UMTA-VA-06-0088-83-1

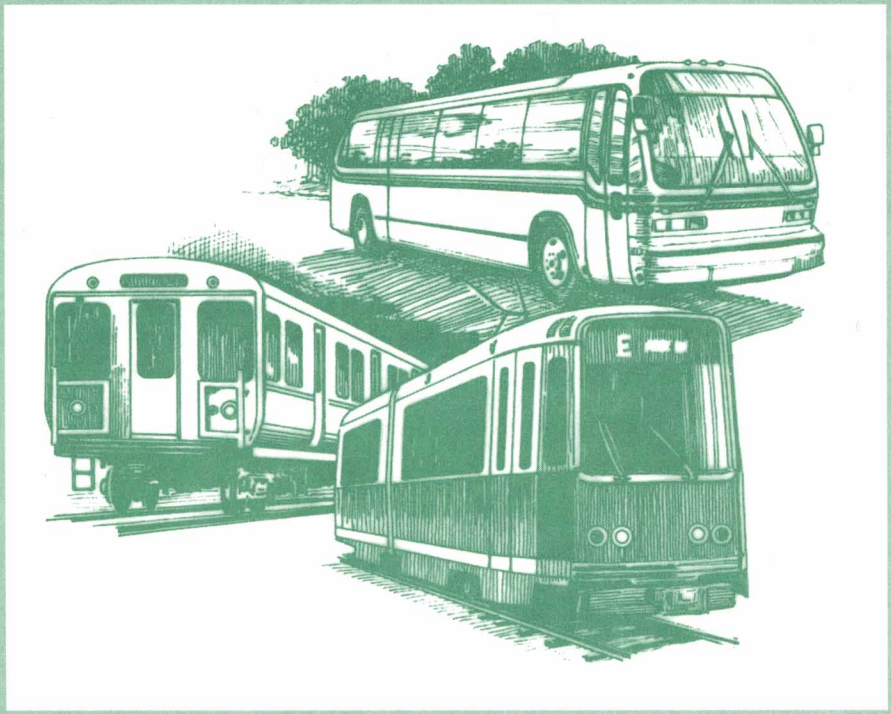
U. S. Department
of Transportation
**Federal Transit
Administration**

Case Studies of Transit Security on Bus Systems

U. S. Department of Transportation
Research and Special Programs Administration
John A. Volpe
National Transportation Systems Center
Cambridge MA 02142

August 1983
Final Report

Reprint
February 1995



FEDERAL TRANSIT ADMINISTRATION

NOTICE

This document 1s disseminated under the sponsorship of the Department of Transportation in the Interest of Information exchange. The United States Government assumes no liability for its contents or use thereof.

NOTICE

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)

2. REPORT DATE
August 1983
Reprint
February 1995

3. REPORT TYPE AND DATES COVERED
Final Report
September 1981 - September 1982

4. TITLE AND SUBTITLE
Case Studies of Transit Security on Bus Systems

5. FUNDING NUMBERS

6. AUTHOR(S)
E.O. Hargadine

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
MANDEX, Inc.
1497 Chain Bridge Road, Suite 304
McLean, VA 22101

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Department of Transportation
Federal Transit Administration
Office of Technical Assistance
Washington, DC 20590

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
UMTA-VA-06-0088-83-1.

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
This document is available to the public through the National Technical Information Service, Springfield, VA 22161

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

The purpose of this report is to provide information on a selection of bus transit security measures for use by transit systems in developing their security programs. The report examines the security measures used by the principal bus transit systems in each of four cities -- Los Angeles, Detroit, Seattle, and Pittsburgh -• and indicates the conditions under which they are most likely to be effective.

Certain transit security measures are common to all four transit systems. All make some use of either a transit police force, or members of a local law enforcement agency. They also all use communications equipment installed in buses, and community programs or school programs. However, there are unique aspects to each city's program. Detroit has an undercover police operation which has been used as a model by many other cities. Los Angeles has several demonstration projects using sophisticated security equipment. Seattle has a stress-management program for its bus operators. Pittsburgh's system has a small police force which emphasizes a quick response to passengers' and operators' reports of problems as a means of heightening the deterrent effort.

The report includes the following sections: an introduction to the problem of transit crime and the security measures taken to combat it; transit security programs in the four case study cities; a comparison of methods used to police bus transit systems; the surveillance and communications equipment used by the four transit systems; school and community education programs and training of operators; the comparative costs of security measures; the public's perception of transit crime; and the study's conclusion on the effectiveness of the measures.

14. SUBJECT TERMS
Transit Security, Security Equipment, Bus Systems, Community Education, Operator Training, Crime Perception

15. NUMBER OF PAGES
134

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT
Unclassified

18. SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

19. SECURITY CLASSIFICATION OF ABSTRACT
Unclassified

20. LIMITATION OF ABSTRACT

METRIC/ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in) = 2.6 centimeters (cm)
1 foot (ft) = 30 centimeters (cm)
1 yard (yd) = 0.9 meter (m)
1 mile (mi) = 1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in^2) = 6.5 square centimeters (cm^2)
1 square foot (sq ft, ft^2) = 0.09 square meter (m^2)
1 square yard (sq yd, yd^2) = 0.8 square meter (m^2)
1 square mile (sq mi, mi^2) = 2.6 square kilometers (km^2)
1 acre = 0.4 hectare (he) = 4,000 square meters (m^2)

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz) = 28 grams (gm)
1 pound (lb) = 0.45 kilogram (kg)
1 short ton = 2,000 pounds (lb) = 0.9 tonne (t)

VOLUME (APPROXIMATE)

1 teaspoon (tsp) = 5 milliliters (ml)
1 tablespoon (tbsp) = 15 milliliters (ml)
1 fluid ounce (fl oz) = 30 milliliters (ml)
1 cup (c) = 0.24 liter (l)
1 pint (pt) = 0.47 liter (l)
1 quart (qt) = 0.96 liter (l)
1 gallon (gal) = 3.8 liters (l)
1 cubic foot (cu ft, ft^3) = 0.03 cubic meter (m^3)
1 cubic yard (cu yd, yd^3) - 0.76 cubic meter (m^3)

TEMPERATURE (EXACT)

[(x-32)(5/9)] °F = y °C

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm) = 0.04 inch (in)
1 centimeter (cm) = 0.4 inch (in)
1 meter (m) = 3.3 feet (ft)
1 meter (m) = 1.1 yards (yd)
1 kilometer (k) = 0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm^2) = 0.16 square inch (sq in, in^2)
1 square meter (m^2) =1.2 square yards (sq yd, yd^2)
1 square kilometer (km^2) = 0.4 square mile (sq mi, mi^2)
10,000 square meters (m^2) = 1 hectare (he) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 gram (gm) = 0.036 ounce (oz)
1 kilogram (kg) = 2.2 pounds (lb)
1 tonne (t) = 1,000 kilograms (kg) = 1.1 short tons

VOLUME (APPROXIMATE)

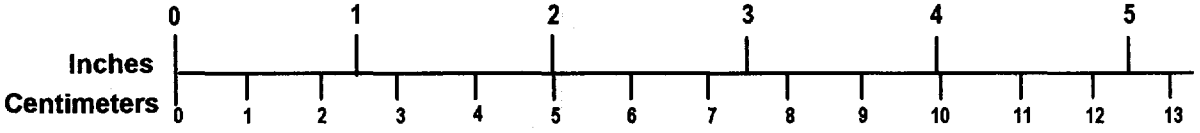
1 milliliter (ml) = 0.03 fluid ounce (fl oz)
1 liter (l) = 2.1 pints (pt)
1 liter (l) = 1.06 quarts (qt)
1 liter (l) = 0.26 gallon (gal)

1 cubic meter (m^3) = 36 cubic feet (cu ft, ft^3)
1 cubic meter (m^3) = 1.3 cubic yards (cu yd, yd^3)

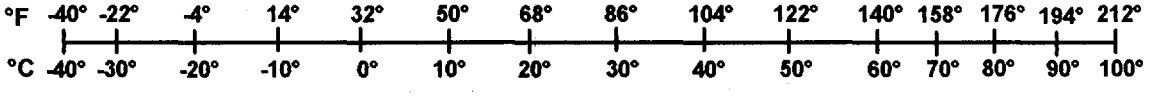
TEMPERATURE (EXACT)

[(9/5) y + 32] °C = x °F

QUICK INCH - CENTIMETER LENGTH CONVERSION



QUICK FAHRENHEIT - CELSIUS TEMPERATURE CONVERSION



For more exact and or other conversion factors, see NBS Miscellaneous Publication 286, Units of Weights and Measures.
Price $2.50 SD Catalog No. C13 10286

1/23/95

PREFACE

This study examines the measures taken by the principal transit systems in each of four cities — Los Angeles, Detroit, Seattle, and Pittsburgh. This study was sponsored by the U.S. Department of Transportation, Urban Mass Transportation Administration, Office of Technical Assistance and performed by MANDEX, Inc. under contract DTUM60-81-C-71098.

Transit and law enforcement officials in Detroit, Los Angeles, Seattle and Pittsburgh provided most of the data contained in this report as well as many valuable insights into transit crime and the measures taken to combat it. We wish to thank them for their cooperation and their numerous helpful suggestions. Many thanks also go to the citizens in the case study cities who took the time to talk with us about security on their buses. We especially wish to thank Ms. Gwendolyn Cooper of the Safety and Security Staff, Office of Technical Assistance, Urban Mass Transportation Administration , for her valuable supervision and comments on the draft reports.

This project was begun under Mr. Robert Maxwell while he was a Vice President of MANDEX, Inc. We would like to thank him for his contribution to this project. When he left MANDEX, Dr. Eileen Hargadine became the principle investigator. The MANDEX officer in charge was Mr. David Couts.

TABLE OF CONTENTS

Section		Page
1.	INTRODUCTION	1
	1.1 Background	1
	1.2 Historical Perspective of Transit Passenger Security	2
	1.3 Determining the Effectiveness of Security Measures	4
	1.4 Selection of Four Cities for Case Studies	7
2.	CITY CASE STUDIES	16
	2.1 Detroit	16
	2.1.1 Development of the Bluebirds and Alternatives Considered	17
	2.1.2 Bluebird Operations	19
	2.1.3 Additional Security Equipment and Related Programs	22
	2.1.4 D-DOT and The City It Serves	23
	2.2 Los Angeles	31
	2.2.1 Development of the SCRTD Transit Police Force	31
	2.2.2 SCRTD Transit Police Operations	32
	2.2.3 SCRTD Coordination with Local Law Enforcement Agencies	35
	2.2.4 Additional Security Measures	38
	2.2.5 Los Angeles and the Southern California Rapid Transit District	40
	2.3 Seattle	45
	2.3.1 Seattle's Comprehensive Security Plans	45
	2.3.2 Seattle's Undercover Police Operations	48
	2.3.3 Development of the Stress Management Program	51
	2.3.4 Other Measures to Improve Transit Security	53
	2.3.5 Union Response to Measures to Improve Operator Security	54
	2.3.6 Seattle and Its Transit System	55
	2.4 Pittsburgh	59
	2.4.1 Development of the PAT Police Force	59
	2.4.2 PAT Police Operations	60
	2.4.3 Other Security Measures and Equipment	63

TABLE OF CONTENTS (CONTINUED)

Section		Page
	2.4.4 Operator Response to Transit Security	63
	2.4.5 The PAT System	64
3.	POLICING TRANSIT SYSTEMS	67
	3.1 Transit Policing Organizations	67
	3.2 Transit Policing Operations	70
	3.3 Public Awareness	74
	3.4 Legislation and Prosecution	75
4.	MECHANICAL AND ELECTRONIC SECURITY MEASURES	77
	4.1 Two-Way Radios and Alarm Systems	77
	4.2 Automatic Vehicle Monitoring System	79
	4.3 Cameras on Buses	81
5.	TRAINING AND EDUCATION	84
	5.1 Transit Education Programs	84
	5.1.1 Detroit	85
	5.1.2 Seattle	85
	5.1.3 Los Angeles	86
	5.1.4 Pittsburgh	87
	5.2 Community Outreach Programs	87
	5.3 Stress Management Training	88
6.	COSTS OF THE SECURITY MEASURES EXAMINED	92
	6.1 Costs of Policing Operations	92
	6.1.1 Detroit	92
	6.1.2 Los Angeles	94
	6.1.3 Seattle	95
	6.1.4 Pittsburgh	95
	6.1.5 Summary	96
	6.2 Costs of Mechanical and Electronic Security Devices	97
	6.3 Costs of Other Programs	98
7.	PUBLIC PERCEPTION OF TRANSIT CRIME	99
	7.1 Public Perception of Transit Security and the Bluebird Operation	100
	7.2 Public Perception of Personal Safety in Los Angeles	102

TABLE OF CONTENTS (CONTINUED)

Section	Page
7.3 Public Perception of Transit Crime in Seattle.....	104
7.4 Public Perception of Transit Security in Pittsburgh.....	105
7.5 Summary.....	106
8. CONCLUSIONS AND RECOMMENDATIONS.....	107
8.1 Policing Transit Systems.....	107
8.2 Equipment to Enhance Passenger Security.....	110
8.3 Stress Management Programs.....	112
8.4 Public Perception of Transit Security and the Impact of Service Quality.....	112
8.5 School Education Programs.....	113
APPENDIX A - PERSONS CONTACTED.....	A-1
APPENDIX B - REPORT OF NEW TECHNOLOGY.....	B-1
REFERENCES.....	R-1
BIBLIOGRAPHY.....	Bibl.-1

LIST OF ILLUSTRATIONS

Figure		Page
2-1	PART I TRANSIT OFFENSES, 1970-1980	26
2-2	NUMBER OF REPORTED PART I CRIMES PER MILLION PASSENGERS	27
2-3	PART II TRANSIT OFFENSES REPORTED BY D-DOT AND BLUEBIRDS, 1970-1980	28
2-4	INCIDENCE OF CRIME PER MILLION INHABITANTS IN DETROIT SMSA	30
2-5	NUMBER OF CRIMES PER HUNDRED INHABITANTS IN LOS ANGELES AND THE SURROUNDING SMSA	44
2-6	NUMBER OF CRIMES PER MILLION INHABITANTS IN SEATTLE AND THE SURROUNDING SMSA	57
2-7	RECORD OF MONTHLY OPERATOR ASSAULTS	58
5-1	RECORD OF MONTHLY OPERATOR ASSAULTS	91

LIST OF TABLES

Table		Page
1-1	CITIES CONSIDERED FOR CASE STUDIES	8
1-2	SEMCOG SUMMARIES OF TRANSIT SYSTEM CRIME STATISTICS: GROUP I SYSTEMS (OVER 100 MILLION PASSENGERS/YEAR)	10
1-3	SEMCOG SUMMARIES OF TRANSIT SYSTEM CRIME STATISTICS: GROUP II SYSTEMS (20 TO 100 MILLION PASSENGERS/YEAR)	11
1-4	SEMCOG SUMMARIES OF TRANSIT SYSTEM CRIME STATISTICS: GROUP III SYSTEMS (LESS THAN 20 MILLION PASSENGERS/YEAR)	12
1-5	GROUP I SYSTEMS CANDIDATES FOR TRANSIT SECURITY STUDY SITES	13
1-6	GROUP II SYSTEMS CANDIDATES FOR TRANSIT SECURITY STUDY SITES	14
2-1	OPERATOR-REPORTED TRANSIT CRIME, 1970-1978	43
2-2	SCRTD TRANSIT POLICE-REPORTED OFFENSES	43
2-3	METRO TRANSIT ANNUAL OPERATING STATISTICS	56
2-4	PASSENGERS CARRIED (1980)	65
2-5	CRIMES COMMITTED (1978-1981)	66
3-1	SUMMARY OF TRANSIT POLICING OPERATIONS IN CASE STUDY CITIES	71
7-1	RATING OF PERSONAL SAFETY ON BUSES	100

LIST OF ABBREVIATIONS

ADW	Assault with Deadly Weapon
AVM	Automatic Vehicle Monitoring
CBD	Central Business District
CTAC	Citizen's Transit Advisory Committee
D-DOT	Detroit Department of Transportation
HEAVY	Human Efforts Aimed at Vitalizing Youth
LAPD	Los Angeles Police Department
MARTA	Metropolitan Atlanta Rapid Transit Authority
MBTA	Massachsuetts Bay Transportation Authority
METRO	Municipality of Metropolitan Seattle
MUNI	San Francisco Municipal Railway
PA Transit	Port Authority of Allegheny County Transit
PCP	Phencyclidine Hydrochloride
RTD	Regional Transportation District-Denver
SCRTD	Southern California Rapid Transit District
SEMTA	Southeastern Michigan Transportation Authority
SEPTA	Southeastern Pennsylvania Transportation Authority
SMSA	Standard Metropolitan Statistical Area
SPD	Seattle Police Department
TSC	Transportation Systems Center
UMTA	Urban Mass Transportation Administration
UPO	Undercover Police Operations
WMATA	Washington Metropolitan Area Transit Authority

1. INTRODUCTION

1.1 BACKGROUND

Over the last fifteen years crime in the United States has created a growing problem in urban areas. Not only is the number of crimes committed skyrocketing, but the increase in the number of crimes per capita, a more appropriate measure, indicates that the possibility of an individual being a victim is increasing. Transit crime is not distinguished from other crime in the national statistics, but transit systems report a surge in crimes against passengers as well as property. Bus hijacking and "stagecoach" robberies have caught the media's attention, and passengers, recounting numerous stories of robberies and harassment that have occurred on the transit system, are increasingly aware of these crimes. Consequently, transit managers have had to direct more attention and resources toward improving passenger and operator security. This is not to say that transit security is solely the responsibility of transit management because the crime that does occur is also the responsibility of the local law enforcement agency. Transit systems have taken various steps to improve transit security. The measures taken range from improved security equipment to increased policing of the transit system.

This study examines the measures taken by the principal systems in each of four cities—Los Angeles, Detroit, Seattle, and Pittsburgh. A new measure does not function in isolation and must therefore be considered in the context of the conditions under which it is implemented. The magnitude of the crime problem, the procedures and equipment already in effect, and other new measures will influence the effectiveness of the measure. For example, implementation of an undercover police operation may require new communications equipment or may utilize equipment already in place. Often a community relations program will be used to reinforce specific security measures.

This report examines the measures used by the four case study transit systems and the conditions under which they are most likely to be effective. It is intended that this information will be useful to other transit systems which may re-evaluate their security programs and consider additional measures. The study was limited to bus systems.

Certain transit security measures are common to all four transit systems. All have means of policing their systems, communications equipment, and community or school programs. However, the composition of the policing group varies as does available equipment, and the type of school and community programs. There are unique aspects to each city's program. The organization of Detroit's undercover police operations has been used as a model by many other cities; Los Angeles has demonstration projects using sophisticated equipment; Seattle has a stress-management program for its bus operators; and the Pittsburgh system's small but effective police force enhances operators' and passengers' perceptions of security by responding to operator and passenger reports of problem areas.

This section provides an introduction to the problem of transit crime and the security measures taken to combat it. Section 2 describes the transit security programs in the four selected cities, the case studies of this report. Section 3 describes and compares the methods used to police bus transit systems. Section 4 examines the surveillance and communications equipment used by the four systems. Section 5 deals with school and community education programs and training of operators. The comparative costs of the various measures are discussed in Section 6 and Section 7 discusses the public's perception of transit crime. Section 8 summarizes the effectiveness of the measures and presents recommendations based on the data collected.

1.2 HISTORICAL PERSPECTIVE OF TRANSIT PASSENGER SECURITY

Passenger security has always been a concern of transit management. Rules governing rowdy, disruptive behavior on transit systems were instituted widely in the early 1900s, and some transit companies were

authorized to operate their own police forces. In some cities, the transit vehicle operators were permitted to carry weapons to protect themselves. However, policing of bus (and trolley) systems was usually the responsibility of the local law enforcement agency.[1] Historical records of transit crime are rare and consist primarily of anecdotal excerpts from books and newspapers.[2] Transit crime did not attract the public's attention as a serious problem until the late 1950s. Increasingly, the large metropolitan areas like New York and Chicago saw their urban discontent and growing street crime reflected in increased transit crime. Vehicle operators were often victims of this crime because they were in charge of the fare box and they spend more time on the vehicles than the average passenger. In the period between 1965 and 1970, union demands for safer working conditions were a major factor in the increased attention to the problem and the steps taken to control it. An important change was the institution of exact-fare policies to free operators of the need to handle currency and make them less attractive as targets.

Transit and street crime continued to rise through the seventies, and pressure increased on bus transit systems to provide a secure environment for their passengers. Recent studies of transit crime has recommended new subway designs to create an environment that would deter and prevent crime, but these designs cannot usually be applied to bus systems. Increased policing and improved communications such as alarm systems are now being adopted by the bus transit systems in many cities including Detroit, Los Angeles, Seattle, and Pittsburgh as described in (see Section 2).

Crime that threatens transit passengers' personal safety has only recently been categorized as a distinct type of crime. However, the distinction between transit crime and street crime is not always clear. If a passenger is assaulted while waiting at a bus stop, is that transit crime? If it is, what about crimes against passengers walking to the bus stop. Crime that occurs on a transit system is part of the crime that occurs on the street because streets are a part of most transit systems. Not surprisingly, high rates of transit crime occur most often

in neighborhoods with high crime rates.[3] To examine transit passenger security apart from the security of the person on the street, it is necessary to stipulate a working definition of the subject, especially since the definition of transit crime statistics has not been standardized. Thus, while some transit systems have a broad definition of transit crime, others restrict their definitions, and subsequent data collection, to only those incidents which occur on the transit vehicles and in subway stations. However, Detroit's transit crime statistics include those crimes which occur at bus stops; consequently, some of that city's security programs include the policing of bus stops. In this report, when a particular city is considered, the scope of its statistics will be noted.

1.3 DETERMINING THE EFFECTIVENESS OF SECURITY MEASURES

An effective security measure would decrease the existing threat to passengers' personal security, but appropriate means of evaluating the existing threat and changes in it are subject to debate. A statistic which lumps together all criminal incidents does not reflect the seriousness of the incidents: a large number of homicides represents more of a threat than a large number of fare evasions. A better representation of the threat to passenger security is afforded by the use of the Federal Bureau of Investigation's uniform crime reporting classifications of Part I and Part II crimes. The most serious Part I offenses include criminal homicide, forcible rape, robbery, aggravated assault, burglary, larceny-theft, motor vehicle theft, and arson. Part II crimes are simple assaults, forgery and counterfeiting, fraud, embezzlement, buying and receiving stolen property, vandalism, possession of deadly weapons, prostitution, and other sex offenses.[4] However, these classifications are not uniformly used by the nation's transit systems.

In addition to the lack of uniform crime classifications, the procedures for reporting transit crime incidents do not ensure accurate, comparable statistics. Most transit systems require vehicle operators to file reports of "unusual" incidents, including traffic accidents,

criminal incidents, and medical emergencies. These reports provide an official record for use in the event of subsequent legal action as well as crime statistics for use in transit security operations. There are several difficulties with this reporting system, most notably a lack of incentive for the vehicle operator to file complete and accurate reports and the operator's inability to observe all activity that occurs in the vehicle while driving. The incentive to file a full report comes primarily from the protection it provides the operator if a law suit results from the incident. If an altercation with a passenger leads to an assault, the operator can ensure that an official record exists of his or her side of the story. Some systems pay their operators the equivalent of the estimated time required to fill out the forms. However, consultations with operators and union officials indicated that some operators disliked filling out the forms because writing full accounts of an incident requires too much time (even if there is some compensation) and filing reports, generally, seems to be a waste of time. Another difficulty with operator reports is their potential misuse by unions to reinforce demands for greater operator security as part of the bargaining process. Operators may be more likely to file reports if crimes against operators are to be the subject of union bargaining.

Furthermore, operators are more likely to report incidents involving themselves than incidents between passengers. Any reporting of passenger-passenger offenses will depend on the seriousness of the offense. Less serious crimes against passengers and "victimless" crimes are less likely to be reported. An operator's principal responsibility is to drive the bus, not to police it, and a pocket-picking or purse-snatching may not always be observed. Even when an incident is observed, the operator is usually not in a position to intervene, and there is little subsequent incentive for the operator to fill out a lengthy report on all observed incidents. Operators may not report minor offenses such as public consumption of alcohol or narcotics if there is no disruption of the bus environment or harassment of other passengers.

Another source of data on transit crime is the local law enforcement agency or the transit police force, if there is one. In the past, most law enforcement agencies have not reported transit crime separately from other crime. However, reporting practices are changing in those cities which have police units dedicated to policing the transit system. Such police reports provide data on transit crime which are independent of operator reports and which more accurately reflect passenger crime. However, the usefulness of police reports is limited because the number of reported incidents depends in part on the number of officers patrolling the system. An increased police presence will usually result in more criminal incidents being observed and reported. Furthermore, if police assignments are changed to provide more coverage of an area experiencing higher crime rates, the number of reported incidents may increase. Consequently police reports must be used cautiously in evaluating the incidence of crime and the effects of transit security measures. Victim reports to the transit system do not present these disadvantages, but not all crimes are reported by victims. Although some victims do complain directly to the transit system, there was no indication in the cities visited that a count of passenger complaints would accurately reflect the number of crimes committed.

Even if accurate figures were available on the number of transit crimes of all types, the actual number of incidents might not represent the real threat to passenger security. If ridership and service are increasing at a greater rate than the incidence of crime, the threat to the individual passenger may be decreasing. Although there is no consensus on how to accurately measure a passenger's exposure to transit crime, suggested criteria include the number of riders, passenger miles, vehicle miles, the number of vehicles, and the average number of people on a bus per hour.[1] Many transit systems do not collect all of these data, and examination of the trends in the incidence of transit crime must then depend on rough estimates of the two more common measures of exposure: ridership and vehicle miles. Changes in the number of incidents per million passengers may be due to changes in trip length rather than in criminal activity. Similarly, changes in the number of

incidents per million vehicle miles may reflect changes in the number of passengers per vehicle. A measure of the threat to passengers should relate the number of offenses to some measure of the number of passengers and the length of time they are exposed to the possibility of transit crime.

