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LOSS PREVENTION DIAGNOSTICS, INC.

810 PASSAIC AVENUE, WEST CALDWELL, NEW JERSEY 07006 (201) 575-1265

LPD

THREE SOLUTIONS IN REDUCTION OF CRIMINAL OPPORTUNITY IN MASS TRANSPORTATION

(A Selection of Devices and Techniques to be demonstrated in Mass Transportation.)

TRANSIT SECURITY STUDY
FOR
CITY OF CHICAGO
DEPARTMENT OF PUBLIC WORKS
CONTRACT NO. 35811

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INTRODUCTION

This text sets forth the development of potential solutions in the reduction of crime and the improvement of real and perceived levels of protection afforded the mass transportation patron. These solutions are based on a process of data collection and authentication, evaluation and interpretation of the existing and potential resources of the City of Chicago and the Chicago Transit Authority as conducted over a period of approximately six months.

Objective of Study

The objective of this study is the selection of innovative mechanisms and/or techniques which will effectively and efficiently deter crime and the perception of crime in a mass transportation system. The attainment of this objective, it is believed, will in turn increase the attractiveness, feasibility and viability of the mass transportation system.

Through an examination of the Chicago mass transportation system these objectives, if attained, would appear to represent broad application opportunities because of the variety of facilities within the Chicago system.

Research Premise

In the presentation of our initial proposal and throughout the various research, evaluation and analytical work tasks of this project, we have based our work on the following premise. It is our position that through a reasonable reduction in the criminal opportunity the objectives of this study can be achieved. Reduction of the criminal opportunity has a direct relationship to the potential endangerment which a patron may perceive. Reduction in the criminal opportunity bears a direct relationship to the felon's perception of his ability to complete a crime with minimum threat of apprehension. Reduction of the criminal opportunity provides law enforcement with a selective capability in manpower allocation as well as the ability to utilize manpower on higher priority problems. If we assume a reasonable level of rational thinking among the three human elements of mass transportation crime, the patron, the felon, and law enforcement, then the reduction of the criminal opportunity offers advantages to each human segment involved.

The patron perceives a more secure environment through a recognition of a lessening criminal opportunity and consequently, we believe, is more inclined to use mass transportation facilities because personal endangerment is apparently minimized. The felon perceives a lessening crime opportunity through his recognition of a greater likelihood of retribution. While this does not necessarily remove his socio-economic motive in committing a crime, it does provide him with a rational basis to seek crime targets which offer a better opportunity. In this aspect reduction of the criminal opportunity serves to channel the felon's perception of crime targets to other locations. The law enforcement agency perceives reduction of the criminal opportunity as a method of moving crime activity to a secondary location where the risk of patron endangerment is lessened or where the felon's provide a better opportunity for supervision. Law enforcement is further enhanced in this thesis in that the re-allocation of manpower becomes a viable possibility which can now be assigned to the control of the felon's activity under more definitive crime suppression conditions.

A substantial part of the reduction of the criminal opportunity philosophy is the ability to measure cost versus risk. It is unlikely, potentially undesirable, that each rapid transit facility in the Chicago system would achieve the same degree of preventive technology. From the cost point of view, equal protection of every facility would create an imbalance wherein the cost of prevention would outweigh the revenue created in transportation. While we recognize the desirability of total crime elimination, we do not believe it a practical business possibility and we, indeed, suggest that it may be more desirable to channel criminal activity to controllable environments rather than seek its absolute elimination. We suggest that in the process of seeking the absolute elimination of crime it may be substantially reduced with the inherent risk of creating a more intense criminal process because only the desperate or depraved are willing to assume the inherent risks. Obviously we do not ascribe rational thinking to all felons, only to the majority of felons. Increasing the intensity of the criminal act within the confines of the mass transportation system, where the felon's alternative choices are more constrained than on the open street may result in a lessening of overall crimes but a substantial increase in serious crimes against the person.

The basis for our work in this study has been the reduction of the criminal opportunity which we believe provides the realistic capability of achieving the objectives of this study as stated in the previous section.

Scope of Work

The scope of work assigned to Loss Prevention Diagnostics, Inc. consists of a variety of work tasks which in certain instances required data collection and authentication while at other times the work task was that of evaluator of basic work tasks involved in the total project. The end result of these work tasks involving Loss Prevention Diagnostics, Inc. is the development of three (3) conceptual designs which are responsive to the study objective.

We have set forth below brief statements of the work tasks assigned to Loss Prevention Diagnostics, Inc. and an equally brief description of the method of performance.

. *Review and analyze Scenarios of Crime on the Chicago Transit Authority as prepared by others.*

Review of the appropriate material was conducted and comments and guidance were provided regarding methodology, format, direction, future considerations and relevancy.

. *Investigate existing mass transit security including the collection of relevant available data on existing security measures used to protect patrons of the CTA.*

This data collection and evaluation process was conducted through interview, observation, record review and participation in the security program as an observer. It included the review and utilization of CTA and the Mass Transit Unit of the Chicago Police Department resources as well as observation of the CTA system.

. *Investigate the types of security devices and techniques available by providing investigative facts, guidance and documentation regarding crime prevention devices.*

This task was completed with a review of contemporary stable state of the art which might be appropriate to mass transportation. Because of our unique and continuing capability in evaluation of crime prevention devices and techniques, we emphasized "stable" in suggesting devices and/or techniques.

- *The consultant shall provide not less than three such conceptual designs based upon varying circumstances.*

  Four potential solutions intended for varying applications have been provided. Each solution has defined varying components necessary for each solution as well as evaluative guidance in application, stability, benefits and procedural use. Our fourth solution is a reconfirmation of an existing practice.

- *Develop a method of establishing cost/benefit analysis as it relates to crime control, mass transit ridership and patron psychology.*

  A potential evaluation technique has been prepared which defines the considerations necessary to realistically evaluate an applied solution to determine cost/benefit factors pertinent to its broader application.

METHODOLOGY OF SOLUTION PORTRAYAL AND CONCEPT

The presentation of each solution in this report is based on our theory of reduction of the criminal opportunity. Three solutions pertain to the facilities and equipment in the rapid transit system. The fourth solution pertains to minor modifications in the "open plan" and our endorsement of the "open plan" concept. The solutions have been numbered consecutively, one through four.

Solution #1

This solution involves a system wherein the patron is provided a method of initiating response and creating a witness to a perceived confrontation. This solution calls for remote monitoring of a patron's perceived endangerment with the ability of a qualified third party to intervene in the termination of an automatic request for police response. Because of the apparent surveillance of the patron and the ability to greatly reduce the time of police response, the felon will perceive a reduced opportunity while the patron will perceive a higher level of personal protection. Because of the requirements to remotely monitor platform activities, this solution is the most expensive and requires the largest commitment to permanent hardware which cannot be easily moved from one location to another. Consistent with the profiles in crime in the mass transportation system this solution provides its highest level of prevention during low platform occupancy periods when the criminal opportunity peaks.

Solution #2

This solution involves a modular system wherein the patron is reminded to be perceptive of potential endangerment. Like Solution #1 he/she is provided a method of initiating a call for assistance when endangerment is perceived. This perception and call for assistance includes the ability to provide a witness to a confrontation based upon the patron's demand as well as initiate a timely police response. Because of the apparent surveillance the patron perceives a higher level of protection and the felon a lower level of criminal opportunity. This system can effectively operate based upon the presence of a station agent or when no station agent is available. This system is less expensive and because of its modular nature can be moved from platform to platform without incurring great expense. As was the case in Solution #1, this solution is most preventive during low occupancy periods when the criminal opportunity peaks.

Solution #3

This solution is designed to offer an ability for the CTA employee (conductor) to exercise judgement as to the need for police assistance without becoming the victim of a coercive situation where the ability to seek assistance is beyond capability. The conductor will be provided with a method of monitoring the car in which he is not riding when he is within a protective enclosure. When the conductor perceives a potential endangerment to himself or a riding patron, he will have a capability of transmitting an assistance required communication from his location to a radio transmitter on-board which in turn will communicate directly with patrol vehicles within .5 miles of the train. This solution, like Solutions #1 and #2, is directed toward lower occupancy periods in the mass transit system when two-car trains comprise an entire train. This solution provides a high degree of protection for the patron, a low criminal opportunity for the felon, and the ability of the conductor to exercise judgement regarding endangerment as well as remove himself from a coercive situation.

Solution #4

This solution is one already well conceived by the Chicago Transit Authority. While we do not create any new system solutions, we do confirm our agreement with the "open plan". The concept of open visibility permits the patron to perceive endangerment at the earliest possible time. The restricted access and egress tends to deter the opportunity as perceived by the felon. The increased lighting levels, of course, both aid the patron and CTA and law enforcement personnel. The "open plan" concept is a significant step in the right direction but reconstruction and site acquisition may well be beyond reasonable cost factors. Solutions #1 and #2 deal in a more cost-effective basis with the reduction of the criminal opportunity. Our contribution to the open plan suggests some potential modifications.

In summary, each solution herein provided is intended to provide a series of alternative choices which are adaptable to a series of changing environments such as found in the Chicago mass transit system. Solutions #1 and #2 are flexible in application in that many component parts of each solution are interchangeable for the creation of a different solution than set forth in this study. Solution #3 is intended to be responsive to a continuation of a patron perceiving less personal endangerment as well as continuing the reduction of the criminal opportunity throughout the system.

Methodology

Each solution is described in an Executive Summary fashion which portrays its application to patron use. The solution is then supported through a series of questions regarding the application of components of the solution with extracts from study and research which supports the application of each primary component. The component parts of the solution are then described as to their purpose, function, application and stability. Any potential modifications of devices are described since all solutions use "off-the-shelf" manufacturer's hardware. The benefits of each component as it relates to the ultimate objective of the solution is described as it relates to the supporting extracted information of previous research.

SOLUTION #1

REMOTE MONITORING OF PATRON SAFETY

EXECUTIVE SUMMARY

SOLUTION #1

Remote Monitoring of Patron Safety

The objectives of this solution are to provide the patron with a high level of protection perception and a capability to take responsive action based upon an evaluation of personal endangerment. It is further the objective of this solution to reduce the time of police response to an endangered patron with a corresponding improvement in the patron's inherent belief in the capability of law enforcement to secure the public means of transportation. It is also the objective of this solution to permit the intervention of a qualified console operator to public endangerment based upon observations not recognized by a patron as inherently dangerous. It is an objective of this system to reduce the specific allocation of police manpower for other mass transportation protection priorities.

This solution requires that specific areas of a platform be visually defined for the patron as the waiting location for public transportation. These distinctively defined areas will be associated with the normal train size operating at nonpeak load hours; most frequently, a two-car train. The area will be color coded and highly lighted. The patron upon entering the platform level from the entryway will have immediately available a patron assistance button, which, if pulled will cause their presence to be recorded on video tape through a closed circuit television system, as well as initiate a process which automatically transmits an assistance required signal to any patrolling police vehicle or foot patrol officer within 1/2 mile of the platform within thirty seconds of the patron's perception of endangerment. With this thirty second evaluation period, a remotely located Mass Transit Unit (MTU) monitor will view the patron's physical endangerment and if he confirms the patron's physical endangerment, he will not intervene. The monitoring console will automatically initiate a signal to the platform which causes the transmission of a subaudible message to patrol units within 1/2 mile of the platform. If the MTU monitor believes the patron is not endangered, he will "abort" the automatic assistance call within the thirty second period.

This capability will be available to the patron from the platform entryway and throughout the distinctively identified "safe" area.

This system will substantially reduce the time of police response. The video taping of a patron who is endangered can be used as an investigative tool which will serve the purpose of a witness to a confrontation as well as serve to deter the felon who may now perceive the opportunity to commit the crime as one involving substantial risk.

This solution meets the criteria for criminal occurrences in mass transportation as defined and authenticated in the research phases of this study by the three participating agencies. The solution is responsive to the patron's perception of personal endangerment, to the capability of improved police response and the patron's evaluation of personal protection and to the felons perception of criminal opportunity. This solution deals effectively with high crime time frames which have been documented as low occupancy periods.

RESEARCH SUPPORT FOR SOLUTION #1

Set forth below is extracted material representing conclusions concerning the needs and capabilities of the rapid transit system of the City of Chicago in its concern for the protection of the patron. The extracted material is from previously conducted and documented research completed by Carnegie-Mellon University, University of Illinois and Loss Prevention Diagnostics, Inc. and submitted to the Transit Security Committee.

The format utilized below poses a series of questions pertaining to the component parts of the solution. The extracted material set forth represents the support for the components existence in the solution.

The extracted documentation is identified by its source in accordance with the coding set forth below.

Source Codes for Extracted Justifications

CM I	Carnegie-Mellon University's I. Data Collection and Analysis
CM II	Carnegie-Mellon University's II. Profiles of Crime on the CTA
CM III	Carnegie-Mellon University's III. Existing Security Measures on the Chicago Transit System
CM IV	Carnegie-Mellon University's IV. Survey of Security Devices and Techniques
UI-CM	University of Illinois' findings presented in Carnegie-Mellon University's Survey Highlights
LPD I	Loss Prevention Diagnostics, Inc.'s Review and Analysis of Crime Profiles - Work Element I
LPD II	Loss Prevention Diagnostics, Inc.'s Existing Protection Resources, Chicago Transit Authority - Work Element II
LPD III	Loss Prevention Diagnostics, Inc.'s Stable State of the Art, Review of Protection Hardware - Work Element III

Editorial Note: *Carnegie-Mellon's analysis of Crime/Ridership reflects that the majority of crime committed in rapid transit occurs between the hours of 5:00 p.m. and 3:00 a.m. (63.3%). The analysis indicates that over 90% of all victims were alone when confronted. This solution deals with the issue of low patron density and high criminal incidence. During high patron density periods and corresponding lower criminal incidence periods, the solution improves patron perception of protection.*

Why is there a need to improve police response?

UI-CM — Public would feel more secure if they:

1. saw more police officers on platforms and trains
2. knew quick assistance was available from CTA personnel or police
3. knew that a policeman and police dog were assigned to each bus or train during nonrush hour periods

LPD I pg. 8 — A defensive posture based upon personal evaluations of vulnerability and timely police response appear as the implied injury reduction opportunity.

LPD I pg. 7 — Today's police response has an affect on the potential for tomorrow's criminal act.

CM I pg. 67 — The constant presence of a CPD patrol at a station does not improve response because of the inadequate communication links between CPD headquarters and MTU, and architectural features interfere with direct surveillance.

When a crime is reported to CPD headquarters the dispatch of district cars is rapid.

CM I pg. 67 — A majority of the high robbery stations have a response time of sixty-one minutes or more. These are in high crime CPD districts and the unavailability of CPD units may be the cause.

CM I pg. 66 — There was a five minute response time for one third of the robberies and crime against persons and for one half of the batteries.

CM I pg. 70 — CPD's response time to side platform stations is seven minutes longer than that of island platform stations.

CM I pg. 69 — A-1 stations have a ten minute longer response time. These are located in older neighborhoods with poorer auto mobility capabilities.

LPD I pg. 7 — There is a delayed police response to A-1 platforms because of construction factors.

Editorial Note: *We recognize that extended delays in police response are the direct result of high activity periods or information which would indicate the crime is completed and crimes in progress are assuming greater priorities.*

CM III pg. 10 — Limitations in mobility exist when encountering a felon on the opposite side of a dual platform station, and combined with communications difficulties both interfere with police response to crimes.

LPD III pg. 57 — Personal radios and their inherent freedoms are worthy of consideration in the subway system for CPD and CTA supervisory and security functions.

LPD III pg. 58 — The critical issue is the capability of personal radios to operate effectively within the subway and on remote surface platforms. CPD officers in subway do not carry radios because they are inoperable in the underground structures. This creates a situation where officers must accurately predict if they can handle the situation or hesitate in their response until a need for backup personnel can be communicated. The lack of personal radios must severely affect the success of "hot pursuit" of a criminal.

LPD II pg. 50 — There may be a break in communication between the District Dispatcher and the Lincoln Band Dispatcher, and also intermittent communications with MTU officers, thereby creating a longer response and an increase in personnel/patron vulnerability.

The coordination of the CPD District and CPD-MTU with CTA Security may reduce response time.

LPD II pg. 48 — Improper priority may be set on a CPD response to a CTA crime because of difficulty in determining "in progress" or "completed" crime.

