ridership levels rather than to generate growth. Therefore, marketing is somewhat on an as-needed and where-needed basis, route by route. This management philosophy was not always the case, as is discussed in Chapter 4.

Since the Area Coordinators and Bus Captains keep a close eye on ridership levels, and since they are keenly aware of layoffs by employers on their particular routes, they can take action when ridership declines.

Action can consist of contacting management within the employment centers on the route for permission to hold group meetings on the premises or to place route and fare bulletins on company bulletin boards. Also, the Area Ccordinator and/or Bus Captain can request of the employer a tab run of employees by residential area. The company personnel supplying such information can often provide COM-BUS with names of individuals who have inquired about car pooling.

Announcements of COM-BUS service are also placed in community newspapers, sometimes as small as a one- or two-page paper.

Mr. Hoffman estimates that the vast majority of COM-BUS riders were attracted by word-of-mouth "advertising" from co-workers or neighbors.

4. SERVICE AND MANAGEMENT EVOLUTION

4.1 IMPETUS FOR START OF COM-BUS

In the fall of 1968, McDonnell Douglas Astronautics Company transferred many of its employees from its Santa Monica facility to its new headquarters in Huntington Beach, California, some 40 miles to the southeast.

Approximately 80 percent of the employees working at the Santa Monica plant at the time of the transfer lived close to the plant or lived in the San Fernando Valley, 15 or 20 miles from the Santa Monica plant in the opposite direction of Huntington Beach. (See Figure 5.)

If the employees were to make the transfer to Huntington Beach without moving their households, their alternatives were driving or riding anywhere from 40 to 60 miles each way daily.

Many individuals chose to drive their own automobiles, while hoping for other, better alternatives. Some chose this alternative on a more permanent basis. (Southern California is noted for single-occupant private automobile commutes where the driver commonly commutes distances of 40 to 60 miles one way daily.) Still other individuals found driving their own autos unacceptable.

COM-BUS has no data on whether attempts were made to form private car pools to make the commutes. (Mr. Hoffman estimates that less than 10% of current COM-BUS ridership used car pools as their previous mode of travel to work.)

Management of the McDonnell Douglas Company initially showed some interest in organizing an employer-sponsored commuter bus

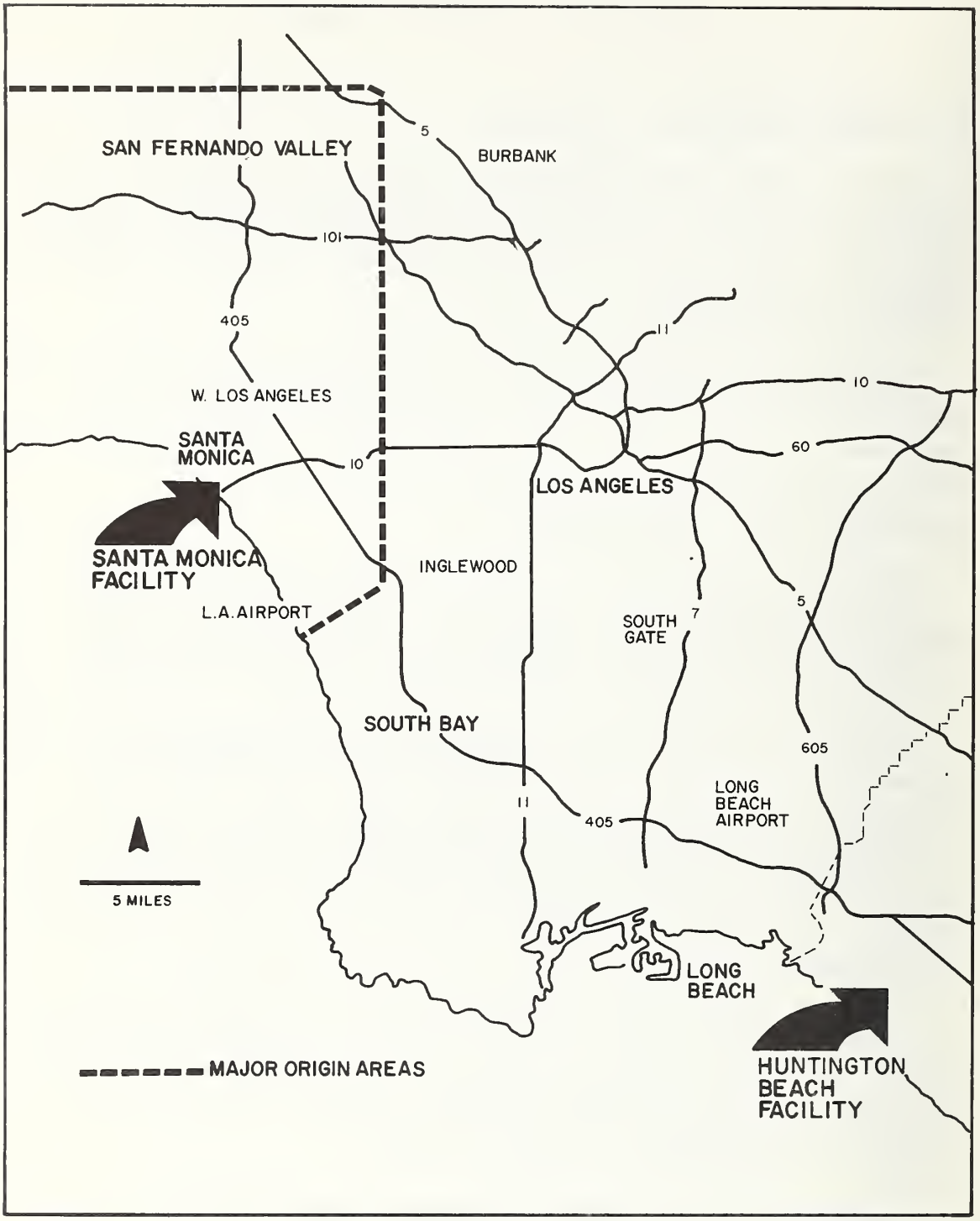


FIGURE 5. WORK SITES AND MAJOR RESIDENCE CENTERS OF MCDONNELL DOUGLAS EMPLOYEES AT TIME OF INITIAL TRANSFER

system for the transferring employees on a temporary basis to make the transition easier, but ultimately decided not to undertake such a transportation program.

Mass rapid transit was considered an unacceptable alternative by all the transferring employees because of the extended travel times involved and inconvenience of numerous transfers.[1] The main supplier of public transit in Southern California (Southern California Rapid Transit District) had no direct routes between Santa Monica and Huntington Beach or between the San Fernando Valley and Huntington Beach, and still has none today.

As a result of the need for an alternative to transportation by private automobile -- the only other alternative acceptable to the McDonnell Douglas commuters -- 45 transferred employees living near the Santa Monica facility decided to explore the possibilities of chartering a commuter bus on a regular basis. Mr. Hoffman became group leader, and bids were obtained from several local bus companies.

It was at this point that the group of commuters became aware of the California Public Utilities Commission's (PUC's) regulations requiring that a Certificate of Convenience and Necessity be issued to a bus operating a commuter route (considered by the PUC to be a passenger stage operation) and that the certificate would represent a monopoly to operate that route.

4.2 REQUIREMENT TO BE PASSENGER STAGE OPERATION

While PUC regulations vary from state to state and, therefore, steps taken by COM-BUS to comply with California PUC regulations are not 100 percent transferable to other locales, it is important that other transportation systems recognize the

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[1] See the footnote on p. 2-4 which describes the testimony of one commuter.

impact of PUC regulations in any location and be prepared to devote time, effort, and money to designing a system that complies with local regulations. A discussion of California PUC regulations has been included here, in order that the reader can understand why certain decisions were made in the design and evolution of the COM-BUS system.

As stated earlier, a passenger stage operation is an operation that carries paying passengers over a route more than once in nine days. Attempts to sidestep this regulation by varying the route slightly each day are not considered acceptable to the PUC.

Passenger stage operations are regulated by the PUC and must:

1) Apply individually for each route they wish to operate, specifying stops to be made.

2) Specify fares, rules and regulations that apply to the operation over each route.

3) Prove to the PUC that a public need exists for the operation of the route.

If the application to become a passenger stage operation is contested (for instance by another transportation operation), a public hearing takes place. If there is no contest, and upon approval of the Public Utilities Commission, a Certificate of Convenience and Necessity is granted, providing the operation a monopoly to operate a specific route or routes.

In exchange for receiving exclusive right to operate a particular route or routes, the passenger stage operation is subject to certain PUC requirements, some of which are:

1) Meeting minimum insurance standards.