There are other problems in using changes in transit crime rates to indicate the effectiveness or ineffectiveness of a particular security measure. An examination of the rates before and after implementing the measure does not provide information on what the rate would have been without the measure. In spite of the adoption of a security measure, transit crime might increase because the service area had experienced increased crime, but the increase in transit crime might have been larger if the measure had not been implemented. In addition, a single measure is rarely implemented without corresponding changes in other security programs and equipment, and the effects of the different programs are not always distinguishable. Consequently, changes in the crime rate must be examined in a broader context when they are used to judge the impact of a security measure.

1.4 SELECTION OF FOUR CITIES FOR CASE STUDIES

The four cities selected for case studies were chosen from an initial list of thirty-four cities by a process of elimination. The initial list consisted of the thirty largest urbanized areas listed in the Urban Mass Transportation Administration's 1981 Directory of Regularly Scheduled, Fixed Route, Local Public Transportation Service in Urbanized Areas Over 50,000 Population, and four additional cities which had implemented specific security measures that might be of interest. (See Table 1-1.)

New York and Chicago were eliminated immediately. In the case of New York, the complexity and magnitude of the system and its security problems put it beyond the scope of the current study. The city of Chicago was not considered because some of its transit security measures are being evaluated by other UMTA programs, and recently that security system was radically altered.

TABLE 1-1. CITIES CONSIDERED FOR TRANSIT SECURITY CASE STUDIES, RANKED BY POPULATION

Population Rank	City
1.	New York - N.E. New Jersey
2.	Los Angeles - Long Beach
3.	Chicago - N.W. Indiana
4.	Philadelphia
5.	Detroit
6.	San Francisco (MUNI)
7.	Boston
8.	Washington, D.C.
9.	Cleveland
10.	St. Louis
11.	Pittsburgh
12.	Minneapolis - St. Paul
13.	Houston
14.	Baltimore
15.	Dallas
16.	Milwaukee
17.	Seattle
18.	Miami
19.	San Diego
20.	Atlanta
21.	Cincinnati
22.	Kansas City
23.	Buffalo
24.	Denver
25.	San Jose
26.	New Orleans
27.	Phoenix
28.	Portland
29.	San Juan
30.	Indianapolis
41	Rochester
50.	Toledo
59.	Syracuse
80.	Fresno

Because bus systems are more common than rail in the United States, consideration was limited to cities having a significant bus transit system. Consideration was further limited to those cities for which published transit crime statistics were readily available. The most complete source of information on transit crime is the Southeast Michigan Council of Governments' (SEMCOG) Crime and Security Measures on Public Transportation Systems: A National Assessment, published July 1981.[5] A list of twenty-nine cities considered in the SEMCOG study and summaries of the transit crime statistics for their principal systems appear in Tables 1-2, 1-3 and 1-4.

The following criteria were used to reduce the number of cities considered for the case studies reported herein:

1. Group III Systems (less than 20 million passengers per year) were not recommended as candidates for this study. These transit systems have, in general, less crime than the larger systems, principally because the cities themselves have less crime. Consequently, security measures introduced into these systems are likely to be less applicable to other systems with significant security problems.
2. Cities with a high incidence of crime were considered because these are the cities in which security measures are most severely tested.
3. Cities with large decreases in the crime rate were recommended for consideration in this study because they demonstrate where security measures may have been effective.
4. Cities that have installed specific security programs that may be of critical interest were also considered to be good candidates for case studies. The resulting list of fifteen cities selected for further consideration and comments on their security program is shown in Table 1-5 and 1-6.

Telephone conversations with transit officials in these cities provided more information on their transit security programs and the availability of statistical data. The number of cities under

TABLE 1-2. SEMCOG SUMMARIES OF TRANSIT SYSTEM CRIME STATISTICS: GROUP I SYSTEMS
(Over 100 Million Passengers/Year)

System	1980 Total Passengers	1980 Total Incidents of Crime	1980 Total Crime Rate per 100,000 Passengers	1980 Part I Offenses per 100,000 Passengers	1980 Part II Offenses per 100,000 Passengers	Part I Offenses 1977	Part I Offenses 1980	Part II Offenses 1977	Part II Offenses 1980
Los Angeles*	334,776,000	4,281	1.28	.099	1.00	497	332	36,417	3,359
Philadelphia(SEPTA)	265,000,000	1,735	0.65	.265	0.30	230	704	573	782
Boston	158,270,000	7,313	4.62	1.20	3.40	660	1,902	5,123	5,371
Washington** (Bus)	145,318,000	1,019	0.70	N/A	N/A	N/A	N/A	N/A	N/A
San Francisco (MUNI)	144,000,000	1,880	1.31	.049	0.82	648	70	1,538	1,179
Pittsburgh	107,199,802	1,140	1.06	.046	1.02	76	49	1,632	1,091
Altanta***	106,831,000	2,120	1.98	.408	1.53	28	436	681	1,632

TABLE 1-3. SEMCOG SUMMARIES OF TRANSIT SYSTEM CRIME STATISTICS: GROUP II SYSTEMS
(20 to 100 Million Passengers/Year)

System	1980 Total Passengers	1980 Total Incidents of Crime	1980 Total Crime Rate per 100,000 Passengers	1980 Part I Offenses per 100,000 Passengers	1980 Part II Offenses per 100,000 Passengers	Part I Offenses 1977	Part I Offenses 1980	Part II Offenses 1977	Part II Offenses 1980
Baltimore	95,800,000	1,699	1.77	.123	1.65	136	118	1,914	1,581
Minneapolis	92,000,000	641	0.70	.024	0.63	236	22	117	582
Milwaukee	85,988,018	9,726	11.32	.0701	0.58	22	60	5,725	9,095
New Orleans	83,264,093	1,655	1.99	.141	0.75	179	118	332	626
Miami	76,588,662	1,266	1.65	.562	1.00	227	430	321	767
St. Louis	69,842,300	2,942	4.21	.031	0.95	N/A	22	N/A	663
Seattle	66,058,690	3,182	4.82	.018	3.69	58	12	1,235	2,434
Detroit (D-DOT)	54,787,000	601	1.10	.084	0.74	175	46	812	434
Buffalo	46,938,640	452	0.96	.051	0.91	61	24	850	428
Houston	43,179,873	683	1.58	.201	1.02	N/A	87	N/A	440
Denver	43,000,000	2,630	6.11	.267	6.12	N/A	115	N/A	2,364
San Diego	34,619,632	1,334	3.86	.081	1.45	0	28	1,112	503
Dallas	34,085,606	399	1.17	.023	1.02	0	8	47	349
San Jose	30,519,663	1,391	4.56	.01	4.55	N/A	3	N/A	1,388
Kansas City	26,513,394	192	0.72	.049	0.57	2	13	64	151
Rochester	24,959,271	395	1.58	.016	1.34	1	9	309	334

TABLE 1-4. SEMCOG SUMMARIES OF TRANSIT SYSTEM CRIME STATISTICS: GROUP III SYSTEMS
(Less than 20 Million Passengers/Year)

System	1980 Total Passengers	1980 Total Incidents of Crime	1980 Total Crime Rate per 100,000 Passengers	1980 Part I Offenses per 100,000 Passengers	1980 Part II Offenses per 100,000 Passengers	Part I Offenses 1977	Part I Offenses 1980	Part II Offenses 1977	Part II Offenses 1980
Indianapolis	15,022,585	552	3.68	0	2.26	15	0	340	339
Syracuse	11,000,000	182	1.30	0.16	0.96	38	23	662	134
Phoenix	13,776,286	150	1.09	.072	0.80	N/A	10	N/A,	111

N/A - Not Available.

•Number of passengers in 1980 based on average daily rate for 260 days. 1977 Part II offenses included observation of marijuana use but not arrest; these incidents were not included in 1980 statistics.

**From WMATA statistics.

***Includes start-up of rail system in 1980 statistics.

Source: Reference 5.

TABLE 1-5. GROUP I SYSTEMS CANDIDATES FOR TRANSIT SECURITY STUDY SITES

System	Total 1980 Crime Rate per 100,000 Passengers	Percentage Change in the Number of Offenses Between 1977 and 1980		Comments
		Part I Offenses	Part II Offenses	
Los Angeles (SCRTD)	1.28	-33	N/A	Experimenting with AVM, cameras on buses, digital communications. Largest bus system under one management. Significant improvement in security over the last several years.
Philadelphia(SEPTA)	0.65	+206	+36	Major increase in Part I and II offenses. Two-way radios planned for implementation; digital systems in use.
San Francisco(MUNI)	1.31	-89	-23	Significant reduction in Part I and II offenses.
Boston (MBTA)	4.62	+14	+5	Lowest expenditure for security and fewest police officers of the major Group I cities. No 2-way radios on buses.
Washington, D.C. (WMATA)	0.70	N/A	N/A	Low transit incident rate in city of high overall crime rates. Reliable statistical data available. Computerized dispatcher control. Regular transit police use of plain clothes operations.
Pittsburgh (PA Transit)	1.06	-36	-33	Relatively small transit police force reduced Part I and II offenses.
Atlanta (MARTA)	1.98	+1457	+1174	High number of both Part I and Part II offenses; large increase in last several years.

TABLE 1-6. GROUP II SYSTEMS CANDIDATES FOR TRANSIT SECURITY STUDY SITES

System	Total 1980 Crime Rate Per 100,000 Passengers	Percentage Change in the Number of Offenses Between 1977 and 1980		Comments
		Part I Offenses	Part II Offenses	
Detroit (D-DOT)	1.10	-73	-46	Significant reduction in Part I offenses. SEMTA provides an annual review of security for the tri-state area including D-DOT.
St. Louis (Bi-State)	4.21	N/A	N/A	Successful use of undercover police using off-duty officers; this practice has been extended through out the bi-state area.
Milwaukee	11.32	+172	+59	High rate of Part II offenses; major increase in the past several years.
Seattle (Metro)	4.82	-79	+97	Moderately high rate of Part *I* offenses; major decrease in Part I and major increase in Part II may be due to redefinition. Use off-duty police officers. Radio enhancement program planned. School program focuses on grade schools.
Miami (Dade)	1.65	+89	+138	Very high rate of Part I offenses getting worse. Small internal security force; contract with county police for limited additional support.
San Diego	3.86	*	-54	Moderately high rate of Part II offenses.
Denver (RTD)	6.11	N/A	N/A	High rate of Part II offenses; silent alarms reported ineffective. Official considers crime incidence and vandalism low.
San Jose	4.56	N/A	N/A	High rate of Part II offenses. Use of cameras on buses being extended. Employ contract police force.

*The number of offenses went from 0 in 1977 to 28 in 1980.

consideration was eventually reduced, in consultations with UMTA, to four: Detroit, Los Angeles, Seattle, and Pittsburgh. The transit systems in each of these cities had collected information on the incidence of transit crime and had successfully implemented security measures that could be applied elsewhere. Together, these cities provided reasonable geographic coverage of the United States and represented a range of metropolitan populations from the second largest to the nineteenth largest.

2. CITY CASE STUDIES

Case studies of the security measures adopted *in* Detroit, Los Angeles, Seattle, and Pittsburgh were developed from published data and interviews with transit and police officials. In each city detailed discussions were held with those in charge of the transit security programs including the chief of the transit police or the supervisor of the local police unit responsible for transit security, the transit official directly responsible for the security program, community relations personnel, and local police officials. A list of the people contacted in each of the four cities is attached in Appendix A. The public's perception of transit security as expressed in meetings with civic leaders was used to fill in the picture of the crime problems faced by each transit system and the countermeasures taken to improve the security of operators and passengers. This section presents a profile of each city including the transit security measures adopted, the alternatives considered, and distinguishing characteristics of the transit system.

2.1 DETROIT

The Detroit metropolitan area experienced a sharp increase in overall crime in the mid-seventies, and many of the city's victims were bus operators and passengers. To provide more protection on the buses and at bus stops, the Detroit Police Department and the Detroit Department of Transportation (D-DOT) instituted the Bluebirds, an undercover police operation. In this program, teams of three and four Detroit police officers ride buses on the lines with a high incidence of crime. The presence of the officers makes possible immediate apprehension of those involved in criminal activity. D-DOT hopes that this tactic will discourage the growth of crime on its buses. In a typical operation, two or three officers ride the bus in plain clothes, and another officer in uniform follows in an unmarked car. The plain clothes officers are equipped with concealed radios, which enable them to call for additional help and communicate with the uniformed officer in the trail car.

2.1.1 Development of the Bluebirds and Alternatives Considered

During the mid-seventies when serious crime was increasing in the city of Detroit, buses seemed to provide an attractive environment for vandalism and crime. While Part I crime in the city increased by 7 percent per annum between 1970 and 1975, during this same period, reported Part I transit crime increased by 115 percent.[4] All transit offenses, including minor vandalism, increased by 52 percent during this period. Transit crime continued to grow in the later seventies and reported Part I offenses increased by 40 percent between 1974 and 1976.[6] To cope with crime, including the rape of a woman driver and the occurrence of stage robberies in which the operator and passengers on a bus were systematically robbed at gun point, D-DOT managers considered various means of policing the transit system — its terminals, vehicles, and coach stops.

Most of D-DOT's transit crime falls in the Detroit Police Department's jurisdiction because the transit system's routes are confined almost entirely to the city. Prior to the Bluebird Operation, the police handled problems as they arose but did not target transit crime for special operations. Consultations between D-DOT management and the police led to a program of assigning uniformed officers to ride buses or runs with high incidence of crime, but the effectiveness of this program was limited. Few crimes were committed in front of the officers, but the absence of crime was conspicuous and anecdotal evidence indicated some offenses were subsequently committed in reaction to the presence of the uniformed officers. According to transit and police officials, there would be no criminal incidents when an officer was on a particular run, but the next day, some offenders would harass the passengers and drivers pointing out that as long as no officer was present they (i.e., the offenders) could do as they pleased. Since the deterent effect of uniformed officers was limited to the time they were present on the vehicle and since there may have been a subsequent negative impact, the use of uniformed officers did not seem to be as potentially effective as undercover officers. In addition, the drivers, accustomed to operating independent of supervision, were not all pleased at the presence of uniformed officers on their buses.

Since the presence of uniformed officers was not found to be satisfactory, plain clothes officers were used for a period of time. They boarded with their police identification and rode the buses with the most severe problems. This program was not found to be very effective, either, mainly because it lacked operator support. Some operators, knowing that there was a police officer on the bus, would provoke incidents with passengers who had previously harassed the driver or other passengers. It was thought that other drivers, knowing they had police back-up, were less likely to avoid confrontations with hostile passengers than they would have done in the absence of police. In some cases, the drivers revealed the officers' presence to the passengers, thus destroying the effectiveness of the undercover police and occasionally provoking confrontations between passengers and officers.

During discussions between D-DOT and the police department, a police officer who had previously been employed as a bus driver suggested an undercover police operation on the buses in which the officers boarded without the operator's knowledge. The two agencies developed a pilot project using plain clothes officers who would board with transfers rather than with their police identification. This eliminated some of the problems caused by the bus operators. One of the advantages of an undercover operation was its potential for controlling crime without complete police coverage of every bus on every line. If criminal activity could be prevented by increasing the probability of immediate apprehension by an unidentifiable officer on the bus, then an officer on each bus would not be necessary.

The hiring of a transit security force was also seriously considered as an alternative to using Detroit police officers to patrol the system. As envisioned by D-DOT, the security force would not have had police power, and without this authority, neither transit nor police officials felt that the security force could have been effective in controlling criminal activity. On the crowded buses in particular, the harassment of passengers by groups of young people and the robbery of passengers by teams of criminals prevails. Without arrest powers, security officers would have had difficulty controlling groups of

disruptive passengers. Thus, D-DOT felt that the solution lay in some sort of police presence.

In 1976 D-DOT entered into a purchase of services contract with the Detroit Police Department to provide a police detail which would conduct undercover operations on the transit system. Consequently, the police department formed the Bluebird Detail, which was dedicated to policing the transit system. Funding was originally provided by a $901,000 grant from the Michigan Department of State Highways, and the detail was originally staffed by twelve teams composed of four officers each. Three of the officers in plain clothes would board the bus separately and, to avoid alerting the driver who might reveal the officers' presence, they used transfers rather than special passes. The fourth officer, in uniform, was responsible for following the bus at a distance in an unmarked car while maintaining radio contact with those officers on the bus. The first officers for the Bluebird Detail were selected from volunteers in the elite Tactical Mobile Unit; each of them had at least ten years of service. Delays in obtaining the cars and the concealable radios delayed full implementation of the Bluebird operations until 1977.

2.1.2 Bluebird Operations

Currently, participation in the Bluebird Detail is limited to officers who request a transfer to that unit because all undercover work is voluntary. These officers are subsequently screened to determine if they are suitable for undercover work and for assignment to the transit detail. Qualified officers are then assigned on the basis of seniority. Originally the Bluebirds were an all male unit because the assignments were based on seniority, and few women could qualify. With increasing numbers of women officers in the department with the required seniority, some are now being recruited for the detail. The detail is reputedly a highly professional unit which attracts top officers.

The Bluebirds had always worked with the Police Department's Gang Squad and Major Crimes Unit, and in 1980 a Tactical Service Department consisting of those three units was organized. Cooperation with the other two units is essential to the effectiveness of the Bluebird

Detail. Because groups of juveniles account for a large proportion of the violators on buses, the Bluebird's operations are often coordinated with those of the Gang Squad as well as with the Narcotics Squad's operations to control drug use on and off the buses.

Because the Bluebird Detail deals almost exclusively with crime that occurs on buses and at bus stops, the officers have developed expertise which increases their efficiency, in dealing with incidents peculiar to the transit system. For example, the plain clothes officers' response to an incident on a bus depends on the seriousness of the crime. To avoid endangering passengers and revealing their identity, undercover officers will usually follow an offender off the bus and then write a ticket if an ordinance was violated or make an arrest for more serious infractions. When the operator or passengers are threatened with serious bodily harm, the officers intervene directly to prevent injury. The uniformed officer in the unmarked trail car is always present at the time of arrest to remove any doubt in the offender's mind that he or she is indeed with the police. The officers' attention is not confined to the bus, and they are instructed to be aware of problems on the street because bus stops are often the scenes of purse snatches and pickpocket operations.

In addition to patrolling the buses, Bluebird officers are occasionally called on to handle incidents that occur in the neighborhood of their assigned bus routes. The trail car provides transportation for the team if it must respond to close-by, nontransit crime. This availability for response to incidents is important to the police department to ensure efficient allocation of manpower. The detail's officers are held accountable for logging all their daily activities. They are required to ride a specified number of buses each week, filing reports on all incidents and reporting the mileage of the unmarked car.

The police and transit officials consulted preferred teams of four officers, but recent budget cuts have required the reduction of the teams to three officers. The effectiveness of three-person and four-person teams is being investigated as part of an evaluation of the Bluebirds by Dr. Ken Weiner at Wayne State University. The reason for the presence of more than one plain clothes officer on the bus is the

need for closer, more immediate backup than is available from the officer in the trail car. If an incident occurs on the bus, not only is the trail officer unable to lend immediate assistance, but he or she may not even be aware that a problem exists. Three officers in plain clothes on the vehicle were considered more effective than two because, with at least three officers on board the bus, if two officers need to disembark to follow on offender, one officer will be able to remain on the bus, and vice versa. Moreover, many incidents involve groups of passengers, particularly juveniles on the school runs. Especially in the close quarters of a bus, incidents involving several people can require several officers to protect passengers or operators. There was a consensus among transit and police officials that three officers on a team were the smallest number that could be effective in this type of operation.

In publicizing the new security program DOT sought to inform the public and potential criminals that there would be undercover officers on the buses. One part of the publicity campaign was a contest for school children to design a poster illustrating the presence of undercover officers who would protect passengers on the buses. The winning poster, a blue bird wearing a police cap hovering over a bus, with the slogan, "The Bluebirds are watching you," was displayed on the buses, and the child received a savings bond. Not all buses have had the posters continuously on display because they are often stolen, presumably to decorate someone's wall.

There was heavy television news coverage of the detail when it began, as well as newspaper articles describing the detail and some of its larger operations. One newspaper article reported the use of a decoy bus to pick up junior high school students who had been harrassing passengers on a particular route. The undercover officers were on the bus when the students boarded, and subsequently identified the major troublemakers who harassed the decoy passengers and other students and were responsible for disrupting the bus ride. The undercover officers then identified themselves as police officers and transfered the students who were not involved to a regularly scheduled bus. The

trouble makers were kept on the bus and taken to the police station, where citations were issued to some students and parents were notified to come to the station to take custody of the younger students. This early media coverage has fallen off, and inquiries to the Detroit News and Detroit Free Press in November 1981, indicated that there were no recent articles on the Bluebirds and that the newspapers did not keep clipping files under that heading. In fact, the persons contacted did not recognize the name "Bluebirds" in connection with the transit system, nor were they aware of the existence of an undercover police operation on the buses.

2.1.3 Additional Security Equipment and Related Programs

The Detroit buses are equipped with two-way radios which enable the driver to communicate with the dispatcher and call for assistance in emergencies. Some vehicles are equipped with external flashers to indicate emergencies to patrol cars and passenger bystanders, but these devices have not been installed on all vehicles. Silent alarms enable the operator to notify the dispatcher of an emergency if the operator cannot talk freely. The usefulness of roof-top flashers has not been established, and there is no record of their having been used in a criminal incident. Silent alarms and two-way radios are considered the most useful security measures in serious incidents. Less serious occurrences such as juvenile rowdiness and harassment of passengers may not warrant calling for police assistance even when the operator cannot control the situation. In addition, the incident may be over and the criminal may have fled before the police can respond to the call. Nevertheless, the two-way radios and silent alarms are considered useful in serious situations because they provide the operator with a means of calling for assistance. Without communications, the operator as well as the passengers would be more vulnerable to crime and minor harassments. The main usefulness of communications is in their potential for discouraging offenders who would perceive the bus and its occupants as ripe, isolated targets for crime.

Because young people are the source of much vandalism and harassment of other passengers, D-DOT initiated school programs to teach

them appropriate bus riding behavior and educate them about transit. Between April 1980 and June 1981, a pilot project was conducted in four metropolitan-area middle schools to disseminate general information on the public transit system including sections on the cost of vandalism and proper behavior on buses. Although the program increased the students' knowledge about transit, there was no indication of a change in attitude toward use of transit.(7)

2.1.4 D-DOT and the City It Serves

The Detroit Department of Transportation operates primarily within the Detroit city limits and, therefore, within the Detroit Police Department's jurisdiction. D-DOT also serves two small incorporated areas that lie wholly within the city boundaries, Highland Park and Hamtramck, but Detroit police officers have no police power in these areas. The Southeast Michigan Transportation Authority (SEMTA) serves the suburbs located in Wayne, Oakland, and Macomb counties but does not carry passengers travelling from one point in the city to another point in the city, because SEMTA cannot carry intra-city passengers. Within the city's boundaries, SEMTA's buses coming into the city only discharge passengers and its buses leaving the city only pick up passengers. However, SEMTA is the designated local transit grant recipient, and as such, receives state and federal subsidies and is responsible for their disbursement to D-DOT. A merger of the two systems has been mandated by the legislature, but a specific timetable has not been established. SEMTA owns all but 8 percent of D-DOT's capital equity and provides about 50 percent of D-DOT's operating funds, but the administration and operation of the two transit agencies remains separate. When the planned merger expands the number of law enforcement jurisdictions served by the unified transit system, there may be a need to reassess the staffing of the undercover operation. The Detroit Police do not have police authority outside the city limits and if there was a need to extend the Bluebird operations to the routes now served by SEMTA, some adjustments in jurisdiction or staffing would have to be made.

D-DOT carried 64,380,000 passengers over 28 million vehicle-miles in fiscal 1981. To provide this service the agency has 799 buses and over a thousand employees. With the urban flight of the seventies, the city's population dropped by 20 percent between 1970 and 1980. Bus ridership declined during this period by an even greater percentage, 36 percent. The population shift to the suburbs is also reflected in SEMTA's growing ridership, from 7,349,186 in 1975 to over 11 million in 1980. Although the shift in population contributed to D-DOT's declining ridership, the increase in transit crime in 1974 and 1975 may have also discouraged passengers.

In 1975, SEMCOG began a study of transit crime in Detroit. At first the data on transit crime was based entirely on operator reports since the Detroit Police Department did not distinguish occurrences of transit crime from other crime. D-DOT and SEMTA operators file reports on any "unusual" incidents including crime. These reports are used as evidence should a law suit or criminal prosecution occur; therefore, it is in the operator's interest to accurately report incidents. Operator reports include a description of the incident, the location, time, weather and light conditions, number of passengers, and number of witnesses.