LPD II pg. 48	Communication by MTU during 2:00 a.m. - 10:00 a.m. may be nonexistent should shift periods be extended.
CM III pg. 7	The police in MTU must rely on police, CTA or public phones. MTU's communication capability is poor.
CM III pg. 7	The hand held transceiver is useless in the subway, experiences great interference in el cars, and transmission and receiving failures are common on open el platforms.
CM III pg. 7-8	MTU's present lack of good continuous communications between the foot patrolman and the central dispatching sergeant cannot help but lower their impact.
CM III pg. 8	Lack of communications with MTU forces local police districts to handle CTA incidents.
LPD II pg. 29	There exists a poor communication capability in MTU. Officers on trains and platforms possess intermittent capability. Officers in the subway have no radios. MTU Supervisors possess communication only when in a mobile radio car.
LPD II pg. 29	The MTU dispatcher may not be aware of the needed response requirement to CTA. This may result in available MTU officers not responding to a crime within their areas of control. MTU subway officers must rely on twenty-nine police phones, agent phones, or public phones. Outside the subway network MTU officers must rely on public or agent phones if the Lincoln Band radio is not functioning.
LPD II pg. 51	Certain agent phones may be locked and force MTU train patrols to move to the street level to communicate with the CPD Dispatcher.
LPD II pg. 4	CPD greatly increases one-man beats and two-man beats to lessen the response time in peak crime periods and to increase the effectiveness of the response.
LPD II pg. 5	Response follows the crime and does not have a direct impact on prevention. Intensification of the patrol function must have preventive impact.

LPD I pg. 3

We believe that pocket picking, purse snatching, and theft of service are representative of crimes which formulate to a more common occurrence and attitude base among the riding patrons. Many thefts may go unreported, and higher police priorities in more serious crimes may cause many of these less severe crimes to not be cleared by arrest and, therefore, may foster in patrons an attitude of an unresponsive CTA.

Why is it necessary to identify a secure area of 100 foot in length in the reduction of the criminal opportunity.

CM I pg. 17

The problem of maintaining optimal passenger density is one of adaptable building design. This is associated with security.

LPD II pg. 46

Lengthy platforms increase unnecessary exposure of patrons at nonrush hour. Wind screens often totally block the visibility of platform access on els and median strip stations.

Split platforms increase the opportunity for criminal attack.

CM I pg. 2

Renovations related to security were clearly the most preferred kinds of improvements according to Broad and Columbia Subway Development Study, Final Report, August 1971.

CM III pg. 24

At the present there is no method of physically restricting the size of the waiting platforms, which could prevent access to isolated areas in off- hours and restrict passengers to smaller areas in order to provide potential witnesses, which can act as a deterrent to certain types of offenders.

LPD II pg. 46

In most stations limited barriers and service gates permit easy entrance and egress for those with unlawful intents.

LPD II pg. 46

In stations other than "open plan" there are locations for unobserved attacks.

CM III pg. 10

The patroling of many stations is time-consuming because of supporting structures, booths, vending machines and signs. Covered rampways also present a sight-line problem because of their length of several hundred feet.

CM I pg. 9

All train cars are nine feet four inches wide. There are a few three section articulated cars which are eighty-nine feet in length (ninety-six passenger capacity). Most cars are forty-eight feet in length (forty-six through fifty-two passenger capacity).

A and B express service provides waiting times (headways) of ten minutes or less.

All stop station headways are five minutes or less.

This service operates during morning and evening rush hours and midday and early evening.

CM I & II Appendix Table 5

Crime/Ridership Indicies for the Rapid Transit System

The following is the justification for the low ridership stations having the highest crime indicies.

Also see the twenty-two highest crime stations.

Cermak to 58th Street station on the South El segment (eight stations) have the highest crime index for North-South Line (27.4 for all crime and 22.1 for robbery).

Tech - 35th and the 47th Street stations have the highest ridership, but the lowest crime indicies.

Dorchester and University on the Jackson Park Branch have the two highest crime indicies for that branch and are the lowest and third lowest, respectively, in ridership.

State, Wentworth, Harvard on the Englewood Branch are by far the low ridership stations in that branch, but their crime indicies are as much as five times higher than other stations.

On the West-Northwest Line - Milwaukee Service-Subway segment, Chicago and Racine stations are the second and third lowest in ridership, yet by far the two highest in crime index on that service.

CM I & II Appendix Table 5

On the Douglas El the Kildare and Kedzie stations are the highest in crime index, but Kildare is the lowest and Kedzie is the fourth lowest in ridership on that service.

On the Congress El the station with the highest patronage has the lowest crime index. All other stations have high crime indicies and low ridership except Kedzie.

On the Lake El the California, Kedzie and Homan stations have the highest crime indicies and the lowest ridership. *Homan has 423 more riders than Ashland (a low crime index station) and ranks fourth on the Lake El in patronage.

The Dan Ryan Service's 47th Street station has the highest crime index and the second lowest ridership.

The Ravenswood El's Sedgewich station has the highest crime index and the lowest ridership

The Loop El's State/Van Buren station has the second highest crime index and is tenth of twenty-two in terms of low ridership.

LPD I pg. 10

Since batteries and robberies occur in similar locations the former may be a prelude to the latter, and it would be desirable to create a situation similar to high density with hardware and systems.

CM I pg. 63

There is a greater prevalence of RT crime during the afternoon and evening.

Editorial Note: *The identification of a safe area for the patron pertains to cost savings factors such as reducing the area requiring increased lighting levels, surveillance and patron defensive techniques. The physical identification of safe areas further serves to place the patron in a controllable area when platform occupancy is low, criminal opportunity is high, trains are less frequent and size of trains will usually be limited to two cars.*

Why does the patron require a capability to obtain assistance by use of a platform emergency switch?

UI-CM — The people interviewed feel <u>least</u> secure while:

1. on stairs, rampway or tunnel to the el subway platform
2. waiting on the el subway platform
3. waiting in the el subway stations

UI-CM — Between 50 and 65% of the various types of CTA users (e.g. bus only, subway only) perceive safety from crime or harassment to be <u>fair</u> to <u>very poor</u> on the el subway.

LPD I pg. 9 — The number of crimes reported by the victim suggests that a CPD five minute response does little to reduce the potential injury of the victim.

LPD I pg. 9 — The victim must be able to perceive his potential status and take specific action to avoid the confrontation. Few felons were apprehended leaving the scene of the crime. This is proven by the small amount of stolen property recovered.

CM I pg. 41 — Seventy-five percent of all crimes studies occurred on rapid transit.

Seventy-five percent of all crimes were robberies and twenty percent were batteries.

Ten percent of all crimes were assaults and crimes against persons.

Attempted robberies were few, indicating that most robberies were completed and some robbery victims report the crime only when they have sustained injury or loss of property.

CM I pg. 43 — The North-South line (1/3 of all stations) had over 50% of all rapid transit crime. The Southside el with only eight stations accounted for most of the crimes on the North-South line.

CM I pg. 46	Riders face more danger on el segments than on the subway; the latter being much below the system-wide average in risk according to the crime indicies. The worse el segments were the Cermak to the 58th Street stations (North-South Line), and the Medical Center to the central stations (West-Northwest Line).
CM I pg. 58	Over 75% of the CAP victims were women.
CM I pg. 58	Twenty percent of the rapid transit robberies and 33% of the batteries were against CTA personnel.
CM I pg. 58	Fifty percent of the robberies were committed by two or three offenders.
CM I pg. 61	The majority of batteries and all crimes against persons were committed by one offender.
CMI pg. 61	Most high crime stations are located in high robbery CPD districts. High crime areas tend to coincide with unemployment areas.
CM II pg. 84	There were almost no witnesses to platform and train robberies.
CM II pg. 84	Most robbery offenders had weapons, but a sizable number did not. The weapons most always were displayed. A few of the victims were hurt by the weapons, but many more were punched and kicked.
CM II pg. 85	The majority of the victims were not injured. Those who were injured required hospitalization. The most frequently stolen articles were money, credit cards, jewelry, wallets and purses. The average cash loss was under $20.
CM I pg. 2	The bulk of transit crime occurs within the confines of rapid transit stations as opposed to on trains or buses.
CM I pg. 58	Ninety percent of all victims were lone.

CM III pg. 25 — A waiting passenger is more vulnerable to crime than one riding the system.

LPD I pg. 8 — Since the majority of robberies occur in low density periods, it is imperative for the lone patron to be supported on the platform by imagined or remote authoritative assistance.

There is a critical need for the lone patron to be able to predict his vulnerability and take crime prevention action.

This implies a patron educational program, and the tools to provide the prevention.

LPD I pg. 9 — The felon identifies his target after identifying the lack of retaliatory response. This stresses the need to overcome the critical platform exposure period either through operational change or prevention devices.

LPD I pg. 11 — The patron needs some recourse when he perceives the possibility of attack. Most battery victims reported the crime after the fact which indicates that there was no prediction opportunity, or that the victims were uneducated in the prediction of vulnerability. Victims and witnesses were not capable of initiating a response before or during the attack.

CM I pg. 25 — Market Facts Inc. stated that many respondents had fear of lonely, dark platforms, of walking to and from the transit stop or station, and of waiting for a bus or train late at night.

CM I pg. 63 — Most RT crimes were in some part of station and platform rather than on the train.

Of crimes on the station premises, 2/3rds were on platforms.

CM II pg. 84 — The main crime location was the platform where the robbery victim was waiting for a train.

CM II pg. 86 — Most battery and assault victims were lone travellers, and the most prevalent victim groups were CTA employees, students and service workers.

CM II pg. 86	Platforms were the worst location for battery and assault crimes, and most victims were waiting for a train.
	The majority of offenders were lone. There were a few instances involving gangs of four or more.
CM II pg. 86	Generally the victims of batteries and assaults were kicked or punched, but a few were struck by a weapon.
	Injured victims required hospitalization.
CM II pg. 87	A significant number of crimes against persons occurred on platforms and station lobbies, and 50% of these felons escaped via train.
CM II pg. 87	Most crimes against persons were victim reported.
CM II pg. 87	Police response to a crime against a person most always was quick (within fifteen minutes).
LPD I pg. 10	Most batteries are committed by lone felons who seek the one on one opportunity. Appropriate hardware and systems can overcome the lone patron exposure period, but not the physical attack which must be overcome by superior authority and timely response.
LPD I pg. 5	The important factor is how will the criminal view the potential opportunity for attack in low and high density periods in relation to his ability to successfully carry out the crime.
LPD I pg. 10	There is an implication that batteries are oriented to patron aggravation or harrassment and, therefore, might be avoided if the patron can perceive the possible situation.
CM II pg. 86	Generally the victims of batteries and assaults reported the crime after it was completed.
	CPD response was within five minutes in the majority of cases.
	One-third of the battery and assault offenders were apprehended.

CM I pg. 66 — Most RT crimes were self-reported after the fact.

LPD II pg. 51 — Generally there is an inability for a lone patron victim to summon assistance at the moment he/she perceives the vulnerability.

LPD II pg. 50 — Patron observers of crime may be discouraged from summoning assistance because of the deposit and dial public phones.

LPD II pg. 3 — Modest delays may result in responding to a "crime completed" because of higher priorities due to a response to a "crime in progress". A "crime in progress" will receive almost immediate response.

CM IV pg. 4 — There is a need for passenger activated communication in the form of emergency buttons located in the train or on the platform.

Why is a radio frequency alarm transmitter needed to improve patron perception of protection and reduce the opportunity for crime?

CM I pg. 66 — Offender apprehension is dependent upon the rapidity of CPD response.

There was one apprehension in over 1/2 of the cases when the response time was quick (within five to fifteen minutes).

CM I pg. 67 — The more time elapsed, the fewer the apprehensions.

CM I pg. 67 — This supports the assertion that delays in communicating the occurrence of the crime seriously hamper CPD function.

CM II pg. 85 — CPD's response was fast (within five minutes) to robberies. The apprehension rate was substantially higher when CPD arrived when the crime was in progress or committed only a short time before.

CM II pg. 87	The felon's escape after a crime against a person on a train was at the first possible train stop. A significant number of crimes against persons occurred on platforms and station lobbies and 50% of these felons escaped via train.
LPD II pg. 4	District response could not be accomplished in less than 3.5 minutes unless CPD is notified while the crime is in progress.
CM I pg. 69	A-1 stations have a ten minute longer response time. These are located in older neighborhoods with poorer auto mobility capabilities.
LPD II pg. 3	Modest delays may result in responding to a "crime completed" because of higher priorities due to a response to a "crime in progress". A crime in progress will receive almost immediate response.
CM II pg. 86	Generally the victims reported the crime after it was completed. CPD response was within five minutes in the majority of cases. One-third of the battery and assault offenders were apprehended.
CM III pg. 7-8	MTU's present lack of good continuous communications between the foot patrolman and the central dispatching sergeant cannot help but lower their impact.
LPD II pg. 51	Certain agent phones may be locked and force MTU train patrols to move to the street level to communicate with the CPD dispatcher.
CM III pg. 10	Limitations in mobility exist when encountering a felon on the opposite side of a dual platform station, and combined with communications difficulties both interfere with police response to crimes.
LPD II pg. 50	There may be a break in communication between the District Dispatcher and the Lincoln Band Dispatcher, and also intermittent communication with MTU officers, thereby creating a longer response and an increase in personnel/patron vulnerability.

LPD III pg. 57 — Radio communications are essential to initiate a response to the needs of patrons.

Radio alarms may be applicable to patron assistance requirements as well as those of CTA employees.

They can be applied in changing the environment of a crime in progress, such as employing remote locking or camera activation.

LPD II pg. 30 — MTU officers working between 2:00 a.m. - 10:00 a.m. outside the subway route would generally use the CTA phone system when available.

LPD III pg. 31 — It may be desirable to design specific new initiating devices which are more responsive to the needs of transit patrons.

Why is a closed circuit television surveillance system required to improve perception of protection and reduce the opportunity for crime?

UI-CM — The people interviewed feel <u>least</u> secure while:

1. on stairs, rampway or tunnel to the el subway platform
2. waiting on the el subway platform
3. waiting in the el subway stations

CM I pg. 25 — Many respondents had fear of lonely, dark platforms of walking to and from the transit stop or station, and of waiting for a bus or train late at night.

The effects of these fears are unknown regarding ridership.

LPD II pg. 4 — If a victim is a lone traveller on RT, the possibility of apprehending the felon is remote unless a witness can notify the police while the crime is in progress.

CM I pg. 65 — Witnesses were present in less than 1/4th of all cases.

LPD I pg. 12 — Witnesses may reduce occurrences and this may be done by hardware.

CM IV pg. 12 — Surveillance devices (a sophisticated form is CCTV monitoring) can be monitored continuously by personnel capable of assessing the meaning of activities observed. Such active control and sequencing ability greatly expands the surveillance capabilities of the system.

CM IV pg. 7 — The possibility exists of using cameras activated by an agent, operator, or passenger to obtain identification of suspects.

LPD III pg. 11 — Video data sampling's objective is the providing of video surveillance data transmission to assure the awareness of a response requirement.

LPD III pg. 12 — Video data sampling techniques can be used as a surveillance technique to verify a crime in progress, or to alert authorities to a potential crime. A typical application may be a camera surveilling a platform and within the video frame there may be an alcove where frequent hold-ups have occurred and, therefore, of specific interest. The presence of a patron in the alcove would indicate a change in the condition and a possible potential crime.

CM III pg. 28 — The experiment with CCTV in a tunnel between State and Dearborn subway stations provided some sort of coverage. Pertinent questions are the number of cameras, their cost, monitoring and their ability to deter crime on the el subway system.

The future use of CCTV is dependent upon the proof of capabilities and the solution to problem of image resolution and monitoring fatigue.

CM I pg. 58 — Ninety percent of all victims are lone. The majority of robbery and battery victims were white and male

Over 75% of the crimes against persons, the victims were women.

LPD I pg. 10 — Since batteries and robberies occur in similar locations, the former may be a prelude to the latter, and it would be desirable to create a situation similar to high density with hardware and systems.

CM II pg. 87 — More than a majority of the victims of crimes against persons were lone women, such as CTA agents, students and clerical workers. Most of the offenders were lone, some of the more serious crimes against persons had multiple offenders.

CM II pg. 84 — Almost all robbery victims were lone travellers, who were principally CTA employees, students and service workers. Most offenders travelled in groups of two or three.

LPD III pg. 27 — The application of alarm receivers, high line security devices, and premise control units to rapid transit facilities may vary from the protection of remote substations to the activation of hold-up devices and patron assistance systems. These techniques would be compatible to existing CTA protection concepts and facilities.

LPD I pg. 5 — Crime can be reduced with more contemporary design techniques. Current lighting standards vary greatly and may not be appropriate. The important factor is how will criminals view the potential opportunity for attack in low and high density periods in relation to his ability to successfully carry out the crime.

CM I pg. 69 — There is no difference between stations with twenty-four hour agent coverage and only seven hour coverage. Agent's have had no apparent effect on crime and no apparent affect on decreasing CPD response time.

Why does the capability to record a confrontation enhance the preventive capabilities of the system?

CM I pg. 65 — Witnesses were present in less than 1/4th of all cases.

CM II pg. 84 — Almost all robbery victims were lone travellers, who were principally CTA employees, students and service workers. Most offenders travelled in groups of two or three.

LPD II pg. 4 — If a victim is a lone traveller on RT, the possibility of apprehending the felon is remote unless a witness can notify the police while the crime is in progress.