2) Assuring that the fare for a specific route does not deviate from that approved by the PUC.

3) Not abandoning a route without approval of the PUC.

This last requirement means that the carrier may have to operate a route that is at times unprofitable. If the route is dropped without PUC approval, the carrier is subject to fines and the possibility of having the authority to operate on other (profitable) routes revoked.

4.3 FIRST BUS COMPANY IS SELECTED

With this requirement to be an authorized passenger stage operation in mind, the commuters selected the one bus company, out of the five bidding, that claimed to have exclusive PUC authority to operate between the Santa Monica and Huntington Beach facilities. (This later proved not to be the case.) An agreement was made with the bus company, and service was provided over several months.

Within days of service initiation, other commuters working at the Huntington Beach plant learned of the commuter bus service and decided to try the same type service between their own residential areas and Huntington Beach. Within three months of initiation of the first route, four other bus routes were independently organized, utilizing the same bus company as the original 45 commuters.

4.4 COM-BUS IS FORMED

It became apparent to the representatives of each route that a focal point would be beneficial for the five routes; thus COM-BUS came into being. At this point, the corporation under which

COM-BUS is today a division had not yet been formed. COM-BUS was the fictitious name given to the informal route-management organization consisting of passenger representatives from each of the five routes, called Bus Captains. Bus Captains gathered complaints, suggestions and requests, as well as collected fares from the passengers and passed these along to the bus company.

Ultimately, the service provided by the bus company operating the five commuter routes to Huntington Beach deteriorated to the point that the commuters agreed they must switch to another bus company.

4.5 SECOND BUS COMPANY REPLACES FIRST, AND LENGTHY HEARING ENSUES

Keeping in mind that PUC approval would have to be sought by the second bus company, COM-BUS checked with the PUC on how long this process would take; the indication was that it could take 18 months to two years. It was unacceptable to the commuters to continue with the first bus company, so an agreement was made with a second bus company that they would provide service concurrent with efforts to obtain a Certificate of Convenience and Necessity from the PUC.

The second bus company's application to obtain authority to operate the five commuter routes triggered a protest to the PUC by the first bus company and resulted in a lengthy public hearing.

The passengers of the five routes spent many hours of their free time in preparing for this hearing. In addition, many took time off from work (some at the expense of having their pay docked) to testify at the hearing. The hearing lasted three weeks (instead of the scheduled two days), and some 90 witnesses testified to the inadequacy of the service provided by the original bus company and to their desire to continue with the present bus company.

The results were the ruling that the original bus company did not have exclusive authority to operate the routes as they had told the commuters, and the authorization by the PUC for the second bus company to operate the five commuter routes. It took 19 months after the hearing before formal authority was granted.

Mr. Hoffman credits the heavy involvement by the passengers in the hearing with gaining the authorization. Without their testimony, he feels that the original bus company may have won the case instead, on the basis that they had been operating the route first.

As a result of this hearing, the new bus company owner requested that one member of COM-BUS be selected to deal with the bus company management, for which a fee would be paid to compensate for the coordination service provided (five percent of gross revenue). Mr. Hoffman was the obvious choice because of continuing involvement since initial service began. At this point COM-BUS became a profit-making service organization, still not yet part of a corporation.

4.6 COM-BUS EXPANDS

Meantime, as a result of the success of COM-BUS, and in some instances by coincidence, groups of employees at other companies were attempting to organize the same type of commuter service.

Employees at TRW, for instance, had attempted to obtain charter commuter bus service from various local charter companies as well as from Southern California Rapid Transit District. SCRTD decided only to inform TRW employees of existing routes and not to provide any commuter service. As a result, SCRTD was considered an unacceptable mode of commuter transportation

by the TRW employees, because of lengthy travel times and transfers, just as had been the case earlier with the original group of 45 McDonnell Douglas commuters.

Approaches by TRW employees to the charter companies met with mixed response. In some cases, the companies and commuters could not come to an agreement, because the bus companies are required to charge based on mileage, independent of the number of passengers; while the commuters wished to pay on a per capita basis. In other cases, the companies stated that they were working with COM-BUS and preferred that arrangement (working with one individual representing all passengers and routes and under a long-term agreement) to working with individual passengers or a number of passenger representatives on a daily basis.

TRW joined the COM-BUS group, and was shortly followed by Fairchild, Hughes Aircraft, Northrop Aircraft Co., and other, smaller companies.

The figures in Table 3 indicate the growth experienced by COM-BUS in a very short period.

It was during this expansion phase that COM-BUS began to mechanize its route-selection and employee-surveying techniques. A computer program developed by the Federal Highway Administration in Washington, D.C., for the purpose of locating employee residence locations on a grid map, was obtained and put into use in Los Angeles by COM-BUS. The first major effort to survey employees in Los Angeles using this program was a 10,000-employee population survey by COM-BUS of the Northrop Aircraft Company. The result of this large sampling computer survey indicated that, for the most part, the routes already established empirically by COM-BUS to bring employees from Orange County to the Los Angeles Airport area, from Los Angeles County, and from the southernmost points in Ventura County to the Los Angeles Airport area were, in fact, very similar to the computer-optimized routes developed

TABLE 3. GROWTH OF COM-BUS IN ITS INITIAL STAGES

Growth Indicator	Year[1]			
	69	70	71	72
Average number of routes	1	5	15	30
Annual passenger trips x 1,000	20	100	300	600
Annual vehicle miles x 1,000	20	100	300	600
Annual passenger miles x 1 million	0.8	4.0	11.5	22.0
Average load factor (%)[2]	91	90	91	90

[1]Data for 1969 through 1972 have been estimated by COM-BUS administration. COM-BUS during that period was not a passenger stage operation and was neither recording data rigorously nor reporting data to PUC.

[2]Load factors are computed by COM-BUS based on paid subscriptions, rather than on actual numbers of passengers by head count.

during the Northrop survey. Further analysis of the reason for this similarity made it apparent that in Southern California -- and probably in most cities -- not only do the suburbs surround the major highways and freeways leading to the city, but there are, in fact, a limited number of highway or freeway exits useful as a commuter bus pickup point.

As the COM-BUS commuter ridership grew, it was necessary for COM-BUS to make arrangements with a number of bus companies in order to satisfy rider demands for routes.[1] It must be remembered that, at this point, only the second bus company ever utilized by the commuters had received PUC authorization to operate.

As COM-BUS grew to serve many companies in the Los Angeles and Orange County areas, the PUC took notice of it and informed COM-BUS that it could not solicit, organize, or manage commuter routes without becoming a passenger stage operation.

COM-BUS management decided to request the charter bus companies -- by now, some eight in number -- to obtain the necessary certificates. Only two of the eight would agree to spend the time and money involved in filing the applications and obtaining legal services if a public hearing were necessary. Having only two of the eight authorized was unacceptable to the PUC, so the other alternatives were to discontinue service on the unauthorized routes, or for COM-BUS itself to become a passenger stage operation and to obtain the proper certificates for the routes.

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[1] To Mr. Hoffman's knowledge, none of the charter companies failing to contract with COM-BUS has gone into commuter business on its own. Some of them still exist, and some have gone out of business.

4.7 COM-BUS BECOMES PASSENGER STAGE OPERATION

On June 13, 1973 COM-BUS incorporated under the laws of the State of California as a passenger stage corporation and filed three separate applications with the Public Utilities Commission for authority to operate within Orange County and Los Angeles County. More than 30 commuter routes to companies such as McDonnell Douglas, TRW, Xerox, Hughes Aircraft, and Fairchild, among others were filed for. The routes applied for were existing COM-BUS routes, serviced by the eight charter companies. On all of these routes, local public transit service was either non-existent or of a nature requiring multiple transfers or commute times in excess of two to three times what express service could provide. A survey of existing passengers indicated that no passenger had ever considered taking local transit service on a permanent basis to get to and from work, because of these factors.

The application to the PUC by COM-BUS was protested by SCRTD, necessitating a public hearing. SCRTD had no direct service along the COM-BUS routes and had no plans to initiate such a service. According to Mr. Hoffman, the SCRTD's apparent intent in protesting was to stop a private company (COM-BUS) from providing service that SCRTD might someday decide to provide, in order to avoid later having to buy out the private company.

Four charter bus companies also filed a joint protest to COM-BUS's application.

Fortunately for COM-BUS and its riders, the PUC did not enforce the letter of the law and cause COM-BUS to cease operations until a decision could be reached -- which was approximately one year after the application. Transportation systems in other locales or at other times may not encounter the same permissive attitude.