Additional reports on transit crime became available as they began to be extracted from other police-reported crimes when the Bluebird Detail was implemented. When a driver calls in a report of an incident in progress on the bus or at a bus stop usually the closest Bluebird team responds. The incidents reported by the detail are available as one source of transit crime data. The other source is the Crime Analysis Unit which responds when a Bluebird unit is not immediately available. Crime Analysis reports include Part I crimes that are transit-related. However, the Bluebirds report both Part I and Part II offenses. Reports from both units are crosschecked with those from operators to avoid double counting of incidents. Ms. Anne Nolan, who is responsible for this reporting program, indicated that she had not encountered any duplication of driver reports by either the Bluebird or Crime Analysis units. It may be that when there is a major incident in which the Bluebird officers identify themselves or when other officers

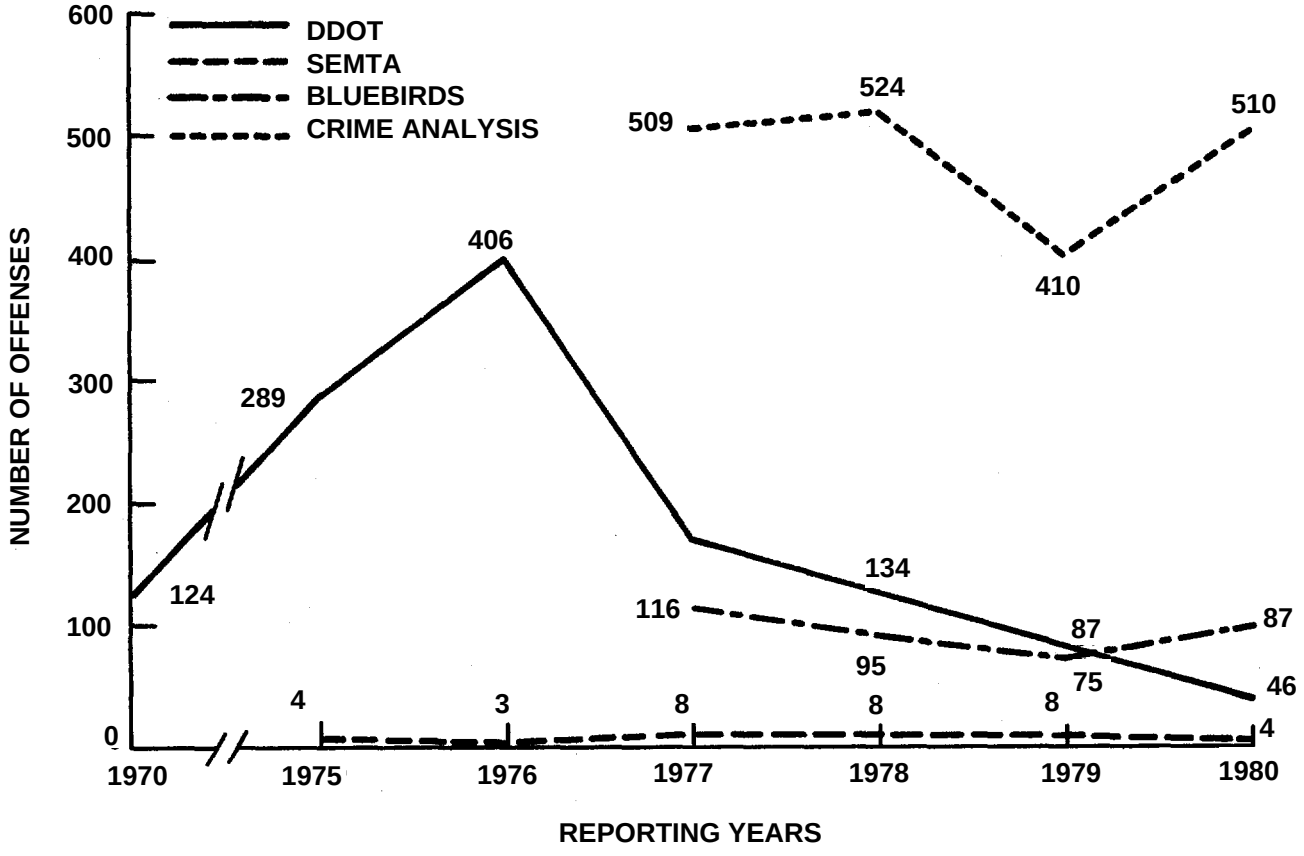
respond, the operator may not feel it necessary to report the incident. It is also possible that some offenses such as purse-snatching may not be noted by the operator.

Because transit crime reporting was expanded in 1977 to include the incidents that involved the Bluebird Detail and the transit-related crimes reported to the Crime Analysis Unit, the pre-1977 transit crime figures are not strictly comparable with the later figures. As mentioned in Section 1, there are problems inherent in the reporting procedures: the number of offenses reported by the detail itself is a function of the number of officers assigned. If the size of the undercover police force increases or decreases there may be a corresponding change in the reporting of incidents.

The trend in Part I transit offenses reported by the various agencies is shown in Figure 2-1. Part I offenses reported by operators dropped sharply with the initiation of undercover police operations and continued to decline in the subsequent years. The number of incidents reported by the Bluebird Detail declined through 1979, but rose in 1980. The number of crimes reported by the Crime Analysis Unit in 1980 was unchanged from the number reported in 1977, although the 1979 figure was significantly lower. However, the incidents reported by the Crime Analysis Unit include a large number of crimes committed at bus stops and on the streets which are not as amenable to transit security measures as the environment of a transit vehicle.

Figure 2-2 shows that the total number of Part I offenses per passenger dropped between 1977 and 1980 and reached its lowest point in 1979. (Information illustrated was calculated from data published in Reference 6.) Therefore, the decrease in reported transit crime was apparently not the result of declining ridership. However, the 1980 increase in crime per passenger was due to the increase in Crime Analysis Unit-reported crime, which includes a higher percentage of bus stop and off-vehicle crimes. The trend of operator-and Bluebird-reported incidents per passenger, excluding incidents reported by the Crime Analysis Unit, is more definitely downward.

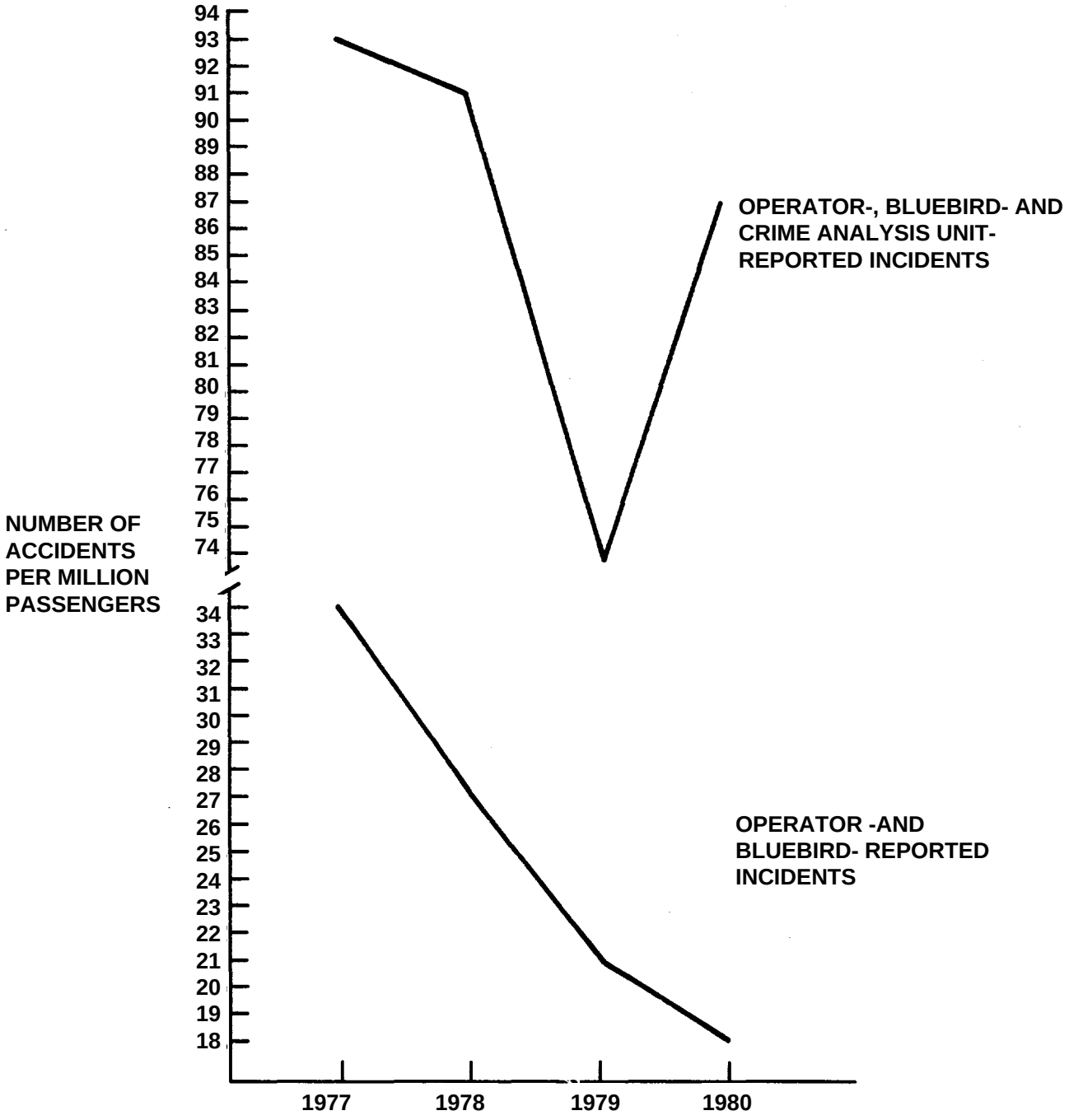
The transit crime problem has not been confined to serious incidents. As shown in Figure 2-3, there were 1,283 Part II criminal



Source: Reference 6, p. 7.

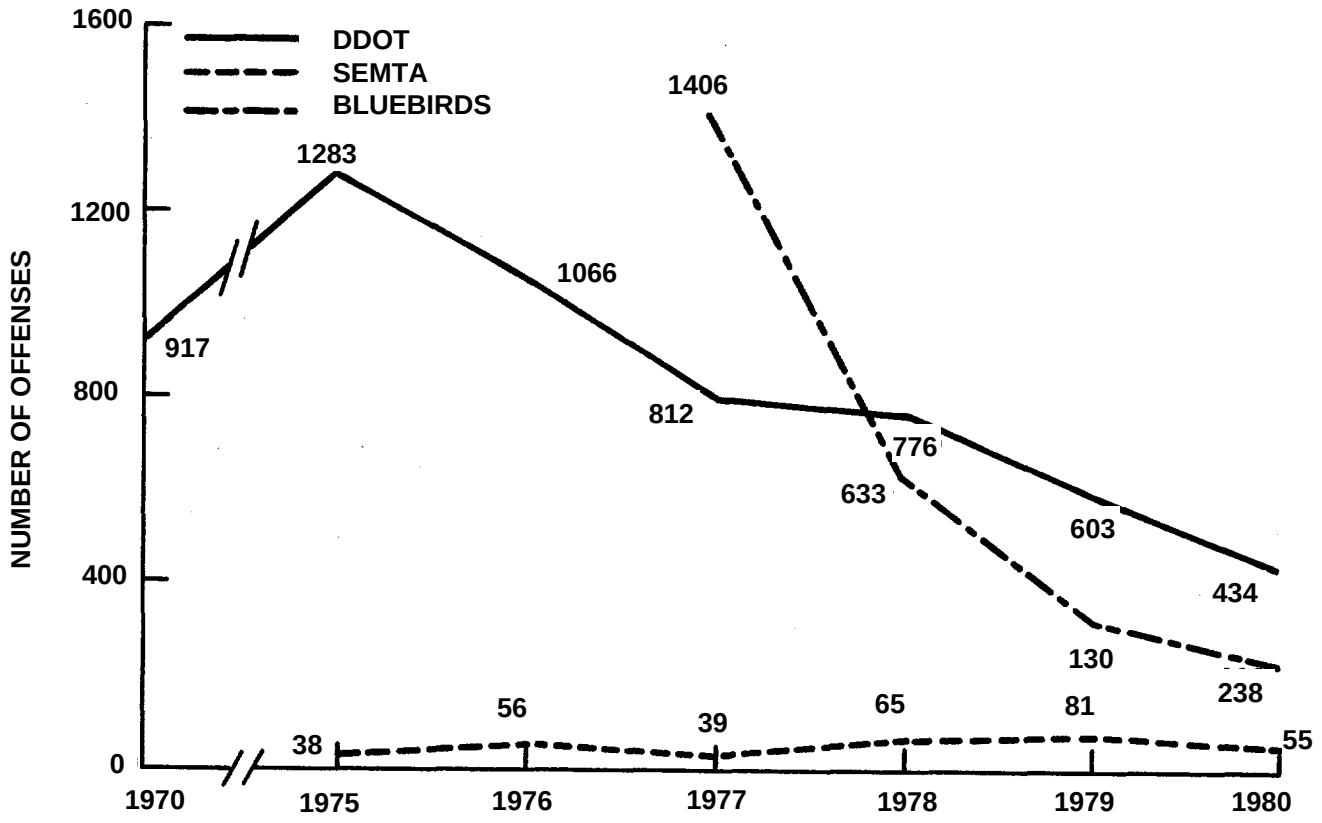
NOTE: 1977 was the first full year of Bluebird operation.

FIGURE 2-1. PART I TRANSIT OFFENSES, 1979-1980



Source: Reference 6.

FIGURE 2-2. NUMBER OF REPORTED PART I CIMMES PER MILLION PASSENGERS



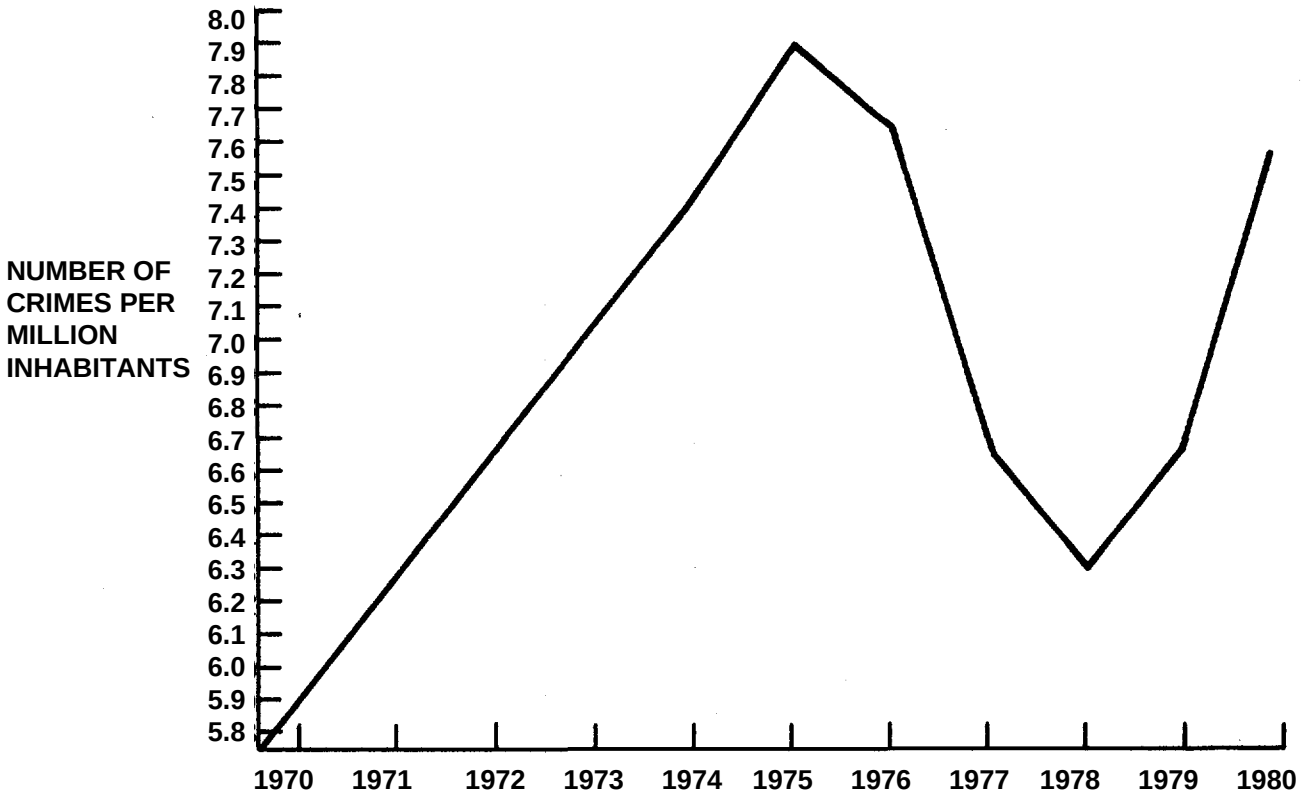
Source: Reference 6, p. 9.

FIGURE 2-3. PART II TRANSIT OFFENSES REPORTED BY D-DOT AND BLUEBIRDS, 1970-1980.

incidents reported in 1975. These minor offenses include public drunkenness and disorderly conduct, vandalism, and narcotic offenses. Forty-eight percent of the 1980 offenses were incidents of vandalism. Since 1975, there has been a significant decrease in the number of offenses reported by operators. The number reported by the Bluebird Detail has also declined significantly.

The trend in the number of transit crimes is similar to that of the total crime rate in the Detroit metropolitan area which exploded in 1974 and 1975. As indicated in Figure 2-4, the number of crimes per capita increased by over 50 percent between 1970 and 1975. During this period, the number of Part I crimes reported on D-DOT buses increased by 133 percent, and the number per passenger increased by 200 percent.(6) Although transit crime grew more than total crime, it seems to have been part of a larger crime problem that the Detroit area experienced. The number of metropolitan area crimes as well as the incidents per capita dropped over the next three years (1976-1978). The reason for this improvement is unknown, but it might be attributable to an improving economy or more efficient law enforcement. While certain socio-economic conditions, such as unemployment, may not directly cause crime, changes in these factors are often associated with changes in the crime rate. The 1979 and 1980 recessions hit Detroit hard: area employment dropped by 8.9 percent between 1978 and 1980, and the unemployment rate doubled. As shown in Figure 2-4, the crime rate did increase dramatically during these two years. However, other factors, such as cutbacks in the number of law enforcement officers, could have also contributed to the increase in crime.

As part of the city's crime, transit crime may also be related to socio-economic factors. The city-wide crime per capita figures are not strictly comparable with those for D-DOT's transit crime. Nevertheless, the decline in Detroit's crime over the 1975-1978 period suggests that transit crime might have decreased somewhat even without the implementation of any transit security measures. However, the number of transit crime incidents per passenger continued to decrease in 1979 when the city crime rate was increasing. This suggests that the security measures implemented by D-DOT did contribute to the decrease in transit crime.



Source: Reference 4.

FIGURE 2-4. INCIDENCE OF CRIME PER MILLION INHABITANTS IN DETROIT SMSA

2.2 LOS ANGELES

The nationwide growth of crime in the seventies was felt strongly in Los Angeles. The Southern California Rapid Transit District (SCRTD), which provides bus service to the metropolitan Los Angeles area, experienced a 40 percent increase in crimes against operators and passengers and a doubling in the number of buses hijacked in one year (1977). To cope with this crime problem, SCRTD obtained legislative authority to operate a transit police force with full police powers. Los Angeles has also been the site for pilot tests of an automatic vehicle monitoring (AVM) system and the use of cameras to provide additional passenger security.

2.2.1 Development of the SCRTD Transit Police Force

Prior to 1978, SCRTD had a security force with limited authority. Its responsibilities were confined to responding to traffic accidents and guarding SCRTD facilities and equipment. These security officers did not have police powers and were not responsible for passenger or operator security. All crime, including transit crime, fell under the jurisdiction of the local law enforcement agencies, with the bulk of the transit crime occurring within the city limits and within the jurisdiction of the Los Angeles Police Department (LAPD).

In 1977, in response to public concern about passenger security and union pressure to increase operator security, SCRTD decided to seek legislative authority for a transit police force staffed by officers with full police powers while on duty. The legislation passed and SCRTD was empowered to establish a transit police force. In July 1978, James P. Burgess, formerly a Captain in the Alhambra Police Department, was appointed Chief of the Transit Police and charged with developing a professional law enforcement organization. One purpose for the selection of a local police officer was that he would be more likely than a newcomer to command the respect of the local law enforcement agencies and to ensure their cooperation.

The new transit police force incorporated the existing security force and offered those security officers who were qualified the opportunity to become sworn police officers. About forty security

guards applied for police officer positions, and half of them passed the required examinations and training. The police force has a budget for seventy sworn officers and forty security guards, twenty-five of which are to be armed and fifteen are not. The security guards patrol the plants and oversee revenue transfers, but do not respond to reports of crime on SCRTD vehicles. The transit police recruits must meet the employment standards of the Los Angeles City and County Police Departments, and they go through the same training programs. The chief of the transit police plans to develop a high-quality force which will be taken seriously by passengers, operators, and offenders. According to him, a quality force is necessary to gain the respect of the local law enforcement officers and ensure their cooperation. As of December 1981, Chief Burgess had recruited and trained fifty-seven full time officers.

To make up for the deficiency in permanent, full-time officers, off-duty law enforcement officers were hired as part-time transit police. The County of Los Angeles made available a $150,000 grant in October 1980, and an additional $225,000 in April 1981, to hire off-duty Los Angeles City and County Police officers. These officers are paid as hourly employees and are furnished with SCRTD identification. Working eight-hour shifts, two days a week, this part-time work force provided the equivalent of nineteen full-time officers in December 1981. After the transit force is fully staffed, Chief Burgess plans to phase out the part-time operation. Benefits of employing off-duty officers include the dissemination of information about the transit police operations and the facilitation of relationships with the police departments.

2.2.2 SCRTD Transit Police Operations

The transit police operate both in uniform and undercover, and they are equipped with police cars bearing an SCRTD Transit Police insignia. The transit police use several modes of operation:

- Undercover and uniformed officers work together. To better assess the impact of uniformed officers, the undercover officers have the opportunity to observe the effect of a uniformed officer's presence and what happens when the officer leaves.

- Three-officer undercover teams are used with two officers on the bus and one following in an unmarked car.
- Two undercover officers are used to work bus stops. These operations concentrate on pickpockets and the counterfeiting of passes.
- Both uniformed and undercover officers randomly board buses.

Because the SCRTD system is so large, the transit police cannot police the entire system intensively. Instead, they concentrate their activities in high-crime areas. Officer assignments are determined by the areas experiencing the most problems. For example, in the summer, the beach lines tend to have more crime than in the winter and additional officers are assigned to cover them, especially on weekends. Nevertheless, all lines are patrolled occasionally to provide a measure of system-wide security and to monitor patterns of crime.

Cooperation between operators and the transit police is encouraged through regular meetings to discuss what is happening in the buses and to solicit feedback on police operations from the operators. Operator training includes a section on how to handle emergencies and the role of the transit police. The transit police officers, for their part, receive some operator training to familiarize them with the operation of a bus and the difficulties faced by drivers.

The transit police are primarily concerned with crime that occurs on SCRTD vehicles, and the officers' responsibilities in dealing with other transit crime are limited. They share the police duties with the local police and their official role is to provide assistance to the local law enforcement agency. If a transit police officer makes an arrest, he or she takes the offender to the nearest police station, where the local police take over. In this situation, the SCRTD officer is expected to take direction from the officer in charge of the facility according to a memo of understanding between the SCRTD Police and the local law enforcement agencies. Following an arrest by a transit officer, the requisite follow-up and investigative work are done by the local police. Transit police operations focus on deterring crime and apprehending criminals rather than on prosecution. Because the police

responsibilities are shared, coordination with the local police is necessary to ensure efficient operations.

When an incident occurs on a bus, the following sequence of events is typical of how the operator communicates the problem and how the police respond. If the incident is minor, the operator calls the dispatcher on the two-way radio and the dispatcher summons the police. If there is a serious incident and the operator does not wish to let the offender know he has called the police, the operator activates the silent alarm. An emergency message then flashes on the signboard normally used to indicate the bus's number and destination. At the same time, an alarm goes into the dispatch center, and the dispatcher must determine the location of the bus and notify the transit and local police. If the vehicle is part of the automatic vehicle monitoring (AVM) system (see Section 4), its location is continuously displayed on a monitoring screen, and the transit and local police can be notified immediately with accurate information on its location and direction of travel. However, the majority of buses and routes are not part of this demonstration program, and the dispatcher must determine the bus's route and schedule and estimate its probable location. Under these circumstances the location information relayed to the transit police and the appropriate local law enforce ment agency may not be correct. Usually both police forces dispatch units to the bus. However, if the transit police do not have a unit reasonably near the bus they leave it to local police to respond to the call. On the other hand, the transit police often can respond more quickly than the local police to incidents at downtown locations. As soon as it is possible for the operator to talk safely, he or she activates a priority switch on the two -way radio and tells the dispatcher what has occurred.

There are two major problems that the police face when responding to silent alarm emergencies: the high frequency of false alarms and the time required to reach the bus. Response time is highly dependent on the location of available officers and on immediate and accurate knowledge of the bus's location. Delays are likely when no transit officers are available to respond, or the bus is off-route and difficult to locate. The transit police are trying to develop better procedures

to handle emergencies and to improve their response time without relying on the AVM because of its limited service area. The high number of false alarms (half of all alarms received) is at least partly due to the switch's location on the floor of the vehicle near the brake. Many times the switch is activated without the operator's knowledge, and some times the maintenance crews inadvertently activate the alarms. To alleviate these problems, the switch is being relocated in the side window panel with other operational switches.

Since not all the violations that occur on a bus are serious enough to warrant an arrest, SCRTD transit police officers sought and were granted citation authority which enables them to enforce SCRTD rules against unacceptable activities such as eating, smoking, drinking, and playing loud radios on the bus. Effective January 1 1982, any California transit district with a sworn police force will be authorized to issue citations for minor infractions of the law, and the transit district will receive 85 percent of the fines collected. This additional authority is expected to help transit police control less serious incidents.