LPD I pg. 5 — The important factor is how will the criminal view the potential opportunity for attack in low and high density periods in relation to his ability to successfully carry out the crime.

LPD III pg. 13 — The use of the video recording method may well serve a variety of documentary purposes in a rapid transit system, both relating to the control of crime or the performance level of personnel.

LPD III pg. 13 — Time lapse video recording is an effective means of documenting circumstances which may relate to a criminal act.

CM IV pg. 7 — The possibility exists of using cameras activated by an agent, operator, or passenger to obtain identification of suspects.

Why is proprietary console monitoring more advantageous to the patron's perception of security and to police response?

LPD III pg. 47 — Proprietary console monitoring provides a method of command control in the identification of a perceived criminal act and an initiation of an appropriate response.

LPD III pg. 53 — Proprietary consoles provide sufficient data from remote locations to permit appropriate and timely response. They have the capability of monitoring many devices and subsystems.

LPD III pg. 27 — The application of alarm receivers, high-line security devices, and premise control units to rapid transit facilities may vary from the protection of remote substations to the activation of hold-up devices and patron assistance systems. These techniques would be compatible to existing CTA protection concepts and facilities.

LPD III pg. 11 Video data sampling's objective is the providing of video surveillance data transmission to assure the awareness of a response requirement.

Editorial Note: The central monitoring concept through a proprietary console offers cost savings in that multiple locations can be monitored by a single individual who is trained to perceive developing criminal confrontations. In most cases the larger the system monitoring, the more cost-effective the individual platform protection costs will become.

Why is there need for a signal multiplexing system which can effectively, and in a timely manner, transmit communications requiring response to patron endangerment and property protection requirements?

Editorial Note: The multiplexing system provides for the monitoring of a variety of platform activities at a selection of platform locations by a single trained evaluator. This uniformity of the potential severity of patron endangerment judgement will assist in establishing consistency in the need for police response. The use of the multiplexing technique further provides a cost-effective capability to monitor platform activities beyond the requirements of the patron protective system. In this regard as new monitoring needs are defined regarding train operations or personnel accountability systems, they can be implemented for minimum cost.

LPD III pg. 4 Signal multiplexing techniques may be appropriate for the transmission of data relating to crime prevention from many rapid transit facilities to a central monitoring location from which a response might be initiated. Effective monitoring of multiple activities could be substantially increased with signal multiplexing.

CM III pg. 8 — Lack of communications with MTU forces local police districts to handle CTA incidents.

CM III pg. 7 — The police in MTU must rely on police, CTA or public phones. MTU's communication capability is poor.

CM III pg. 7 — The hand held transceiver is useless in the subway, experiences great interference in el cars, and transmission and receiving failures are common on open el platforms.

Why should there be hold-up alarms in the station agents' booths?

LPD I pg. 10 — Most battery victims were lone individuals.

LPD I pg. 10 — Many of these were CTA employees which implies that station agents and conductors are vulnerable to a coercion situation which degrades their ability to perform crime prevention tasks.

LPD I pg. 11 — Crimes against persons were committed against lone persons, particularly women, and involved public indecency. Frequently the crimes were against CTA women employees in fixed posts.

Public indecency does not lend itself to prediction for it requires only the likelihood of successful commission and escape.

LPD I pg. 12 — Witnesses may reduce occurrences and this may be done by hardware.

LPD II pg. 21 — The ticket agent's responsibility is to report all incidents and abuses, and is, therefore, linked to the safety and security system of CTA.

LPD II pg. 22 — The more the agent is protected the better he will be able to report a criminal incident.

CM I pg. 70	Stations with agent silent alarms had higher crime indicies because they are in higher crime areas.
CM I pg. 70	CPD's response time is ten minutes less in stations with hold-up alarms.
CM I pg. 69	The station agent has an important influence on the security atmosphere.
	An agent can act as a potential witness and his presence can have a possible deterrent effect.
CM I & II Table 18	CTA employees were victimized more than any other occupational group.
	CTA employees were the victims in 19.2% of all rapid transit crimes.
CM III pg. 13	CTA requires all incidents occurring on the system be reported immediately to either the line supervisor or CTA radio dispatcher. All employees involved in any way are required to submit a written report or see to it that one is submitted. Employees are required to render any possible assistance to crime victims.
CM II pg. 84	Robberies in the station lobby were mostly directed toward agents.

Why should there be intrusion detection devices on agents' booths?

CM II pg. 84	Robberies in the station lobby were mostly directed toward agents.
LPD II pg. 46	Agent booths are not substantial to resist attack or robbery.
LPD II pg. 49	The use of drawers in some agent's booths as cash repositories may increase the likelihood of successful robbery or cash manipulation.

LPD III pg. 27 — The application of alarm receivers, high-line security devices, and premise control units to rapid transit facilities may vary from the protection of remote substations to the activation of hold-up devices and patron assistance systems. These techniques would be compatible to existing CTA protection concepts and facilities.

LPD III pg. 28 — A door supervisor monitor may be used for the protection of valuables within the rapid transit system that may require intermittent access during operating hours.

Editorial Note: *The increase in valuable hardware located in the agent's booth in Solution #1 adds further justification for intrusion alarm techniques.*

SOLUTION #1

REMOTE MONITORING OF PATRON SAFETY

Alarm Actuator

Purpose of Device:

The alarm actuator will be utilized by any patron, who, upon entering platform level perceives himself/herself to be endangered either by the suspicious acts of present patrons, or their sole occupancy of the platform for an extended period of time.

Description of Device:

This device will be similar to a standard alarm industry holdup alarm actuator which requires that the activator button be pulled outward rather than pushed inward. Pulling of this button will cause a signal to be transmitted via hard wire to the remote circuitry which, in thirty seconds, will cause the radio transmitter to transmit a radio signal a distance of 1/2 mile. A second pair of hard wires from the actuator will cause a signal to be transmitted to the remote monitoring terminal which will activate platform devices and cause a remote signal to be transmitted to the MTU Dispatch Center.

Application of Device:

The holdup activators will be surface mounted at the immediate points of entry to the platform and agent's booth at a height of fifty-two inches. The requirement of pulling the activation button for activation is included as a deterrent for accidental activation caused by leaning against the device. Activation will require a conscious effort. Appropriate signs will be mounted immediately over the activating device. These signs are intended to motivate the patron to be perceptive regarding personal endangerment while deterring individuals who may purposely initiate a false alarm. The text of the sign will contain a reference to the statute in the City Code dealing with false alarms and furnishing false information of a crime. The patron message will read as follows:

> "Patron's requiring personal protection will pull the assistance button for police response. You will automatically be recorded on closed circuit television."

The actuating device shall be constructed in a heavy steel encasement and mounted to the surface with nonreversing screws. The two pairs of connecting hard wire shall be encased in rigid conduit from the mounting location to the ticket agents' booth where they connect to the alarm transmitter circuitry and the remote monitoring terminal.

The mounting surface shall be painted in a distinctive color from floor to structural ceiling in a thirty-six inch wide strip. This will assist in locating actuating devices from any location on the platform.

Stability of Device:

This device is extremely stable and not subject to malfunction.

Potential Device Modification Requirements:

None.

Benefits of Device:

. Requires positive action by patron to activate.
. Reduces accidental activation because of construction.
. Immediate availability to patron on entering platform or at other secondary locations.
. Patron assurance that response reaction of law enforcement can be initiated based upon individual perception of endangerment.

Potential Suppliers:

Mosler Electronic Systems Division
9 South Street
Danbury, Connecticut

Walter Kidde and Company
65 Route #4
River Edge, New Jersey

Closed Circuit Television Surveillance

Purpose of Device:

The closed circuit television platform system will be used to provide a method of witnessing a patron's perceived "distress" situation. Based upon the perceived endangerment becoming a reality, the surveillance system will provide an identifiable record of a confrontation while permitting a monitoring individual to make a valid judgement as to the need for a police response.

Description of Device:

This closed circuit television camera shall be capable of monitoring a field of vision which shall include the potentially endangered patron. The unit shall provide 650 lines of horizontal resolution by solid state circuitry and shall be provided with an automatic light compensation of approximately 5,000 to 1 capable of providing a useable picture with as little as .5 footcandles of illumination at the faceplate. The camera unit shall operate on 110 VAC source of power. The unit shall be capable of continuous operation with no material alteration in the quality of a transmitted picture. The camera shall be capable of operation in temperature ranges between 25°F and 140°F.

In instances where the cost of illuminating to a level of .5 footcandles at the camera faceplate would exceed the cost of a more sensitive camera capability, a more sensitive camera shall be utilized.

This alternate camera shall provide 650 lines of horizontal resolution, be of solid state circuitry and capable of producing a useable picture with .001 footcandles of illumination at the camera faceplate and automatic light compensation as necessary based on the dark to light fluctuations in the applied environment. The camera shall utilize a 110 VAC source of power and be capable of continuous operation without alteration in the quality of the transmitted picture.

Lens - A wide angle *f*1.4, 9mm lens system shall be provided which covers an approximate field of vision encompassing 82°. This shall be a fixed focus lens with good focus capability from foreground to an estimated distance of fifty feet. The approximate field of vision capability at fifty feet from the lens shall be seventy-six feet in width and fifty-five feet in height; and at a distance of five feet from the lens, it shall be five feet in width and seven feet in height. Good definition shall exist at least to a distance of fifty feet in the field of visions.

Camera Housing - Each camera applied to an unheated area which is exposed to the public shall be provided with a tamper resistant housing with an automatic heater kit capable of maintaining a thermostatically controlled temperature above 25°F. The housing shall provide for access to the camera by key and shall be capable of withstanding a moderate physical attack similar to that sustained by throwing a five pound weight a distance of ten feet before striking the housing.

Mounting Brackets - The camera and enclosure housing shall be mounted in a fixed position by stable, heavy-duty brackets capable of a minimum 180° swing and secured to the mounting surface by not less than three heavy-duty (1/4 inch or larger) bolts.

Automatic Sequential Switchers - Automatic sequential switching devices with a capability of controlling up to eight cameras are commonly available. These sequential switchers cause each camera to be scanned for variable periods of from .05 to 60 seconds based upon the needs of a specific application. This scanning of multiple cameras can be terminated with the switcher holding a particular camera picture until the system is reset. This will permit a patron having initiated a specific assistance call to hold themselves on a television monitor at the central monitoring point until a train arrives or police response arrives on the scene. This will further permit the endangered patron to be video taped for subsequent investigation if the circumstances warrant such action.

Application of Device:

The camera system shall ordinarily be mounted at a height of eight feet to a secure, stable surface with a clear visual field not less than twelve inches above the mounting bracket. The cameras shall operate in a live mode at all times. If mounted on subway tunnel walls, the height will be an estimated fifteen feet. Based upon activation of the patron assistance alarm, camera transmission will be recorded onto video tape direct from the

monitoring location. The visual surveillance field shall be within a defined patron confrontation area extending from the entrance to the platform and encompassing the patron waiting area in accord with a two or four car train as may be appropriate. Within the visual field of each camera will be a patron assistance button which serves as the system initiating device. The location of this initiating device will be well within the distinct visually identifiable field of the camera lens.

Stability of Device:

Most closed circuit television cameras of solid state design are relatively stable as regards operation and maintenance. Not infrequently the most frequent replacement relates to the Vidicon tube whose life expectancy will vary greatly with quality. A common rule of thumb on cost of maintenance is 10% of the cost of hardware.

Potential Device Modification:

None. All hardware is available as manufacturer's "shelf" items.

Benefits of Device:

This surveillance system is cost-effective because it permits manpower allocations to be reduced to that required for monitoring multiple locations with nearly the same effectiveness as a man assigned to a specific area of the platform. The following predictable benefits will accrue from its use.

. Reduced manpower requirements in actual platform patrol. Assuming a requirement of manning a platform for 24 hours each day, 365 days each year with a qualified police officer, the predictable cost of the assignment is $50,400 each year. This is based upon a salary of $12,000 each year and a manpower requirement of 4.2 men per post. This system, per platform for installation over a comparable period of years, will be less expensive.

. Multiple camera application to a platform will provide consistent and continuous coverage which cannot be accomplished by one man assigned continuously to a platform post.

- Camera application is capable of providing a record of a confrontation thereby carrying the implied threat of a live witness for the prosecution.

- Camera application will improve the perceived patron level of protection because of the assumption of continuous surveillance within the confines of an identified surveillance area. In actual fact cameras may be scanned by a monitor with a stop sequence based upon activation of the patron assistance button or the monitoring of a central console operator.

- Because of the ability of a monitor to observe a suspicious act on the platform, he will be capable of initiating a police response in advance of the commission of a crime.

- Because of the surveillance system, the actual frequency of platform checks conducted by District Commands can be reduced.

Potential Suppliers:

G.B.C. Corporation
74 Fifth Avenue
New York, New York

Motorola Communications and Electronics, Inc.
1301 East Algonquin Road
Schaumbery, Illinois

Special Note: The length of transmission of a television picture may require booster amplification units.

Radio Alarm Transmitter:

Purpose of Device:

The radio alarm transmitter will be used to provide a method of communicating a patron's perceived endangerment directly to a police patrol or personal radio receiver within 1/2 mile of the alarm initiating location.

Description of Device:

This device is capable of monitoring two alarm initiating points or, with an expansion board, up to six alarm initiating points. An alarm initiating device will cause the transmitter to transmit a signal with up to thirty watts of radio frequency power direct to a patrol receiving unit. The device is provided with a coding technique which creates a unique identification signal in a sub-audible technique. The initiation of an alarm from the transmitter creates a distinctive tone signal which is transmitted and which is repeated three times to guarantee reception in crowded channels. The transmission of the signal tone, such as a tone burst of two-four, would provide the distinctive identity of a specific platform or split platform or in the case of subways, a specific location on a large platform. To assure a nondisruptive signal to primary police and radio transmissions, the sub-audible identifying tone burst is accomplished three times in one minute intervals.

The alarm initiating devices can be hard wired to any (normally open) device similar to commonly utilized devices in the alarm industry. The unit is capable of operating from any 12 volt D.C. source, a self-contained rechargeable 12 volt battery or it can be utilized with battery chargers operating from 117 VAC. The unit is 100% solid state design which will assure long life and the electronics are encased in an all weather water-resistant cabinet. It is necessary to utilize an external antenna.

One master system of this alarm reporting unit is capable of accomodating up to eighty-one remote units. Since each remote device can handle up to six distinct signals, the total alarm initiating points total 486. This device operates effectively in temperatures ranging from -22°F to +149°F.

Application of Device:

The radio alarm transmitter will be mounted within the agent's booth in the test platform and connected to an external antenna mounted on the roof of the platform. At least two, and up to six, alarm initiating buttons will be mounted at platform level entrances or otherwise strategically placed to assure the patron is always within reasonable proximity to an alarm initiator.

The patron, believing himself/herself to be in potential danger, will pull the nearest alarm initiating button. A coded signal will be transmitted to the central monitoring location causing an operator to retransmit a signal to the remote monitoring terminal which will activate the radio frequency alarm unit (See Function of Remote Monitoring Terminal [RMT] and Central Monitoring Terminal [CMT] for details of alarm transmission monitoring and platform closed circuit monitoring). If the central MTU monitor does not abort police response through primary console communication within thirty seconds, the platform radio alarm transmitter automatically initiates a transmission of a distinctive sub-audible tone burst to any police patrol radio receiver within 1/2 mile and operating on the same frequency. The police patrol unit will respond immediately to the identified location.

Stability of Device:

This device should assure a long operating life and be relatively maintenance free because of its solid state weather resistant construction and relatively passive operating nature. Because the device will be located within the agent's booth, it will be relatively free from tampering and vandalism and immune to weather, heat and cold characteristics.

Potential Device Modification Requirements:

The following modifications may be necessary in "off-the-shelf" hardware to assure total compatibility. Because of the potential broad application in mass transportation, such modifications are believed to be of relative insignificance.

- Potential modifications to assure transmission in appropriate police radio frequencies.
- Potential use of timing relay between the initiating device and transmitter to assure a thirty second delay in the signal transmission.
- Potential reduction in signal transmission power to limit signal transmission to 1/2 mile in distance.

Benefits of the Device:

This device assures a reasonably cost-effective application of protective hardware. The following predicted benefits will accrue from its use.

- Provide the patron with a method of taking predictive, responsive action
- Provide a substantial reduction in police response
- Provide improved patron perception of police capability because he will respond either during the commission of a crime or prior to a felon's successful escape
- Provide improved perception of a potential felon's observation of the criminal opportunity resulting in a reduced likelihood that the criminal attack will be initiated
- Reduce the potential extent of injury to a patron because the interception of a criminal attack will take place earlier than has formerly been the case

Potential Suppliers:

Motorola Communications and Electronics, Inc.
1301 East Algonquin Road
Schaumbery, Illinois

Transcience Corporation, Inc.
17 Irving Avenue
Stamford, Connecticut

Signal Multiplexing and Signal Initiating

Purpose of Device:

The signal multiplexing capability will be utilized to provide a means of processing various signals of indicated conditions on a platform, transmitting those signals to the appropriate action locations either on the platform or at a central monitoring location. This will be accomplished with a reduced wiring requirement between the remote monitored platform and the central monitoring location.