The hearing took place over a period of about three months, with a total of 13 days of hearing. Passengers from each route testified to the necessity of the routes.

Also in support of the COM-BUS application, the Orange County Transit District (through Dr. Fielding, its president, and his representatives) clearly stated that COM-BUS complemented the Orange County Transit District operations rather than competed. Orange County Transit District also questioned the authority of the Rapid Transit District to protest routes originating in or operating within Orange County.

Several local governments also supported the COM-BUS applications. For example, the City Council of Huntington Beach, a city in Orange County in which many of its citizens were utilizing COM-BUS service, passed a resolution supporting the COM-BUS application for routes from Orange County to the aerospace companies in the South Bay and Los Angeles Airport area.

Approximately one year after the last hearing, the PUC decided in favor of COM-BUS and granted the Certificates of Convenience and Necessity, carrying in them the authority to operate all the routes applied for.

With the granting of the routes to COM-BUS, COM-BUS became one of the two largest private commuter bus companies in the United States, rivaled only by the Reston Commuter Bus System in Reston, Virginia.

Shortly thereafter, COM-BUS submitted an application for routes from Orange County and other areas into the Los Angeles Civic Center. This application was also protested by the SCRTD. In this case, some service was currently being provided by the SCRTD to the downtown area. The result of this application was that COM-BUS was granted rights to operate between Orange County

and downtown Los Angeles, and was denied rights to operate to that locale from other areas, on the basis that the SCRTD was proposing to operate a similar service. The application was denied "without prejudice," allowing COM-BUS to reapply in the future, should the SCRTD not provide the proper level of service.

4.8 DEVELOPMENT OF COM-BUS MANAGEMENT AND ADMINISTRATIVE SYSTEMS

The COM-BUS administrative and management systems developed as a result of daily experiments rather than design. It should be remembered that the COM-BUS system was and is essentially a volunteer operation. While Bus Captains are to be paid the equivalent of one passenger fare (that is, they ride free, for the services they provide in keeping track of passenger fares and reservation lists), this hardly compensates for the amount of effort required. According to Mr. Hoffman, they do it because of personal interest in assuring that the bus service continues, or, in some cases, for altruistic or social reasons. It is because Bus Captains are not highly compensated that the administrative procedures have been kept as simple as possible, consistent with the requirements of both the PUC and the IRS for accountability and traceability of income and expenditures.

The expansion of the COM-BUS system required the establishment of a uniform system of rules for all commuter buses, and Bus Captains were made responsible for enforcement of the rules. (These rules were presented in Section 3.5 of this report.)

For a time, COM-BUS tried accepting less than a full week's fare on a regular basis from some individuals. In essence, this resulted in part-time riders paying a part-time fare but "occupying" the seats for the full week since the seats could not be sold on a one- or two-day basis to someone else. When the uniform set of rules was developed, subscriptions were changed to advance <u>weekly</u> increments only, with rebates for only limited circumstances described in the rules.

Bus Captains were a part of the commuter management system from the very first commuter buses. Only later, as the COM-BUS system developed and grew was it decided to appoint Area Coordinators as an intermediate level of management between the Bus Captain and the policy-making executives of COM-BUS. Coordinators were appointed to handle a number of routes within a geographical area or, in some cases, routes to a particular employer.

A more detailed discussion of Bus Captain and Area Coordinator responsibilities and activities is contained in Section 3.3, where the way COM-BUS operates today is described.

As part of the management and administration of COM-BUS, three basic methods of communicating with passengers were developed:

1) Information passed on verbally by bus captains, about decisions made by COM-BUS management after passenger input.

2) Group meetings (usually in company cafeterias, conference rooms, or recreational centers) at which COM-BUS management has attempted to answer questions from potential riders.

3) Distribution to all riders of bulletins published by COM-BUS management covering topics of general interest to commuters.

Through trial and error, COM-BUS has determined which positions within the employment center served have the authority to aid COM-BUS in communicating with employees. They have found that often the individual within an employment center who is responsible for on-premises transportation is <u>not</u> in authority to permit dissemination of COM-BUS information, due to the employer's desire to avoid third-party liability situations.

Often, the more appropriate individuals to be contacted are in the legal, insurance, or personnel departments of the companies.

4.9 DEVELOPMENT OF ROUTE DESIGN CRITERIA AND OPERATING RULES

COM-BUS tried the most personalized approach to commuter service, picking up passengers at their doors, and the most express form, where all passengers gather at a central boarding point. Neither of these proved to be the most workable in the long run.

A group of passengers approached COM-BUS with a suggestion that, rather than run the route in the evening as a reverse route of the morning pickups (the normal procedure), the route be changed so that in the evening those passengers who got on first in the morning would be dropped off first in the evening, thereby allowing each passenger at all of the three stops to be on the commuter bus for approximately the same amount of time. Those passengers at the first stop in the morning would have the longest ride in the morning but the shortest ride in the evening because they would be dropped off first by taking this alternate freeway route. The passengers who were picked up last in the morning and, therefore, had the shortest morning ride would be dropped off last in the evening and, therefore, would have the longest ride in the evening. While this policy seemed like an equitable arrangement, Mr. Hoffman found that dropping off last in the evening (longest travel times to home) those who were picked up last in the morning (shortest travel times to work) provided a travel time on the homebound trip which was unacceptably longer than use of the private automobile. Most of the people at the last morning pickup simply quit riding because they were getting home much later than their automobiles would have gotten them home.

The COM-BUS policies related to route development are constrained by PUC regulations, and have evolved to the point where, to be considered a viable route, it must:

1) Have between three and five stops.

2) Travel a direct route.

3) Pick up the most people at the last stop in the morning.

4) Drop the most people at work first in the morning.

5) Pick up the most people at work last at night.

As a matter of policy, when patronage growth allows for an additional bus to be put into service, the new bus is not added as a second unit on an existing route. Instead, all routes which might be affected by the addition of another bus are surveyed, and several new routes are formulated to better serve all of the riders in a particular region.

For example, prior to the 1973/1974 fuel crisis, COM-BUS operated four, 45-passenger buses from the San Fernando Valley to McDonnell Douglas Corporation in Huntington Beach. Each of the four buses operated along different routes in the San Fernando Valley, making between two and five stops to pick up passengers. Since all of these buses were running to capacity, passengers requesting rides during the early weeks of the fuel crisis had to be put on waiting lists. When the total number of persons on the combined waiting lists for the four buses operating from the San Fernando Valley reached approximately 35, COM-BUS added another bus. At that time, the exact residence addresses of all current riders (on the four buses) as well as those on the waiting lists, were surveyed, and four new routes to replace three existing routes (one existing route remained unchanged) were put into effect. The result of this

revision was that, on the whole, COM-BUS passengers had less distance to travel from their homes to the bus pickup and fewer stops to make once on the bus.

Prior to the establishment of a uniform set of rules for all COM-BUS routes, each bus was operating under what each Bus Captain and COM-BUS thought was reasonable procedure for that particular route. Not having uniform rules promoted jealousies between buses concerning what was to be allowed and what was not. When a uniform set of rules was developed, efforts were made (and continue to be made) to impress upon the passengers the importance of accepting the rules in order that the total COM-BUS system benefit. (Figure 4 is a copy of the current rules.) In particular, it is essential that rules with regard to payment be observed. If too many exceptions to the rules are made, too many rebates for partial weeks are given, profitability goes down -- possibly to the point where the whole system is losing money. Passengers are reminded that, since the system operates totally without subsidy, profitability of the system is essential to the system's survival.

COM-BUS management (including Bus Captains) found that the attitudes of the riders improved considerably when the uniform rules were developed and enforced on all buses. Treatment of common passenger requests (such as for route changes, schedule changes, fare rebates, or change in the smoking rules) became consistent, resulting in a uniform level of service over the entire COM-BUS system -- a level considered high by the riders. Passengers look upon the COM-BUS system as a community program where they have an obligation to "do their part" in making it successful. When passengers complain about paying for a week's service in advance and then having to miss a day or two without receiving a rebate, they are reminded of the COM-BUS philosophy that they are paying for something similar to their mortgage or their auto insurance. That is, they are not in their home 100

percent of the time, yet they must pay for 100 percent of the time because they have the right of use of their home 100 percent of the time. The same is true of auto insurance, even though the the auto will sit idle much of the time.

4.10 IMPACT OF 1973/1974 FUEL CRISIS

When the fuel-shortage crisis of 1973/1974 first occurred, the Federal Government set priorities for allocation of fuel. High priorities were given to:

1) Defense equipment
2) Farm equipment
3) Public transportation.