2.2.3 SCRTD Coordination with Local Law Enforcement Agencies

The SCRTD bus routes cross forty-six separate law enforcement jurisdictions. The center of its operations is the city of Los Angeles, but its bus routes do extend into the surrounding Los Angeles County. The Los Angeles Police Department (LAPD) has jurisdiction over the city and the Los Angeles County Sheriff's Department serves the unincorporated areas in the county. Some smaller municipalities also contract with the sheriff's department for police services rather than institute a force of their own. The county sheriffs also provide specialized police services in cases of homicide, narcotics, and vice control even in those municipalities with their own police force. These multiple jurisdictions were one reason for the institution of a transit police force with the authority to arrest offenders in any jurisdiction. SCRTD works closely with LAPD and the sheriff's department. SCRTD encourages all local law enforcement officers to ride the bus to and

from work by allowing them free rides when they show their identification. This is by far the least expensive security measure used.

Until the institution of the SCRTD police, LAPD had sole jurisdiction over transit-related crime committed in the city. Now it shares, with the SCRTD transit police, responsibility for incidents that occur on buses as well as those at bus stops. LAPD notifies the SCRTD transit police of any police activities that could involve the transit system, such as planned boardings by either uniformed or undercover officers; this notification procedure allows SCRTD officers to be deployed in other areas to increase police coverage and avoids inadvertant interruption of LAPD operations.

Since transit crime requires city-wide coordination, it is under the jurisdiction of the LAPD Metropolitan Division, which has police responsibilities throughout the whole city. This division controls the seventeen LAPD helicopters and two fixed-wing aircraft, which patrol the Los Angeles area. The helicopters patrol the city daily. When there is a hijacking or a bus is off-route, the officers in the helicopters can spot the bus by its identification number, which is painted on the roof. These resources of the LAPD are available to the SCRTD Pblice when they are needed.

The Metropolitan Division of LAPD does monitor transit crime, and after identification of emerging patterns of incidents, it develops operations to deter or prevent these incidents. When there are frequent transit crimes in an area, the division develops a profile of the type of crime and the routes it occurs on. If the incidents are the less serious and repressible types of crime, such as juvenile vandalism, uniformed officers are assigned to the area. Their visible presence usually discourages the offenders. If the crimes are more serious, undercover and uniformed officers may be assigned to particular operations on the buses or at the bus stops. Occasionally more elaborate, covert operations involving extensive undercover work are conducted.

LAPD undercover operations use the following three approaches:

> Plain clothes surveillance of problem areas, which includes observing activity on the buses, staking out bus stops where robberies and purse-snatches occur, and providing saturation of the problem areas for quick response to bus alarms (radio, flashers, and message board).
>
> Undercover ride-along and tail vehicle. In this procedure the officers make arrests on board the bus and take the suspect off the bus to the tail car.
>
> Undercover observation with radio, reporting to officers at bus stops and/or in tail vehicles. In this mode, the officer doesn't identify himself but instead relays information on criminal or suspicious activity to other officers. This method allows the officer to continue to operate without detection. This method ensures less chance of an altercation on the bus wherein an operator or passenger could be accidentally injured.*

A saturation operation run by LAPD is of interest because it illustrates the difficulty in eliminating transit crime. In November 1980, LAPD began an operation which attempted to eliminate all transit crime in a high-crime area and to determine the level of effort and cost required to do so. Even if it was a limited success and only displaced crime to another area there would be some cost-effectiveness data generated. Officers were assigned to the area on a 24-hour basis, and the criminal activity did decrease as the word went out that the neighborhood was crawling with police officers. However, there always seemed to be a few people who "hadn't gotten the word," stumbled into the operation, and were arrested. Because of budget considerations the operation was discontinued before all transit crime was eliminated. However, the possibility of totally eliminating transit crime seemed bleak.

---

*Letter from LAPD Chief Daryl Gates to Earl Clark, General Chairman, United Transportation Union, October 21, 1980.

The budget and personnel restrictions that resulted from passage of Proposition 13 have caused LAPD to discontinue some of its transit crime operations. The SCRTD police force had been created to deal with transit crime, and duplication of effort could no longer be afforded.

Like LAPD, the sheriff's department also cooperates with the transit police. Its officers are not usually allowed to moonlight, but an exception was made in the case of SCRTD transit police part-time employment of off-duty local law enforcement officers. Off-duty county officers are also encouraged to ride SCRTD buses free upon showing their identification. These part-time employment and free bus service programs were positively received by the bus operators and apparently alleviated some of their previous hostility toward the county officers. Transit crime is not considered a major issue in the county and is not classified separately in its statistics. Security problems on the street as well as in automobiles are considered much more serious, and street crime is reputedly worse in some areas than is crime that occurs on buses. The community of Lynwood is typical. It currently has a high crime rate and the sheriff's department receives more complaints about attacks on occupants in cars than on buses. Incidence of crime on buses in Lynwood is reputedly very low; there have been only four incidents reported to the sheriff's department in the period from June to December 1981.

2.2.4 Additional Security Measures

In addition to the two-way radios and silent alarms already in place, two other projects to improve security using equipment have been initiated in Los Angeles—the automatic vehicle monitoring (AVM) system ,and a camera monitoring program. The AVM was originally designed as a management tool to provide continuous and accurate information on the location of buses in the system as well as the number of passengers boarding and disembarking. Dispatchers can use the AVM to monitor schedules and to respond to emergencies, and SCRTD managers can use the data to develop future routes and schedules. In an emergency, the dispatcher can immediately notify the police of the exact location of the vehicle regardless of whether it is stopped or still moving.

However, the monitoring equipment has not been installed throughout the city, and an AVM vehicle outside the system may not be automatically located when an emergency occurs. There have been delays in relaying silent alarm information, in part because of the high number of false alarms and because police response time depends on the dispatcher's immediate response to receiving an alarm. If the alarm is ignored or information relayed to the police is delayed, the response time will be increased. Police officials expressed concern that, in an emergency, immediate and accurate information on a vehicle's location should be disseminated promptly if immediacy is of value.

SCRTD's other project was a pilot camera-on-bus monitoring program patterned after the use of cameras in banks. It's purpose was to document any crimes, to provide evidence in criminal cases, and to increase the probability of positive identification of the perpetrators. Cameras to be activated by operators were installed on SCRTD Grumman buses operating in high-crime areas. But the project became short-lived when the Grumman buses were found to be structurally defective and had to be taken out of service midway through the project. Based on a short period of use, the results of using cameras on buses were not conclusive. There was less vandalism reported on the test buses, but the incidence of other minor crimes increased. Additional details on the AVM and camera-on-bus projects can be found in Section 4.

While additional security devices are being tested, problems have been encountered with the newly designed buses. The buses' dark tinted windows have been widely criticized by law enforcement officials as well as passengers. When police officers respond to a daytime emergency, they cannot see what is occurring in the bus and have difficulty assessing the situation. In addition, the windows, which are easily opened from the inside, allow offenders to escape and avoid apprehension.

The use of specialized equipment is not the only measure taken to improve passenger security. The SCRTD community relations department also promotes citizen involvement in combating crime. These projects help educate the community about the transit security measures that

SCRTD employs and often affect the public's perception of transit security.

One community program to combat vandalism through a public relations and youth education campaign, called "Operation Teamwork," used Los Angeles Rams football players to popularize responsible transit behavior. Because of a lack of funds, the program was suspended in 1979. However, in response to requests by community leaders and a needs assessment which indicated that an SCRTD outreach to the community was necessary, Operation Teamwork was revived in 1981. In June 1981, two full-time positions and one internship were added to the SCRTD community relations staff. "Operation Teamwork" made twenty-two presentations to community groups in high-crime areas during October 1981. The program currently includes the following activities:

- Community outreach and publications such as "Crime Prevention Tips and "How To Ride A Bus".
- Youth education: poster and essay contest, peer tutoring and counseling, and youth employment.
- Education: literature and curriculum development.
- Victim and witness assistance for those testifying in court cases.

Another community-oriented program was financed by a grant in 1980 to an organization called Project HEAVY (Human Efforts Aimed at Vitalizing Youth). This group operated an extensive public outreach program and promoted the use of its help-line to report transit crime incidents. A decision to renew their grant is pending review of the final report.

2.2.5 Los Angeles and the Southern California Rapid Transit District

Created by the California legislature in 1964, the Southern California Rapid Transit District was given two mandates: to develop a rapid transit system for Los Angeles County, and to operate and improve the existing bus system. Design of the heavy-rail system is almost complete, but construction has not yet begun. As the major provider of

the Los Angeles-Long Beach area's public transportation, SCRTD serves both the city and county of Los Angeles and seventy-seven separate municipalities. There are twenty-one other private and public transit agencies serving smaller communities in the metropolitan area, but more than half of these transit systems have fewer than twenty-five buses. As the largest all-bus transit systems in the United States, SCRTD has a total fleet of 2,913 buses, carrying 398 million passengers a year.

SCRTD serves the second largest American metropolitan area, a population of 7,445,000. Unlike many large urban areas with a shrinking inner city and a growing suburban population, the growth of the city of Los Angeles has kept pace with that of the surrounding metropolitan area. Between 1970 and 1980, the population of the city grew by 9.1 percent and the entire area by 5.8 percent. Although Los Angeles is well known as an auto-oriented city, SCRTD transports an increasing number of passengers. A recent report showed that 45 percent of all persons entering the downtown area during the morning rush hour did so by bus. Between 1978 and 1980, bus ridership to the downtown area has increased by 18 percent.(8)

The increase in transit crime which eventually led to the development of an SCRTD police force is presented in Table 2-1. These transit crime statistics were informally compiled from operator incident reports prior to the institution of the transit police. As indicated in the table, the number of reported incidents involving operators is much greater than those involving passengers. This may be a reporting bias caused by the lack of incentives for operators to report passenger crime and their limited awareness of passenger crime, as noted in Section 1. Nevertheless, the trends in the number of crimes against both passengers and operators increased significantly between 1970 and 1978.

To better understand transit crime patterns and develop the information necessary to assign personnel to bus routes and areas of the city, the transit police have developed a more detailed and descriptive set of crime categories, and they collect more data than previously. Summaries of transit crime data are now compiled from reports of incidents that transit police have responded to. Data on incidents reported directly to the city and county police departments are not

currently collected, but procedures are being implemented to allow the transit police to include these incidents in their future crime summaries. Although the transit police force is not yet fully staffed, reductions in the number of thefts and robberies against operators and passengers indicate some progress in improved SCRTD security. Table 2-2 includes the numbers of incidents reported by the transit police between 1979 and 1981. That ridership increased by 10 percent during this period suggests that the exposure of passengers to criminal offenses decreased as a result of SCRTD transit police work.

The crime rate in the Los Angeles metropolitan area was relatively stable between 1974 and 1978 prior to a sharp upswing in the period 1978 to 1980, as noted in Figure 2-5. Between 1977 and 1980, the total number of crimes reported increased by 25 percent, and violent crime increased by 39 percent. The city of Los Angeles has had a higher overall crime rate than the metropolitan area, but the trends in the number of crimes per capita have been similar.

TABLE 2-1. OPERATOR-REPORTED TRANSIT CRIME, 1970-1978

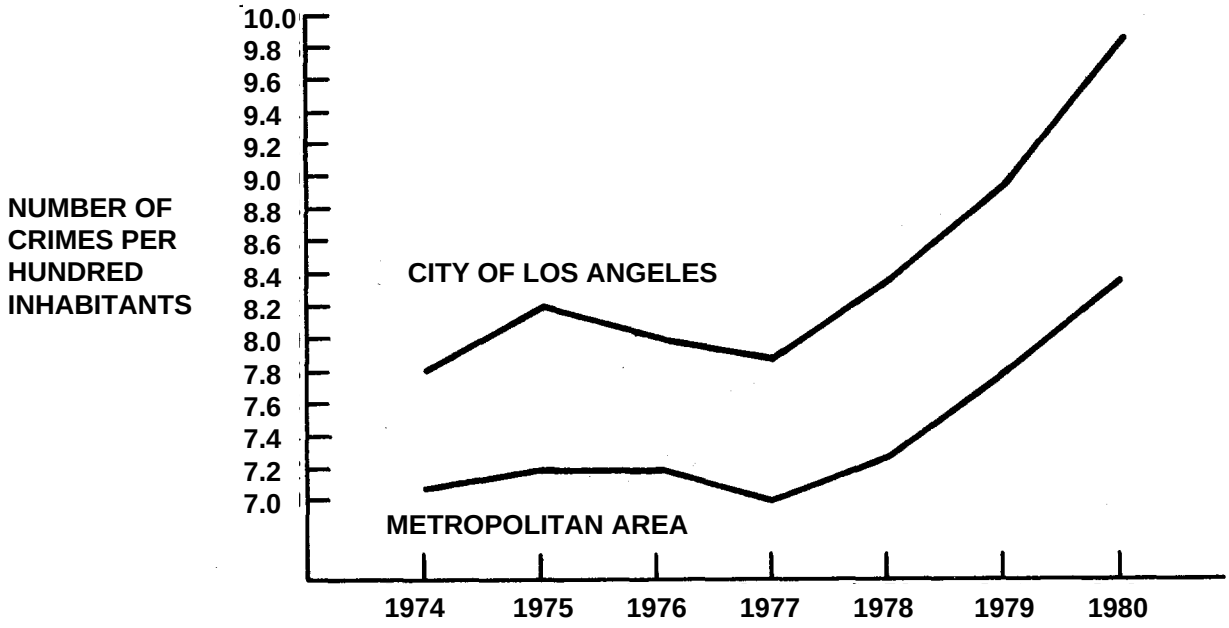
	1970	1971	1972	1973	1974	1975	1976	1977	1978
OPERATORS									
Homicides									
Robberies	2	7	9	10	4	7	15	18	17
ADWs									
Assaults	40	48	86	114	93	106	122	176	195
Thefts		103	160	182	142	264	194	238	212
PASSENGERS									
Homicides									
Robberies	6		18	32	52	38	45	52	59
Strong-Arm Robberies	3		42	56	32	26	19	64	85
ADW									
Assults			62	66	113	87	55	75	100
Thefts by Pickpocket									
OTHER									
Bus Hijacks			2		2	3	3	6	2
Bus Thefts									
Stage Coach Robberies									
	51	158	379	460	438	531	453	629	670

Source: SCRTD Transit Police Department.

TABLE 2-2. SCRTD TRANSIT POLICE-REPORTED OFFENSES

	1979	1980	1981
OPERATORS			
Homicides	0	0	0
Rapes	0	0	2
Robberies	32	47	29
Assaults	206	225	206
Thefts	194	105	19
PASSENGERS			
Homicides	1	2	2
Rapes	NA	NA	2
Robberies	103	174	113
Assaults	126	130	132
Thefts	NA	NA	129
RIDERSHIP	345,000,000	--	397,000,000

Source: SCRTD Transit Police Department.



Source: Reference 4.

FIGURE 2-5. NUMBER OF CRIMES PER HUNDRED INHABITANTS IN LOS ANGELES AND THE SURROUNDING SMSA

2.3 SEATTLE

Seattle Metro instituted two security measures which focused primarily on prevention of operator assaults. The high number of operator assaults is partially attributable to Seattle's fare collection system. Under this system passengers may ride any bus within the Seattle Central Business District (CBD) without paying a fare. When a passenger boards the bus in the free zone and disembarks outside the zone, he or she must pay the appropriate fare. A passenger picked up outside the fare-free zone pays or is refused access, but the disembarking passenger has already received the desired transportation service. In such cases, the operator is at a disadvantage after delivering the passenger to his destination. When the operator tries to enforce fare payment, some passengers use abusive language and refuse to pay. These scenarios can lead to physical confrontations. In 1978 a rash of operator assaults caused the union to begin pressing for improved operator security. To provide safer working conditions, Metro took two steps: it provided undercover police protection on buses in high-crime areas, and it instituted a stress training program to teach operators to handle fare disputes and improve passenger relations.

2.3.1 Seattle's Comprehensive Security Plans

In early 1980, Mr. Charles Cox, supervisor of Metro Operations Control, and Mr. David Johnston, president of the transit union, developed a joint plan for improving transit security on Seattle Metro's buses. Their recommendations were formulated without regard to cost and funding considerations but were, in their judgment, the most effective measures that could be taken to improve security. Recommendations for the short term included the following:

1. Redesign non-payment of fare procedures.

   It is recommended that transit operators be instructed to limit requests for payment of fare to one time only. Experience has shown that continual requests may lead to a potential assault situation. Use of the present non payment of fare coupon (i.e., requesting the name and address of the offender) may also lead to a potential assault situation. It is recommended that the following procedures be enacted:

-(Operators) request payment of fare once, and one time only.

-(Operators) indicate the non-payment of fare by dropping a simplified coupon into the fare box.

-(Supervisors) inform transit operators that fare collection, while remaining an important part of transit operations, should not lead to a potential assault situation.

2. Continue to utilize off-duty, plain-clothes Seattle police officers as Metro Transit's security force.

   It is recommended that a more sophisticated assignment process be enacted, so that more individual trips are covered by the S.P.D. officers.

3. Proceed with a test of a transit operator-actuated emergency signalling system to indicate the actual or potential threat of bodily harm to a transit operator or passenger. (Flashing marker lights).

4. Pursue changes in the criminal code at the state level.

   It is recommended that the possibility of reclassifying criminal activities perpetrated against transit operators as felonies be investigated.

5. Continue the present stress management and human relations training for transit operators.

6. Pursue Joint labor-management use of positive media exposure.

7. Increase emphasis on the completion of Incident Forms (0674).

   It is vitally necessary that all transit operators complete an incident form whenever a situation, how ever insignificant, has occurred. The information gathered from the incident reports is used to pin point problem areas, which then leads to the assignment of security officers or S.P.D. patrol officers to that particular area and/or route and run.

8. Involve Metro Transit's Marketing Division

   The present "NO SMOKING" sign is adequate for that purpose, but other signage should be developed to indicate that eating or drinking, playing radios and tape decks, littering and abusive language and/or behavior is strictly forbidden.

9. Involve law enforcement agencies throughout King County.

It is recommended that all law enforcement agencies in King County be apprised of the Assault Prevention Program.

10. Develop a new "duress" code.

It is recommended that a new "duress code" be established, and that the present "emergency" and "911" codes for operators be modified.

(Excerpted from Reference 9.)

Action has been taken on many of these recommendations. The change in the non-payment of fare procedures, while not fully accepted by the operators, is meant to prevent passenger-operator confrontations. The existing undercover police operation and the stress management programs were modified in accordance with the joint recommendations as indicated below, in Sections 2.3.2 and 2.3.3.

In addition to the actions that could be taken immediately, the report recommended five additional steps which might take longer to implement:

1. Radio system

It is recommended that a new state-of-the-art radio system be installed, including

-a "coach identifier" system which would automatically indicate what coach has called in;

-an "emergency eavesdrop" capability, which, during a "10-99" emergency, would allow the coordinator to overhear what was transpiring on board the coach; and - an added "silent alarm" feature.

(Metro Transit should also investigate the feasibility of a direct land line to the dispatcher at the King County Department of Public Safety.)

2. Political realm

It.is recommended that the municipality enact its own ordinances prohibiting

- smoking on board coaches,
- eating and/or drinking on board coaches, and
- littering on board coaches.

3. Establishing a permanent law enforcement security force

It is recommended that Metro and Division #587 actively pursue the establishment of a jointly -funded city or county police detachment, some what similar to the Detroit Police Department's "Bluebird" program.

4. Judicial liaison

It is recommended that Metro request that a single county prosecutor be assigned to deal with cases involving assaults against transit operators and/or passengers (similar to Metro's current arrangement with the Seattle city court system).

5. Staffing requirements

It is recommended that Metro assign a permanent liaison person (or persons) to coordinate reports and follow-up procedures with operators involved in an assault. The individual(s) would also isolate and identify areas where the plain clothes security force would patrol.

(Excerpted from Reference 9.)

2.3.2 Seattle's Undercover Police Operations

To bring the high incidence of operator assaults under control, Metro management met with members of the Seattle Police Department. These consultations resulted in the institution of undercover police operations (UPO) staffed by off-duty Seattle police officers. The project had the support of the police chief and the police guild. The UPO is supervised by a Seattle police sergeant who is responsible for administering the operation after his regular shift, about four hours, five days a week. He contacts the officers, makes the schedules and assignments, and does the payroll. The usual undercover assignments are between 8 p.m. and 1 a.m., after the officer's regular shifts. Occasionally, there are afternoon and Saturday assignments.

When the undercover operation began in August 1978, individual officers were assigned to ride a designated bus for the entire evening.

This method of assignment did not seem particularly effective to transit management, and operator assaults continued to be a problem. As a result of the joint union-management recommendations in 1980, Metro instituted a new procedure for undercover assignments. Under the original system, an officer was assigned to ride a particular bus for the duration of his evening shift, which meant he would not be on active duty during layovers. Consequently, the number of bus trips covered was very small. Now the officer is assigned to a particular line and at the end of each run, he takes the next bus out rather than laying over and waiting for the bus he arrived on.

To improve the effectiveness of UPO, efforts were made to identify the lines with the biggest crime problems and to increase coverage of those lines. For security reasons, only the sergeant who makes the weekly assignments knows how many officers will be working on any particular night, and this information is kept confidential. Metro management is concerned that if the actual number of officers and assignments were made public, it would be a challenge to the criminals to take advantage of the areas not patrolled. During most two-week periods, there are an average of 14 to 23 officers on duty at various times and they may ride from 90 to 250 units in that period. Like the Bluebird Operation in Detroit, the purpose of Seattle's UPO is to maximize the impact of a small number of officers.

Operator incident reports are Seattle's primary source of information on transit crime. Although it is in the operators' self interest to fill them out at the end of each shift, they do not always take the time to do so. With the new reporting procedures recently instituted, Metro management and the union have tried to stress the importance of completing these forms so that the undercover operations will have accurate transit crime information. According to Mr. Johnston, president of the local transit union, only 10 percent of the incidents had been reported previously, a percentage that was now probably 30 to 35 percent.

Off-duty officers in street clothes are usually assigned singly to buses, although they may operate in pairs on weekend nights or when a major problem is noted on a particular line. The officers must use

their own revolvers and their police equipment consists of only handcuffs and a citation book. They have no radios and must rely on the bus operator's communication equipment. If an officer needs assistance, the operator calls the operations center, which has a direct line to the Seattle Police Department. Response time is reputedly very short in these cases, but radios for the officers are being considered.

When city ordinances such as the prohibitions against public consumption of alcohol or against causing public disturbances are violated, the undercover officer will usually identify himself and inform the passenger of the violation. If the offender stops the prohibited activity, no further action is taken, but if the offender continues, he or she may be put off the bus or, in extreme cases, arrested. A warning from the officer is usually sufficient, particularly in fare disputes. If an officer identifies himself to a passenger who has refused to pay the fare, the passenger will usually deposit the money. Although the officer's identity is then known to the other passengers he continues to ride on the same bus. There is no attempt to conceal the officer's identity because the focus of the program is to prevent crime rather than increase the number of offenders apprehended. The officer's presence is considered a means to that end whether or not his identity is known.

The lack of enforceable ordinances governing public behavior on transit vehicles limits the UPO officer's authority. When Seattle recently reviewed its ordinances, most of those relating to behavior on transit vehicles were repealed. Only two of these city ordinances remain: no spitting and no gambling on transit vehicles. The remaining applicable ordinances for offenses not specifically related to transit, such as possession of narcotics, public consumption of alcohol or failure to pay for services rendered are not considered comprehensive enough to cover the problems such as loud radios and eating on buses. Metro does have rules governing behavior on vehicles, but it does not have the power to enforce them. To reinforce its security operations, Metro is presenting a set of transit-related ordinances to the city council which hopes to have these enacted. There is also a move to have state laws enacted for all transit systems in the state of Washington.

The UPO officers' authority is also limited because, as city police officers, they cannot make arrests when the bus is outside the city limits in the King County sheriff's jurisdiction. If a serious offense occurs in the county, the officer may only make a citizen's arrest and hold the person for official arrest by the local police. However, under the state laws currently being considered, the officers would be authorized to take action in the county.

Publicity about the undercover operations is limited to posters in the buses with the message that there are undercover officers on Metro buses for the protection of passengers. Metro policy is to avoid issuing a challenge to offenders who might make a concentrated effort to find out just how many officers are working at any particular time and exploit their knowledge of the areas and times where protection is limited. Since personal security is not a big issue among passengers and the buses to most areas are relatively free from crime, Metro does not want to alarm the passengers by publizing transit security problems. Metro does not encourage media coverage of the UPO.

2.3.3 Development of the Stress Management Program

When operator assaults became a major problem in 1978, Metro already had a human relations training course for operators to improve operator-passenger relations. The stress management program was developed from this program as a means of preventing operator assaults. The program was designed to train operators in professional behavior and to teach them to avoid confrontations that could lead to assaults.

Two former bus operators who suggested effective changes in the earlier human relations program assist in the instruction and conduct of classes. The use of former operators as instructors has helped to overcome many of the operators' initial skepticism about the value of stress management. Because these instructors have experienced the on-the-job frustrations which may lead to confrontations between operator and passenger, they effectively relate stress management practices to specific every-day situations. The program consists of two classes, lasting two hours each, which are scheduled a week apart.

The two principal objectives of the stress management program are (1) to provide the operators with conflict avoidance and human relations training to improve their skills in dealing with the public and 2) to teach them methods of coping with stress build-up on the job. By encouraging the operators to act in a professional manner, the instructors hope to discourage drivers from provoking assaults. The curriculum emphasizes avoidance of confrontation in those circumstances over which the driver has some control. However, some drivers find ignoring or not responding to insults demeaning or "unmanly". If an operator is insulted by a passenger, he or she may feel quite justified in responding in a way that might provoke a physical assault by the passenger. One of the instructors, who, as an operator, had been involved in several assaults, strongly supported the contention that these assaults could have been avoided and that he was responsible for encouraging them. However, there is no consensus among operators that avoidance of confrontation is always appropriate. The stress management program also teaches operators to identify aberrant behavior in passengers and ways to deal with passengers who may be looking for a fight.