Description of Device:

The multiplexing system will provide for a remote monitoring terminal located in a secure location on the platform. From this remote monitoring terminal all appropriate system devices relating to this solution will be connected by "hard wire". The activation of various sensors, in this case patron assistance buttons, will be transmitted to the remote monitoring terminal.

The remote monitoring terminal will process these signals and retransmit coded signals to the central monitoring point where response action will take place by the central monitor. Because these various platform initiated signals are converted into a digital language and retransmitted at high speed, a single wire between the remote monitored location and the central monitoring location will carry all necessary communications. Each remote monitoring terminal, generally one per platform, will be capable of processing thirty-two initiating signals from the platform. This capability exceeds predictable solution design requirements. The central monitoring terminal will receive digitally encoded messages from the remote terminal at the platform, and provide a monitor operation with a capability of determining which specific platform signal initiating device was activated, therefore, permitting the appropriate action to be taken.

The central monitoring terminal is capable of handling eight remote monitoring terminals or a total of 256 distinctive signals and converting these signals into required action indicators.

The multiplexing signal system will be provided with a line supervision module which will detect open or grounded circuits in any of the platform field wiring from the remote platform terminal to the initiating device. The central monitoring terminal will periodically interrogate each circuit to determine its status. System failure will be reported as a "trouble" indication while platform initiating signals will be reported into a required action indication.

Special Note: *Because of the need to transmit a television signal over coaxial cable, it will be necessary to provide for a separate and distinct television communication capability. We believe the most practical answer is the leasing of a coxial cable from the Bell Telephone System.*

At such time as microwave carrier becomes a serious consideration, such as would be the case in multiple application of this solution, the remote television monitoring capability will become a more cost-effective consideration.

Application Device:

The remote monitoring terminal (RMT) will be located inside the platform agent's booth. Various wire runs from alarm initiators will terminate at the remote monitoring terminal. A description of the connected devices are as follows:

. The patron assistance button will be wired direct to the RMT. Activation of the patron assistance button will transmit an impulse to the RMT which, in turn, will cause the television camera synchronization unit to terminate scanning of all cameras and fix the picture transmission of the camera associated with the activated assistance button.

. The patron assistance button will also be wired directly to the RMT in the agent's booth which will, in turn, initiate an alarm impulse to the central monitor who will view the "locked in" television picture. The monitor operator upon observing the patron in endangerment will permit the CMT to return a signal to the radio alarm transmitter which will transmit a sub-audible code to any police patrol vehicle within 1/2 mile of the platform. The patrol vehicle will respond based upon receipt of the alarm condition. If the central monitor believes the patron is not endangered, he will depress an "abort" switch at the console which will terminate the return signal to the platform radio transmitter.

. The agent's booth will be provided with magnetic contacts on the booth entry door and duress switch which will be wired directly to the RMT. During nonagent hours the opening of the door will cause an impulse to the RMT which will retransmit an intrusion alarm to the central monitoring terminal.

Stability of Device:

The construction of multiplexing systems is of solid state circuitry and, therefore, is reasonably maintenance free.

The means of signal transmissions, the multiplex cable, is virtually without problems except those occasioned by man.

Potential Device Modification Requirements:

None.

Benefits of Device:

The majority of the benefits in multiplex signalling revolve around cost-effective application. We have detailed other benefits below:

- The use of signal multiplexing maximizes the use of required transmission cables. Individual sensors require the shortest possible wire run with multiple sensor signals processed through a terminal for long distance over one cable of three twisted, jacketed and shielded pairs of wires.

- The use of multiplexing system provides a reasonable level of protection from tampering or circumvention of transmission links which assure definition of failure location and facilitates repair.

- The use of multiplexing promotes two-way communication between the monitored and monitoring location. This makes the patron system a response oriented system as opposed to a reporting system only.

- The multiplexing system is modular and expandable providing adaptability to future design needs, as well as selected electro-mechanical supervision related to the physical operation and signalling of trains.

- Because the multiplexing system is fast and secure, patrons are assured of no measurable delay in the transmission of a call for assistance.

- Because the multiplexing system represents application, not leading to obsolescence for some time, the concern of maintaining state of the art protection is relegated to the sensor based, or less expensive, part of the system.

Potential Suppliers:

American Multiplex Systems, Inc.
175 Freedom Avenue
Anaheim, California

Notifier Company
3700 North 56 Street
Lincoln, Nebraska

The Central Monitoring Console

Purpose of Device:

The central monitoring console will provide the capability of a single qualified operator at the Mass Transportation Unit Dispatch Center to evaluate patron endangerment and as appropriate, initiate a proper response.

Description of Device and Application:

The description contained herein pertains to a central monitoring console configuration as it may be associated with one platform. Its expansive capability would offer additional economics in the application of monitoring equipment. For example, one multiplexing system, which is an integral concept of this console, can handle up to 8,000 protected points if required.

The console configuration will consist of a separate set of television monitors, recording equipment and multiplex signal receiving and initiating equipment.

CCTV Module - The transmission of a television picture from the platform shall be accomplished by coaxial cable leased from the Bell Telephone Systems. Assuming that a platform has three live television cameras, these cameras will be monitored by one 9 inch video monitor. Because the platform sequential switcher will be changing the monitor picture every thirty seconds, one monitor will be sufficient for the platform. At such times as a patron on a platform activates an assistance button, the sequential switcher will cover only the transmission of the camera providing coverage of the endangered patron.

This console CCTV module will provide the capability for the operator to switch the transmitted picture to a twenty-three inch monitor adjacent to the console. This will provide the operator with a clear visualization of the perceived endangerment. If the operator's determination is one of patron endangerment, he will cause the surveiled sequence of events to be recorded on video tape.

A time lapse video recorder will be associated with the CCTV module. This video recorder will permit time compression which provides a lapse ratio up to sixty-one hours of recording time. This recorder will be provided with a time and date generator which will superimpose this information on the tape as the recording is taking place.

The console operator, at the termination of a patron endangerment event, shall be capable of remotely instituting the scan mode of the sequential switch at the platform location.

The video tapes will be retained until police supervision reviews the morning crime reports and compares them with the previously recorded events. If need be, the appropriate events will be extracted from the tape as part of the investigative case file. If no extractions are required, a supervisor may permit the tape to be purged.

Multiplex Monitoring Module - The multiplex monitoring module will receive signals from the monitored platform, record on hard copy the received signals and initiate response action with similar hard copy recording of events. These monitored and recorded events, specifically, are as follows:

- The console will provide a light indicator initiated by the platform assistance button which will relate the platform to the camera converting to a fixed visual field from the scan mode.

- The console will provide for the transmission of a reaction signal to the remote platform terminal and then to the radio alarm transmitter. After thirty seconds have passed from receipt of the initial alarm at the console, this reaction signal will automatically be transmitted. An operator intervention button will be provided which permits the console operator to terminate this reaction signal to the RMT and radio alarm within the thirty seconds prior to its automatic occurrence. During this thirty second period,

the console operator will decide the degree of patron endangerment, whether to video record the event or whether to abort the console's automatic activation of the radio alarm unit.

- The console will provide a light indicator which will identify the ticket agent's transmission of a holdup signal at a specific booth.

- The console will provide a light indication which will identify the unauthorized opening of the ticket agent's booth entry door or the breaking of the booth window during such periods when no agent is in residence in the booth.

- The console will provide a light indication which will identify the open or grounded condition of any field wiring connected to the remote platform monitoring terminal. The console will interrogate the status of each circuit in the system.

- The console shall provide additional space for a minimum of three functions which may subsequently be carried on at the platform and monitored by the console operator.

- A priority dispatch telephone will be provided to the Central Police Dispatch Unit to facilitate holdup response and to define this crime situation as distinctive from the patron confrontation.

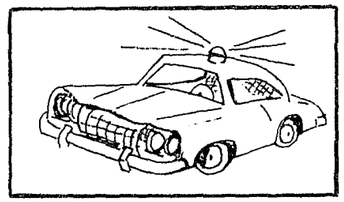
SEQ MONITORS
CONFIRM & ABORT

9" SCREENS - IMAGES
CAN BE TRANSFERED TO
23" SCREEN

23" SCREEN

VIDEO TAPE
RECORDER

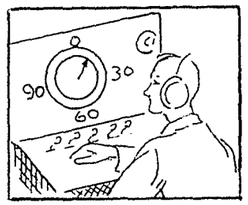
DISTRICT PATROL



MAX. 5 MILES

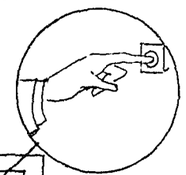
SCANNER

PRINTER



CENTRAL
MULTIPLEX
TERMINAL
M.T.U
HEADQUARTERS

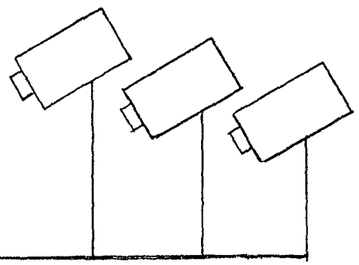
SECURE AREA
AGENTS BOOTH

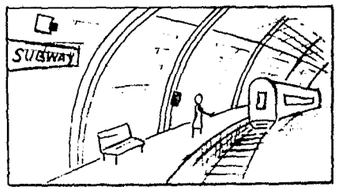


AGENTS
HOLD UP
BUTTON
BURGLAR
ALARM

REMOTE
MULTI-
PLEX
TERMINAL

EQUIPMENT
LOCATED ON SUBWAY PLATFORM





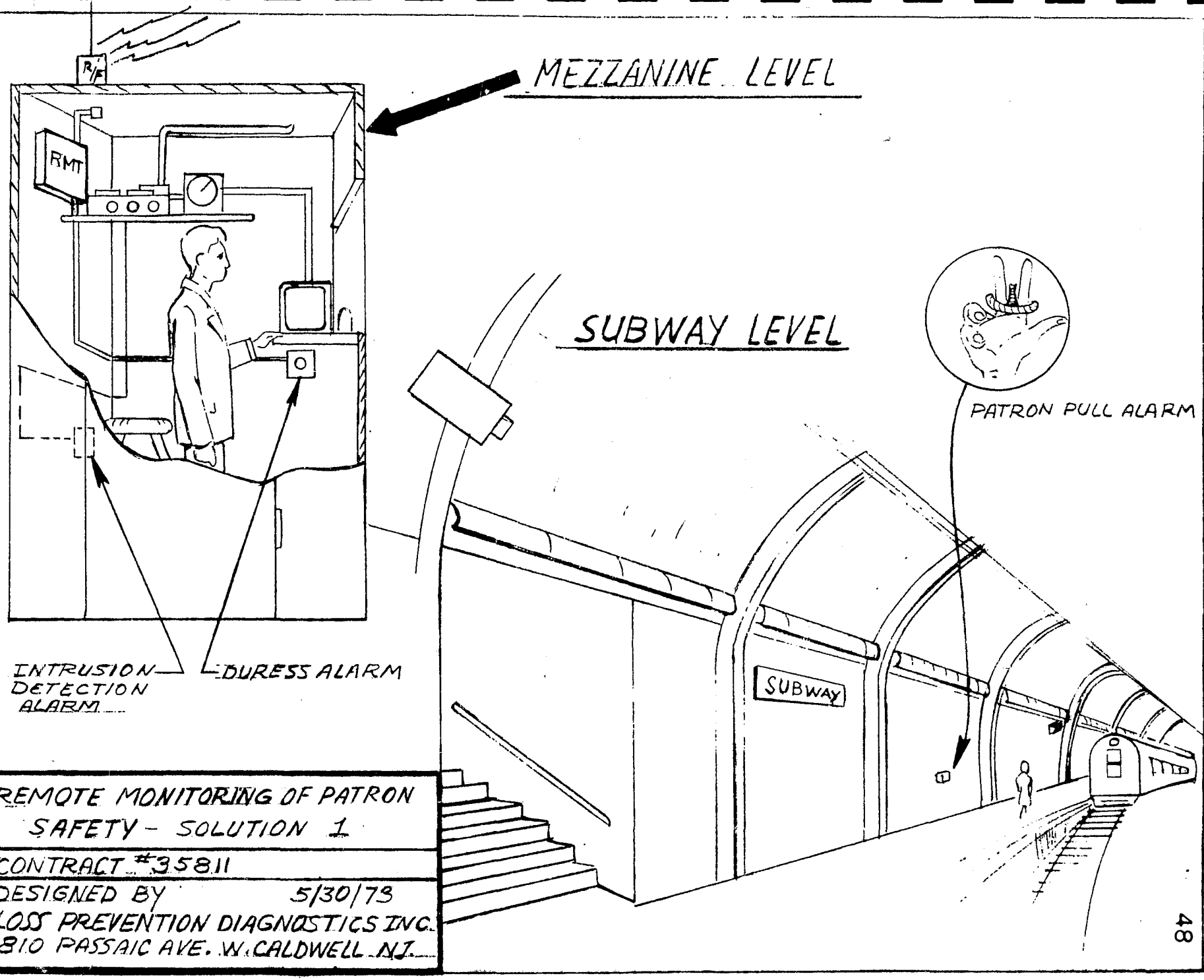
PATRONS' PULL ALARMS

REMOTE MONITORING OF PATRON SAFETY — SOLUTION 1

TRANSIT SECURITY STUDY
CITY OF CHICAGO

CONTRACT # 35811

DESIGNED BY 5/30/73
LOSS PREVENTION DIAGNOSTICS INC
810 PASSAIC AVE., W. CALDWELL, N J



REMOTE MONITORING OF PATRON SAFETY - SOLUTION 1

CONTRACT #35811

DESIGNED BY 5/30/73

LOSS PREVENTION DIAGNOSTICS INC.
810 PASSAIC AVE. W. CALDWELL NJ.

SOLUTION #1 (APPLIED)

The application of Solution #1 to the Jackson Boulevard station represents a selection based upon a crime ridership index of 6.9 which was the second overall highest index in the subway system. This station sustained thirty-seven robberies in the twenty reporting periods which were the subject of research examination. From the desirability of an implementation test location, it is also our belief that this station will require the minimum distance between the station and potential central monitoring locations if leasing of coaxial cables is considered. We believe its application to this platform will provide maximum patron exposure to the solution.

In the application of the solution to a rapid transit platform, we believe the following hardware will be applied. It should be borne in mind that the surveilled area consists of 100 feet of platform area. It is the intent of this solution to restrict the area where hardware will be applied consistent with train operation during high crime periods. It is conceivable that in extremely long platforms this solution may be applied twice at opposite ends of the platform.

Hardware required for 100 foot surveilled area as defined in Solution #1.

Platform:

3 Television cameras with low light level capability and a 1.4*f* 9mm wide angle lens in environmental housing with appropriate mounting brackets.

3 Patron assistance activators

1 Radio alarm transmitter with capability of broadcasting a subaudible digital tone a distance of 1/2 mile from street level.

1 Remote multiplexing terminal capable of transmitting several distinct signals over a single hard wire to a central monitoring point.

1 9 inch monitor in the agent's booth capable of reproducing a surveillance picture either in a scan or hold mode as dictated by the patron activation of the assistance button.

1 Hold-up activator in the agent's booth which transmits a district signal via the remote multiplex system.

1 Magnetic door contact and foil or window contact on agent's booth capable of transmitting a burglarious entry signal via the remote multiplex terminal.