Fortunately for COM-BUS, they were considered public transportation and were able to obtain fuel. The charter bus companies from whom COM-BUS obtained services were not considered public transportation for their non-commuting charter services, and encountered difficulties getting fuel for their non-commuting charter business.

Within the first week of the crisis, existing COM-BUS routes which were nearly full before the crisis became waitlist-only status. In keeping with their policy for assignment of routes, COM-BUS revised several routes to make it more convenient for passengers to take the bus. This resulted in improved routing for pre-crisis passengers and a dispersion of the new patrons among all bus routes. The only routes on which patronage was unaffected by the crisis were those few routes serving very affluent areas.

Selection of bus equipment became a difficult problem. Prior to the crisis, COM-BUS was utilizing the best of equipment available, since the quality of the equipment was a highly

important factor in passenger decision to use the COM-BUS service. The scarcity of high-quality equipment was due to the pre-crisis limited availability of such equipment and also the fact that charter business (in spite of difficulties with obtaining fuel) increased dramatically during the crisis. Charter companies experienced a dramatic increase in demand for service to places where individuals would normally have used their private autos. Charter trips to ski resorts, for example, nearly tripled during the crisis.

The scarcity of bus equipment forced COM-BUS to accept equipment with which they were not completely satisfied. It also forced COM-BUS to expand their requests for equipment from particular charter companies, beyond the suppliers' ability to handle the increased work load adequately from a management standpoint. Dispatchers had their work loads doubled in some instances; the proper mix of commuter-to-charter work was strained; and drivers were in short supply and therefore over-worked. All this resulted in a decline in service quality on many routes: more frequent late buses, more mechanical failures (preventive maintenance was almost non-existent because buses were constantly in service), and more management-oriented errors such as inadequate route descriptions and dispatcher errors.

COM-BUS lost touch with its passengers and altered its carefully developed procedures in an attempt to meet the heavily increased demands for service under less-than-ideal circumstances. The height of the inconvenience to the individual motorist by the fuel crisis lasted approximately four months. COM-BUS ridership had increased by 27 percent within a period of about six weeks. At the abrupt end of the crisis, 80 percent of these new patrons quit using COM-BUS within three weeks.

5. LEVEL OF SERVICE, DEMAND, AND FINANCIAL INFORMATION

COM-BUS, as an operation, came into being suddenly in 1968 as the result of the transfer of the McDonnell Douglas headquarters from Santa Monica to Huntington Beach. From a small beginning (one route, 45 passengers, all from one employment center), COM-BUS grew rapidly to its current level of 47 routes, serving approximately 2,000 passengers daily and a variety of employment centers. The early growth period was in response to a sudden and increasing demand. For approximately the last four years, supply, demand, and productivity measures have remained fairly stable, which has been the intent of COM-BUS management. While it is possible that ridership levels could be increased through active marketing, COM-BUS management feels that an increased operational size could not be managed at a high-quality level by essentially volunteer personnel.

This chapter discusses the specific changes in levels of service, demand, and productivity since the origin of COM-BUS in 1968.

5.1 LEVEL OF SERVICE

As COM-BUS was initiated and expanded, changes in its level of service can be described in three major categories: coverage, travel times and reliability, and operations.

5.1.1 Coverage

As can be seen in Table 4, there was a dramatic growth from one to 30 routes in the first four years, during which time COM-BUS was not a formal entity, but performed a coordinating function only. Between 1972 and 1973 the number of routes grew to 47, a level of service which has remained

TABLE 4. COM-BUS ROUTE EXPANSION, 1969-1976

Growth Indicator	Year[1]							
	69	70	71	72	73[2]	74	75	76[3]
Average number of routes	1	5	15	30	47	45	47	47
Annual vehicle miles x 1,000	20	100	300	600	705	695	703	710

[1]Data for 1969 through 1972 have been estimated by COM-BUS administration. COM-BUS during that period was not a passenger stage operation and was neither recording data rigorously nor reporting data to PUC.

[2]Minibuses were introduced to the COM-BUS system in 1973, with some impacts on average vehicle capacity (reduced). Therefore, load factor and number of routes may be biased upward somewhat.

[3]Estimated.

fairly constant since that time. As the average number of routes increased from a modest service area within close proximity to the Santa Monica McDonnell Douglas plant, the service area has expanded dramatically and now covers more than 1200 square miles.

It should be noted that individuals can use COM-BUS only if accepted by COM-BUS. Hence, expanded coverage is heavily dependent on existing route structures and individual origins and destinations. Additional origins and destinations are covered only if there is sufficient increase in demand to warrant new, modified, or additional routes.

The current service area, including major pickup points and work destinations, was given in Figure 2. Passengers from the San Fernando Valley and Northwestern Orange County are provided service to the Federal Building in Westwood, the McDonnell Douglas plant in Huntington Beach, and aerospace and defense firms clustered near the International Airport.

Naturally, more vehicles were added as each route was added, resulting in approximately 710,000 vehicle-miles in 1976 (see Table 4). While the principal type of vehicle utilized throughout the existence of COM-BUS has been the large, highway coach, in 1973 minibuses, purchased by the COM-BUS parent company, were added to the service. Use of the minibuses has been a help in meeting fluctuating demand. On routes where demand suddenly drops to the point where use of the large coach is too costly, a minibus (or two) can be substituted until demand picks up or the route can be officially dropped. The minibuses are also used on routes where demand is suddenly increased but not sufficiently high to justify use of a second highway coach.

The route-development policy maintained by COM-BUS management (discussed in Section 3.4), provides the flexibility to alter routes (improved coverage) in a way that the overall system will benefit by more convenient pick-up and discharge locations, and service that, for many passengers, is express.

Approximately five percent of COM-BUS commuters are picked up at their residence; 70 percent park and ride within two miles of their residence; 25 percent gather at central pick-up points for express service.

5.1.2 Travel Times and Reliability

System on-time performance and travel times are further measures of level of service and are both important considerations to the passengers, particularly when arrival at work by

a specified time is essential for many of the workers within the aerospace industry. COM-BUS does not have records of on-time performance over its entire history, but current performance is estimated as: 95 percent on schedule at destination, and less than two percent more than ten minutes late. It should be noted that, while wait times are minimal, the service user must be on time or will miss the COM-BUS pickup and have to find alternative transportation that day.

With respect to COM-BUS service travel times, the current contract fleet averages about 60 minutes over a 40-mile route. Extremes in the scheduled travel times and distances range from 20 to 70 miles one way, and from 40 minutes to one hour and 50 minutes one way, based on current COM-BUS schedules. The corresponding trip over the 40-mile route by private auto is approximately 50 minutes.

5.1.3 Operations

COM-BUS began with a contract with one charter company, has contracted with as many as eight, and currently contracts with five.

The type of vehicle principally used is an important factor in level of service, since the passengers have expressed very strong preference for the highway coach vehicle and for certain amenities included in the vehicle. According to Mr. Hoffman, amenities considered essential by the riders in order to choose the bus over private auto are:

1) Reclining, airline type seats
2) Air-conditioning
3) Sufficient legroom.

Features considered desirable but not essential are:

1) Refreshment bars on the evening runs, serving both hard and soft drinks as well as minor snacks such as nuts and pretzels.

2) Carpeted floors.

3) Drink wells alongside many of the seats.

4) Assignment of the same driver on a regular basis.

There has not been any significant change in the type of vehicle utilized, throughout the existence of COM-BUS, except for the addition of minibuses and the fact that COM-BUS had difficulty obtaining the high-quality vehicles desired for some routes during the fuel crisis. As was discussed in Section 3.3, the minibuses have been modified in order to bring the passenger amenities to a high level, comparable to the amenities found on the highway coaches.

Because COM-BUS passengers must pay for their week's subscription in advance, they are assured of having a seat for that entire week -- there are no stand-up passengers in the system.

While the service is, in general, considered to be of a high quality by its ridership (time to relax, read, sleep, and even have a beverage on the homebound trip), assurance of a seat through weekly pre-payments introduces an inflexibility from the users' viewpoint. This inflexibility is due to the fact that the rider must accept COM-BUS rules and schedules. Fixed schedules (only one pick-up time for each passenger) tend to impose a rigidity on the passenger (as contrasted with the Reston, Viginia service where the passenger does have a choice of several buses to catch to and from work. At Reston, however, the passengers are not guaranteed a seat).

5.2 DEMAND

5.2.1 Ridership

The rapid growth in demand for COM-BUS services from its inception in 1968 to 1972 can be seen in Table 5. From 1972 to the date of this report, response to ridership demand has been maintained at a fairly stable level. This is primarily due to the desire by COM-BUS management not to expand beyond the current level of service.