The curriculum trains the operators to avoid confrontations over non-payment of fares. Operators are instructed that their responsibility is to inform passengers that it is company policy that they are to pay a fare, but it is not the operators' responsibility to enforce this policy. Some operators, feeling that all passengers should be required to pay their fares, do not like this procedure and want to enforce fare payment policy. There is a strong sense among operators that, while they are working, the bus is their domain; to some of the operators, going along with refusal of fare payment is demoralizing. The union supports a policy providing the operator with the option of enforcing fare payment and does not approve of penalizing the operators for attempting to enforce payment. However, some operators prefer to avoid the possibility of assault by not taking responsibility for enforcement.

To cope with stress that arises on and off the job and to alleviate the tension which may cause an operator to provoke a physical confrontation, the operators are taught to identify common symptoms of stress and alternative methods of reducing it. According to the curriculum, the value of stress management is its contribution to better personal health by controlling stress and, thereby, making the job less onerous. To deal with stress, the course teaches relaxation exercises and the recognition of alternative responses to a stressful situation: that is, (1) act to change the situation, (2) accept the situation and learn to cope with it, or (3) gripe and let yourself be hassled by the situation. The last option is not considered stress management.

Although the stress management program is required for all operators, some resist participation. The union is somewhat concerned about the program's use to deter assaults since this was not the original purpose of the human relations program. The behavior modification approach is not well accepted by operators who are satisfied with their current behavior patterns. Over 2,000 bus drivers have taken the course, but because of staff turnover, there are operators who have not yet taken it.

2.3.4 Other Measures to Improve Transit Security

Transit offenses are handled in one of two courts, the Seattle City Court or the King County Municipal Court. Metro supports strict enforcement of the applicable laws and prosecution of transit crime to support their undercover police operation. To ensure prosecution of transit crime, when an arrest is made in any transit-related offense, the city or the county becomes the plaintiff. The operator assaulted or involved in an incident does not file charges but testifies as a witness in the trial. Metro has asked the courts for consistent and full prosecution of transit crime and has argued that, though the violations may seem minor upon occasion, they represent real problems to passengers and operators on transit vehicles. Both the city and county courts have cooperated by designating one prosecutor to handle all transit -related offenses. When one prosecutor is assigned responsibility for all transit-related crimes, these cases receive more consistent treatment

than they would otherwise and the prosecutor develops expertise in this area. Cooperation by the courts has resulted in more convictions and stricter treatment of offenders with records of multiple transit offenses. Strict enforcement and prosecution seem to increase the effectiveness of policing the transit system.

In May 1981, Seattle Metro began a school program to teach children in grades K through 6 about bus-riding manners and safety. Although vandalism and crime do not receive special emphasis, they are included in the curriculum. Metro plans to develop additional presentations that will address transit crime problems.

2.3.5 Union Response to Measures to Improve Operator Security

According to Mr. David Johnston, president of Amalgamated Transit Union No. 587, in spite of improved security measures, operators still perceive their working conditions as unsafe. He estimated that only 10 percent of the operator assaults were reported prior to the 1980 development of a comprehensive security program, but that, with management's increased attention to operator protection and the institution of new reporting forms, the percentage of assaults reported has probably increased to 30 or 35 percent.

The union's response to the undercover police operations has been favorable. It supports the concept of increased policing of the transit system by the Seattle Police Department but does not support the institution of a specialized transit police force.

The union's response to the stress management program as a means of preventing assaults was less enthusiastic. The purpose of the original human relations program was to help operators cope with job stress, which they attributed more to management practices than to passenger assaults. The operators' personalities are suited to independent work without direct job supervision, and some resent management's attempt via the stress management program to control their actions in situations like non-payment of fares. It has been suggested that, when the absence of a police officer hinders the enforcement of fare payment, the operator should have the option to enforce fare payment and should not be penalized for doing so. Mr. Johnston suggested an honor fare system

in which passengers, having purchased tickets from vending machines, would be required to hold their tickets while riding. Passengers would be required to show their tickets in random inspections by non-operator security personnel and would be subject to fines if caught riding without a ticket. This system would remove all fare-collection responsibilities from the operators.

The union has also identified a problem of lesser magnitude, but one which it would like remedied: unruly students on school trips. Metro provides school transportation, and the school district is supposed to provide monitors, but often fails to do so. Because operators are not permitted to evict unruly students, it is difficult for operators to maintain order.

2.3.6 Seattle and Its Transit System

The Seattle Metro transit system provides transportation service over a 2,000 square mile area to a population of 1,250,000. Most of its operations are within the Seattle city limits, with some routes feeding in from surrounding King County. It has 1,102 buses in its fleet, a monorail, and a small trolley system. Unlike many metropolitan transit systems, Metro has increased its ridership and service over the last four years, (See Table 2-3.) Use of Metro to commute to the downtown area is encouraged by limiting the number of available parking spaces in new buildings. The rates charged for these few spaces are quite high. Seattle attracted national attention in 1973 when it began its free-fare zone in the downtown area. The free-fare policy has been continued and other special service programs were initiated in 1979. One was a subscription service for bus transportation to areas other than downtown, and the other was a contract with Seattle Public Schools to provide transportation for school children. The Seattle park-and-ride facilities have proved popular, with over 7,000 automobiles using 71 percent of the parking capacity in October 1981, an increase of 7 percent since October 1980.

Between 1969 and 1977, the city was economically depressed with high unemployment, especially in the aircraft industry. Although

TABLE 2-3. METRO TRANSIT ANNUAL OPERATING STATISTICS

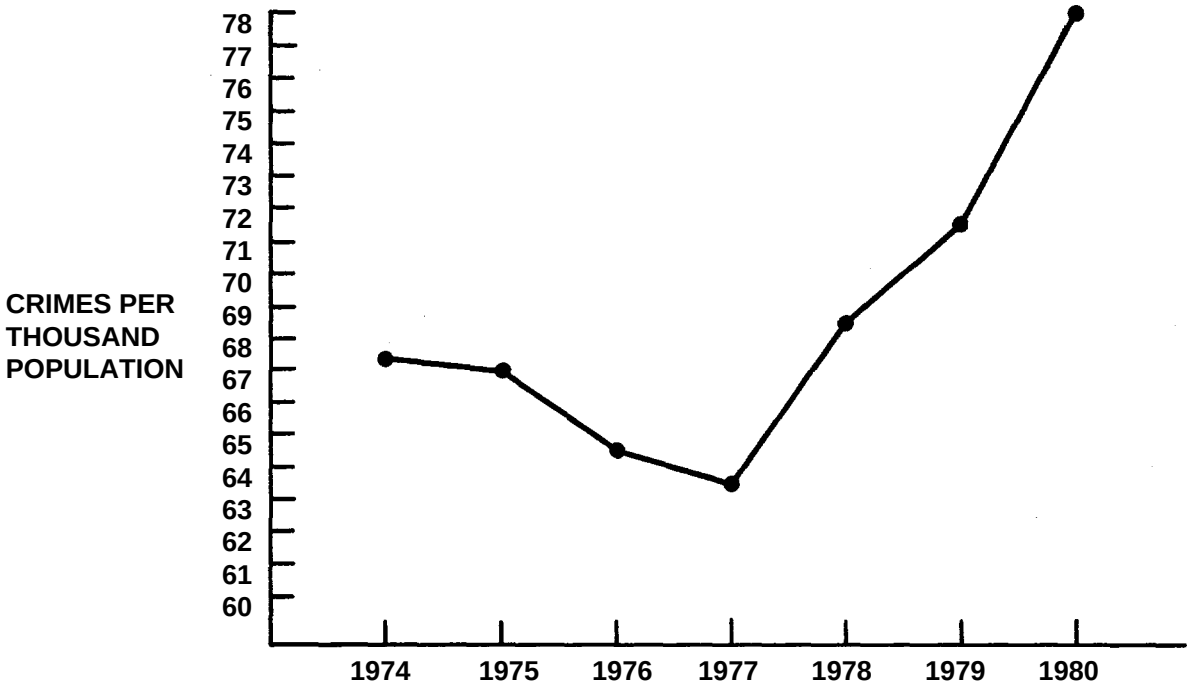
Year	Total Revenue Passengers	Total Revenue Vehicle Hours	Total Revenue Vehicle Miles
1978	49,460,654	1,019,461	25,573,365
1979	58,259,153	2,019,461	27,619,419
1980	66,071,730	2,269,442	31,691,419
1980YTD(Oct)	55,558,565	1,876,494	26,203,339
198lYTD(Oct)	55,083,393	2,023,808	28,613,391

Source: Seattle Metro Transit System, "Monthly Management Report," Seattle, Washington, October 1981.

economic conditions improved over the next three years, the total crime rate per capita increased by 23 percent in the Seattle metropolitan area between 1977 and 1980. (See Figure 2-6.) The principal target of Metro's security measures is operator assaults, and in this same period Part I crime which victimized operators declined by 79 percent.*(5) for the period 1979 to 1980, as illustrated in Figure 2-7, there is no definitive trend in the total number of operator assaults. The number of assaults per month fluctuated widely. A majority of them were classified as preventable by management although no breakdown by seriousness of the assault was available. Even though operator assaults did not decrease significantly during this time, the number of vehicle hours operated increased by 12 percent between 1979 and 1980, with another 8 percent increase in the first ten months of 1981. The increased operating time might have been accompanied by increased assaults if Metro had not instituted its security measures.

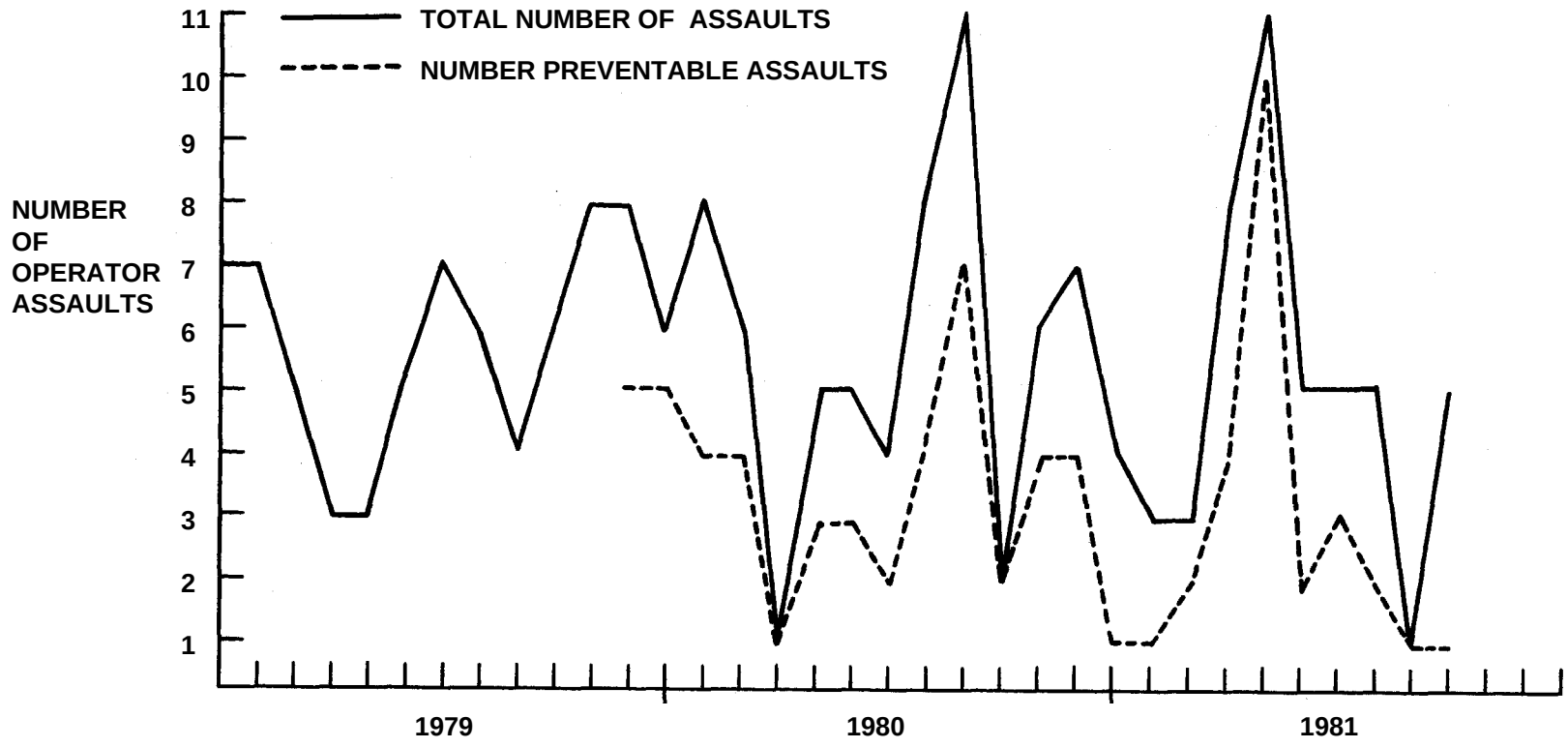
Data on transit crime broken down by victim (operator or passenger) was not available. Data on the number of arrests and activities of the undercover police operations were available by pay period for 1981, but since the number of reported incidents is dependent on the number of officers on duty at anytime and .that number is not available, it would be misleading to only look at these police statistics. Moreover accurate conclusions cannot be drawn from such a short time period.

*According to Metro officials these offenses only involved operators,



Source: Reference 4.

FIGURE 2-6. NUMBER OF CRIMES PER MILLION INHABITANTS IN SEATTLE AND THE SURROUNDING SMSA



Source: Internal Seattle Metro Memos, January 1979 to October 1981.

FIGURE 2-7. RECORD OF MONTHLY OPERATOR ASSAULTS

2.4 PITTSBURGH

The Port Authority of Allegheny County (PAT Transit) system in Pittsburgh has had a security force since 1970. But until 1979 it consisted of only two or three officers with limited police powers. The Railroad Act of 1901 authorized the Pittsburgh Railways to employ detectives to provide security on the trains. When PAT took over operation of the local Pittsburgh transit systems, it acquired, by extension from the Railroad Act, some authority to police the transit system. This was the sole legislative basis for PAT's transit policing activities until 1979 when PAT security officers were deputized and given full police powers. Since then, PAT has developed a larger, more active transit police force whose activities include prevention of employee theft as well as providing a secure transit environment.

2.4.1 Development of the PAT Police Force

In response to a growing crime problem, particularly with juveniles on school trips, PAT established a security force division in 1970 under the Railroad Act of 1901. Its responsibilities were twofold: to police PAT Transit Systems and to provide security for PAT operators and passengers. The original force was composed of two detectives working directly for PAT with assistance from the County Sheriff's Department. Under a contract for services agreement, seven county sheriffs worked with the PAT security force. The county sheriffs had full police powers as sworn law enforcement officers, but the PAT officers had only limited police authority. The Railroad Act only authorized the security officers to use their police powers in and around rail vehicles. As part of a move to upgrade the PAT security force, an additional officer, Richard Ehland, was hired in 1978. When the previous chief resigned in 1979, Mr. Ehland became chief of the department and continued the process of building a police force rather than a security force.

The first step in developing the PAT police force was an arrangement with the County Sheriff's Department to swear in the PAT police officers as deputy sheriffs. The PAT officers then had full

police powers of arrest and law enforcement, 24 hours a day, anywhere in the county. To ensure a high quality police force that could command the respect of the local law enforcement agencies, PAT officers must graduate from the Allegheny Municipal Police Academy and meet the local police hiring requirements. Currently the PAT force is composed of six officers, five with previous police and security experience and one former PAT operator who attended the Police Academy to qualify for the force. The PAT police force is still supplemented by the services of seven county sheriffs who are accountable to Chief Ehland. He determines their assignments and has the right to dismiss them from PAT service.

2.4.2 PAT Police Operations

As sworn county law enforcement officers, the PAT officers and the county sheriffs are empowered to enforce all laws in all county jurisdictions. These powers are broader than those of the city police, which are limited to their municipal jurisdiction. County-wide authority is important since PAT serves all of Allegheny County and a few routes extend into Westmoreland and Washington counties. This service area encompasses a total of 132 municipalities, many with their own police forces. PAT police reported that jurisdictional problems are minor. Although the PAT officers' and the county sheriffs' police powers are comparable, their responsibilities and daily activities are quite different. The sheriffs' responsibilities are limited to the area of operator and passenger security, while PAT officers also handle employee theft.

The county sheriffs operate as conventional law enforcement officers, in uniform and with marked sheriff's cars. They are assigned to areas where passenger and operator safety may be threatened and they respond to emergency calls by operators. A specific duty of the sheriff's patrol is the monitoring of school-trippers, the PAT buses used to transport children to and from school. Some school-trippers regularly have problems with vandalism and rowdiness on the buses and at

bus stops. The sheriffs are assigned to these routes and trail the school bus until the children are let off at school. The operator can call for immediate assistance if the situation gets beyond his control.

The sheriffs, who are instructed to work with the juveniles and to develop some rapport with them, try to convince the troublemakers that it is in their own self-interest to behave. The purpose of the program is to educate the students and to discourage vandalism, not to make arrests.

The sheriffs monitor both morning and afternoon school-trippers in areas where gangs or juvenile crime is prevalent. Since this program was implemented, the problem areas have shifted and the sheriffs' assignments have been modified to cover areas with emerging juvenile crime. After morning school duty, the sheriffs patrol areas where transit-related crimes have been committed or investigate passenger complaints. They are always available if an operator calls in an emergency.

In contrast to the uniformed sheriff's patrol, the PAT officers work in plain clothes and drive unmarked cars. They rarely monitor the school-trippers and spend most of their time on other transit crime and employee theft. Each officer is assigned an unmarked car with a police radio because they are on call 24 hours a day, but they have no walkie-talkies. Consequently they cannot call for assistance when on a transit vehicle or on the street. The PAT officers usually work alone and undercover on assignments such as observation of operator fare theft, interruption of pickpocket operations, or verification of pass counterfeiting and sales. All transit crime cases are documented for prosecution, and more than half of those arrested for transit-related assault and robbery have been convicted. A policy of full investigation and prosecution also applies to employee crime. Employees are not allowed to resign to avoid prosecution, and often the union does not provide legal representation because, when an employee is prosecuted the evidence is usually incontrovertible. The PAT police force resources are often used in the prosecution of operators because the losses to theft may be as high as $300 a day.

Both the sheriffs and the PAT officers make arrests on the street if they observe a crime being committed, and they assist local police officers when called on. On transit vehicles, citations may be issued for disorderly conduct, public intoxication, and the like. If an operator needs police assistance, he or she calls the dispatcher, who immediately notifies the PAT police force, the County Sheriff's Department, and the Pittsburgh Police Department. All PAT officers and sheriffs assigned to PAT are usually in the field rather than the office, and they respond to these calls along with the local law enforcement officers. The first officer on the scene makes the arrest and takes the suspect to the nearest police station. Subsequent investigations are the responsibility of the arresting officer.

To let the passengers and operators know that there is a PAT police force responsible for security on the transit system, attention is given to every complaint. There are posters on the transit vehicles and at bus stops advertising rewards for information in cases of assault and other crimes, and anonymous tips have proved valuable in cases of operator theft as well as other transit crime. If an operator or passenger files a complaint or incident report about a particular area or person, PAT officers ride undercover or tail the bus in order to be available for an immediate response. The complainant is usually informed when the police will be present and is encouraged to call again if the situation does not improve. By being responsive to community and operator concerns about security, the PAT police promote better relations with these groups.

Officer assignments are based on the crime reported in the operator and dispatcher reports. The dispatchers keep a log of all emergency calls, and operators are expected to fill out incident reports. As an incentive for operators to provide a detailedand accurate report, they are paid a wage equivalent of thirty minutes for each report. However, this incentive may not be adequate for operators who find reports difficult to write.

2.4.3 Other Security Measures and Equipment

PAT transit vehicles are equipped with two-way radios but have no additional security equipment like silent alarms or flashing emergency lights. Although transit crime is not presently considered serious, PAT is concerned that the building of the planned subway may present more security problems.

In response to operator's demands for added protection during the mid-seventies, when assaults on operators increased, PAT installed plastic shields around the operator's seat on some buses. The heavy bullet-proof plastic completely enclosed the operator in a plastic cage with a small opening for the operator to hand back transfers. At this time the buses were not equipped with two-way radios, and some operators strongly supported this security measure as a means of keeping passengers at a distance. However, many operators did not like the shields because they felt penned in and uncomfortable in the small space. Passenger contact is important to many drivers and the shields made the job impersonal. Problems with glare and bad side visibility were also reported. The doors were removed from some of the shields by dissatisfied operators, and the units were eventually taken out of service. The installation of two-way radios obviated the need for shields, according to some operators.

As another means of promoting transit security, PAT takes a transit education program to the schools. The curriculum includes discussion of the cost of repairing vandalism and community responsibility for the public transit system. One purpose of the program is to deter juvenile vandalism through education. Although developed for eighth-grade school children, the program has been adapted for other ages. When schools request the program, a bus equipped with a slide projector is taken to the school and classes are held on the bus. Because not all of the schools have yet had the program, requests for repeat visits are discouraged by the transit education program supervisor.

2.4.4 Operator Response to Transit Security

In discussions with base superintendents and operators, various opinions were aired on transit security and the effectiveness of

measures taken to improve security, especially for operators. According to those interviewed, working conditions had improved and there was less talk in the "bull pen" of assaults and robberies. Operators like the exact-fare system, which has discouraged operator robbery. Collection of fares still can present problems, but the operator is only expected to make an honest attempt to collect the fare, not to jeopardize his or her life. Some operators make a greater effort to collect fares than others. Not all operators have problems with passenger assaults, and those interviewed agreed that some operators may provoke incidents. However, they claimed that many incidents are entirely unprovoked. Juveniles and young adults were identified as the source of most of the vandalism and many operator assaults. No one thought personal security was a major problem. As noted above, operator response to the plastic shields varied, but was generally negative.

According to those interviewed, the PAT police responded promptly to complaints. Some operators would like more PAT police assistance, and some suggested that a uniformed officer be present on every bus or at least on all the night runs. The presence of an officer on the vehicle was perceived as more helpful than a sheriff's escorting of the school-trippers.

2.4.5 The PAT System

PAT operates a variety of vehicles including buses, light rail trolleys, trains, and two funiculars. In 1980, 107 million passengers were carried. The modal distribution of passengers is presented in Table 2-4. Ridership in 1981 was down by five percent, and to provide more reliable service and promote ridership, PAT has built one bus-way, a separate roadway reserved for transit vehicles only, and construction is in progress on another one. The light-rail system and PATrain systems are also being expanded.

Table 2-4. PASSENGERS CARRIED (1980)

Bus	99,272,475
Light Rail	6,307,427
PATrain	352,257
Mon & Duquesne Inclines (funiculars)	1,267,543
Charters	266,689
TOTAL	107,466,391

Source: Port Authority Transit System. "Transit Operations: 1980 Statistics," Pittsburgh, Pennsylvania, 1980.

The PAT system operations are concentrated in Allegheny County and in the city of Pittsburgh, During the seventies, the population of Allegheny County dropped by 9.7 percent and the inner city began to deteriorate. A recent increase in office construction and the building of a convention center is reversing the deterioration, and PAT expects to provide transportation to 30,000 of the new employees who will occupy new office space in the downtown area. Transit crime is not considered a major deterrent to potential passengers nor is it expected to affect the anticipated increase in riders.

The reported number of assaults on operators and passengers, robberies of operators and passengers, and broken windows for the years 1977 to 1980 are listed in Table 2-5. The only category of transit crime in which the number of incidents has significantly and consistently decreased is assaults on operators. Assaults on passengers have increased, but the arrest rate for assaults involving operators as well as passengers has increased in the last two years and the increased, probability of apprehension may deter future assaults.

TABLE 2-5. CRIMES COMMITTED (1978-1981)

Year	Assaults Operators No./Arrests		Assualts Passengers No./Arrests		Robberies Passengers & Operators Number	Arrests	Broken Windows Number	Arrests
1977	80	28%	21	10%	22	5$	564	1$
1978	76	30%	20	10%	16	0$	464	2$
1979	53	38%	10	40$	38	16$	622	2$
1980	51	70%	35	42%	23	4%	490	2$

Source: Port Authority of Allegheny County Interoffice Memoranda 1978-1981.

3. POLICING TRANSIT SYSTEMS

One of the most direct means of dealing with transit crime is to put officers on the vehicles so that, when an incident occurs, response time is shortened and swift apprehension helps deter potential crime. Policing of the transit system is done by local law enforcement agents in some systems and by a transit police force in others. Several types of police operations are in use, and officials vary in their opinions about publicity and other aspects of public relations. All who were interviewed recognized a need for legislation authorizing specific transit police activities. This section presents general conclusions about the different ways of organizing a transit police operation, the various operations used, public relations, and supporting legislation and prosecution.

3.1 TRANSIT POLICING ORGANIZATIONS

Each of the transit systems studied, organized its transit police differently to accommodate characteristics of its transit security problems and the area served. Here is a brief summary of their arrangements: Los Angeles has its own dedicated transit police force, currently supplemented by off-duty local law enforcement officers; Detroit contracts for police services from the Detroit Police Department; Seattle uses off-duty Seattle police officers; and Pittsburgh has a transit police force composed of officers who work directly for the transit systems and officers detailed from the sheriff's department.

A dedicated transit police force is most appropriate for deterrence of crime and apprehension of offenders when the transit system serves a number of law enforcement jurisdictions. Los Angeles' Southern California Rapid Transit District (SCRTD) is the largest all-bus transit system in the United States and serves a very large population spread out over abroad area, including 79 different jurisdictions. Under these conditions a contract for services agreement with a local police department such as LAPD would limit transit policing activities to the area within that department's jurisdiction. Pittsburgh's Port Authority

Transit (PAT) also serves numerous municipalities with their own law enforcement agencies. As sworn county sheriffs, the PAT police officers are empowered to act thoughout Allegheny County, which encompasses most of the PAT transit routes. In this case, the number of jurisdictions would not seem to affect the investigative duties of the police.