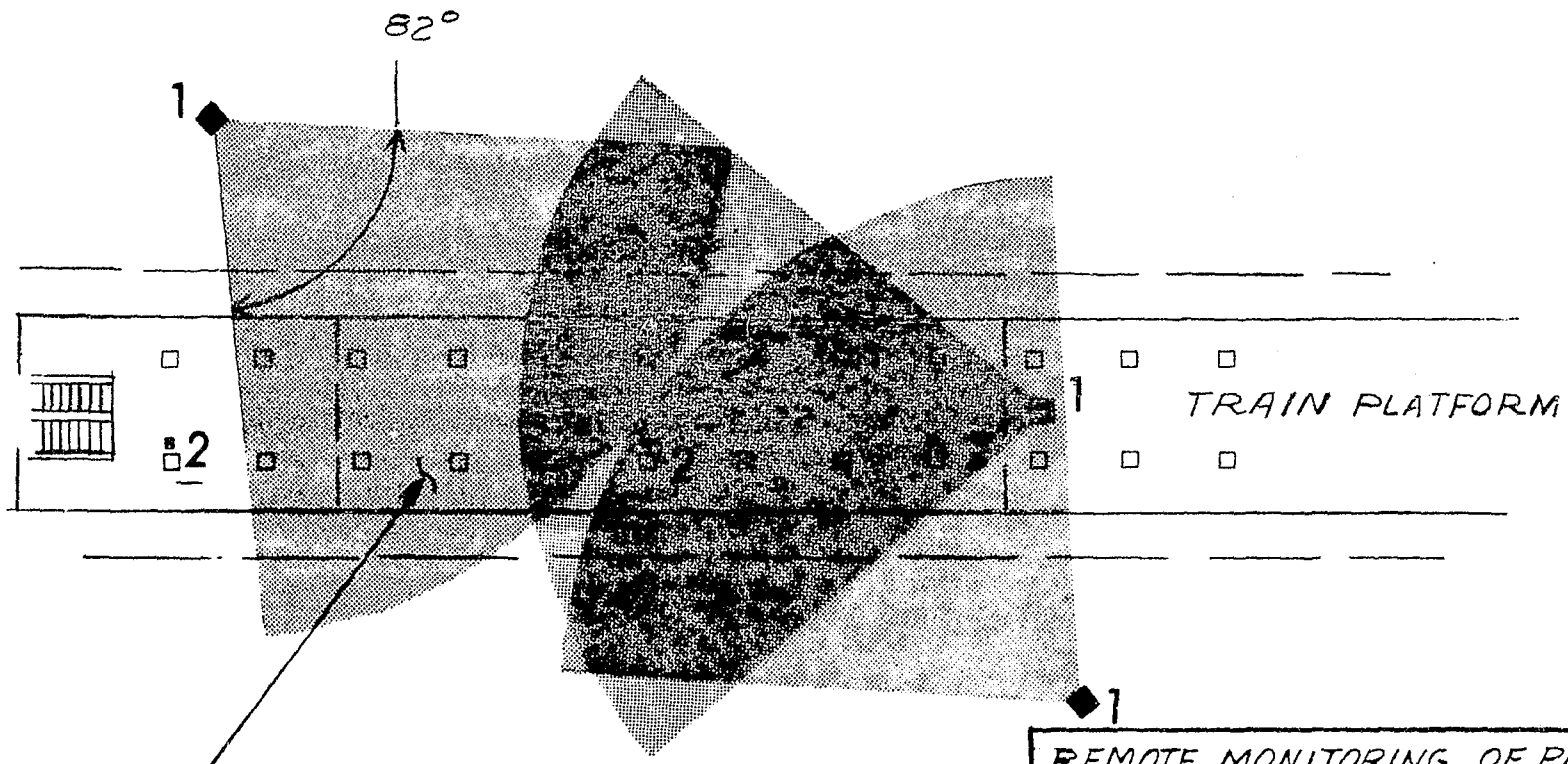
Central Monitoring Point:

1 Central Multiplex Terminal capable of monitoring distinctive platform signals exclusive of CCTV transmissions but including patron activation of assistance buttons, burglary and robbery signals; and further capable of transmitting to the platform a release signal for the radio alarm unit via a single hard wire multiplex cable.

1 9 inch monitor and one 23 inch monitor capable of portraying a surveillance picture of 100 feet of surveilled platfrom with an associated switching device which portrays each camera for 30 seconds until a patron button is activated at which time the switcher holds the camera on the 9 inch monitor permitting the operator to switch to the 23 inch monitor.

1 Video tape recorder capable of recording from the 23 inch monitor based upon the decision of the console operator.

1 Printer which will document each action received or initiated from the central monitoring point.



COLOR CODED SAFE AREA

1 CC.TV CAMERA
2 PATRON PULL ALARM

REMOTE MONITORING OF PATRON SAFETY SOLUTION 1 APPLIED
STATE ST. SUBWAY, NORTH-SOUTH LINE
JACKSON STATION

CONTRACT #35811

DESIGNED BY 5/30/73
LOSS PREVENTION DIAGNOSTICS INC.
810 PASSAIC AVE. W. CALDWELL N.J.

SOLUTION #1 (APPLIED)

ESTIMATED COST

The estimated costs set forth below provide for no contingencies. Because the majority of hardware is "off-the-shelf" requiring only modest modification, if any, we believe engineering costs should not represent a serious investment, specifically not in access of 10% hardware costs. Estimates are divided into two categories; those requiring capitalization, and those representing continuing expense. Because test period maintenance costs are highly negotiable, no estimates are provided. This solution is applied to a 100 foot sector of a subway platform within one mile of a monitoring location.

Platform:

Hardware	Capitalized Cost		Expense
3 Low Light Level Cameras	$ 1,100 ea.		
3 1.4*f* 9mm 82° Wide Angle Lens	200 ea.		
3 Environmental/Secure Housings	180 ea.		
3 Heavy-duty Mounting Brackets	40 ea.		
	($ 1,520 x 3)	$ 4,560	
3 Patron Assistance Switches	($ 60 x 3)	$ 180	
1 Radio Alarm Transmitter		$ 1,200	
1 Remote Multiplex Terminal with Line Supervision		$ 205	

	Capitalized Cost	Expense
Platform: Agent's Booth		
1 9" Monitor	$ 150	
1 Holdup Activator	$ 60	
1 Magnetic Contact	$ 8	
1 Foiling Unit	$ 20	
Subtotal	$ 6,383	

	Capitalized Cost	Expense
Subtotal brought forward	$ 6,383	
Estimated cost of data link over a distance of one mile at .09¢ per foot	$ 494	
1/2 mile coaxial cable allowance in platform and one (1) coaxial cable link to monitoring location at estimated lease expense of $190 per mile per month for twelve months (285 x 12)		$ 3,420
Special engineering estimate 10%	$ 688	$ 342
Cost of installation is estimated at 110% cost of hardware. This estimate provides a realistic rule of thumb without regard to unforeseen difficulties in the installation.	$ 15,887	
Estimated platform related costs in first year	$ 23,452	$ 3,762

	Capitalized Cost	Expense
Central Monitoring Console (This estimate pertains to one applied solution with an expandable console capability.)		
1 Central Multiplex Unit with two hundred point capacity	$ 4,200	
1 Regenerative Line Repeater	600	
1 Emergency Power Unit	1,100	
3 9" Monitors at $150 each	450	
1 23" Monitor and Switchover Gear	600	
1 Sequential Switcher	250	
1 Video Recorder (Time Lapse)	4,000	
1 Character (Date and Time) Generator	2,500	
1 Printer	2,000	
Special Engineering Estimate 10%	1,570	
Cost of installation is estimated at 110% cost of hardware. This estimate provides a realistic rule of thumb without regard to unforeseen difficulties in the installation.	17,270	
	$ 32,970	
Estimated Cost of one Console Monitor seven days a week, 365 days at $12,500		$ 52,500

Summary of Estimated Costs

Solution #1

	Capitalized Costs	Expense
Platform	$ 23,452	$ 3,762
Central Monitoring Console	32,970	52,500
	$ 56,422	$ 56,262

After initial capitalization, the continuing operating costs are estimated at $56,262 exclusive of negotiated maintenance. Expansion of the system to more than one test platform would incur a similar platform cost with a greatly reduced cost for expansion of the Central Monitoring Console.

SOLUTION #2

LOCAL MONITORING OF PATRON SAFETY

EXECUTIVE SUMMARY

SOLUTION #2

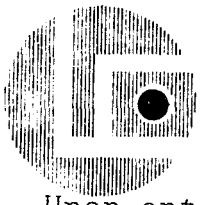
Local Monitoring of Patron Safety

The objective of this solution is to provide the patron with a reasonable degree of protection perception and a capability to take responsive action based solely upon an evaluation of personal endangerment. It is the objective of this solution to provide the patron with a method of initiating police response based upon a perception of endangerment. It is further the objective of this solution to provide the patron with an educational cue upon entry to the rapid transit system which reinforces their need to predict endangerment and provides information on the defensive action which they may take. It is also the objective of this solution to reduce the perception of criminal opportunity as observed by the felon and to create the potential for a reduction in allocation of police manpower.

This solution has been designed to provide a less expensive alternative to Solution #1. This solution does not include remote monitoring of patron safety; however, with that exception all other objectives are accomplished. This solution is one which is self-contained on the platform in that all functions are controlled, automtically, from the agent's booth, but do not require an agent's presence.

This solution requires that specific areas of a platform be visually defined for the patron as a waiting location for public transportation. These distinctively defined areas will be associated with the normal train size operating at nonpeak load hours; most frequently, a two-car train. The area will be color-coded and highly lighted. The patron, upon proceeding up the stairs to the platform, will interrupt two photoelectric sensors in a series, one behind the other. This sensor disruption must occur in a sequence of unit one and then unit two which will be indicative of motion up the stairway to the platform. Activation of the photoelectric sensors (unit one and unit two), shall cause an impulse to be sent to the agent's booth further causing the following prerecorded message to be conveyed to the patron as he/she reaches the top of the stairs.

> "This is a CTA safety announcement. You are entering the public transportation system and your safe passage is a public concern. Please remain within the color coded area where your safety can be visually recorded. Should you require police assistance, pick up the red telephone in the center of the platform."
>
> (A fifteen second message)



Upon entering the platform area the patron will be within the visual range of the closed circuit television system which will be repeated on a nine inch monitor in the agent's booth. This will permit the agent to surveil the general platform activity, but will not require any action on his part unless he perceives danger which the patron has not perceived.

In the center of the color-coded surveilled area will be a red self-locator telephone mounted on a post at a height of fifty-two inches. If the patron perceives personal endangerment, he/she may pick up the telephone and be directly connected to an MTU Dispatcher regarding the need for police assistance which the dispatcher may initiate. At the time the patron removed the telephone handset from its cradle, a second impulse was transmitted to a video tape recorder which caused the surveilled scene, including the patron, to be recorded on video tape.

This system is designed to be responsive to the patron perception of safety and felon perception of opportunity during low occupancy periods when crimes of opportunity reach their peak. Because of this objective there will be a disconnect switch in the agent's booth which will deactivate the photo-electric sensor and loudspeaker message system during high traffic periods. The balance of the system will remain intact at all times. The video taping of a patron's perceived endangerment can be used as an investigative tool which will serve the purpose of a witness to a confrontation as well as serve to deter the felon who may perceive the surveilled opportunity to commit a crime as a less desirable opportunity.

This solution meets the criteria for criminal occurrences in mass transportation as defined and authenticated in the research phases of this study by the three participating agencies. The solution is responsive to the patron's perception of safety as well as educational in their use of the system and their responsibility to be perceptive regarding personal safety. The solution is responsive to improvement of police response as well as reducing the apparent opportunity to commit a crime.

RESEARCH SUPPORT FOR SOLUTION #2

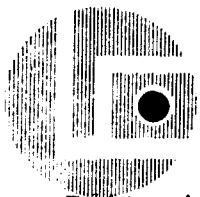
Set forth below is extracted material representing conclusions concerning the needs and capabilities of the rapid transit system of the City of Chicago in its concern for the protection of the patron. The extracted material is from previously conducted and documented research completed by Carnegie-Mellon University, University of Illinois and Loss Prevention Diagnostics, Inc. and submitted to the Transit Security Committee.

The format utilized below poses a series of questions pertaining to the component parts of the solution. The extracted material set forth represents the support for the components existence in the solution.

The extracted documentation is identified by its source in accordance with the coding set forth below.

Source Codes for Extracted Justifications

CM I	Carnegie-Mellon University's I. Data Collection and Analysis
CM II	Carnegie-Mellon University's II. Profiles of Crime on the CTA
CM III	Carnegie-Mellon University's III. Existing Security Measures on the Chicago Transit System
CM IV	Carnegie-Mellon University's IV. Survey of Security Devices and Techniques
UI-CM	University of Illinois' findings presented in Carnegie-Mellon University's Survey Highlights
LPD I	Loss Prevention Diagnostics, Inc.'s Review and Analysis of Crime Profiles - Work Element I
LPD II	Loss Prevention Diagnostics, Inc.'s Existing Protection Resources, Chicago Transit Authority - Work Element II
LPD III	Loss Prevention Diagnostics, Inc.'s Stable State of the Art, Review of Protection Hardware - Work Element III



Editorial Note: *Carnegie-Mellon's analysis of Crime/Ridership reflects that the majority of crime committed in rapid transit occurs between the hours of 5:00 p.m. and 3:00 a.m. (63.3%). The analysis indicates that over 90% of all victims were alone when confronted. This solution deals with the issue of low patron density and high criminal incidence. During high patron density periods and corresponding lower criminal incidence periods, the solution improves patron perception of protection.*

Why is there a need to improve police response?

UI-CM — Public would feel more secure if they:

1. saw more police officers on platforms and trains
2. knew quick assistance was available from CTA personnel or police
3. knew that a policeman and police dog were assigned to each bus or train during nonrush hour periods.

UI-CM — Between 50% and 65% of the various types of CTA users (e.g. bus only, subway only) perceive safety from crime or harassment to be fair to very poor on the el subway.

LPD II pg. 4 — CPD greatly increases one man beats and two-man beats to lessen the response time in peak crime periods and to increase the effectiveness of the response.

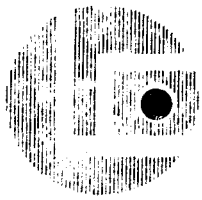
LPD II pg. 5 — Response follows the crime and does not have a direct impact on prevention. Intensification of the patrol function must have preventive impact.

Editorial Note: *We believe a shortened police response will result in a higher level of perception and have a preventive impact on felons as they observe the timely response.*

LPD I pg. 10 — Most batteries are committed by lone felons who seek the one on one opportunity. Appropriate hardware and systems can overcome the lone patron exposure period, but not the physical attack which must be overcome by superior authority and timely response.

CM I pg. 2 — The bulk of transit crime occurs within the confines of rapid transit stations as opposed to on trains or buses.

LPD I pg. 9 — The number of crimes reported by the victim suggests that a CPD five minute response does little to reduce the potential injury of the victim.



CM I pg. 67 — A majority of the high robbery stations have a response time of sixty-one minutes or more. These are in high crime CPD districts and the unavailability of CPD units may be the cause.

CM I pg. 70 — CPD's response time to side platform stations is seven minutes longer than that of island platform stations.

CM I pg. 67 — The constant presence of a CPD patrol at a station does not improve response because of the inadequate communication links between CPD headquarters and MTU, and architectural features interfering with direct surveillance.

When a crime is reported to CPD headquarters, the dispatch of district cars is rapid.

Why does the patron require a capability to obtain assistance by use of a platform emergency phone which identifies the calling location?

UI-CM — Eight percent of sample were crime victims - 50% of these were of theft.

UI-CM — Additional 8% of sample were victims of attempted crimes.

UI-CM — Between 88% and 94% of el subway users will not use the el subway after 9:00 p.m.

CM I pg. 63 — Most RT crimes were in some part of station and platform rather than on the train.

Of crimes on the station premises two-thirds were on platforms.

There is a greater prevalence of RT crime during the afternoon and evening.

CM I pg. 41 — Seventy-five percent of all crimes studied occurred on rapid transit.

Seventy-five percent of all crimes were robberies and 20% were batteries.

CM I pg. 41

Ten percent of all crimes were assaults and crimes against persons.

Attempted robberies were few, indicating that most robberies were completed and some robbery victims report the crime only when they have sustained injury or loss of property.

LPD I pg. 6

El patrons face considerably more danger than subway patrons.

Cermak to 58th Street of the North-South Line and the Medical Center to the Central segment of the West-Northwest Line are dangerous segments.

LPD II pg. 38

Skip-Stops shorten all-stop waiting time, but double A and B station waiting time to ten minutes especially on Saturdays. From 6:00 p.m. - 6:00 a.m. the average wait for a train is twenty-five minutes.

LPD II pg. 12

Robbery is the most serious recurring crime because of its frequency and endangerment.

LPD I pg. 9

The felon identifies his target after identifying the lack of retaliatory response. This stresses the need to overcome the critical platform exposure period either through operational change or prevention devices.

LPD I pg. 3

We believe that pocket picking, purse snatching, and theft of service are representative of crimes which formulate a more common occurrence and attitude base among the riding patrons. Many thefts go unreported, and higher police priorities in more serious crimes may cause many of these less severe crimes not to be cleared by arrest and, therefore, may foster in patrons an attitude of an unresponsive CTA.

LPD I pg. 8

Rapid Transit Robbery Profile:

A defensive posture based upon personal evaluations of vulnerability and timely police response appears as the implied injury reduction opportunity.

CM I & II Appendix Table 5

Crime/Ridership Indicies for the Rapid Transit System

The following is the justification for the low ridership stations having the highest crime indicies.

Also see the twenty-two highest crime stations.

Support for the least patronized stations having the highest crime indicies.

North-South Line

North/Clybourn (State Street Subway) has the third lowest ridership and the highest crime index of all subway stations.

Cermak to 58th Street station on the south el segment (eight stations) have the highest crime index for North-South Line (27.4 for all crime and 22.1 for robbery).

Tech 35th and the 47th Street stations have the highest ridership, but the lowest crime indicies.

Dorchester and University on the Jackson Park Branch have the two highest crime indicies for that branch and are the lowest and third lowest, respectively, in ridership.