The original route demand was for trips to the McDonnell Douglas Huntington Beach plant only. As described in Section 4.6, employees from other employment centers shortly began to subscribe to COM-BUS, leading to its early rapid growth to meet demand.

Fluctuations in ridership on a particular route are considered normal, since many of the destinations served are aerospace companies, which experience fluctuations in employment levels. Expansion in service occurs only when demand is "guaranteed" (by converting wait-listed commuters to paid subscribers); service contracts when demand diminishes.

As stated earlier in this report, COM-BUS management has balanced supply and demand in such a way as to maintain an average load factor in excess of 90 percent (See Table 5). This average load factor has never dipped below 90 percent and has ranged as high as 94 percent. Once the break-even load has been achieved, additional subscribed seats have a significant impact on profit.

"Average load factor" could more accurately be termed "average subscription factor." Actual head count is of little consequence to COM-BUS management, since only subscription levels affect revenue and ultimately profit. Head counts are performed (as discussed in Appendix B) to satisfy PUC regulations.

TABLE 5. COM-BUS RIDERSHIP AND LOAD FACTORS

Indicator	Year[1]							
	69	70	71	72	73[2]	74	75	76[3]
Annual passenger trips x 1,000	20	100	300	600	702	690	702	700
Annual passenger miles x 1 million	0.8	4.0	11.5	22.0	26.8	27.8	27.0	26.3
Average load factor (percent)	91	90	91	90	92	93	94	91

[1] Data for 1969 through 1972 have been estimated by COM-BUS administration. COM-BUS during that period was not a passenger stage operation and was neither recording data rigorously nor reporting data to PUC.

[2] Minibuses were introduced to the COM-BUS system in 1973, with some impacts on average vehicle capacity (reduced). Therefore, load factor and number of routes may be biased upward somewhat.

[3] Estimated.

5.2.2 Ridership Profiles

Very little has been done in the way of COM-BUS passenger surveys, so very few ridership characteristics can be documented. However, Mr. Hoffman has provided the following descriptions, based on his in-depth experience with COM-BUS riders:

Age: Varied uniformly between 25 and 65 years.

Sex: 80 percent male, 20 percent female, same as aerospace employment population.

Ethnic Background: Varied. Same as aerospace employment population.

Income: Fairly narrow range--95 percent of salaried and hourly employees earn between $15,000 and $35,000 per year; 80 percent earn from $18,000, to $30,000 per year.

Number of cars: Mostly two-car families.

The makeup of each route is a function of the residential area served only. For example, one route serves Pacific Palisades, taking people to TRW Systems in Redondo Beach, and has 95 percent Senior Engineers/Scientists, Program Managers, and Administrators. There are very few hourly (blue-collar) passengers on this route, simply due to the affluent residential area being served. On the other hand, a route serving the Westchester/Inglewood area has about a 50 percent mix of white- and blue-collar passengers.

With respect to passenger turnover, Mr. Hoffman states that, "Although there are no firm statistics on passenger turnover, our records indicate that 15 percent of the current ridership have been riding for six years or more; 50 percent have been riding for from four to six years, and the remaining 35 percent less than four years. Of this 35 percent, slightly more than half are riding on new routes that did not exist four years ago."

5.3 FINANCIAL INFORMATION

In the analyses which follow, it is important to note that data for 1969 through 1972 have been estimated by COM-BUS management. During that period, COM-BUS was not a passenger stage operation and was neither recording data rigorously nor reporting data to the PUC.

This section addresses costs, revenue, and service productivity levels.

5.3.1 Costs

According to Mr. Hoffman, during 1976 the average yearly cost per passenger-mile was 3.194 cents. In comparison, costs per seat-mile were 2.875 cents. Some of the elements of these costs are discussed below.

The largest single expense to COM-BUS is in the contracted cost with each carrier. Average cost per round trip from 1968 to the present, based on 41-passenger buses and 80-mile round trips, are:

1968-1971	1972-1973	1974-1975	1976
$70	$75	$80	$86

The contract cost includes liability insurance. COM-BUS management is projecting a cost of $90 per round trip for 1977. The increase between 1968 and 1976 is 23 percent.

The second largest expense to COM-BUS is for operation of the eight minibuses. Each 14-passenger Dodge Sportsman Royal costs $8,100, plus approximately $450 in conversion costs. (Conversion features are described in Section 3.3.) For bodily injury liability coverage, limit of $450,000, COM-BUS currently pays $1,500 per van each year. Fuel for each van averages $38 weekly; maintenance averages $12 per week. Drivers of the minibuses do not contribute to expense, since they are not employees; rather, they are volunteer passengers who have obtained the necessary chauffeur's license and who ride free in exchange for driving and some administrative chores. They have the opportunity to collect the small profit that occurs if the van is kept full.

Additional COM-BUS expenses are full-time clerical support from two people, fees to Area Coordinators, and other miscellaneous administrative expenses such as printing.

5.3.2 Revenues

Revenue information prior to 1973 (when COM-BUS incorporated and became an approved passenger stage operation) has been provided by COM-BUS management and is only estimated. In addition, revenue for 1976 is also estimated. Revenue information since 1968 is:

1968	$ 22,500
1972	$225,000
1973	$225,000
1974	$815,000
1975	$850,000
1976	$960,000

Currently, fares vary from $11.50 per week for the shortest route (20 miles one way) to $15.00 for the longest route (70 miles one way). As a result of anticipated increases in operating costs (primarily insurance) in 1977, COM-BUS management is forecasting a slight increase in fares.

It is interesting to note that, for an average weekly fare of $13, the revenue to COM-BUS (and costs to the passenger) would amount to $650 per year (assuming 50 work weeks per year). If a 40-mile trip length is assumed, a personal automobile would be driven 20,000 miles per year for commute transportation. At twelve cents per mile, this amounts to an annual cost to the driver of $2,400 to utilize a private automobile for work trips.

5.3.3 Service Productivities

COM-BUS maintains high productivity levels as it successfully adjusts supply to meet changes in demand.

The use of large coaches aids productivity not only because these are the vehicles preferred by the passengers, but also because they are more cost-effective to operate. COM-BUS has found that a profit can be generated by achieving greater than 90 percent load factors on vehicles of 45-passenger capacity or greater, while charging a reasonable price. Therefore, they have set a 90 percent load factor as a minimum operational standard. As can be seen in Table 5, the average load factor has never dipped below 90 percent and has ranged from 90 percent to 94 percent. Once a breakeven load has been achieved, additional subscribed seats have a significant impact on profit. Hence, in most cases, coaches without restrooms (not considered necessary on the commuter routes) are utilized, allowing adding seats without sacrificing legroom.

6. SUMMARY AND CONCLUSIONS

The COM-BUS system is considered successful, by many criteria:

1) It continues to operate at a profit, without any form of subsidy.

2) It continues to have high load (subscription) factors.

3) The system was organized and operates with a minimum of capital outlay.

4) The system is managed with a minimum of administrative and overhead expense.

Key elements which have made COM-BUS a success are described first in terms of the service itself and, secondly, in terms of the service area and service development. Conclusions, as they relate to the SMD Program objectives, are set forth.

6.1 COM-BUS AS A SERVICE

COM-BUS is a subscription commuter bus service, accepting only advance, weekly payments for seats. This assures each passenger of a seat for the entire week, increases and stabilizes revenue over what would be collected on a day-to-day basis, aids in predicting vehicle needs, and considerably reduces accounting chores and thus costs. These factors, coupled with other aspects of the service which follow, have resulted in COM-BUS's operating at a profit and providing service at an estimated cost per passenger-mile of 3.194 cents and per seat-mile of 2.875 cents during 1976.

6.1.1 Ridership

Approximately 2,000 people per day are being transported to and from work by COM-BUS in an area in which between 85.9% and 92.5% utilize the private automobile as their means of transportation to and from work. (For SMSA's of 250,000 or more this figure is 76.6%).

COM-BUS passengers are predominantly former auto drivers, disenchanted with the long commute drives and well satisfied with the level of service available through COM-BUS. As a consequence, COM-BUS has contributed to a reduction in the number of private autos during peak periods, with the attendant reduction in pollution and energy requirements.

Prior to COM-BUS initiation, there was no viable public transit alternative to satisfy the specific work trips and, even today, no public transit alternative exists.