Officials in both cities indicated that full police powers were necessary for an efficient transit police force. Security guards without full police powers cannot make arrests or enforce ordinances. Although some transit crime is minor harassment of other passengers and vandalism which might be deterred by the presence of security guards, officers with more authority are needed for more serious criminal incidents. The present lack of police powers renders the security guards ineffective in many transit crime incidents so, in the opinion of most transit and police officials, officers with full police powers would be more effective.

An effective transit police force must also be well trained and be able to command the respect of their colleagues in the local law enforcement agencies. The emphasis in both SCRTD and PAT on high recruitment and training standards may be partly occasioned by the need to compensate for the "security guard" image of transit security forces. Both SCRTD and PAT require their officers to meet the same standards as the local police departments and to attend the local police academies. Their transit police forces are both headed by officers who have extensive experience with one of the local police departments and who are highly respected by their peers.

Cooperation with the local law enforcement agencies is necessary for the support of transit police operations because local agencies ensure back-up for the transit officers, encourage exchange of information, and allow joint operations. In addition, local police facilities will be used to hold those arrested by the transit police. In both Los Angeles and Pittsburgh, working contact between transit police and local police facilitates communications and improves rapport between both police forces.

Although PATs[1] and SCRTD[1]s policies on recruitment and cooperation with the local police are similar, there are some major differences

between them. First, the SCRTD force is more than four times as large as PAT's because Los Angeles is a bigger city and the crime problem is more severe. The forces' responsibilities also differ. One of PAT's major responsibilities is control of employee theft; and when a PAT officer makes an arrest, he or she is responsible for the follow-up investigation. Under the arrangements with the local Los Angeles law enforcement agencies, the SCRTD officers do not do follow-up investigations. PAT's officers work primarily in plain clothes while the county sheriffs detailed to PAT do the uniformed patrolling. SCRTD is not organized in this way and both uniformed and plain clothes operations are part of SCRTD's responsibility. SCRTD stresses its offical presence with uniformed officers and marked cars.

Although Detroit and Seattle do not have transit police forces, a dedicated unit of the Detroit Police Department patrols the D-DOT bus system, and off-duty Seattle police officers patrol some of Metro's lines. Although there are similarities between these two operations, they are staffed and operated quite differently. The D-DOT Bluebirds are a unit in the police department working full-time on transit-related crime; whereas, Seattle's undercover officers work part-time during their off-duty hours on an irregular basis. Seattle has very few Part I crimes and has identified its problems as operator harassment and fare disputes that occur on lines that run through high-crime areas. Seattle's transit security problems do not seem to justify the institution of a major, more extensive program like the Bluebirds. The dedicated police unit in Detroit, however, experiences more passenger crime and more serious crime than does Seattle's transit police.

The majority of D-DOT service is within the jurisdiction of the Detroit Police Department. However, D-DOT serves two incorporated enclaves within the city limits, and some bus routes do extend beyond the city limits. Although the Detroit Police Department's Bluebird Detail only have police authority in Detroit, these other areas served by D-DOT are relatively crime-free. Consequently, D-DOT's contract with the Detroit Police has not created a major jurisdictional dispute. When D-DOT and SEMTA merge, there may need to be a restructuring of the

policing operation because more law enforcement jurisdictions will be served by a single transit system.

Seattle Metro's lines with the greatest crime problem are in the city of Seattle, and its undercover police operations are generally kept within the city limits to avoid any jurisdictional dispute with the surrounding county.

3.2 TRANSIT POLICING OPERATIONS

Policing a transit system is done by conducting special operations, responding to operator calls, escorting buses with particular problems like those that take juveniles to school, and patrolling the vehicles. As indicated in Table 3-1, each transit system conducts these operations somewhat differently. Only Seattle does not regularly use some special operations to respond to patterns of crime that emerge in the transit system; but Seattle's crime problem is relatively minor and consists primarily of operator assaults. Special policing operations are conducted on the other three systems. Pittsburgh's PAT police include employee theft in the crimes that are targeted with special operations.

The two-way radios in the vehicles enable the operators to call for police assistance. When there is no transit police force, the local law enforcement agency responds. In Detroit's case, there is a police unit dedicated to transit security and it responds to most calls. When its officers are not available, the Crime Analysis Unit answers the call. Even when there is a transit police force as in Los Angeles and Pittsburgh, the local law enforcement agencies are notified. Usually officers from both agencies will answer operator calls for assistance. Follow-up investigation is done by PAT officers in Pittsburgh and by the local police in Los Angeles as specified by arrangements between the transit and local police.

The PAT police force has an operation specifically directed toward the buses that provide school transportation for students. The county sheriffs escort these buses in their marked cars and provide a visible deterrent to juveniles who might be inclined to vandalism and rowdiness. This practice seems to be an effective use of uniformed officers because the problem of harrassment of operators and other students as well as

TABLE 3-1. SUMMARY OF TRANSIT POLICING OPERATIONS IN CASE STUDY CITIES

Operations

Transit System	Special Operations	Response to Operator Emergency Calls	Bus Escort	Patrol of the Vehicles
D-DOT	Has some special operations. Works with Narcotics and Gang Squad.	Undercover Bluebirds respond. If they are not available Crime Analysis Unit responds.	None	Undercover 3- or 4-person teams with uniformed officer in trail car.
SCRTD	Some special operations on vehicles and at bus stops.	Local police respond and SCRTD police also if incident is not too far away.	None	Undercover but operations onspond and SCRTD not regularly. Local police ride free.
METRO	None	Local police and Metro superintendent.	None	Under during evening and one-person teams. No trail car.
PAT	Some special operations including some to combat employee theft.	Local police and PAT police.	Sheriffs escort school-trippers	Undercover, local police ride free.

vandalism are regular occurrences. Unlike the more sporadic crime on regularly scheduled buses, the location and time of the problem are known in advance. In addition, the offenses that occur are relatively minor and easily discouraged by a police presence. If the juvenile crime problem on school-trippers were more wide spread, this might not be a practical security measure, but it seems to be effective under the conditions described. This is the only regular operation of its kind used by the transit systems studied.

Transit policing operations can use uniformed or plain clothes officers, but none of the transit systems studied used uniformed officers for patrolling the vehicles. However, the Los Angeles and Pittsburgh systems encourage local law enforcement officers to commute by bus with a no-fare policy and their officers usually ride in uniform. The opinions of operators and community leaders on the use of uniformed officers to patrol buses were mixed. Some of the operators in Pittsburgh suggested that a uniformed police presence would be useful in high-risk areas at night. However, D-DOT's experience with uniformed officers was not successful and was not welcomed by the operators there. Some community leaders were also hostile to the idea of uniformed officers and doubted that their presence would be effective. In contrast to this attitude, some of the elderly people interviewed suggested that a uniformed officer would reassure them and make them feel more secure. Although some operators and passengers support the use of uniformed officers to patrol transit vehicles, the cost of implementing such an operation for the entire system would be prohibitive, and it may provoke or encourage more criminal activity when the officer is not present.

Some of the problems encountered in using uniformed officers — hostility from operators and passengers, offender's taking advantage of the absence of the officers — are obviated when plain clothes officers are deployed on buses. The four systems visited used plain clothes officers for some of their transit patrolling operations. Patrol operations by plain clothes officers allow the officers to respond immediately to offenses. The existence of a police presence which may not be easily detected by potential offenders is expected to reduce the

apparent vulnerability of operators and passengers to transit crime. The use of plain clothes officers to patrol the vehicles may deter crime by creating uncertainty in the mind of the offender about the possible presence of a police officer on the bus who cannot be identified. There is also a potential for creating an image of a larger police presence than is actually operating on a regular basis. How effectively undercover operations manipulate the public's or criminal's perception of the size of the police force on the transit system is not known.

The style of plain clothes operations varys from city to city. D-DOT's Bluebird Detail conducts routine undercover operations which have been used as a model by other systems developing their own transit policing policies. The Bluebird operations consist of two or three plain clothes officers who ride a bus and maintain radio contact with a uniformed officer in an unmarked trail car. The officers patrol those bus lines that are experiencing the most crime as reported by operators and the police. When a violation is committed, one or more of the undercover officers will follow the offender off the bus, and with the uniformed officer present, they issue a citation or make the necessary arrest. Unless needed for apprehension, at least one undercover officer continues to ride on the bus. The officers take action on the bus only when a passenger or operator is threatened with bodily harm.

Los Angeles' SCRTD and Pittsburgh's PAT use plain clothes patrols on a more limited basis than D-DOT does. The SCRTD transit police develop their undercover operations to respond to particular problems. Pittsburgh's PAT police use undercover operations to combat employee theft as well as crime against passengers and operators. In response to anonymous tips, reports by operators, and complaints by passengers, the PAT police will assign plain clothes officers to observe and document the criminal activity.

Seattle Metro's plain clothes patrols are similar to those in Detroit in that certain bus routes are regularly patrolled by plain clothes officers. However, in Seattle, officers usually ride alone rather than in teams of three or four. The goal of the Seattle plain clothes officer patrols is to discourage minor problems like fare evasion, loud radios, and smoking. Serious transit crime is not

considered a problem requiring more elaborate policing operations. When an offense is committed on the bus, the officer responds immediately to ensure fare payment or to require the offender to cease harassing or annoying other passengers. Bus patrons have supported this overt action to control transit offenses. After the situation is resolved, the officer continues to ride the bus and does not attempt to conceal his identity. Seattle's problem is less widespread than that of Detroit and seems to respond to part-time patrol on a limited number of runs.

3.3 PUBLIC AWARENESS

Publicity about transit policing operations serves two purposes: to make the public, particularly passengers, feel more secure on the transit system, and to deter transit crime by increasing offenders' awareness that they could be apprehended by police. The Bluebird undercover operation in Detroit undertook a publicity campaign when the detail was initiated to maximize the effectiveness of its relatively small force. Posters about the undercover police were displayed on the vehicles, and both newspaper articles and television news stories discussed the new operations. It was hoped that by creating uncertainty among potential offenders about the possible presence of unidentifiable police officers on the bus, the Bluebird Detail could deter crime even when no officers were actually present. Discussions with the public and media inquiries indicated a low level of awareness of the program so that it seems unlikely that the publicity can have greatly increased transit riders' sense of security. There has been no survey of offenders to determine if they were aware of the operation at the time they committed an offense and if they had learned about it through the publicity campaign.

Not all undercover police operations seek to publicize their activities. Seattle Metro discourages publicity and media attention to its undercover operations and to incidents of transit crime. Because transit crime is not considered a major problem, Metro's position is that calling attention to their police operations will unduly alarm their passengers.

Los Angeles' SCRTD and Pittsburgh's PAT expect that increased public knowledge about their police forces will increase the pubic's perception of security on the transit system. The SCRTD transit police use marked cars and uniforms to increase their visibility when responding to transit crime incidents. The PAT police have a policy of responding to all calls about transit-related crime, regardless of their source or the seriousness of the crime. For example, often the operator or passenger who reports a pattern of crime at a particular bus stop or on a particular run will be informed that an undercover officer will investigate the problem, will be given a general description of the officer, and will be told when the officer will be there. This policy of providing a strong immediate response is intended to reassure the passengers and operators about transit security.

3.4 LEGISLATION AND PROSECUTION

All four transit systems addressed the need for authority to issue citations. Detroit's Bluebirds and the PAT police are authorized to issue citations for ordinance violations, such as eating and smoking on the buses, which require the payment of fines. Los Angeles SCRTD successfully sought legislation to allow the issuance of citations for similar transit-related infractions. Effective January 1, 1982, any California transit police force can issue citations for minor incidents in all jurisdictions served by SCRTD, and transit police units will receive 85 percent of the fines collected. Citation authority provides the officers with options other than arrest of an offender who may not have committed a serious crime (i.e., a disruptive passenger). Both transit management and police officials indicated the need for discretion in the issuance of citations. It was generally felt that a citation should not be issued to a little old lady for eating an apple. Citations were envisioned as a means to control littering, smoking, and rowdiness, and to discourage offenders from more serious offenses.

Although Seattle Metro's undercover officers are not currently authorized to issue citations, Metro is seeking such authority. Metro's rules against eating, smoking, etc., on the bus are not technically

enforceable, but Seattle passengers do not usually challenge an officer who informs them that they are violating a Metro ordinance. Seattle Metro does have a special arrangement with the courts to provide effective prosecution of those responsible for transit crime. There is one prosecutor in the city court and one in the King County municipal courts who are responsible for prosecuting transit-related crimes. This system enables Metro to follow-up on transit crime cases and to ensure an operator's presence as a witness when necessary. Repeat offenders become known to the prosecutors, and Metro encourages the court to consider all transit-related crimes *as* serious incidents because of the impact on the passenger safety. The Seattle Transit Union would also like to see operator assaults automatically classified as a felony, but there is no indication that this will be done. Court cooperation can enhance the effectiveness of transit police forces because potential offenders face more serious consequences and a higher probability of conviction.

4. MECHANICAL AND ELECTRONIC SECURITY MEASURES

Policing of the transit system is not the only way to make the transit environment more secure, especially when limited manpower prevents policing of the entire system at all times. Various communication devices, cameras-on-buses, and the automatic vehicle monitoring (AVM) system are used to improve passenger and operator security. Not all of these devices were developed as security measures; the AVM was originally intended to provide accurate data on bus movements for management's use in scheduling and routing buses as well to improve the monitoring of bus operations. Furthermore, both the AVM and two-way radios continue to have important operational uses in addition to their security applications. When queried on what security measure has been most effective, transit properties throughout the country cited two-way radios as having the greatest utility.*

4.1 TWO-WAY RADIOS AND ALARM SYSTEMS

Transit operators in all major cities have two-way radios installed in their vehicles which allow them to talk with the dispatchers. In addition to being used against transit crime, this equipment is used for administrative tasks and to report traffic accidents and medical emergencies. An operator without a radio is unable to communicate with the dispatchers without leaving the vehicle, which would only be done in the most serious circumstances, such as after a crime had occurred and the offender had fled. Two-way radios provide a means for the operator to call for police or other assistance without leaving the vehicle, sometimes before an offense has actually occurred. Thus, two-way radio increase the probability that police will be called and shorten the time required for the police to respond to a criminal incident on a vehicle. Under some conditions, however, the operator may be warned

*Data collected by Ann Nolan when updating the Southeast Michigan Council of Governments' 1977 National Report on Crime and Security Measures in Public Transportation Systems, but not included in the published version, Reference 5.

against using a two-way radio. If the dispatcher fails to call the police immediately, the response time will be greater and the police will be less likely to apprehend the suspect. In some cities, like Seattle, where the officers who patrol the buses do not have radios, the operator's two-way radio provides an important communications link in the security system.

Some of the more sophisticated communications systems have priority override, silent alarms, and digital alarms. With the override feature, an operator with an emergency can make a priority call and get the dispatcher's immediate attention rather than wait for the dispatcher to answer the calls in the order they are received. Silent alarms are usually wired into the dispatcher's switchboard. When activated by an operator, the alarm signals the dispatcher that an incident has occurred, but the operator is unable to talk to the dispatcher. Unfortunately, under these circumstances, the operator cannot indicate the seriousness of the incident or any details about the vehicle's location until he or she is free to talk. More sophisticated than the silent alarm, the digital alarm system uses a pre-arranged code with which the operator can indicate more details on the incident in progress. For example, a 9 may mean a stagecoach robbery is in progress, and a 5 may indicate a bus hijacking.

The biggest problem with the use of silent alarms is the high rate of false alarms. This discourages prompt response by the transit and local police. Los Angeles SCRTD's experience with false alarms is instructive. The alarm was originally located on the floor of the bus and was susceptible to being inadvertently activated by maintenance personnel as well as operators. Between June and October 1981, 43 percent of the silent alarm calls were false alarms. For some.operating divisions, the monthly rate of false alarms was 73 percent. Although during this period there was a campaign to reduce the number of false alarms, 52 percent of the silent alarm calls during October were false alarms. This high rate of false alarms was cited by the local law enforcement agencies and the SCRTD transit police as a reason why the dispatchers as well as the police officers did not always promptly relay the alarm to the appropriate person. A good location for the alarm's

activation switch and driver training in the appropriate uses of the alarm are considered essential to the efficient utilization of a silent alarm system.

Two-way radios and silent alarms may also have a deterrent value if would-be offenders are aware that the operator is able to notify the dispatcher and the police. However, because a robbery or assault may last only a few minutes, an offender may judge that he can be gone before the police arrive. Nevertheless, radios and alarms do provide the operators with a greater sense of security, and discussions with transit users indicated the public's perception of security is also enhanced by knowing that the operator has the use of one of these devices.

4.2 AUTOMATIC VEHICLE MONITORING SYSTEM

When an emergency occurs and police officers are dispatched to the vehicle, the response time is dependent on the officers' accurate knowledge of the vehicle's location. Automatic Vehicle Monitoring (AVM) systems like the demonstration project in Los Angeles continuously indicate the bus's exact location if it is within the system's range.

The Urban Mass Transportation Administration (UMTA), through the Transportation Systems Center (TSC), sponsored the Los Angeles AVM project, which automatically monitors the location of 200 SCRTD buses operating on four specified routes and 15 SCRTD random-route service vehicles. The AVM system uses battery-powered transmitters that are installed along the bus route, usually in utility poles, to inform the receiver and micro-processor on the bus of the vehicle's location. Every forty seconds, the control center computer interrogates the bus, and the bus's microprocessor transmits its location and bus number, the number of passengers boarding and alighting at the last stop, arrival and departure time at the last check point, and the status of operator communications (i.e., silent alarm, priorty request to talk, etc.). This information is displayed for each bus on a screen in the control center, enabling the dispatchers to supervise and monitor the schedule. The passenger data collected also assist SCRTD planners to determine better routes and scheduling.

This AVM system was developed not primarily as a security device but as a means for SCRTD to manage its transportation operations more effectively. However, it provides immediate and accurate location information that can shorten the police response time in emergencies. If a crime is committed on a bus and the operator cannot use voice communications to indicate the location of the vehicle, he or she activates the silent alarm which causes the bus symbol on the control center monitor to flash. The dispatcher can see the vehicle's exact location and the direction in which it is heading. As long as the bus remains in an area with sign-post transmitters, it can be located even if it is off-route. This immediate location information enables the police to respond more quickly to an incident than when the dispatcher must estimate the location from the schedule. The AVM system also provides a greater degree of certainty about the vehicle's location.

Unfortunately, the four bus lines used in the Los Angeles AVM demonstration project are not in high-crime areas. However, AVM usefulness in emergencies has been simulated in tests which compared the response time of two security vehicles, one dispatched by an AVM dispatcher and one by a regular dispatcher using route and schedule information. Not unexpectedly, the AVM-dispatched vehicle arrived first in these tests. Several law enforcement officers pointed out that faster, more accurate information on vehicle location does not always facilitate police efforts to respond if the dispatchers ignore the alarm or delay in reporting it to the police. If the alarm information must be relayed through several people, there are additional delays and the potential exists for garbling the report. The AVM's ability to reduce response time and improve transit security depends on the interface between the dispatchers monitoring the system and the transit and local police departments. Because of the difficulties inherent in responding to a bus which may be moving, it may not be possible to significantly reduce the response time(1)*

*See discussion Section 3.1.

4.3 CAMERAS ON BUSES

In 1980, in a program patterned on the use of cameras in banks, SCRTD installed movie cameras on some of its Grumman buses. But the buses were withdrawn from service before the test was completed, and the results were inconclusive. Originally scheduled to run between 16 October 1980, and 15 February 1981, the program would compare the crime and vandalism on five buses equipped with live cameras, five with dummy cameras, and ten control buses, all of which were operating in high-crime areas. The program was expected to achieve the following:

1. prevent crime by discouraging the criminal with a more sure means of identification and subsequent apprehension and conviction when a crime was committed,
2. provide usable evidence in court against those who commit crimes on buses, and
3. provide the public with a greater sense of safety.

Five cameras with very high-speed surveillance type film were installed on the stanchion over and behind the driver's head, and five dummy units with the appearance of live cameras were installed on five other buses. The purpose of the dummy units was to provide additional deterrence at a cost less than that for the installation of live cameras. The public was notified of the earneras'operation by various signs on the bus which indicated that the interior was being continuously monitored with a camera. The operators were instructed to use the cameras to record incidents, people, or activities which would normally be reported to the transit police or a division manager.

> Generally speaking, any time the operator would report any crime or suspicious incident to the dispatcher via radio or phone, he may and should film the incident and/or suspect. The contacting of the dispatcher may be done prior, during, or after the recording. This decision must be left to the best judgement of the operators.

> There is no change of policy regarding any life-endangering incident. The SAS Silent Alarm System alarm may be activated if the operator elects to do so. He should bear in mind that, in doing so, he is losing his important communication link to the Dispatch Center. (Internal SCRTD memo on the First Program for Security Cameras, July 9, 1980.)

The cameras operated while the activating switch was down and for an additional four seconds after its release. The operator was requested to submit a completed "Telecamera report" form whenever an incident was recorded. These forms were used to monitor use of the cameras and to maintain control of exposed film. The cameras also operated when the silent alarm system was activated. They were programmed to run continuously until all remaining film was exposed when triggered by the silent alarm.

Several problems were encountered during the short period when program was operating: film was wasted, employees did not cooperate, and problems arose with film development and product quality. Some film was wasted because cameras were activated during routine maintenance inspections of the electrical equipment. Inadvertant operation of the camera occurred because the switch was poorly located. Lack of cooperation and understanding by drivers and mechanics resulted in frequent activation of the camera and film exposure in the yards and during quiet periods on the bus. Operators made evaluation of the system more difficult by not filling out reports on its use. There were also incidents of mechanics and service personnel covering the camera lens to prevent possibile monitoring of their work in the yards. Wasted film was costly because overnight film development was expensive. Development of a film roll was 6 to 10 dollars, and the printing of a single frame for court evidence cost 25 to 30 dollars. Technical problems with the program included a method of installation which subjected the cameras to too much vibration. In one case when a hinge screw on a camera vibrated loose, the cover fell off and struck the driver in the head. (This problem was subsequently corrected by the camera company.)

During the short time that the buses were operational, the apparent effect of the cameras on crime was mixed: vandalism decreased, miscellaneous minor crime increased. Additional problems became evident when the reporting methods were examined, and inadequate reporting may have been responsible for these results. Although vandalism on the buses with the cameras and dummy cameras was reported to be 40 percent less than that on the control vehicles, the procedures for reporting vandalism were found to be indadequate and improvements in reporting would be necessary for an accurate assessment of the cameras' impact on vandalism. The incidence of driver and transit police reports of miscellaneous crime was twice as high on the buses with cameras than on those without cameras. However, to justify use of the camera the driver may have reported more incidents. In addition, because the program was terminated after only two months, this data is based on a very limited sample of incidents.

This study did not give consideration to alternative methods of camera monitoring of buses. Cameras with a timed automatic exposure would prevent misuse by operators, and costs could be held down by developing the film only when an incident occurred. Use might be made of cameras with a film loop which would continuously monitor and then reuse the same film. Again, there would be no need for development of the film unless an incident occurred.

5. TRAINING AND EDUCATION

Many transit systems have developed school programs and community outreach projects as a means of preventing crime, and some have instituted stress-management training to help operators avoid situations which lead to physical confrontations. The efficacy of some of these programs is difficult to measure because the results are not easily quantified. It is also difficult to prove that a measured reduction in crime is attributable to training and education rather than to other factors. And, since transit crime is only a part of the overall crime problem that affects the security of the inhabitants of large cities, programs to prevent transit crime through education and community support are really taking on (often with very meager resources) a much larger problem than just transit crime. Transit systems use these programs to improve community relations and to develop community support for other security measures as well as to discourage minor offenses.

5.1 TRANSIT EDUCATION PROGRAMS

Because juveniles are responsible for much of the vandalism of transit systems and the harassment of passengers, many transit officials have gone to the schools to combat the problem through education. Often contingent on available funding, the programs in use in the four case study cities have varied from year to year. Discussions with those responsible for the school programs indicated that the programs were not developed as security measures, but that vandalism and appropriate behavior on buses was addressed as part of the presentation. They also indicated that the programs would be most effective when presented to elementary school children and then reinforced in subsequent grades. None of the programs have been formally evaluated to determine its effectiveness in preventing crime. There is a need for more studies in this area to determine the most effective ways of preventing juvenile crime. The following synopses of projects are intended to describe what has been found effective in the case study cities.

5.1.1 Detroit

A transit education demonstration project* was conducted in Detroit between April 1980 and June 1981.(7) The purpose of this project was to increase middle school students' awareness of public transit alternatives and of appropriate behavior on buses. A transit curriculum was developed for use in middle schools as a mini-course. It is adaptable for presentation over five to ten weeks in 40- to 55-minute class periods, and the materials can be adapted to the characteristics of a particular class (i.e., handicapped, gifted, or slow learners). Of the five teaching units, two are related to security: "Vandalism and Graffiti: the Consequences" and "Passenger Courtesy and Safety/Use of Public Transportation." The vandalism unit includes films, class discussion, use of guest speakers from the police department, a visit to a bus maintenance center to discuss with maintenance personnel the costs of repairing vandalism, skits, and mathematical problems using vandalism statistics. The passenger courtesy unit uses skits, films, and letter writing.

A pre-post test of the students' transit knowledge indicated an increase in correct responses, but student attitudes toward transit changed very little. Follow-up interviews with students who used public transit indicated their lack of awareness of the anti-social and illegal nature of some behavior on public transportation such as loud radios, eating, and rowdy behavior. The project manager's experience as a teacher led her to believe that the issue of transit crime and appropriate behavior should be addressed at an earlier age in the elementary schools.