State, Wentworth, Harvard on the Englewood Branch are by far the low ridership stations in that branch, but their crime indicies are as much as five times higher than other stations.

On the West - Northwest Line - Milwaukee Service-subway segment - Chicago and Racine stations are the second and third lowest in ridership, yet by far the two highest in crime index on that service.

On the Douglas El the Kildare and Kedzie stations are the highest in crime index, but Kildare is the lowest and Kedzie is the fourth lowest in ridership on that service.

On the Congress El the station with the highest patronage has the lowest crime index.

All other stations have high crime indicies and low ridership except Kedzie.

CM I & II Appendix Table 5	On the Lake El the California, Kedzie and Homan stations have the highest crime indicies and the lowest ridership.
	*Homan has 423 more riders than Ashland (a low crime index station) and ranks fourth on the Lake El in patronage.
	The Dan Ryan service's 47th Street station has the highest crime index and the second lowest ridership.
	The Ravenswood El's Sedgewich station has the highest crime index and the lowest ridership.
	The Loop El's State/Van Buren station has the second highest crime index and is tenth of twenty-two in terms of low ridership.
CM III pg. 25	A waiting passenger is more vulnerable to crime than one riding the system.
CM II pg. 84	The main crime location was the platform where a victim was waiting for a train.
CM II pg. 86	Platforms were the worse location for this crime, and most victims were waiting for a train.
	The majority of offenders were lone. There were a few instances involving gangs of four or more.
LPD II pg. 50	Patron observers of crime may be discouraged from summoning assistance because of the deposit and dial public phones.
CM I pg. 66	Most RT crimes were self-reported and after the fact.
LPD I pg. 11	The patron needs some recourse when he perceives the possibility of attack.
	Most battery victims reported the crime after the fact.
LPD III pg. 57	Personal radios and their inherent freedoms are worthy of consideration in the subway system for CPD and CTA supervisory and security functions.

LPD III pg. 58

The critical issue is the capability of personal radios to operate effectively within the subway and on remote surface platforms.

CPD officers in subway do not carry radios because they are inoperable in the underground structures. This creates a situation where officers must accurately predict if they can handle the confrontation.

LPD II pg. 29

There exists a poor communication capability in MTU. Officers on trains and platforms possess intermittent capability. Officers in the subway have no radios. MTU Supervisors possess communication only when in a mobile radio car.

The MTU dispatch may not be aware of the needed response requirement to CTA. This may result in available MTU officers not responding to a crime within their areas of control.

MTU subway officers must rely on twenty-nine police phones, agent phones, or public phones.

Outside the subway network MTU officers must rely on public or agent phone if the Lincoln Band radio is not functioning.

CM III pg. 18-19

The entire CTA communication system does not seem to be able to perform effectively as an emergency communications network for the complete transit system. A more versatile and publicly accessible system is needed to provide this essential communication.

CM IV pg. 4

There is a need for passenger activated communication in the form of emergency buttons located in the train or on the platform.

CM IV pg. 5

An automatic locating telephone system with no verbal communication necessary may be desirable. Each phone would be completely independent of any other phone or system.

CM II pg. 87

Most crimes were victim reported.

Why is it necessary to provide the patron with an educational reminder via the public address system in Solution #2?

Editorial Note: Because there is no remote monitoring which would otherwise provide an opportunity for judgement to be exercised regarding endangerment if the patron failed to exercise such judgement.

LPD II pg. 51 — Generally there is an inability for a lone patron victim to summon assistance at the moment he/she perceives the vulnerability.

LPD I pg. 8 — Since the majority of robberies occur in low density periods, it is imperative for the lone patron to be supported on the platform by imagined or remote authoritative assistance.

There is a critical need for the lone patron to be able to predict his vulnerability and take crime prevention action.

This implies a patron educational program, and the tools to provide the prevention.

LPD I pg. 5 — Visibility is important to the perception of patron security and also gives the patron the capability to evaluate his vulnerability.

Visibility and illumination have high degree of correlation.

LPD I pg. 11 — Most battery victims reported the crime after the fact which indicates that there was no prediction opportunity, or that the victims were uneducated in the prediction of vulnerability.

Victims and witnesses were not capable of initiating a response before or during the attack.

LPD I pg. 9 — The victim must be able to perceive his potential status and take specific action to avoid the confrontation.

Few felons were apprehended leaving the scene of the crime. This is suggested by the small amount of stolen property recovered.

CM III pg. 16 — Station PA systems are located on forty-three platforms.

There is less of a possibility for using this system for criminal incidents than there is of using the train PA system.

LPD II pg. 51 — Where public address systems exist, the use of pre-programmed protective messages may serve to educate the patron in self-protection capabilities.

Why is it necessary to identify a secure area of 100 feet in length in reduction of the criminal opportunity?

CM I pg. 17 — The problem of maintaining optimal passenger density is one of adaptable building design. This is associated with security.

CM I pg. 9 — All train cars are nine feet four inches wide. There are a few three section articulated cars which are eighty-nine feet in length (ninety-six passenger capacity). Most cars are forty-eight feet in length (forty-six - fifty-two passenger capacity).

LPD II pg. 46 — Lengthy platforms increase unnecessary exposure of patrons at nonrush hours.

Wind screens often totally block the visibility of platform access on els and median strip stations.

Split platforms increase the opportunity for criminal attack.

CM II pg. 84 — Rapid Transit Robbery was distributed evenly between armed and strong-armed, and only a few attempts were reported.

Most robberies were completed.

Most robberies occurred from 6:00 p.m. to Midnight, with Friday and Saturday nights being the worse.

There were few robberies during morning and early afternoon hours.

CM II pg. 84 — The worse segments for robberies were the South side el from Cermak to 58th Street, and the Congress and Douglas Services of the West-Northwest Line.

CM II pg. 86 — Rapid Transit Crimes Against Persons

These crimes involved mainly public indecency, but some were justifiable homicides and rapes, and a few were murders.

The worse times for this type of crime was the morning rush and 7:00 p.m. to 10:00 p.m.

The majority of CAP's occurred on the North side el, the State Street subway, the Congress Service and the Dearborn Street subway.

CM I pg. 69 — Platform location does not reduce crime.

CM III pg. 24 — At the present there is no method of physically restricting the size of the waiting platforms, which could prevent access to isolated areas in off-hours and restrict passengers to smaller areas in order to provide potential witnesses, which can act as a deterrent to certain types of offenders.

Editorial Note: *The study reflects that low patron density and a high crime incidence occurs within similar time frames. It is during low density that a general conversion to the two-car train is made. Securing platform area in relationship to available train length at peak crime periods is cost-effective.*

Why is a closed circuit television surveillance system required to improve perception of protection and reduce the opportunity for crime?

UI-CM — The people interviewed feel <u>least</u> secure while:

1. on stairs, rampway or tunnel to the el subway platform
2. waiting on the el subway platform
3. waiting in the el subway stations

CM I pg. 25 — Many respondents had fear of lonely, dark platforms, of walking to and from the transit stop or station, and of waiting for a bus or train late at night.

The effects of these fears are unknown regarding ridership.

LPD I pg. 5 — Crime can be reduced with more contemporary design techniques.

Current lighting standards varv greatly and may not be appropriate.

The important factor is how will the criminal view the potential opportunity for attack in low and high density periods in relation to his ability to successfully carry out the crime.

LPD III pg. 27 — The application of alarm receivers, high-line security devices, and premise control units to rapid transit facilities may vary from the protection of remote substations to the activation of hold-up devices and patron assistance systems. These techniques would be compatible to existing CTA protection concepts and facilities.

CM II pg. 84 — Almost all robbery victims were lone travellers, who were principally CTA employees, students and service workers.

Most offenders travelled in groups of two or three.

CM I pg. 69 — There is no difference between stations with twenty-four hour agent coverage and only seven hour coverage. Agents have had no apparent effect on crime and no apparent effect on decreasing CPD response time.

CM II pg. 87	More than a majority of the victims of crimes against persons were lone women, such as CTA agents, students and clerical workers. Most of the offenders were lone, some of the more serious crimes against persons had multiple offenders.
CM I pg. 58	Ninety percent of all victims were lone. The majority of robbery and battery victims were white and male. Over 75% of the crime against person victims were women.
LPD I pg. 10	Since batteries and robberies occur in similar locations, the former may be a prelude to the latter and it would be desirable to create a situation similar to high density with hardware and systems.
LPD II pg. 4	If a victim is a lone traveller on RT, the possibility of apprehending the felon is remote unless a witness can notify the police while the crime is in progress.
LPD I pg. 3	We believe that pocket picking, purse snatching, and theft of service are representative of crimes which formulate a more common occurrence and attitude base among the riding patrons. Many thefts go unreported and higher police priorities in more serious crimes may cause many of these less severe crimes not to be cleared by arrest and, therefore, may foster in patrons an attitude of an unresponsive CTA.
CM I pg. 65	Witnesses were present in less than one-quarter of all cases.
CM IV pg. 7	The possibility exists of using cameras activated by an agent, operator, or passenger to obtain identification of suspects.
CM IV pg. 12	Surveillance devices (a sophisticated form is CCTV monitoring) can be monitored continuously by personnel capable of assessing the meaning of activities observed. Such active control and sequencing ability greatly expands the surveillance capabilities of the system.

CM III pg. 28 — The experiment with CCTV in a tunnel between State and Dearborn subway stations provided some sort of coverage. Pertinent questions are the number of cameras, their cost, monitoring, and their ability to deter crime on the el subway system.

The future use of CCTV is dependent upon the proof of capabilities and the solution to problem of image resolution and monitoring fatique.

LPD III pg. 12 — Video data sampling techniques can be used as a surveillance technique to verify a crime in progress, or to alert authorities to a potential crime. A typical application may be a camera surveilling a platform and within the video frame there may be an alcove where frequent hold-ups have occurred and, therefore, of specific interest. The presence of a patron in the alcove would indicate a change in the condition, and a possible potential crime.

Editorial Note: *The use of a closed circuit surveillance system which is apparent provides a perceptive protective image for the patron and perception of a reducing criminal opportunity for the felon.*

Why does the capability to record a confrontation enhance the preventive capabilities of the system?

CM I pg. 65 — Witnesses were present in less than one-quarter of all cases.

LPD II pg. 4 — If a victim is a lone traveller on RT, the possibility of apprehending the felon is remote unless a witness can notify the police while the crime is in progress.

CM II pg. 84 — Almost all robbery victims were lone travellers, who were principally CTA employees, students and service workers.

Most offenders travelled in groups of two or three.

LPD I pg. 5 — The important factor is how will the criminal view the potential opportunity for attack in low and high density periods in relation to his ability to successfully carry out the crime.

CM IV pg. 7 — The possibility exists of using cameras activated by an agent, operator, or passenger to obtain identification of suspects.

LPD III pg. 13 — The use of the video recording method may well serve a variety of documentary purposes in a rapid transit system, both relating to the control of crime or the performance level of personnel.

LPD III pg. 13 — Time lapse video recording is an effective means of documenting circumstances which may relate to a criminal act.

Editorial Note: *The use of video recording techniques provides investigative lead information for subsequent police investigation of a confrontation as well as creates the implied capability in the felon's perception of the ability to prosecute otherwise unwitnessed crimes.*

SOLUTION #2

LOCAL MONITORING OF PATRON SAFETY

Alarm Actuator

Purpose of Device:

The alarm actuator will be utilized by any patron, who, upon entering platform level perceives himself/herself to be endangered either by the suspicious acts of present patrons, or their sole occupancy of the platform for an extended period of time.

Description of Device:

This alarm actuator will be in the form of a traditional telephone instrument, red in color, pedestal mounted in the center of a surveilled area. This emergency telephone will provide a dedicated communication link to the MTU dispatcher. Picking up of the handset of the telephone will also transmit an electrical impulse to the video record and switching unit in the agent's booth.

Application of Device:

The emergency telephone will be pedestal mounted in a secure manner in the center of the visual range of two television cameras on the platform. Picking up of the handset causes a direct connection with voice communication to the Mass Transit Unit Dispatcher who will, based on a patron's perceived endangerment, note the activated location and initiate a police response.

When the patron picks up the telephone handset, a second electrical impulse is transmitted to the control unit in the agent's booth which causes a video recorder to record the actual television unit on the platform for a period of five minutes.

The platform location of the pedestal mounted telephone will be in the center of a color coded area, 100 feet in length, which is inclusive of the camera visual, useable range.

Also mounted on the pedestal will be the following sign:

"Patrons requiring personal protection will pick up the handset and talk with the police dispatcher while automatically being recorded on closed circuit television."

The connecting communication wires and video recorder impulse wire will be run within the pedestal mounting. The instrument will be secured to the pedestal with nonreversing screws, and the instrument shall be resistive to impact such as would be the case were it constructed of Lexan type materials.

Stability of Device:

This device is extremely stable and not subject to malfunction. The device can be subjected to vandalism, but the surveillance system will serve as a deterrent to this crime.

Potential Device Modification Requirements:

A modest change will be required which shall attach a twenty-two gauge wire to a lever switch in the telephone enclosure which will engage when the handset cradle is released.

Benefits of Device:

. Requires positive action by patron to activate.
. Provides patron assurance that response reaction of law enforcement can be definitively initiated based upon patron perception.
. Automtically identifies activated location.

Potential Supplier:

Western Electric Corporation
White Plains, New York

Closed Circuit Television Surveillance

Purpose of Device:

The closed circuit television platform system will be used to provide a method of witnessing a patron's perceived "distress" situation. Based upon the perceived endangerment becoming a reality, the surveillance system will provide an identifiable record of a confrontation while permitting a monitoring individual to make a valid judgement as to the need for a police response.

Description of Device:

This closed circuit television camera shall be capable of monitoring a field of vision which shall include the potentially endangered patron. The unit shall provide 650 lines of horizontal resolution by solid state circuitry, and shall be provided with an automatic light compensation of approximately 5,000 to 1 capable of providing a useable picture with as little as .5 footcandles of illumination at the faceplate. The camera unit shall operate on 110 VAC source of power. The unit shall be capable of continuous operation with no material alteration in the quality of a transmitted picture. The camera shall be capable of operation in temperature ranges between 25°F and 140°F.

In instances where the cost of illuminating to a level of .5 footcandles at the camera faceplate would exceed the cost of a more sensitive camera capability, a more sensitive camera shall be utilized.

This alternate camera shall provide 650 lines of horizontal resolution, be of solid state circuitry and capable of producing a useable picture with .001 footcandles of illumination at the camera faceplate and automatic light compensation as necessary based on the dark to light fluctuations in the applied environment. The camera shall utilize a 110 VAC source of power and be capable of continuous operation without alteration in the quality of the transmitted picture.

Lens - A wide angle *f*1.4, 9mm lens system shall be provided which covers an approximate field of vision encompassing 82°. This shall be a fixed focus lens with good focus capable from foreground to an estimated distance of fifty feet. The approximate field of vision capability at fifty feet from the lens shall be seventy-six feet in width and fifty-five feet in height; and at a distance of five feet from the lens, it shall be five feet in width and seven feet in height. Good definition shall exist at least to a distance of fifty feet in the field of visions.

Camera Housing - Each camera applied to an unheated area which is exposed to the public shall be provided with a tamper resistant housing with an automatic heater kit capable of maintaining a thermostatically controlled temperature above 25°F. The housing shall provide for access to the camera by key and shall be capable of withstanding a moderate physical attack similar to that sustained by throwing a five pound weight a distance of ten feet before striking the housing.

Mounting Brackets - The camera and enclosure housing shall be mounted in a fixed position by stable, heavy-duty brackets capable of a minimum 180° swing and secured to the mounting surface by not less than three heavy-duty (1/4 inch or larger) bolts.

Automatic Sequential Switchers - Automatic sequential switching devices with a capability of controlling up to eight cameras are commonly available. These sequential switchers cause each camera to be scanned for variable periods of from .05 to 60 seconds based upon the needs of a specific application. This scanning of multiple cameras can be terminated with the switcher holding a particular camera picture until the system is reset. This will permit a patron having initiated a specific assistance call to hold themselves on a television monitor at the central monitoring point until a train arrives or police response arrives on the scene. This will further permit the endangered patron to be video taped for subsequent investigation if the circumstances warrant such action.

Video Recorder - A video recorder without time lapse capability, but with a minimum of four hours continuous recording capability, shall be mounted in the agent's booth. At such time as the emergency handset is picked up, a control unit will activate the video recorder after the camera switching device converts to a "hold" mode in the appropriate camera. This recorder will be

adequate to record forty-eight individual confrontations before exceeding its capacity. The police morning reports will be reviewed each day for the appropriate platform and if no crimes have been recorded, the recorder tape need not be purged until thirty-five of the forty-eight 5 minute spots have been utilized.