6.1.2 Trips and Fares

COM-BUS one-way trip lengths vary from 20 miles to 70 miles with travel times ranging from 40 minutes to one hour and 50 minutes. Corresponding weekly fares are $11.50 and $15.00, respectively. These relatively high fares are perceived by passengers to be lower than the alternative costs of taking these rather long trips - 20 miles or more - by automobile. Fares are high enough so that, coupled with high load factors, COM-BUS can be operated at a profit. COM-BUS concentrates its entire efforts on providing transportation for individuals to and from work only.

Travel times are competitive with the private automobile. For a 40-mile trip, the private automobile averages 50 minutes, while COM-BUS averages 60 minutes. The following illustrates

the need for travel times comparable to the private automobile. During early stages in developing route design criteria, Mr. Hoffman found that adopting a routing policy that dropped off last in the evening those individuals who were picked up last in the morning provided a travel time on the homebound trip which was unacceptably longer than use of the private automobile. Under this policy, most of the COM-BUS riders at the last evening drop off simply quit riding. Presently, COM-BUS management tries to make travel times for all passengers close to that of the private automobile.

Though COM-BUS service operates for a profit, fares are considerably less than corresponding costs to operate a private automobile on similar work trips. To illustrate, for an average weekly fare of $13, the revenue to COM-BUS (and costs to the passenger) would amount to $650 per year (assuming 50 work weeks per year). If a 40-mile trip length is assumed, a personal automobile would be driven 20,000 miles per year for commute transportation. At twelve cents per mile, this amounts to an annual cost to the driver of $2,400 to utilize a private automobile for work trips.

6.1.3 Reliability

On-time performance is of great importance to the COM-BUS commuters. COM-BUS management credits the simultaneous use of multiple charter companies with fostering healthy competition that ensures reliability of equipment and on-time performance. (There are approximately 40 charter companies licensed in the COM-BUS service area.) An estimated 95 percent of the trips arrive at their destination on time or early. Less than two percent arrive more than ten minutes late.

Also, because Bus Captains are passengers, they are personally interested in assuring reliable service, and have the support of the Area Coordinators in dealing with the transportation suppliers.

6.1.4 Route and Schedule Policies

Within the constraints of PUC regulations, COM-BUS's management attitude is to alter schedules and routes as necessary to satisfy changing demand. Routing and schedule changes are considered within the framework of the total system, rather than looking just at a change desired on one route.

The COM-BUS routing philosophy is aimed at providing service that is as near to express for the majority of riders as possible. Approximately five percent of COM-BUS commuters are picked up at their residence; 70 percent park and ride within two miles of their residence; 25 percent gather at central pick-up points for express service.

6.1.5 Dedicated Organizational Unit

Personal need on the part of a small group originated the idea of the COM-BUS subscription commuter service. The personal dedication of Mr. Ronald Hoffman, current owner of COM-BUS, was a key factor in COM-BUS's formation and growth. Without an intelligent, energetic leader, a transportation system could flounder and eventually die in the face of the severe institutional constraints which act as stumbling blocks to system growth and necessary timely adjustments to changing demand. In the case of COM-BUS, the major impediment to growth and service stabilization was not a lack of demand but rather constraints set forth by local institutions and regulations.

Other primarily volunteer support, who had and continue to have a personal stake in seeing COM-BUS succeed, are the Bus Captains and Area Coordinators. Because the Bus Captains are themselves passengers who depend on COM-BUS for transportation to and from work, they are highly motivated to keep their fellow passengers satisfied with the service and to keep the ridership

levels high. Working with the Area Coordinators, the Bus Captains utilize the route development policy (discussed in Section 3.4) to promote overall system effectiveness because routes are developed or modified in light of the total system and not based on the convenience or desires of the riders on a particular route.

6.1.6 Vehicles and Drivers

Since the local transit authority was unwilling to supply direct, commuter-hour service on the routes desired by COM-BUS commuters, the commuters turned to charter companies for vehicles and drivers. In the three counties being served, there are approximately 40 charter companies -- more than enough to serve the COM-BUS demand under current management philosophy.

Sound management operational policies, implemented through the Bus Captains and Area Coordinators, make it possible to match supply to demand while maintaining high load factors. Utilizing several charter companies simultaneously promoted healthy competition and consequently generated good service. Charter bus companies were unwilling to take the risk of a per capita situation where revenues depended upon number of passengers carried weekly; they are, in fact, required by the PUC to charge on a mileage basis. The willingness to take a risk on revenues was a fundamental philosophy adopted as COM-BUS was formed and service developed. COM-BUS was willing to take the risk of making or losing money on the basis of its performance in keeping passenger loads high.

Enhancing COM-BUS's service capability to adapt to changes in demand is a small fleet of eight 14-passenger Dodge Maxivans, owned by a division of SCCBS and made available to be used where new service is desired or where current service demand has diminished. The vans serve only as an interim measure until

the entire system supply/demand situation can be reassessed and adjustments made in routes and schedules. Although the mini-buses usually operate at a loss (the option is to provide no service at all), COM-BUS is capturing passengers that will in the long run be placed on the larger coaches and would otherwise adopt use of their private automobiles as a permanent alternative.

Since COM-BUS provides only work-related trips, the utilization of charter bus companies eliminates COM-BUS's need to keep the vehicles filled during non-commuting hours, and makes the marketing of service easier than marketing transit to a total area population.

6.1.7 Personalized Service Features

Virtually all of the insight gained by COM-BUS into those service features considered essential by its commuters can be adopted by other commuter transportation systems.

1) COM-BUS utilizes the type of large, highway coaches that have:
   a) Reclining airline type seats
   b) Airconditioning
   c) Sufficient legroom.
2) Routes are developed that do not extend total travel time more than eight to ten minutes over what the trip would take by private auto.
3) Route-development policy permits route changes as passenger demand changes. Criteria for route changes and modifications must be flexible enough to permit rapid reaction to shifts in levels of passenger demand, as well as origins. Arrangements with the charter companies are

flexible enough to permit this rapid modification in supply, thereby minimizing times for operating non-profitable routes. (Although only five are currently under contract, there are more than 40 charter companies registered with the PUC within the COM-BUS service area.)

4) Consistently dependable service is provided through the use of only those charter companies willing and able to provide such service and by providing a rebate for late service.

5) A uniform set of rules has been developed and is enforced for all buses, by Bus Captains who are, themselves, passengers of the service.

6) Each passenger is assured a seat, by requiring weekly, advance subscriptions. (While this may be considered a plus, it is important to bear in mind that a weekly seat reservation does introduce a degree of inflexibility from the user's viewpoint, since both morning and evening pick-up times must be adhered to.)

7) Quick response to passengers' desires and complaints is achieved through the Bus Captains on each bus.

6.2 SERVICE AREA AND SERVICE DEVELOPMENT

In assessing elements of a COM-BUS type commuter subscription bus service for potential transferability to other locales, it is important to consider certain basic service area characteristics and key events during service development.

6.2.1 Service Area

It appears that the COM-BUS service area possesses a set of characteristics which have had an impact on COM-BUS productivity. The tri-county service area is characterized by fairly high-density residential origins. This factor, coupled with concentrations of major work destinations (primarily large aerospace and defense firms) provides a basis for development of a commuter bus service which provides an express bus service for a major portion of the trip.

The nature of the service area freeway system is such that most major residential and work destinations are within minutes of a freeway off-ramp.

These three items, along with the fact that work trip distances in the area range from 20 to 70 miles one way, provide COM-BUS with the ability to develop a service which provides travel times quite competitive with the private automobile. Moreover, long trip lengths enhance COM-BUS's ability to make a profit. It is hypothesized that people are willing to pay the relatively high fares because these fares are perceived to be lower than the alternative costs of taking these rather long trips by automobile.

The combination of origins, destinations, and trip lengths (coupled with previously mentioned bus amenities) make it possible to introduce an element of comfort during each trip, since there is adequate time for the passenger to relax, read, sleep, or even enjoy a beverage on the evening homebound trip. The particular service area has an abundance (approximately 40) of charter companies with which to contract for the desired service.

Shifts may occur in individual ridership, but clusters of origins tend to remain fairly stable. By the nature of the aerospace industry, when one firm has a cutback, another firm, perhaps in the same general industrial area, will be hiring. These factors lend a stability to the COM-BUS scheduling of routes.

6.2.2 Service Development

While the conditions identified in the previous section may be necessary for the development of a viable subscription commuter bus service, service implementation and expansion may be complicated by institutional and regulatory constraints.