5.1.2 Seattle

In May 1981, Seattle Metro started a program to teach children in grades K-6 about bus-riding manners and safety. This program makes a supplementary transit curriculum available to teachers in the area served by Metro. The schools are notified about the program, and if a

*For a full discription of the materials used see Reference 7-

teacher wants to use the curriculum, introductory materials including a Metro map and suggestions for discussion are sent. At an arranged time, the program manager visits the school and presents a half hour instructional program; then the class is taken for a 20-minute bus ride. The children are asked to practice on the bus what they learned in the class; for example, they pay the fare requested—a smile. The presentation uses puppets (made by the program manager) to teach appropriate manners and safety on the buses. The curriculum includes transit - related vocabulary and spelling tests because it is meant to teach academic skills, not just to entertain the children. The teacher response to the program has been very good and some have requested return visits. Unfortunately, there are fewer requests for the curriculum from the schools that have the most vandalism and that are served by problem bus lines. There are plans to develop more presentations which will target specific transit problems such as vandalism, but currently the program is a general introduction to transit.

5.1.3 Los Angeles

For several years, SCRTD sponsored "Operation Teamwork," a community relations program that went into the schools with a film comparing transit operations with a football teams' activities. This film was made with two Los Angeles Rams football players, who frequently attended showings of the film and talked to the young people. The program was discontinued in 1979 because of a lack of funds.

A broader program under the same name was begun in June 1981. Two full-time staff persons and one intern will administer the following programs:

- Community outreach—publications such as "Crime Prevention Tips" and "How to Ride a Bus."
- Youth education—poster and essay contest, peer tutor counseling, and youth employment.
- Education—literature and curriculum development.
- Victim and witness assistance for testifying in court cases.

5.1.4 Pittsburgh

Pittsburgh's school program was developed by the supervisor of consumer services using a bus retrofitted as a classroom with the capability to show slides. Although the materials are most suitable for eighth-grade students, when presenting the program to other grades, the supervisor has adapted the curriculum for the appropriate age group. When invited to a school, she has presented as many as eight 45-minute classes in one day. The supervisor usually has the operator of the bus take part in the presentation to encourage the students to identify him or her as a real person. Although she has no tests to measure the effectiveness of the program, she is encouraged by being asked back to present the program again at the same school.

The potential effectiveness of school programs was demonstrated when PAT was having problems with vandalism of bus shelters at schools. Some shelters were badly marked up and others destroyed, so the program manager went to the schools and talked to them about ownership and pride in their facilities. After some of the young people suggested that their sense of ownership would be stronger if the school insignia were on the shelters, the program manager tried to have this suggestion implemented. Although no insignias were put on the shelters, the program manager found that the vandalism decreased after the students were directly approached on the problem.

5.2 COMMUNITY OUTREACH PROGRAMS

SCRTD provided funding in 1980 for Project HEAVY, Human Efforts Aimed at Vitalizing Youth, to develop a community outreach program which would increase the passengers' perceptions of security and encourage more community assistance in combatting transit crime. The project's objectives were the following:

Development of a community-based agency mailing, announcing the program and soliciting comments and suggestions from the public.

Use of Project HEAVY's existing Phenciplidine Hydrochloride (PCP) helpline for the public to report incidents and call in suggestions.

Development of written drafts of public presentation literature and techniques for RTD staff use.

> Recommendation of appropriate forums to reach target audiences, primarily youth and senior citizens. (Project HEAVY, Southern California Rapid Transit District Monthly Report, December 1980.)

Project HEAVY sent letters and posters to 4,000 community-based agencies requesting community members to call the project's helpline and share their transit service and crime experiences. Between 17 October 1980 and 16 January 1981, 432 calls were received. One hundred and eight calls recommended specific changes in the bus routes, and 106 calls registered complaints about driver discourtesy and poor driving. Transit crime and passenger security were addressed in the miscellaneous category of calls, which numbered 53. Although these calls included suggestions for improved security using guards or cameras, it is important to note that poor service was the subject of more calls than was the lack of personal security. It may be that those people concerned about transit crime are satisfied with how SCRTD is handling the problem and consequently felt no need to use the helpline. Those people dissatisfied with service might have found that the only way to communicate with the transit system was to use the helpline.

Project HEAVY also developed public service advertisements for radio, television, and newspapers and solicited more suggestions through community meetings. Although Project HEAVY provided SCRTD with important community feedback on service and security issues, it served more to improve community relations than to increase passenger security. The value of community relations programs like this is their provision of a forum for passengers to report the problems they have with transit crime—problems which may not otherwise reach transit management.

5.3 STRESS MANAGEMENT TRAINING

As part of its operator training, Seattle Metro developed a stress-management program for operators. Based on the assumption that operators can avoid provoking hostile passengers and that this avoidance is a better option than physical confrontation, Metro instructs its

operators in the value of stress-management techniques, how to identify problem passengers, and how to deal with them. The validity of the assumption that operators can avoid assaults was reinforced by discussions with two instructors who had been operators. (One of them, who had been involved in several assaults, indicated that he had contributed to the assaults by provoking the passengers.) However, this opinion is not universally held by operators and there is some hostility to the program.

The training consists of two 2-hour classes held about a week apart. The program's objectives are to teach the operators

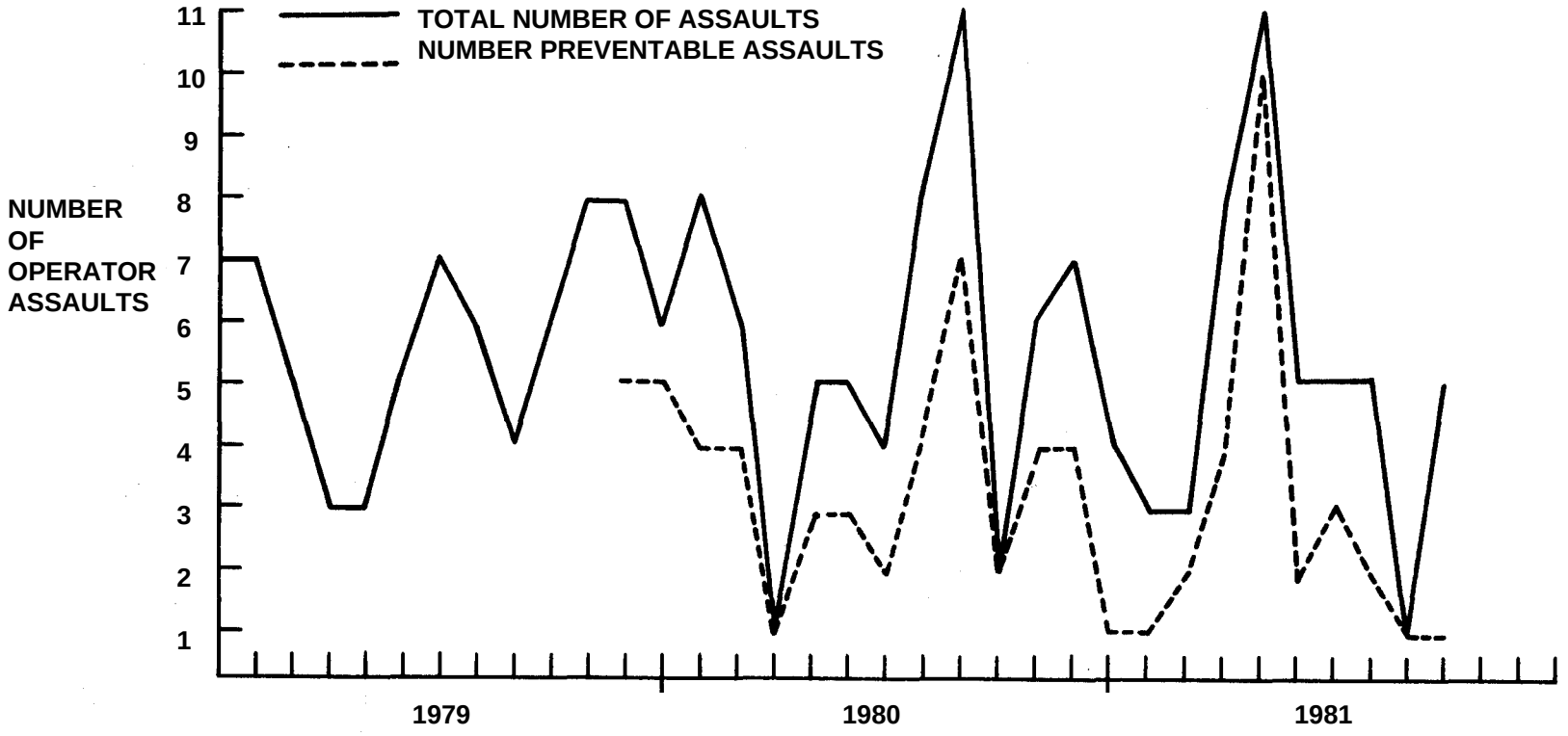
- to improve their ability to cope with stress;
- to distinguish the difference between pressure and stress;
- the common symptoms of stress and how the body responds—i.e., how behavior and performance are affected;
- to identify alternate ways to handle stress-producing situations;
- the value of stress management:
  - a. For the operator, in terms of better personal health and performance;
  - b. For the public, in terms of better service by healthier and more skilled operators;
  - c. For Metro, in terms of better operator performance;
- to improve their skill in dealing with the public and the organization in order to benefit both operators and Metro;
- the proper utilization of Metro's resources in problem-solving;
- their role as peacekeeper, not enforcer;
- to clarify Metro policy and, in particular, to promote the new non-payment-of-fare policy; and
- to accumulate feedback data on stress,
  - a. for the operator,

b. for Metro.

In the first session, the instructors lecture on stress—its causes and effects; then they introduce the operators to physical exercises which can help reduce stress. The second session presents additional physical exercises, models of conflict resolution, and how to use Metro's resources for problem solving. The program sought to prove the premise that if operators recognize aberrant behavior in passengers and know how to avoid confrontations with those passengers who are looking for a fight, they should be less vulnerable to assaults. No evaluation of this program was available, but there are plans to compare the number of assaults that operators had before training with the number they have afterwards.

Seattle keeps records of operator assaults and classifies them as "preventable" and "not preventable." This classification is the result of subjective evaluations, and the operator involved may not concur with the classification of a particular assault as preventable. Nevertheless, the numbers do represent some assessment of the degree to which assaults could be reduced. Figure 5-1 illustrates the total number of assaults reported per month and the number of assaults that were classified as preventable. The number of unavoidable assaults ranged between zero and four for the period, while the number classified as preventable ranged from one to ten. Because of operator turnover, Seattle has never had all of its operators trained at any one time, but with continued emphasis on the stress-management program and avoidance of confrontations, the preventable assaults may be reduced.

The effectiveness of the stress-management program cannot be adequately measured by examining only the trends in the number of assaults that are presented in Figure 5-1. The program's impact on operator assaults must take into account the trends of city-wide crime and the reliability of the data. For example, Seattle's crime per capita grew by 9.4 percent from January 1979 to October 1981, but the number of operator assaults declined slightly. There is a potential, too, for biased reporting as operators learn to distinguish between "preventable" and "not preventable" assaults.



Source: Internal Seattle Metro Memos, January 1979 to October 1981.

FIGURE 5-1. RECORD OF MONTHLY OPERATOR ASSAULTS

6. COSTS OF THE SECURITY MEASURES EXAMINED

The total cost of any particular security measure is not just the cost incurred by the transit system because the system does not always bear the full cost. Some of the costs may be paid by other agencies, such as the local police and the school department. Where they can be identified, these costs will be noted in the cost descriptions of the various measures. It is not clear whether the costs of transit security measures should be paid by the transit system, and this section makes no assumptions about which agencies should bear the costs.

6.1 COSTS OF POLICING OPERATIONS

The implementation costs of the various transit policing programs in the case study cities depended on the size of each particular program, which was, in turn, affected by the seriousness of the crime problem. In Seattle, where threats to passenger security are limited to a small area and are not a major problem, the costs of the transit system's security measures are modest compared to the costs of police operations in Los Angeles, with its more severe crime problem and large service area. Because police operations may require the use of special support equipment, these costs are also included in the following discussion of the policing operations in the four transit systems studied.

6.1.1 Detroit

The total costs for the Detroit Department of Transportation CD-DOT) and the Detroit Police Department to implement and*then operate the Bluebird Detail for a year were close to $1,750,000 in 1977. The largest single expense for the Bluebird Detail is officers' salaries. The first year's capital expenditures to set up the operation comprised less than 8 percent of that year's total estimated costs. The original capital expenditures for vehicles and communications equipment were $111,203, and the annual operating costs (primarily labor) were between 1.2 and 1.5 million dollars.

The Detroit Department of Transportation proposal to the state of Michigan in 1976 for a 12-month undercover police operation requested funds for the following items:

48 Police Officers ($26,002 per officer for salary and fringe benefits)	1,248,096.00
12 Vehicles (unmarked, without radios).	53,316.00
12 Mobile Radios.	4,752.00
Installation of Radios	960.00
25 Concealable PREP Radios.	49,500.00
25 Additional Batteries	1,375.00
2 PREP Chargers, 12-Unit Ability	1.300.00
TOTAL FUNDS REQUESTED	$1.359.299.00

However, the proposed state funding was not expected to cover the total cost of implementing the Bluebird undercover program. As a condition of this grant, D-DOT agreed to hire an additional dispatcher who would be responsible for liaison with the Bluebird Detail. The Detroit Police Department would bear the costs of office space for the detail, necessary supervisors and their equipment, and ten to twelve relief officers to compensate for time-off, court time, etc., taken by the forty-eight funded officers. A staff of about sixty officers is required to provide a daily 48-officer detail. In addition, the salary item specified in the proposal was not based on the salaries of the senior officers who would actually be assigned to the transit security operation, but on the salaries of forty-eight recently laid-off officers who would be rehired to replace the more experienced officers assigned to the Bluebird Detail. A dollar figure on the costs absorbed by the Detroit Police Department was not available, nor were the costs of maintenance, fuel, etc., included in the cost breakdown of the detail. It is not clear if alternative support equipment was considered, for example, other less costly concealable radios.

The first state grant of $901,000 for the Bluebirds included funds for the original capital expenditures and a salary allocation for 364 man-months, at $2167.02 per month. This grant was later supplemented by an additional $706,237.00, bringing the total state expenditure for the first fifteen months to $1,607,237. By 1979, the annual operating cost

to D-DOT of the US-officer detail had increased to $1,493,606.40, of which the state paid one-third. State funding was phased out in 1980, while operating costs had risen to $2 million per year. In the following two years, budget cuts were required throughout the D-DOT system, and the D-DOT contract for purchase of police department services was cut to $1 million (a little over one percent of the FY 1981 budget).

With fewer funds available for salaries, the police department assigned fewer officers to this detail. The current number of assigned officers was estimated to be about thirty. (There is some reluctance on the part of police departments to disclose staff levels, especially when there have been cutbacks in the number of officers, because they don't want to encourage an increase in criminal activity.) D-DOT's current contract for services does not specify a particular level of effort by the police department. According to D-DOT officials, this flexible arrangement allows them to call on the police when there are problem areas which need policing, and allows the police department to utilize its personnel efficiently.

6.1.2 Los Angeles

In Los Angeles, the transit police force of the Southern California Rapid Transit District (SCRTD) is responsible for guarding farebox transfers and facilities as well as ensuring passenger security. Since no available cost breakdown distinguishes between these two functions, the following figures overstate somewhat the costs of the policing operations. The transit police budget, including salaries, vehicles, and overhead costs, was estimated to represent 2 to 3 percent of SCRTD's annual budget of $473 million. Transit police employees' salaries and benefits total $4 million, making up the largest single expenditure in the transit police budget.

The transit police also have a $375,000 grant from Los Angeles County to hire off-duty local law enforcement officers to work part-time for SCRTD. The off-duty officers are paid as hourly employees and do not require employee fringe benefits such as health insurance, vacation time, etc. Consequently, the labor costs for these part-time employees

are much less than those for regular full-time employees. The regular transit police force had not been fully staffed as of December 1981 and these part-time officers provide the transit police with the necessary operating staff to effectively police the SCRTD system.

6.1.3 Seattle

Seattle Metro's policing operations are much more modest than those of Detroit or Los Angeles. Seattle has an undercover police operation that works principally at night and is staffed by off-duty city police officers. There are no full-time transit security employees assigned to this operation by either Seattle Metro or the police department. These off-duty officers are hired at an overtime rate of about $13 per hour, and the annual cost of the operation runs between $100,000 and $150,000. The expenditures for the undercover police operation come to less than 0.2 percent of Metro's annual budget. One reason for the low cost of this operation is that the officers work without radios or other equipment, and the lack of equipment is considered a handicap for the officers. The possibility of obtaining equipment is being investigated, but doing so would increase the costs of Metro's program. The costs of policing the system during the day is born by the local police, who respond to transit crimes reported by operators, as part of their regular duties.

6.1.4 Pittsburgh

Port Authority Transit (PAT) in Pittsburgh has a transit police force that is assisted by county sheriffs detailed to work with the PAT police. The contract with the sheriff's department provides PAT with seven officers for a cost of $20,000 per month. Total operating costs for the PAT police, including the contract with the county sheriff, are about $500,000 a year. The capital expenditure for the unit's six cars and radios was not available. In FY 1980 the PAT expenditures for its police force were less than one percent of its total budget. One of the major responsibilities of the PAT police is control of employee theft; therefore, not all of the costs can be attributed to passenger security operations. The investigations of employee theft can provide a

substantial financial return because theft by a single operator can amount to over $300 per day.

6.1.5 Summary

If the magnitude of the security problem is small and it can be contained with a small police effort, then off-duty local police officers will be able to provide the requisite service. If they are hired as hourly employees and the usual cost for insurance and vacations can be foregone because they receive these benefits from their regular employer, the labor costs can be kept quite low. Another possibility is to pay them at an overtime rate which, although increasing the hourly costs, will still probably cost less than hiring the officer as a regular employee. An arrangement to use off-duty local police requires the local police department's cooperation, and the salary level may be set in negotiations with them. Since there are few overhead and administrative costs associated with this type of policing operation, it provides a reasonable policing option to a small transit system or a supplementary labor force to a large transit police force.

An extension of the use of off-duty officers is a contract for services with the local police department. This option may not be feasible when more than one law enforcement jurisdiction is served by the transit system; but if implemented, it limits the transit system's overhead and administrative expenses for policing. A contract for its service is also advantageous to the police department because the contract will provide it with more operating funds without significantly increasing its overhead costs. A contract for services usually provides more police service than hiring off-duty officers, but the costs depend on the arrangement that can be reached with the local law enforcement agency.

When a transit system institutes its own police force, administrative and overhead costs must be borne by the transit system. Yet there may be no feasible alternative to a transit police force if there are many law enforcement jurisdictions involved and if the transit crime problem requires a large policing operation. A transit police force can still use the part-time services of off-duty officers or

contract with the local police for additional support or to balance fluctuations in staffing requirements. There is also the possibility that a transit police force can somewhat offset its costs by controlling employee theft, as is being done in Pittsburgh. None of the transit systems examined spent more than 3 percent of their operating budgets on transit policing operations.

6.2 COSTS OF MECHANICAL AND ELECTRONIC SECURITY DEVICES

Since major transit systems have already installed two-way radios in their vehicles, and the current cost of installing a system would be more accurately obtained by consulting manufacturers about the various options and costs, this data was not collected from the transit systems visited. The automatic vehicle monitoring (AVM) system is an expensive program, and the costs of this program are high in part because the AVM is not yet fully developed. In 1979 and 1980 almost 10 million dollars was spent on the system in Los Angeles, and an additional 1 million was anticipated.

The costs of the surveillance cameras project in Los Angeles are detailed below:

Telecamera of Southern California: Surveillance Cameras from	
Five dummy units and five complete units	$5,000.00
Installation Labor, 10 buses	2,000.00
Film Purchase and Development, 17 Rolls	185.00
Miscellaneous Equipment for Test Recording:	
35mm Camera, Film, and Stationery	165.00
Test Personnel, Salary 100 hours	1,400.00
Total	$8,750.00

If cameras or dummy units were installed on the entire fleet, the unit costs would decrease if a discount were available for purchase of large numbers of cameras and quantities of film. A limited camera project using cameras only on buses in high-crime areas might be more cost-effective than installing cameras on the entire bus fleet. However, limited implementation might create scheduling problems when available

buses are in short supply. The buses with cameras might be needed in low-crime areas and then be unavailable for use in the high-crime areas.

6.3 COSTS OF OTHER PROGRAMS

Seattle Metro's stress management program was developed to improve operator security more than passenger security, but operator assaults make up a significant percentage of reported transit crime on many transit systems. The cost of the program includes the operator's wages for the time required to attend the sessions, $95,000 per year, as well as the supervisor's and trainer's wages, totaling $93,067. The total annual cost comes to $188,067. There are some additional costs for printed materials, but these are not large, and a breakout of the overhead attributable to the program is not available. The cost of Metro's school program is primarily the cost of the time spent by the program supervisor. Since she does not work full-time on this project and much of the work creating her Metro Puppets was done at home, the labor cost is less than her annual salary. Additional costs of the program include the $36 per hour for a bus and driver to take the students for a ride and $2,000 to $3,000 for the handouts, which are created and printed in house Pittsburgh's school program is similar in scope to Metro's, but no cost figures were available. Detroit had a pilot program to develop a five- to ten-week curriculum block for the school teachers to use in their classes. This program was not conducted by transit personnel and was developed with funding of $125,000 from UMTA. The costs to present the curriculum, i.e., the teacher's time, were born by the schools. Now that the curriculum is available, the costs of providing it to the schools will be less than the original cost of developing and testing the curriculum in four schools.

7. PUBLIC PERCEPTION OF TRANSIT CRIME

To investigate the public's perception of transit crime in the four cities visited, ridership and marketing surveys were obtained from those systems that had conducted studies, and inquiries to the media were made. In addition, comments were solicited from the public. The groups consulted varied from city to city, but in each case, the respondents were first asked open-ended questions about transit security and how they perceived their personal safety on the buses. Before the discussions ended, the respondents were asked if they knew what measures had been implemented by the relevant transit system and if they seemed effective. The interviewers were careful not to offer any opinions on specific transit security problems or measures.

In discussions of transit crime with riders in the case study cities, the respondents knew which bus route had the worst problems and which times of day were the most dangerous. This knowledge affects rider's decisions on when and where to travel by public transportation. Although the use of uniformed officers on buses was not supported by everyone, many people said they would feel more secure with a police presence. The public's perception of security seemed very dependent on visible efforts to provide more security and to respond to transit crime.

Often this perception of security is derived from media accounts of transit crime as much as from personal experience, and the media may be the only source of information for non-riders. News stories more often report criminal activities and how people have been victimized than mention how secure the transit system is. Reports of increased transit crime often do not mention the changes in the number of passengers or the increased crime on the streets. The impression given by the media is that "roving gangs of youthful criminals prey on transit passengers almost at will."(10) Even if the public's perception of crime is not completely accurate, it is the basis for decisions on transit use and, as such, must be addressed by transit agency managers.

7.1 PUBLIC PERCEPTION OF TRANSIT SECURITY AND THE BLUEBIRD OPERATION

A 1981 survey of randomly selected households in the Southeast Michigan Area (which includes the city of Detroit and the surrounding counties) questioned people on their attitudes toward transit. The majority of the respondents rarely if ever, used public transit, and frequent users of transit numbered less than 10 percent of all respondents. Forty-nine percent of those surveyed agreed with the statement "I am concerned about my personal safety when riding the bus or train." However, in their rating of personal safety on buses, 41 percent of the respondents selected the "Don't Know" response, as indicated in Table 7-1.

TABLE 7-1 RATING OF PERSONAL SAFETY ON BUSES 108

	Percent Responding					
	Very Good	Good	Fair	Poor	Don't Know	No Response
General population [1]	5	27	17	7	41	4
D-DOT Riders[2]	14	23	31	16	17	0

Source: [1] Reference 11.
[2] Reference 12.

The large percentage of the general population sample that selected "Don't Know" suggests that personal safety on buses is not an overriding issue to many Southeast Michigan area residents. Only 24 percent of all respondents rated personal safety as fair or poor, while 32 percent rated it as good or very good. These responses suggest that, while many of the respondents are somewhat concerned about their personal safety, they are not aware of the hazards (if any) of riding the buses. The

study did note that "the most frequent 'poor' ratings of current service were obtained from residents of the city of Detroit rather than from residents of other surrounding jurisdictions."(11)

The second set of responses in Table 7-1 were those from a survey of D-DOT riders, and the percentage of "Don't Know" responses was much lower for this group. Those rating the service as fair or poor accounted for 47 percent of the respondents, while 37 percent rated personal safety as good or very good. The responses were not broken down by geographic areas of Detroit, and those respondents rating personal safety as "poor" may ride the lines in high-crime areas, while those responding more favorably may use buses in less critical areas. The results from these two surveys suggest that even if the D-DOT system may not be completely safe, neither is there a consensus that the system is very dangerous.

Comments on transit security were also solicited from a group of community leaders. The manager of each of the Detroit Neighborhood City Halls, the local extensions of city government, brought a member of his or her community to a round-table discussion of transit and transit security. Although this group was not representative of the city's population, it was representative of community members active in local affairs in all of the city's neighborhoods.

During the meeting, the participants expressed concern over various aspects of D-DOT operations; the issues are summarized below:

- Service on many of the bus lines is irregular and inadequate, forcing people to wait at bus stops for extended periods of time, and thereby increasing their exposure to street crime.

- The bus operator is perceived as vulnerable to assault and often unable to cope successfully with many crimes and incidents of vandalism. It was suggested that bus operators receive stress -training and instruction in handling emergency situations and that riders be given information on how to report incidents which occur on buses.