Application of Device:

The camera system shall be mounted at a height of 8 feet to a secure stable surface. The cameras shall operate in a live mode at all times. At such time as a patron picks up the emergency handset (within the surveilled area), a signal impulse shall be transmitted to the agent's booth to a control unit which causes the appropriate camera to enter a hold mode for a period of five minutes during which time the "hold" camera is recorded on video tape and the agent's booth 9 inch monitor. The video recorder will automatically reset after five minutes.

Stability of Devices:

The devices required in the closed circuit television system are a stable design, but do require preventive services. Most frequently camera Vidicon tubes fail after extensive continuous use. In this system, preventive maintenance will be particularly valuable in assuring the automatic switching and recording continues to function properly.

Potential Device Modification:

None.

Benefits of Devices:

This surveillance system is cost-effective because it permits manpower allocations to be reduced to that required for monitoring multiple locations with nearly the same effectiveness as a man assigned to a specific area of the platform. The following predictable benefits will accrue from its use.

. Reduced manpower requirements in actual platform patrol. Assuming a requirement of manning a platform for 24 hours

each day, 365 days each year with a qualified police officer, the predictable cost of the assignment is $50,400 each year. This is based upon a salary of $12,000 each year and a manpower requirements of 4.2 men per post. This system, per platform for installation over a comparable period of years, will be less expensive.

. Multiple camera application to a platform will provide consistent and continuous coverage which cannot be accomplished by one man assigned continuously to a platform post.

. Camera application is capable of providing a record of a confrontation thereby carrying the implied threat of a live witness for the prosecution.

. Camera application will improve the perceived patron level of protection because of the assumption of continuous surveillance within the confines of an identified surveillance area.

. Because of the surveillance system, the actual frequency of platform checks conducted by District Command can be reduced.

Potential Suppliers:

G.B.C. Corporation
74 Fifth Avenue
New York, New York

Motorola Communications and Electronics, Inc.
1301 East Algonquin Road
Schaumbery, Illinois

Photoelectric Sensing and Public Safety Message System

Purpose of System:

It is the purpose of the photoelectric sensing devices to detect the entrance only to the platform by a patron. Sensing the patron's entrance to the platform will cause a public safety message to be broadcast at the platform level.

Description of System:

Two infrared transmitters and receivers will be mounted, one behind the other on a 3 foot center in the entrance stairs to the platform. These infrared sensors will be provided with a self-contained battery capability when their primary power source experiences a power outage. When both units sense movement in a sequence from the first unit nearest to street level to the second unit 3 feet to its rear, an electrical impulse will be sent to a voice recorder in the agent's booth which will broadcast a public safety message at the platform level. The voice recorder will be a single track unit with an automatic rewind after each transmission similar to the automatic telephone answering/recording devices. A disconnect switch will be located on the voice recorder which will deactivate the public message unit during peak patron load periods.

Application of System:

The patron, upon walking up the stairway to the platform, will activate each of two photoelectric sensors mounted on the side panels of the stairway. This shall cause an electrical impulse to be transmitted to the agent's booth control unit which will cause a voice recorder to broadcast a prerecorded message at the platform as the patron reaches the top of the stairs.

The broadcast message will be of 15 seconds duration as follows:

> "This is a CTA safety announcement. You are entering the public transportation system and your safe passage is a public concern. Please remain within the color coded area where your safety can be visually recorded. Should you require police assistance, pick up the red telephone in the center of the platform."

At peak patron load periods, the ticket agent will deactivate the public safety message recorder unit. During nonpeak load periods, he will activate the unit.

Stability of System:

Stability of photoelectric sensors is rated as good. The better devices are of solid state design with relatively little malfunction. The greatest potential malfunction results from misalignment which can be compensated for through good applications design. Voice recorders of solid state design within a controlled environment such as the agent's booth, with periodic preventive maintenance, can be rated as of good stability.

Potential Device Modification Requirements:

There are no major modifications except for the development of the interface between the recorder and sensor. This is considered a simple modification.

Benefits of the System:

- The system provides the patron with continuing exposure to their obligation to perceive a potential confrontation.
- This system will serve to assure better utilization of the protective system because the educational message and use of the system are in proximity to each other.
- This system will serve as a reminder to a potential felon of the existence of the protective system and the risk of apprehension.
- This system will serve to improve patron perception of personal safety with each use of the platform.

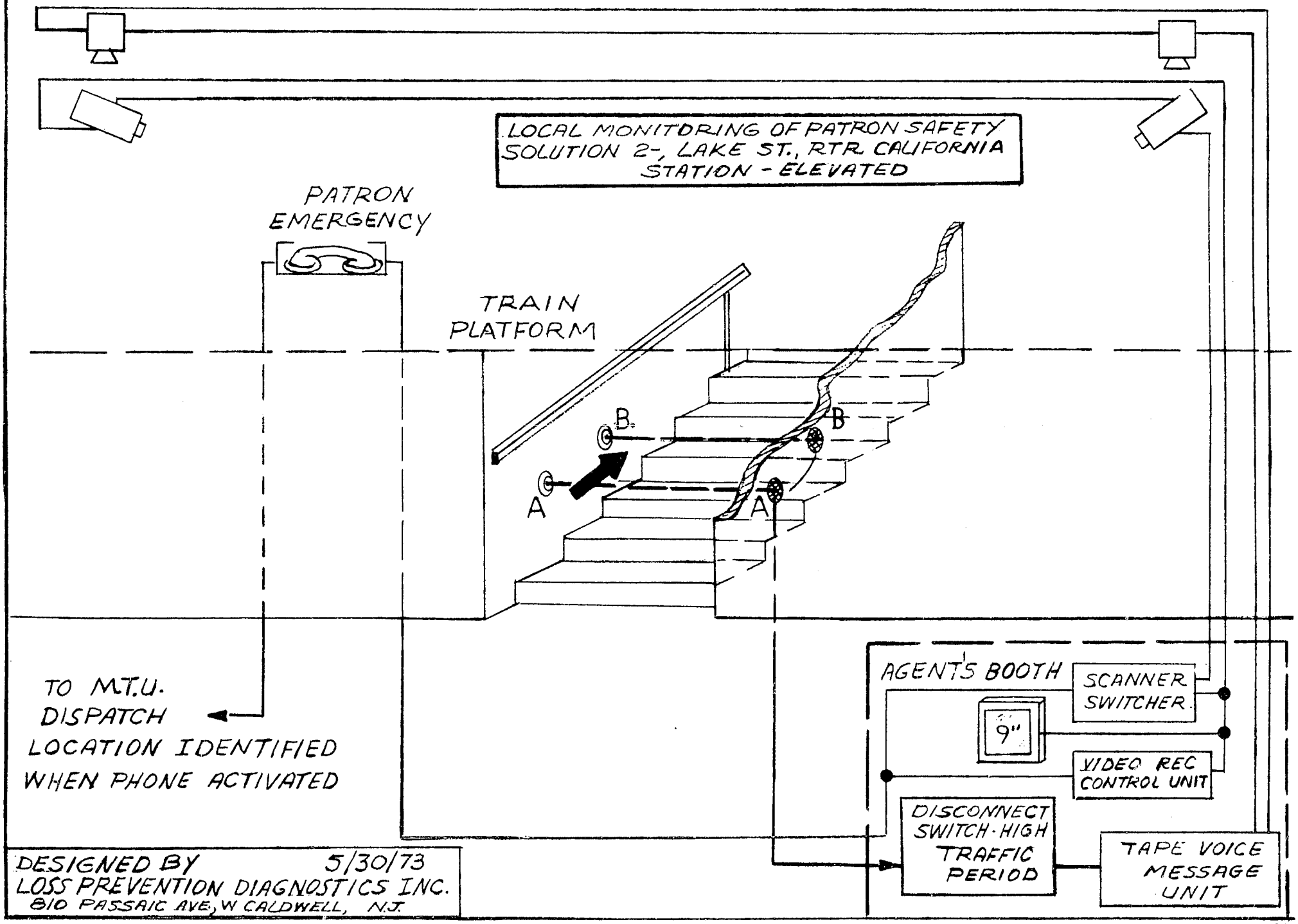
Potential Suppliers:

Photosensors - Arrowhead Enterprises, Inc.
Diamond Avenue
Bethel, Connecticut

American District Telegraph
155 Sixth Avenue
New York, New York

Voice Recorders - Ford Industires, Inc.
5001 Se. Johnson Creek Boulevard
Portland, Oregon

Motorola, Inc.
1301 E. Algonquin Road
Schaumburg, Illinois


LOCAL MONITORING OF PATRON SAFETY
SOLUTION 2-, LAKE ST., RTR. CALIFORNIA
STATION - ELEVATED
PATRON
EMERGENCY
TRAIN
PLATFORM
B
B
A
A
TO M.T.U.
DISPATCH
LOCATION IDENTIFIED
WHEN PHONE ACTIVATED
AGENT'S BOOTH
SCANNER
SWITCHER
9"
VIDEO REC
CONTROL UNIT
DISCONNECT
SWITCH-HIGH
TRAFFIC
PERIOD
TAPE VOICE
MESSAGE
UNIT
DESIGNED BY 5/30/73
LOSS PREVENTION DIAGNOSTICS INC.
810 PASSAIC AVE, W CALDWELL, N.J.

SOLUTION #2 (APPLIED)

The application of Solution #2 to the California elevated station represents a selection based upon the highest Crime Ridership Index (67.9) among elevated stations. Because of this station's age (approximately 80 years) and its construction, it represents what we believe are many of the factors detrimental to patron safety. We do not believe the elevated system is conducive to reconstruction along the requirements of "open plan" concepts, and frequently the distance from a monitoring location to the elevated system would involve substantial leasing costs regarding coaxial cable. Solution #2, which is a self-contained solution, does not incur the remote monitoring operating expenses incurred in Solution #1 with the exception of a dedicated telephone connection to MTU Dispatch.

In the application of this solution to a split elevated platform, we believe the following hardware will be applied. It should be borne in mind that the surveilled area consists of 100 feet of platform on each split platform. This necessitates duplication of hardware in each platform for this solution.

The following hardware commitment is foreseen to secure the 100 foot length of two platforms as defined in Solution #2.

CONTINUED

1 OF 2

Hardware required for 100 foot surveilled area as defined in Solution #2.

Platform: (Split Platform requiring double system.)

4 Television cameras with low light level capability and 1.4*f* 9mm wide angle lens in environmental housings with appropriate mounting brackets.

2 Self-locator telephones with dedicated connection to MTU Dispatch - estimated distance to Central Console - ten miles.

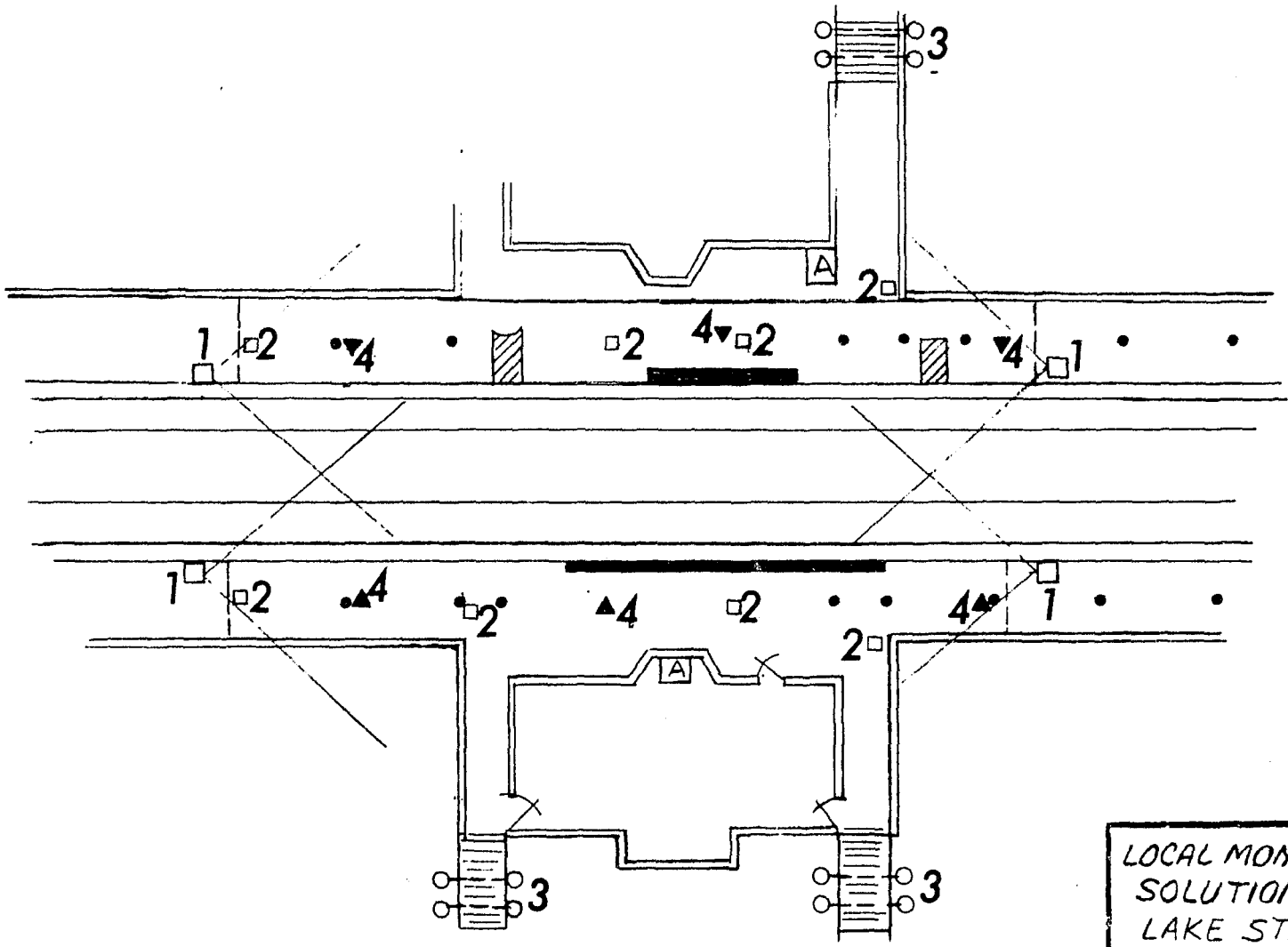
6 Infrared transmitters and receivers, two units to each accessway in series connected to control unit which activates a recorder and resets to a detection mode.

2 Voice recorders connected to the existing public address system.

2 Video recorders connected to a switcher. When switcher places camera in "hold" mode, video recorder records for five minutes and resets automatically.

2 Switchers causing cameras to hold in 30 second modes until emergency phone activated at which time activated camera holds for five minutes.

2 9 inch monitors which reproduce surveilled area in accord with switching technique.



1- CCTV CAMERA
2- PHONE
3- PHOTO CELL
4- P.A SYSTEM

LOCAL MONITORING OF PATRON SAFETY
SOLUTION #2 APPLIED
LAKE STREET RTR - LINE
CALIFORNIA STATION - ELEVATED

CONTRAT # 35811

DESIGNED BY 5/30/73
LOSS PREVENTION DIAGNOSTICS
810 PASSAIC AVE. W. CALDWELL, NJ

SOLUTION #2 (APPLIED)

ESTIMATED COST

The estimated costs set forth below provide for no contingencies. Because the majority of hardware is "off-the-shelf" requiring virtually no modification. Special engineering costs should not exceed 10 percent of the cost of hardware. Estimates are divided into capitalized costs and expense. Maintenance costs in a test program are negotiable since the vendor has a vested interest in effective operation. This solution is applied to a 100 foot sector of an elevated split platform.

Platform: (2 Platforms)

Hardware	Capitalized Cost		Expense
4 Low Light Level Cameras	$ 1,100 ea.		
4 1.4*f* 9mm 82° Wide Angle Lens	$ 200 ea.		
4 Environmental/Secure Housings	180 ea.		
4 Heavy-duty Mounting Brackets	40 ea.		
	($ 1,520 x 4)	$ 6,080	
Estimate 400 foot Coaxial Cable at $1 per foot		$ 400	
6 Infrared Transmitters/Receivers ($400 x 6)		$ 2,400	
2 Voice Recorders to Existing P.A. system including disconnect switch and control unit at $600 each		$ 1,200	
2 Video Recorders at $900 ea.		$ 1,800	
2 Sequential Switchers at $250 ea.		$ 500	
2 9 inch Monitors at $150 ea.		$ 300	
Subtotal		$ 12,680	

	Capitalized Cost	Expense
Subtotal brought forward	$ 12,680	
Estimated cost of installation 110% of hardware cost. Because this system is simple, we believe this allowance to be high, but it serves as a good rule of thumb.	$ 13,948	
Estimated leased expense for dedicated location identified telephone links for 10 miles at $60 per month for 12 months ($60 x 2 = $120)		$ 1,440
Special engineering estimate 10%	$ 1,268	
Total Estimated Cost - First year	$ 27,896	$ 1,440

Special Note: *For single platform application, the cost is estimated at $13,948 capital cost and $720 expense. This solution costs substantially less than Solution #1.*

SOLUTION #3

TRAIN MONITORING OF PATRON SAFETY

EXECUTIVE SUMMARY

SOLUTION #3

Train Monitoring of Patron Safety

The objective of this solution is to provide the patron with a continuance of a secure environment perception established at train platforms utilizing either Solution #1 or Solution #2. It is further the objective of this solution to provide a conductor on a train with the ability to initiate a timely police response based upon his perceived endangerment of patrons from a location where coercion will not be a serious consideration, or in a manner which will provide minimum visible indication that a request for police response has been initiated. It is further the objective of this solution to provide the potential for reduced manpower allocation of MTU police personnel onboard trains, as well as reduce the percieved opportunity of a felon in the commission of a crime or the use of the train as a method of leaving a platform crime scene.