A service such as COM-BUS cannot be expected to evolve over a short period of time. In addition to the needed leadership and individual involvements, an awareness of local laws and requirements is essential. In the opinion of COM-BUS management, understanding and complying with regulatory constraints is the most difficult and time-consuming problem with which COM-BUS management has had to deal. COM-BUS estimates that approximately 22 percent of operating costs are directly attributable to compliance with PUC regulations. Within the service area, the PUC apparently sensed the value of the COM-BUS service and permitted initiation of route and service modifications during hearings and approval cycles, a permissive situation which made adjustments of supply in response to demand shifts feasible. This situation may not exist in other locales.

As a timely illustration of the critical need for PUC compliance and of how difficult compliance is made by sluggish mechanisms (due primarily to an overload of work), as this report was being prepared, Mr. Hoffman identified a critical situation involving the PUC and insurance considerations. That is, insurance rates for charter bus operations have doubled in California in the last six months of 1976. Additionally,

many insurance companies are refusing to write the coverage regardless of rates. The charter companies supplying COM-BUS with vehicles are paying for insurance which has now doubled in six months and, consequently, have to raise their charges to COM-BUS. In turn, COM-BUS will have to raise the subscription rates to its commuters. The bus company can raise its rates to COM-BUS immediately, yet COM-BUS cannot legally raise its rates to its commuters without PUC approval.

Mr. Hoffman checked with the PUC and was told it would be six months minimum (more likely near 18 months) before the application for increased rates could be approved, due to a flood of similar requests from other transportation suppliers. As a result, many transportation suppliers are in danger of being put out of business.

6.3 SERVICE AND METHODS DEMONSTRATIONS PROGRAM OBJECTIVES

With respect to the three SMD Program objectives, which relate to the COM-BUS service, the following comments are in order:

6.3.1 Reduce Travel Time for Transit Users

Although there was not, nor is there today, any viable public transit alternative to COM-BUS for its subscribers, it has been indicated that to link the same origins and destinations would require between two and four times the travel time using available public transit with its many transfers. In addition, COM-BUS travel times over a 40-mile route average about 60 minutes, whereas the comparable private automobile travel time is approximately 50 minutes. COM-BUS has established acceptable travel times for work-related trips.

6.3.2 Increase Transit Coverage

While there are no comparable public transit routes to those served by COM-BUS, it is clear that the expansion of the COM-BUS routes since its inception in 1968 has provided an increased coverage and service throughout the Los Angeles basin, from approximately 225 square miles in 1968 to approximately 1,200 square miles in 1976, and from one route to 47 routes.

6.3.3 Increase Transit Vehicle Productivity

COM-BUS is operating at slightly better than a 90 percent average load factor, over an average of 47 routes daily, providing in excess of 26 million passenger-miles during 1976. It has been and continues to operate at a profit.

It must be recognized by transportation system management that system productivity levels will be affected by "expansion plateau situations." These are situations in which it is necessary to operate temporarily without profit or at a loss because of taking the next step in expansion of business. For COM-BUS this is at the point where Area Coordinators are hired to help with management. According to Mr. Hoffman, paying for Area Coordinators usually reduces the company profits until such time that the coordinators are handling an average of five or six routes.

APPENDIX A. WEEKLY PASSENGER FORMS AND FINANCIAL ACCOUNTING

A.1 PASSENGER LIST AND WORKSHEET

Figure A-1 is the standard passenger list and worksheet used by COM-BUS. A single form can be used for seven weeks, as illustrated by the columns for the seven weeks at the top of the page. Each Bus Captain receives new copies of this form approximately one week prior to the first date on which the form will be used.

Also shown at the tops of the columns are letter symbols representing each week. For example, the symbol for the week of 4-30 is the letter "C." The symbol is used to denote the date of payment by a passenger; so, passengers paying for the week of 4-30 whose payments were received by the previous Friday have a "C" entered in the 4-30 column next to their names - which is most of the passengers. Passenger 6, however, has a "D" entered next to the name, indicating payment for the "C" week was made during the "D" week. This is further verified by the fact that the word "Late" was written in and has been crossed out.

The superscript "c" in the 4-30 column next to Passenger 6 indicates that payment was received in cash rather than by check.

Note that during the week of 5-7 the Bus Captain has noted "Skip" for Passenger 6. Apparently that passenger notified the Bus Captain in advance that he or she would not be riding that week for one of the reasons permitted by the bus rules, so no payment is due. It is the passengers' responsibility to notify the Bus Captain that service will be skipped for one of the reasons permitted. If no such

ROUTE Westside ROUTE # 32 CAPTAIN Clayton

	REGULAR BUS #		WEEK ENDING	4-16 A	4-23 B	4-30 C	5-7 D	5-14 E	5-21 F	5-28 G
	NAME	EXT.	STOP							
1	Rica, R.		Hoover	a	B[c]	C[c]	D[c]			
2	Allen, B.		4T	a	B	C	D			
3	August, L.		State	a	B	C	D			
4	Biffer, W.		4T	a	B	C	D			
5	Bowman, V.		4T	a	B	C	D			
6	Braun, F.		4T	a	B	late D[c]	skip			
7	Barbosa, L.		Hoover	a	B 10.35	C	D[c]			
8	~~Carman, H.~~		~~Natnl~~	~~Vac.~~	~~Vac.~~	~~C~~ moved to Huntington				Black
9	Cazares, M.		Natnl	a	B	C	D			
10	Fleckenstein, C.		State	a	B	C	D			
11	Goldfinger, J.		Pico	a	B	C	D			
12	Higgins, C.		State	a	B	C	D			
13	Johnson, J.		Fairfax	a	B[c]	C[c]	D[c]			
14	Melin, M.		4T	a	B	C	D			
15	Martin, S.		State	a	B	C	late			
16	Neustadt, M.		Pico	a	B	C	D			
17	Neuscheuander, O.		natnl	a	B	C	D			
18	Lucerne, R.		State	a[c]	sick	C[c]	D[c]			
19	Olsen, E.		4T	a	B	C	D			
20	Papet, R.		State	a	a	C	C			
21	Rosen, H.		Pico	a 9.20	B	C	D			
22	Wilson, B.		4T	a	B	B	late			
23	Wizelman, A.		Beverly	a 10.35	B	C	D			
24	Wolf, B.		Pico	a	late C	C	D			
25	Yoshika, V.		State	a	B	C	D			
26	Smith, E.		Pico	a	B	C	D			
27	Waters, W.		State	a	B	C	D			

FIGURE A-1. PASSENGER LIST AND WORKSHEET

notice or payment is received, the passenger will be marked late when the Bus Captain closes the books at the end of the day Friday. If a passenger who has not paid or notified the Bus Captain of skipping then shows up Monday, payment must be made before the passenger can ride, and payment will be noted as having been received during a week other than when it was due.

The column entitled "Stop" indicates the particular route stop where each passenger boards the bus, and is useful for considerations of rerouting.

There is a second page to this form (not shown here), which is merely a continuation of the first page, to allow for as many as 55 passengers to be listed.

A.2 SUMMARY WORKSHEET

The third page of the weekly passenger sheets (Figure A-2) contains a summary of financial accounting for each week. A copy is turned in by the Bus Captains to the Area Coordinators, along with copies of the two previous pages each week. Information on this summary page is divided into four major categories:

1) Passenger Balance: the number of seats sold for that week.

2) Deposit Balance: total number of fares deposited and the corresponding number of dollars deposited.

3) Outstanding Futures and Riders Expected Next Week: the number of passengers who are paid in advance and who are owed rides by COM-BUS, and the number expected to be riding the upcoming week.

ROUTE Westside ROUTE # 32 CAPTAIN Clayton

WEEK ENDING	4-16 A	4-23 B	4-30 C	5-7 D	5-14 E	5-21 F	5-28 G
PASSENGER BALANCE							
FUTURE Applied	1	1	1	1			
CURRENT Collected This Week	41	36	39	37			
LATE This Week	—	5	1	3			
TOTAL PAID PASSENGERS	42	37	41	41			
Vac, CB, Skips, Etc.	2/1	2/1	2/1	2/1			
TOTAL PASSENGERS LISTED	45	45	44	44			

DEPOSIT BALANCE							
LATES For Last Week	1	0	2	1			
CURRENT Collected This week	41	36	39	37			
FUTURES Collected This Week	1	1	1	0			
Miscellaneous	—	—	—	—			
TOTAL FARES DEPOSITED	43	37	42	38			
TOTAL $	485.45	421.25	482.00	435.90			

OUTSTANDING FUTURES	1	1	1	0			
RIDERS EXPECTED NEXT WEEK		44	41	41			

PASSENGER HEAD COUNT MON.	42	37	38	39			
(Am only excluding Captn.) TUES.	37	35	39	39			
WED.	36	37	40	37			
THURS.	34	39	38	39			
FRI.	34	37	39	38			

FIGURE A-2. SUMMARY WORKSHEET

4) Head Count: actual number of passengers riding each day.