- Many people view the use of public transportation as hazardous. Lack of personal security is perceived as a problem on buses, at bus stops, and en route to and from bus stops. Elderly persons feel particularly helpless and vulnerable to criminals.

- The "new look" GMC bus was criticized for its cramped aisle space and seat room. Since physical contact between passengers occurs more often be cause of the bus configuration, the number of incidents between passengers increases. The tinted windows also make it difficult to see out at night, causing people, especially the elderly, to disembark at the wrong bus stop, which increases their walking time and exposure to street crime.

The most striking result of the meeting's proceedings was the absence of any mention of the Bluebird Detail or undercover police during the undirected discussion of transit crime and personal safety on buses. Many comments concerned the inadequacies of D-DOT service and the need for more money and buses to provide frequent service over a broader area. When the group was asked directly about the Bluebirds, only three of the 22 participants knew of the operation by that name, and only 11 were aware that there was an undercover police detail that was responsible for bus security. This level of public awareness may not be all that transit and police officials expect, but it also was not a statistically representative sample of the population. These citizens were not those most likely to commit crimes, and it is possible that there is more awareness among criminal elements. (On the other hand, as community leaders they might have been expected to be more than ordinarily aware of security problems and measures.) A study of the awareness among offenders and groups containing higher than average percentage of offenders (e.g., teenage males) would provide a measure of the detail's probable effectiveness in deterring crime.

7.2 PUBLIC PERCEPTION OF PERSONAL SAFETY IN LOS ANGELES

An attitude survey done for SCRTD indicated that public concern about personal safety and security on the SCRTD bus system was not very high. Less than twenty percent of the respondents responded "very strongly agree" or "very strongly disagree" with the following statements:

> Most RTD drivers are able to handle almost any trouble or problems that might come up on their buses... .

> All public transit bus drivers should be given some kind of weapon to help protect themselves and their passengers... .
>
> I don't like to use public transit buses because there is too much of a chance of being robbed or hurt... .
>
> The best way to make public transit buses safe is to put an armed guard on board... .(13)

A random sample of 1,134 persons was drawn to represent the Los Angeles County population that travels to and from the home, including transit users and non-users. Part of the survey queried the respondents about their attitudes toward security and asked respondents to indicate their opinions on forty transit-related statements with six possible responses ranging from "strongly agree" to "strongly disagree". Four of these statements related to perceptions of transit security and possible security measures. The summary report only included responses for the fifteen statements which drew the strongest responses, and the responses to security-related statements were not reported. The fifteen statements that drew strong responses concerned attitudes toward SCRTD service and perceptions of the value of transit to the public. These statements drew responses from at least 19 percent of those surveyed that they strongly agreed or disagreed with the statement. Less than 20 percent of the respondents felt strongly about the statements of transit security.

Statements about drivers were reported separately. The statement that most RTD drivers are able to handle any problem drew a "strongly agree" or "very strongly agree" response from 27 percent of the respondents, but another 24 percent strongly or very strongly disagreed with this statement. There did not seem to be a consensus on the operators' ability to handle problems, which would include transit crime.

Discussions with community members and leaders indicated that many people were apprehensive about riding SCRTD buses. Passengers and operators are perceived as vulnerable to assaults; gambling is conducted in the back of the bus; and public consumption of alcohol and use of

narcotics contributes to many passengers' fear of crime on the buses. However, the discussions of transit crime often led to the subject of SCRTD service. Transit users seemed to be as concerned about the lack of frequent, reliable service as they were about personal safety. The two issues are related because infrequent or tardy service forces passengers to wait longer periods at bus stops; this increases the time they are exposed to crime on the streets. Crowded buses were blamed for providing opportunities for pickpockets and thieves. Some riders suggested that better service would alleviate some of the crime problems. Community leaders were not generally aware of the existence of the SCRTD police force and its use of uniformed and plain clothes officers to control transit crime. SCRTD management was not considered responsive to complaints on service or crime; consequently, many crimes against passengers may not be reported.

7.3 PUBLIC PERCEPTION OF TRANSIT CRIME IN SEATTLE

Seattle Metro management spoke of transit crime as principally assaults on operators and indicated that passenger crime was not a major problem. No rider or household attitude surveys have been conducted in Seattle, but open-ended questions included in the marketing department's surveys have not shown crime to be a problem in promoting increased ridership.

A meeting with the operations subcommittee of the Citizens' Transit Advisory Committee (CTAC) supported transit management's position that passenger security on the buses was not a major concern. Many of the committee members are quite knowledgable about transit operations and equipment and they take their responsibilities as citizen advisors quite seriously. They meet on a regular basis with a liaison official from Seattle Metro who is responsible for relaying their concerns and opinions back to the appropriate Metro department. They perceive Metro as responsive to their concerns. The CTAC subcommittee expressed more concern over security for passengers at bus stops and en route to the bus than while on the bus. According to the subcommittee, girls and young women have more problems with harassment than anyone else,

although one person suggested that the elderly or the "weak" people have more trouble than the average rider. The vulnerability of the operators was also mentioned as a problem for Metro. Vandalism of automobiles at the park-and-ride lots was considered a problem meriting Metro's attention. That some of the lots are poorly lit and there is no public telephone service discourages passengers who might otherwise use the system to return late at night. Vandalism of bus shelters is also common. The subcommittee attributed most vandalism to juveniles. In spite of these concerns, the subcommittee did not believe that fear for personal safety on the buses was keeping people from using Metro.

Transit users' apprehension about street crime and their exposure to crime while waiting for transfers has been specifically addressed by Metro. Seattle Metro times its schedules to minimize waiting time between buses for transfer passengers. Centralized transfer points are used and there are often several people at these points to enhance the passengers' feelings of security. The CTAC subcommittee, aware of the joint undercover police program between Metro and the police department, considered the program to be effective in discouraging crime at night on the buses that are patrolled.

7.4 PUBLIC PERCEPTION OF TRANSIT SECURITY IN PITTSBURGH

PAT had not conducted any attitude surveys which addressed the question of transit security, but all passenger crime incidents and concerns for personal safety are referred to the PAT police, who respond to all callers with some action. An example of the PAT police response is illustrated in the handling of a complaint by a woman about trouble at the bus stop where she catches her bus late in the evening after work. An undercover PAT officer and a sheriff's car were assigned to patrol that area during the time the woman would probably be there, and she was given a general description of the undercover officer and told where the sheriff's car would be. A subsequent discussion with this woman revealed she was primarily concerned about street crime at the bus stop and that she felt the bus trip itself was relatively safe. She was concerned about crime while waiting for overdue buses and complained more about PAT's service than about fear for personal safety.

Discussions with various community leaders indicated a perception by many people that transit security had improved since 1976. What had been a serious problem was now limited to isolated cases which did not affect many passengers. The principal problems mentioned were vandalism and harassment of older people, particularly by juveniles. Often the driver is looked to for assistance in controlling juvenile behavior, but many operators do not or can not keep order in the bus. Use of school-trippers to take the students to school has improved the situation, but young people do ride buses at other times. Pickpockets are sometimes a problem, especially on crowded buses, and some drivers warn passengers to be careful when known pickpockets are on the bus. Again, poor service was mentioned in these discussions as contributing to the passengers' exposure to crime on the streets.

7.5 SUMMARY

Public concern about transit crime can be summarized as a fear that transportation by bus is not secure and that harassment, robberies, and assaults are common. The relationship between poor service and transit crime was mentioned frequently. Since transit crime is, in part, an extension of street crime, the more time passengers spend at bus stops waiting for buses, the more they are exposed to street crime. Crowded buses, like crowded public places of any sort, are the hunting grounds of pickpockets and other thieves. To the extent that bus service can be less crowded, some crime may be prevented. The crowding also contributes to confrontations between passengers who accidently come in physical contact with each other. There seems to be a need for more examination of the impact of service on passenger security.

8. CONCLUSIONS AND RECOMMENDATIONS

Through the cooperation of transit management, security and police officials, and community leaders, a great deal of information was obtained on the policing of transit systems, the use of monitoring equipment such as cameras-on-buses and the AVM, stress management programs, and the public's perception of transit security in the four case study cities. This information supports several conclusions and recommendations. However, the conclusions and recommendations are 'tentative: first, because the study was based on the security programs in four cities and as such represents only a limited sample of transit security measures in use in the United States; and second, because the study contract permitted only a limited exploration of the measures in use in each city. The applicability of the findings in other cities will depend partly on local conditions, which will assuredly be different from conditions in the cities initially studied. Thus, officials in other cities must judge for themselves whether the effectiveness or ineffectiveness of measures tried in Detroit, Los Angeles, Pittsburgh, and Seattle are indicative of the results they could expect from implementing the same measures. Therefore, the following tentative conclusions and recommendations are presented as suggestions of issues which transit systems should explore when considering measures to improve transit passenger security.

8.1 POLICING TRANSIT SYSTEMS

Police powers, particularly the authority to arrest offenders and issue citations, seem necessary for any officers responsible for patrolling a transit system. None of the officials interviewed in the case study cities had found security guards without police powers to be a useful means of improving passenger security. They felt that offenders would be inclined to challenge or ignore security guards trying to enforce a law or regulation without the authority to issue a citation or to make an arrest. Consequently, if a transit system is contemplating using officers to patrol the transit system, serious

consideration should be given to the use of officers with police powers rather than security guards.

In the case study cities, transit policing activities were carried out by either local police officers or a separate transit police force. In the two systems where policing was done by local police officers, one employed off-duty officers and the other used a police department unit dedicated to transit crime. In both cases, transit policing activities were confined to a single law enforcement jurisdiction. In the other two cases, a transit police force was responsible for policing a transit system which operated in many jurisdictions. In these four cities, the organization of the policing operations in each system was to some extent determined by the number of jurisdictions served by the system. Two solutions to the question of police authority in a transit system serving several jurisdictions are suggested. One is for state legislation granting multijurisdictional police authority to the transit force. The other is for the transit police officers to be deputized by the sheriffs of counties in which the system operates.

In any city, the transit policing operations will be only a small part of the total policing effort and cannot function independently of the local police forces. In addition, the operations of the local police forces will be affected in some degree by transit policing operations. Transit policing operations will require facilities to process and detain offenders who are arrested, and upon occasion, may require backup and investigation support by the local police. This makes it essential that transit management coordinate its plans for transit security with the local police and obtain their cooperation in the planning and implementation of policing operations. The local police operations will be directly affected by any transit police operations which contract for their services, and may be indirectly affected if a separate transit police force employed off-duty local police officers.

If a transit police force is instituted, the scope of the officers' duties will be determined not only by the police powers they are granted, but also by arrangements made with the local police. For

example, after a transit crime is committed, subsequent investigations may be done by the local or transit police. In Pittsburgh, responsibility for investigation lies with the PAT police, and in Los Angeles it lies with the local police. Depending on the particular circumstances, transit management may want to consider limiting transit police activities to deterrence and apprehension of offenders, leaving the investigation of incidents to the local police.

Although specific types of police operations were not investigated in detail, some operations seem more appropriate for uniformed officers and others for plain clothes officers. There is some limited evidence that where transit crime is localized and can be deterred by a uniformed police presence, a bus escort by uniformed officers may be an effective security measure. In Pittsburgh, uniformed sheriffs in marked cars escort some of the buses which provide school transportation. The fact that the sheriffs can respond immediately to calls for assistance is believed to deter the students from physically intimidating other students and severely damaging the vehicle. However, it seems that the use of uniformed officers to patrol and ride the buses is not an efficient security measure. Detroit's limited experience indicated that while the presence of uniformed officers would deter crime while they were on the bus, their absence was as noticeable as their presence, and incidents occurred in which the offenders felt secure in committing crimes because no uniformed officers were present to apprehend them.

Patrols by plain clothes officers and undercover operations were used to some extent in each of the case study cities. Plain clothes patrols are used because it is believed that offenders can be cited or arrested immediately after they commit crimes which a uniformed presence might have deterred until a later time or another place. Another reason for using plain clothes officers is the potential deterrence of offenses by creating uncertainty in the mind of the offender about the possible presence of an officer on the vehicle. It may also be possible to create the impression of a larger, more omnipresent force with officers who are not immediately identifiable.

The impact and effectiveness of plain clothes operations deserves further study. One such study of the Detroit Bluebirds operations is being conducted by Dr. Ken Weiner of Wayne State University. While the various plain clothes operations are believed to have certain effects on offenders, evidence of the deterrent effect of plain clothes operations has not been documented. It has not been ascertained whether the existence of a plain clothes policing operation will deter potential offenders, and if it does deter crime, what is the major factor in deterrence.

In the case study cities, the authority to issue citations seemed to provide the transit security agency with an additional tool to combat crime. When an officer observes a minor offense, he or she is authorized to issue a citation, like a parking ticket, which requires the offender to pay a fine. In addition to punishing minor offenses by a fine, the issuance of a citation serves as a warning to potential offenders that the transit system is being policed. Other transit systems may want to explore this area to determine if the authority to issue citations would enhance their transit policing effectiveness.

8.2 EQUIPMENT TO ENHANCE PASSENGER SECURITY

This report describes the application of two types of equipment that have been used in the Southern California Rapid Transit District's system: cameras-on-buses and the automatic vehicle monitoring (AVM) system. No definite conclusions can be drawn about the effectiveness of either of these programs because of their limited testing. However, potentially effective means of camera monitoring have been identified and further investigation of the AVM may be warranted because of recent technological advances.

The demonstration program using cameras to monitor the vehicle interiors suffered several setbacks. The experiment was cut short when the buses with cameras were taken out of service, film development was expensive, and employees did not always cooperate fully. Although the cameras seemed to be effective in limiting vandalism, the buses with cameras experienced more minor crimes against people such as harassment,

pickpocketing, and purse-snatching. Unfortunately these results were based on reporting practices which were later determined to be less than fully reliable. In some cases operators may have filed incident reports to justify their use of the cameras, and in other cases, they failed to file any reports.

As far as could be determined, the use of other types of cameras was not explored. Cameras which do not require operator activation might be more effective and less costly. For example, an automatic still camera which exposes a frame of film at intervals of perhaps 20 seconds could continuously monitor a bus. It would be necessary to develop the film only when an operator reported an incident; this would keep the costs of film development down. Another possibility would be a television camera using a continuous loop of recording tape which could be set to make a continuous record lasting perhaps ten to fifteen minutes. If an incident occurred, the camera could be turned off by the operator to preserve a record of the incident. Thus, a film or tape record would be available for use in the prosecution of the offender. In either case, economies result from the limited quantity of recording medium consumed and the limited need for developing of film. A more thorough evaluation of the use of cameras to monitor buses seems justified if only because the Los Angeles program was too limited, both in the range of techniques evaluated and in the thoroughness of the evaluation.

As installed, the AVM did not cover enough of the SCRTD transit system to provide a full evaluation of its usefulness as a security measure under operational conditions. However, simulations of emergencies indicated that AVM dispatchers can help reduce police response time. A major concern is the AVM's high cost. However, recent technological progress is bringing down the costs of communications equipment, which may make the AVM more economically feasible. In addition, the large costs of demonstration projects are not always indicative of the costs of widespread implementation because economies of scale may be possible which would reduce unit costs. The AVM's potential for reducing response time deserves further investigation as it becomes more economically feasible.

8.3 STRESS MANAGEMENT PROGRAMS

Teaching operators how to manage on-the-job stress and appropriate ways to deal with passengers who do not comply with rules such as paying the appropriate fare has been tried as a means to reduce operator assaults. The usefulness of this training is predicated on the assumption that operators sometimes contribute to assaults by provoking the assailant. On the basis of the limited experiment in Seattle, it seems that the stress management program has the potential for helping control the number of operator assaults. It is recommended that this type of training program be considered where operator assaults are a significant problem and where many of these assaults appear to be over minor matters.

8.4 PUBLIC PERCEPTION OF TRANSIT SECURITY AND THE IMPACT OF SERVICE QUALITY

When asked about transit security, many people responded with complaints about the quality of service. They explained that poor service requires them to wait long periods of time on the street for infrequent or late buses. During these long waits, passengers report feeling vulnerable to street crime, and they gave the opinion that their exposure to crime is increased by poor service. Crowded buses were also blamed by some passengers for facilitating thefts and for leading to fights because the crowding results in unwanted physical contact.

The vehicles themselves were cited as contributing to transit crime because the narrow aisles of some of the newer buses make them seem more crowded than the older buses. Tinted windows were criticized because they make it difficult for people to see out at night. Some passengers, especially senior citizens, may miss their stop (or disembark early to avoid missing their stop) and must then walk farther than necessary to their destination. This additional time on the street is seen as increasing the passengers' exposure to crime. Some police officials also criticized the tinted windows because they limit observation of the interior of the vehicle. If a crime is occuring on the bus, the officers are at a disadvantage if they must board the bus without-knowing what they will face inside.

Since the passengers and the general public that were consulted in this study consistently mentioned poor service in connection with transit crime, it is recommended that the relationship between service and crime be investigated further.

8.5 SCHOOL EDUCATION PROGRAMS

The effect of school and community outreach programs on transit crime has not been thoroughly studied in any of the case study cities. Most programs have been designed to teach students and the community about transit service, not as security measures. Pittsburgh did have success in one instance in controlling vandalism of shelters by going to the school students and making control of the vandalism a matter of school pride. This success, though modest, would justify a more thorough investigation of the effects obtainable from school programs.

APPENDIX A

PERSONS CONTACTED IN THE CASE STUDY CITIES (BY AGENCY)

DETROIT, MICHIGAN Detroit Department of Transportation (D-DOT)

Conrad Mallett, Director
William J. Anderson, Deputy Director
Don Voelker, Administrative Assistant
Claryce Ossman, Transit Planning
George Nobles, Assistant Superintendent of Transit Operations
Silas Young, Head of Property Guards

Southeastern Michigan Transit Authority (SEMTA)

Gary Krause, Acting Director
Lt. Carl Watkins, Manager of Security
Cleveland Brown, Manager, Research and Systems Development
Judith E. Griffie, Community Relations Representative

Southeast Michigan Council of Governments (SEMCOG)

Anne Nolan, Manager, Public Safety Programs
Jim Thomas, Information Services

Detroit Police Department (D-DOT)

James Younger, Commanding Officer, Special Crime Section
Lt. Simmons, Bluebird Detail

Other Agencies

Dr. Ken Weiner, Assistant Professor, Wayne State University
Dr. Tom Austin, Research Statistician, Wayne State University
Willis Tabor, Administrative Aide, City of Detroit
Managers and Representatives of Neighborhood City Halls

LOS ANGELES, CALIFORNIA

Southern California Rapid Transit District

James P. Burgess, Chief of Transit Police
Harry L. Budds, Ass't. Chief of Transit Police
Sterling E. Putnam, Sergeant, Transit Police
Albert Reyes, Jr., Community Relations Coordinator
Robert G. Williams, Manager of Customer Relations
Russell K. McFarland, Manager of Systems Analysis, Metro Rail Project
William J. Rhine, Deputy Chief Engineer, Metro Rail Project

Los Angeles Police Department

George Morrison, Commander, Uniformed Services Group, Operations -Headquarters Bureau

Sheriff's Department, County of Los Angeles

Robert A. Edmonds, Ass't. Sheriff
R.D.(Rick) Merick, Inspector, Field Operations, West Division

Other Agencies

Ray Remy, Deputy Mayor, City of Los Angeles
Earl Clark, General Chairman, United Transportation Union
Kenneth J. Bray, Resident Manager, Automatic Vehicle Monitoring Project, U.S. DOT, Transportation Systems Center
Nola Carter, Center Director, Florence -Graham Neighborhood Center
Lauraine Barber, Director, Federation of Community Coordinating Councils, County of Los Angeles
Ruth Sanders, Community Resource 4 Research Assistant, Federation of Community Coordinating Councils, County of Los Angeles
Amalia Guerro, Director, East Los Angeles Health Task Force
Juana Soria, Case Aide, East Los Angeles Health Task Force
Don R. Griffin, Director, Economic Development & Employment, Los Angeles Urban League
Joseph E. Grimmett, 1st Vice President, NAACP, Los Angeles Branch

SEATTLE, WASHINGTON

Metro - Municipality of Metropolitan Seattle

Howard B. Picht, Manager of Service Control
Charles E. Cox, Supervisor of Operations Control
Pam Salisbury, Customer Relations Instructor (Supervisor, Stress Management Program)
Raymond V. Shea, Supervisor, Market Planning
Elaine Chapman, School Information Specialist
Ruth Hertz, Publications Supervisor, Public Services
Patty Wells, Coordinator, Relations with Citizens Transit Advisory Committee

Seattle Police Department

Don Greg, Officer in charge of Undercover Police Operation

Other Agencies

David M. Johnston, President-Business Representative, Amalgamated Transit Union No. 587
Operations Subcommittee Members, Citizen's Transit Advisory Committee
Bob Lane, Reporter Covering Transit Crimes, Seattle Times PITTSBURGH,

PENNSYLVANIA

Port Authority of Allegheny County Transit (PAT)

Robert Parker, Director of Transit Operations
Michael Scanlon, Director of Media
Donald Fraser, Manager of Transportation
Richard Ehland, Chief of Transit Police
Tom Leidtke, Supervisor for Elderly and Handicapped Programs
Katie Everette Johnson, Supervisor, Consumer Services
Carl Denson, Equal Opportunity Affirmative Officer
Paul Skotelas, Planning and Research
William Reynolds, PAT Officer
Charles Alien, PAT Officer

Thomas Waschak, PAT Officer
Vera Avery, PAT Officer
Howard Holzer, Base Superintendent
Mik Tutko, Base Superintendent

Allegheny County Sheriff's Department
Captain Muno, Liason with PAT
Art Aloise, Sheriff assigned to PAT
Ralph Barry, Sheriff assigned to PAT

Pittsburgh Police Department
Mayer DeRoy, Assistant Superintendent

Other Agencies
Ken Fisher, Reporter, Pittsburgh Post Gazette
Douglas Martin, Ward Constable
Justin Johnson, Superior Court Judge
Ester Godlman, Senior Citizen
Mrs. Smalstig, Senior Citizen
Mrs. Genevieve, Senior Citizen
Jackie Smith, Organization of Black Catholic Ministries
Mrs. Price, East Liberty Chamber of Commerce
Dorothy Park
Marcy Edwards

APPENDIX B

REPORT OF NEW TECHNOLOGY

This report provides information on selecting bus transit security measures for use by transit systems in developing their security programs. The work performed under this contract did not lead to any new inventions.

REFERENCES

1. Siegel, L., et al. An Assessment of Crime and Policing Responses in Urban Mass Transit Systems. Prepared by Mitre Corporation for the U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, Washington, D.C., April 1977.

2. Wallace, Paul Stanley. Urban Mass Transit; Crime and Related Problems - A Brief Historical Review (1853-1977) with Annotated Bibliography. UMTA-UTB-50-79-1. U.S. Department of Transportation, Urban Mass Transportation Administration, Washington, D.C., August 1977.

3. Siegel, L., et al. Policing Urban Mass Transit Systems. LEAA Series A #23. Prepared by Mitre Corporation for the U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, Washington, D.C., September 1979.

4. U.S. Department of Justice, Federal Bureau of Investigation. Uniform Crime Reports for the United States. 1975-1980. U.S. Government Printing Office, Washington, D.C., 1980.

5. Public Safety Division. Crime and Security Measures on Public Transportation Systems; A National Assessment. Southeast Michigan Council of Governments. Detroit, Michigan, July 1981.

6. Southeast Michigan Council of Governments. The 1981 Ridership Security Report on Public Transportation for the Tri-County Area of Southeast Michigan. Michigan, April 1981.

7. Southeast Michigan Transportation Authority. Transit Education Demonstration Project: Project 696 Final Report. Michigan, August 1981.

8. American Public Transit Association. Passenger Transport, 11 December 1981, p. 16.

9. Cox, C.E., and Johnston, D.M. "Joint Report of Recommendations: Operator/Passenger Assault Prevention Program." A joint report by the Municipality of Metropolitan Seattle, Metro Transit, and the Analgamated Transit Union No. 587, Seattle, Washington, 20 February 1980.

10. Pearlstein, Adele, and Wachs, Martin. "Crime in Public Transit Systems" An Environmental Design Perspective." An unpublished paper prepared for the School of Architecture and Urban Planning, University of Los Angeles, Los Angeles, California, November 1981.

11. Shimpeler Corradino Associates. Southeast Michigan Regional Travel Survey; Executive Summary. Prepared for the Southeast Michigan Transportation Authority, Michigan, October 1981.

12. CRW Associates, Inc. Transit User Survey; Report on Data Collection and Preliminary Analysis. Prepared for the Southeast Michigan Transportation Authority, Michigan, December 1980.

13. Data Services Inc. Summary Report; 1981 Service Awareness and Transit Ridership Study. Prepared for the Southern California Rapid Transit District, California, May 1981.

SELECTED BIBLIOGRAPHY
OF
WORKS CONSULTED (NOT CITED)

New York State Senate Committee on Transportation. Transit Crime; Is it Taking Over Our Public Transportation Systems. Albany, New York, October 1980.

Statistical Services, Inc. Metro Transit 1980 Attitude and Awareness Study. Prepared for Municipality of Metropolitan Seattle, Seattle Metro, Seattle, Washington, July 1981.

Southeast Michigan Council of Governments. 1977 National Report on Crime and Security Measures in Public Transportation Systems. Michigan, February 1979.

U.S. Department of Transportation, Urban Mass Transportation Administration. Automatic Vehicle Monitoring: Program Digest. DOT-TSC-UMTA-81-11. Office of Technology Sharing (U.S. Government Printing Office, Washington, D.C., April 1981.

U.S. Department of Transportation, Urban Mass Transportation Administration. National Conference on Mass Transit Crime and Vandalism; Compendium of Proceedings, 1981. Washington, D.C., 1981.

• U.S. GOVERNMENT PRINTING OFFICE: 1995-601-251/20000