A.2.1 Passenger Balance

A.2.1.1 Future Applied

A "future applied" is a payment during a previous week for a ride in the current week, and shows up in the first two pages of the passenger sheets as a letter symbol other than the one for the current week. The number of futures applied entered on the summary sheet represents the number of prepaid rides that are being applied (used up) during the current week.

A.2.1.2 Current Collected

This figure represents the number of passengers paying for a ride during the current week whose payments will be turned in by the Bus Captain during the current week. Most of the passengers will be in this category.

A.2.1.3 Late This Week

This item is the number of passengers riding or otherwise owing for service during the current week whose payments were not received by the end of the day Friday of the previous week but were, instead, received this current week.

A.2.1.4 Total Paid Passengers

This is a summary of the three previous rows, and includes passengers who have paid in advance, paid during the current week, or those who are not riding but still owe payment for the current week. (Passengers not riding, yet owing, would be those whose reason for not riding is not one allowable by bus rules.)

A.2.1.5 Total Passengers Listed

This figure adds the Total Paid Passengers to any other passengers not riding the current week but who are on the permanent list of regular passengers. These individuals might be on vacation, ill, away on business trips, or absent for other reason allowable by the bus rules.

A.2.2 Deposit Balance

A.2.2.1 Lates for Last Week

This figure represents the number of passengers paying during the current week for service the previous week.

A.2.2.2 Current Collected This Week

The figure entered under this heading is always the same as Current Collected This Week under the Passenger Balance category above. It is the total of "C" payments received during the "C" week, or the number of "D" payments received during the "D" week, and so on.

A.2.2.3 Futures Collected This Week

This is the number of passengers paying during the current week for future weeks.

A.2.2.4 Miscellaneous

This area of the summary is used for adjustments to the standard fare, such as rebates for overpayment by mistake.

A.2.2.5 Total Fares Deposited

This entry is the total of the first four items under Deposit Balance.

A.2.2.6 Total Dollars

The number of Total Fares Deposited are then multiplied by the weekly route charge, in this case $11.50, to arrive at the total number of dollars owed to COM-BUS. It should be noted that the Total Fares Deposited the week of 5-7 (38) does not correspond to the Total Paid Passengers (41), since three passengers are late.

A.2.3 Outstanding Futures and Riders Expected Next Week

The number of Outstanding Futures is the number of passengers paid in advance and who are owed rides by COM-BUS.

The number of Riders Expected Next Week is a figure based on the Bus Captain's judgment, and is roughly based on the number of passengers who have paid for next week. It is used by the Bus Captain in determining the type and number of vehicles required on a specific route.

A.2.4 Passenger Head Count

The Bus Captain counts actual passengers each morning (excluding the Bus Captain) and enters this on the worksheet. Head counts are taken in the mornings, since COM-BUS has found that maximum head counts occur in the morning rather than evening. The counts are taken only once a day, in order to simplify the duties of the Bus Captains.

In an effort to maintain totally accurate head counts, COM-BUS has an agreement with each of its charter companies, that the drivers are to also take a head count each morning and provide that information to COM-BUS. In no case is the head count permitted to exceed the number of paid passengers.

APPENDIX B. SAMPLE CONTRACT BETWEEN COM-BUS AND CHARTER COMPANY

Enclosed herewith is a Bus Lease Agreement between your company, referred to therein as "Owner," and COM-BUS.

It is understood and agreed between your company and COM-BUS that COM-BUS holds a certificate of public convenience and necessity for the route which is attached to the Bus Lease Agreement. In the event COM-BUS does not already hold such certificate, an application either is pending or will be filed in the immediate future.

In consideration of the execution of the Bus Lease Agreement by COM-BUS and for other good and valuable consideration, receipt of which is acknowledged, Owner hereby agrees that it will not protest any application for said route and will not file an application before the Public Utilities Commission to operate said route or any portion thereof for a period of six months after the termination of the Bus Lease Agreement.

Please acknowledge by signing and returning a copy of this letter together with a signed copy of the Bus Lease Agreement.

Yours very truly,

SOUTHERN CALIFORNIA COMMUTER
BUS SERVICE, INC.

By Ronald L. Hoffman
COM-BUS

AGREED TO.

Date: 12-24-73

John Doe
OWNER

BUS LEASE AGREEMENT

THIS AGREEMENT is made this 24th day of DECEMBER, 1973, by and between XYZ BUS LINES, INC. 2100 E. WALNUT, FULLERTON, CALIF. 92631, hereinafter designated as "Owner," and Southern California Commuter Bus Service, Inc., a corporation, 71 Angelo Walk, Long Beach, California, hereinafter designated as "COM-BUS," as follows:

1. DESCRIPTION: Owner hereby rents and leases to COM-BUS its motor bus, ID No. 4106-150, License California XYZ 7, for the term hereinafter set forth. A comparable bus may be substituted by Owner in the event bus ID No. 4106-150 is being serviced or otherwise not in operating condition.

2. USE: During the term of this lease said vehicle leased by COM-BUS shall be used for the transportation of passengers between ORANGE COUNTY and SOUTH BAY - L.A. AIRPORT during the hours of 6 A.M. and 8:30 a.m. and the hours of 4 P.M. and 6:30 p.m. on working days. The bus shall operate over routes and at the times designated by COM-BUS. A copy of said route is attached hereto, made part hereof and marked Addendum A. Said route may be amended from time to time by COM-BUS but shall not exceed 50 one way miles per day. Any such amendment shall not change the general location of either terminus of the original route.

3. TERM: This lease shall be for a period of 36 months, commencing with the date first written above to and including DECEMBER 24, 1976.

4. RENT: COM-BUS agrees to pay as rent to Owner $66.-, per DAY. Payment shall be made by COM-BUS within 10 days following the receipt of Owner's statement for said period. Owner shall send statements to COM-BUS every 2 WEEKS - FOLLOWING PERIOD.

5. MAINTENANCE: Owner agrees to maintain and service said vehicle at its sole expense during the term of this lease. Owner shall pay fuel and all other operating expenses.

6. TAXES: Owner shall pay all registration fees and all taxes assessed directly against the vehicle.

7. INSURANCE: Owner agrees to procure public liability insurance and property damage insurance in amounts required by the California Public Utilities Commission pursuant to General Order 101-C. Said policies of insurance shall name COM-BUS as additional insured.

8. RISK OF LOSS, DAMAGE OR DESTRUCTION: Owner shall bear the risk of loss of, damage to, or destruction of the bus whether resulting from fire, theft, collision or any other cause whatsoever.

9. DRIVERS: Owner shall hire and pay the driver(s) of the bus. The driver(s) shall be full-time regular employees of the Owner unless otherwise agreed to in writing by COM-BUS. Owner agrees to cooperate fully with COM-BUS in the assignment of

driver(s) for the bus. During the hours when the bus is operated for COM-BUS the driver shall be under the supervision, direction and control of COM-BUS.

10. OPERATING RESPONSIBILITY: Owner shall be responsible that the driver reports on time at the point of origin in the morning and evening and uses his best efforts to maintain the schedule as established by COM-BUS with due regard for all safety factors and applicable laws. In the event the driver fails to have the bus at the point of origin at the scheduled time (in the morning or evening) COM-BUS shall not be responsible for payment of the bus for such trip. A pro rata reduction shall be made in the statement which Owner shall send to COM-BUS under Paragraph 4 hereof.

11. HOLD HARMLESS: Owner agrees to indemnify and hold harmless COM-BUS from any and all claims, demands, actions, liability or loss which may directly or indirectly arise from, or be incurred as a result of, injury or damage to persons or property in the operation of the bus.

12. NOTICES: All notices hereunder may be given to a party by mail, addressed to such party at the address hereinabove set forth, and any notice so given shall be deemed to have been received 48 hours after the same has been deposited in the United States mail so addressed with postage prepaid.

13. NON-ASSIGNMENT: This agreement is not assignable or transferable by either party unless agreed to by both parties in writing.

John Doe

XYZ BUS LINES PRESIDENT

OWNER

SOUTHERN CALIFORNIA COMMUTER
BUS SERVICE, INC.

BY Ronald L. Hoffman

COM-BUS

APPENDIX C. REPORT OF INVENTIONS

A diligent review of the work performed under this contract has revealed no significant innovations, discoveries, or inventions at this time. In addition, all methods employed are available in the open literature.

However, the findings in this document will be useful in furthering capabilities throughout the United States in providing needed contract commuter subscription bus service.