This solution is based upon the two-car train which is in primary use during high crime nonpeak load periods. It is possible, however, that four, six and eight car trains could be utilized.

This solution involves the construction of a secure conductor enclosure in the area of the train door controls. This enclosure will be as substantial as the motorman's enclosure, capable of locking and shall be provided with a break resistive viewing window which provides a visual surveillance opportunity of the entire car interior in which the enclosure is located.

In the second car, the unit in which the motorman is situated, a television camera with a wide angle lens shall surveil the entire interior of that car and transmit that surveilled area to a nine inch monitor located in the conductor's car. This will permit the conductor to view activity in the motorman's car without a requirement for his physical presence. The conductor enclosure shall also be provided with an "Assistance Required" button which if depressed, will cause a digital sub-audible tone to be radio frequency transmitted to any patrol vehicle within 1/2 mile of the train's location at the time of transmission. This sub-audible digital tone (Example: 3-1) will be indicative of a train proceeding on a northbound track.

Patrol vehicles within transmission distance will proceed to the platform immediately north of their present location if

that platform is within their patrol track. (The directions utilized are for example purposes only.) When the conductor initiates the sub-audible tone transmission, a light indicator will be activated in the motorman's cab which is to indicate a requirement to slow train progress before reaching the next platform. This will assist in assuring train arrival and police response occur within a similar time frame. The conductor shall also be provided with a miniaturized radio transmitter capable of fitting in his pocket. When outside the secure enclosure, he shall be capable of activating this unit which will transmit an activating signal to the radio alarm transmitter in the conductor's enclosure.

The solution will substantially reduce the time of police response while minimizing the delays currently occurring when a motorman is required to hold a train outside the station while waiting for police response. Because of an ability to reduce the police response time this system will tend to reduce the time in which patron or CTA employees may be subjected to personal injury because the felon is provided with no escape alternatives.

This solution meets the criteria for criminal occurrences in mass transportation as defined and authenticated in the research phases of this study. The solution is responsive to the patron's perception of personal safety as well as to the felon's perception of a reduced criminal opportunity. This solution deals effectively with high crime time frames which have been documented as low occupancy periods when crimes are committed on platforms or trains, or when the train may be used as a method of escape. This solution has application during peak-load periods as well, in that car capacity is limited and the system would only be deterred by groups of standing patrons.

While not conceived as an integral requirement of the solution, the use of a video tape recorder which would be activated when the radio frequency alarm is activated may serve the same witness potential as is the case in Solution #1 and #2. Use of this recorder as it relates to the surveilled car may tend to serve as an inducement for conductor cooperation in his perception of patron endangerment.

Note: This solution will require lossy line installation in subway tunnels if it is to be effective while trains are in the subway system. In this fashion the lossy line would serve both the purpose of improved underground police communication and the transmission requirements of Solution #3.

RESEARCH SUPPORT FOR SOLUTION #3

Set forth below is extracted material representing conclusions concerning the needs and capabilities of the rapid transit system of the City of Chicago in its concern for the protection of the patron. The extracted material is from previously conducted and documented research completed by Carnegie-Mellon University, University of Illinois and Loss Prevention Diagnostics, Inc. and submitted to the Transit Security Committee.

The format utilized below poses a series of questions pertaining to the component parts of the solution. The extracted material set forth represents the support for the components existence in the solution.

The extracted documentation is identified by its source in accordance with the coding set forth below.

Source Codes for Extracted Justifications

CM I	Carnegie-Mellon University's I. Data Collection and Analysis
CM II	Carnegie-Mellon University's II. Profiles of Crime on the CTA
CM III	Carnegie-Mellon University's III. Existing Security Measures on the Chicago Transit System
CM IV	Carnegie-Mellon University's IV. Survey of Security Devices and Techniques
UI-CM	University of Illinois' findings presented in Carnegie-Mellon University's Survey Highlights
LPD I	Loss Prevention Diagnostics, Inc.'s Review and Analysis of Crime Profiles - Work Element I
LPD II	Loss Prevention Diagnostics, Inc.'s Existing Protection Resources, Chicago Transit Authority - Work Element II
LPD III	Loss Prevention Diagnostics, Inc.'s Stable State of the Art, Review of Protection Hardware - Work Element III

Editorial Note: *Carnegie-Mellon's analysis of Crime/Ridership reflects that the majority of crime committed in rapid transit occurs between the hours of 5:00 p.m. and 3:00 a.m. (63.3%). The analysis indicates that over 90% of all victims were alone when confronted. This solution deals with the issue of low patron density and high criminal incidence. During high patron density periods and corresponding lower criminal incidence periods, the solution improves patron perception of protection.*

Why is there a need to improve police response?

CM III pg. 8 — Police evaluate their performance by the number of robberies on the CTA. The number of robberies tell where trouble spots are and those spots receive special police attention.

CM I pg. 58 — Fifty percent of the robberies were committed by two or three offenders.

CM I pg. 61 — The majority of batteries and all crime against persons were committed by one offender. Nearly all the offenders were negro and male.

CM I pg. 66 — Offender apprehension is dependent upon the rapidity of CPD response. There was one apprehension in over 1/2 of the cases when the response time was quick (within 5 to 15 minutes).

CM I pg. 67 — The more time elapsed, the fewer the apprehensions.

CM I pg. 67 — This supports the assertion that delays in communicating the occurrence of the crime seriously hampers the CPD function.

CM II pg. 87 — Fifty percent of crimes against persons occurred on a moving train between stations.

The felon's escape was at the first possible train stop.

CM II pg. 84 — The train was in motion between stations during most on train robberies.

CM I pg. 66 — Significant number of on train victims rode through to the end of the line before reporting the crime. CPD response priorities are lower for these crimes than for crimes either in progress or just completed.

CM II pg. 85 — CPD's response was fast (within 5 minutes) to robberies. The apprehension rate was substantially higher when CPD arrived when the crime was in progress or committed only a short time before.

Does the patron need protection from crime while riding on the rapid transit system?

CM II pg. 87 — Fifty percent of crimes against the person occurred on a moving train between stations.

CM II pg. 84 — The train was in motion between stations during most on train robberies.

There were almost no witnesses to platform and train robberies.

CM I pg. 66 — There was a five minute response time for 1/3 of of the robberies and CAP's and 1/2 of the batteries.

CM I pg. 66 — A significant number of on train victims rode through to the end of the line before reporting the crime. CPD response priorities are lower for these crimes than for crimes either in progress or just completed.

CM II pg. 85 — The fastest escape exit was always taken by the felon. He most always used stairs and ramps from the platform, and the next train stop (felon remained on the train till then) to escape from the train.

The crime was almost always reported by the victim.

LPD II pg. 4. — If a victim is a lone traveller on RT, the possibility of apprehending the felon is remote , unless a witness can notify the police while the crime is in progress.

CM II pg. 86 — Felons escaped as fast as possible from the system, using stairs, ramps or the next train stop, always trying to avoid the station lobbey.

Why have two car trains been selected for the most common application of solution #3?

LPD II pg. 51 — Skip-stop trains may increase patron exposure on platforms during daytime nonrush hours, and also shortened two-car trains should be utilized during daytime nonrush hours to increase surveillance.

CM II pg. 85	Very little stolen property was recovered.
CM I pg. 66	There was a five minute response time for 1/3 of the batteries.
CM I pg. 67	A majority of the high robbery stations have a response time of 61 minutes or more. These are in high crime CPD districts and the unavailability of CPD units may be the cause.
CM I pg. 70	CPD's response time to side platform stations is 7 minutes longer than that of island platform stations.
CM I pg. 70	CPD's response time is 10 minutes less to stations with holdup alarms.
CM III pg. 7	The police in MTU must rely on police, CTA or public phones. MTU's communication capability is poor.
CM III pg. 7	The hand held transceiver is useless in the subway experiences great interference in el cars, and transmission and receiving failures are common on open el platforms.
CM III pg. 8	Lack of communications with MTU forces local police districts to handle CTA incidents.
LPD II pg. 34	CPD platform phones are not self locating.
CM I pg. 67	The constant presence of a CPD patrol at a station doesn't improve response because of the inadequate communication links between CPD headquarters and MTU, and architectural features interfering with direct surveillance. When a crime is reported to CPD headquarters, the dispatch of district cars is rapid.
LPD I pg. 7	There is a delayed police response to A-1 platforms because of construction factors. Today's police response has an affect on the potential for tomorrow's criminal act.

LPD pg. 40 — Shortened trains increase the train crew's ability to supervise.

CM III pg. 24 — Two car trains operate 7:30 p.m. - 5:00 a.m., and no skip-stops at this time. The waiting time has been lowered and each car has a CTA employee on board.

Two Car Train Times
CTA Report 11-22-72

North-South Route

Weekday	10:00 p.m. - 6:00 a.m.
Saturday	6:00 p.m. - 6:00 a.m.
Sunday	10:00 p.m. - 9:00 a.m.

West - Northwest Route

Weekday	9:00 a.m. - 3:00 p.m. & 6:00 p.m. - 6:00 a.m.
Saturday and Sunday	6:00 a.m. - 6:00 a.m. (48 hours)

West - South Route

Weekday	9:00 a.m. - 3:00 p.m. & 6:00 p.m. - 6:00 a.m.
Saturday	6:00 p.m. - 6:00 a.m.
Sunday	6:00 a.m. - 6:00 a.m. (24 hours)

Ravenswood Route

Weekday	9:00 a.m. - 3:00 p.m. & 6:00 p.m. - 6:00 a.m.
Saturday & Sunday	6:00 a.m. - 6:00 a.m. (48 hours)

Loop Shuttle

Weekday & Saturday	6:00 a.m. - 6:45 p.m.
(No service at other times)	

Evanston Express

Weekday	9:00 a.m. - 12:00 p.m.

Editorial Note: *From 3:00 p.m. to 3:00 a.m. 72.4% of all rapid transit crime occurs. More crimes are committed on Friday and Saturday than on any other day of the week. Two car trains are in operation during the greater portion of the high crime period. Therefore, when a crime occurs on rapid transit it will most probably be against a patron waiting for or riding on a two car train.*

Why is the conductor provided with an alarm activator for his person as well as the alarm activator in the secure enclosure?

CM II pg. 86 — Most victims were lone travellers, and the most prevalent victim groups were CTA employees, students and service workers.

CM I pg. 58 — Twenty percent of the rapid transit robberies and 33 percent of the batteries were against CTA personnel.

LPD I pg. 10 — Most battery victims were lone individuals.

LPD I pg. 10 — Many of these were CTA employees which implies that station agents and conductors are vulnerable to a coercion situation which degrades their ability to perform crime prevention tasks.

LPD II pg. 41 — Collection of train fares by conductors depends on their ability to identify and collect revenues from patrons entering the train.

LPD II pg. 12 — Theft of service is the largest single enforcement problem.

CM III pg. 13 — CTA requires all incidents occurring on the system be reported immediately to either the line supervisor or CTA radio dispatcher. All employees involved in any way are required to submit a written report or see to it that one is submitted. Employees are required to render any possible assistance to crime victims.

CM III pg. 24 — The motorman and conductor on trains also add to the atmosphere of security.

LPD II pg. 48 — Improper priority may be set on a CPD response to a CTA crime because of difficulty in determining "in progress" or "completed" crime.

CM III pg. 25 — Crime on the train can be handled by the motorman notifying the line supervisor of its nature, and the supervisor calling CPD. The motorman can wait until CPD reaches the station and then pull the train into the station. This practice is used sparingly, and only when the probability of apprehension is high.

CM III pg. 14

Trainphone system is in need of extensive modernization or possibly replacement with a more versatile version.

CM III pg. 15

Trainphone limitations:

1. The public has no access.
2. The system does not function properly if too many trains are in the same section of track or if the train derails.
3. The motorman has no direct line to CPD. All emergency calls are relayed by the CTA dispatcher.

CM III pg. 15

There is no public use of the train PA system and no way for a passenger to call for aid unless he leaves the scene.

Limitations of train PA system:

1. There is no single car addressing.
2. The conductor cannot talk with the motorman individually.
3. The conductor cannot talk to central dispatching.

LPD II pg. 31

The PA system on trains is used for announcements by line supervisors. Passengers have no voice communication with CTA control except through the conductor and motorman.

CM III pg. 18

The entire CTA communication system does not seem to be able to perform effectively as an emergency communications network for the complete transit system. A more versatile and publicly accessable system is needed to provide this essential communication.

LPD II pg. 20

Conductors must render aid to all passengers when The situation warrants it, and must initiate the summoning of aid.

Conductors are exposed to the same conditions as patrons and, on certain trains carry $5 banks and collect fares.

He receives no training in responding to criminal or emergency situations.

Why does the motorman's car require remote surveillance of patron safety in the second car of a two car train?

CM I pg. 65 — Witnesses were present in less than 1/4 of all cases.

LPD II pg. 4 — If a victim is a lone traveller on RT, the possibility of apprehending the felon is remote unless a witness can notify the police while the crime is in progress.

LPD I pg. 10 — Since batteries and robberies occur in similar locations, the former may be a prelude to the latter and it would be desirable to create a situation similar to high density with hardware and systems.

CM I pg. 58 — Ninety percent of all victims are lone. The majority of robbery and battery victims were white and male. Over 75 percent of the crime against persons victims were women.

CM II pg. 87 — More than a majority of the victims of crimes against persons were lone women, such as CTA agents, students and clerical workers. Most of the offenders were lone, some of the more serious crimes against persons had multiple offenders.

CM II pg. 84 — Almost all robbery victims were lone travellers, who were principally CTA employees, students and service workers. Most offenders travelled in groups of two or three.

LPD pg. 5 — Crime can be reduced with more contemporary design technique. Current lighting standards vary greatly and may not be appropriate. The important factor is how will criminals view the potential opportunity for attack in low and high density periods in relation to their ability to successfully carry out the crime.

CM IV pg. 7 — The possibility exists of using cameras activated by an agent, operator or passenger to obtain identification of suspects.

LPD III pg. 27

The application of alarm receivers, high line security device, and premise control units to rapid transit facilities may vary from the protection of remote substations to the activation of hold-up devices and patron assistance systems. These techniques would be compatible to existing CTA protection concepts and facilities.

LPD III pg. 11

Video data sampling's objective is the providing of video surveillance data transmission to assure the awareness of a response requirement.

LPD III pg. 12

Video data sampling techniques can be used as a surveillance technique to verify a crime in progress, or to alert authorities to a potential crime. A typical application may be a camera surveilling a platform and within the video frame, there may be an alcove where frequent hold-ups have occurred, and therefore, of specific interest. The presence of a patron in the alcove would indicate a change in the condition, and a possible potential crime.

CM IV pg. 12

Surveillance devices (a sophisticated form as CCTV monitoring) can be monitored continuously by personnel capable of assessing the meaning of activities observed. Such active control and sequencing ability greatly expands the surveillance capabilities of the system.

LPD I pg. 3

We believe that pocket picking, purse snatching and theft of service are representative of crimes which formulate a more common occurrence and attitude base among the riding patrons. Many thefts may go unreported, and higher police priorities in more serious crimes may cause many of these less severe crimes not to be cleared by arrest and therefore may foster in patrons an attitude of an unresponsive CTA.

Why is a radio frequency alarm transmitter needed to improve platform perception of protection and reduce the opportunity for crime?

CM II pg. 87 — The felon's escape was at the first possible train stop. A significant number of crimes against persons occurred on platforms and station lobbies, and 50 percent of these felons escaped via train.

CM I pg. 66 — Offender apprehension is dependent upon the rapidity of CPD response. There was one apprehension in over 1/2 of the cases when the response time was quick (within 5 to 15 minutes).

CM I pg. 67 — The more time elapsed, the fewer the apprehensions.

CM I pg. 67 — This supports the assertion that delays in communicating the occurrence of the crime seriously hamper the CPD function.

CM II pg. 85 — CPD's response was fast (within 5 minutes) to robberies. The apprehension rate was substantially higher when CPD arrived when the crime was in progress or committed only a short time before.

LPD II pg. 4 — District response could not be accomplished in less than 3.5 minutes unless CPC is notified while the crime is in progress.

LPD II pg. 3 — Modest delays may result in responding to a "crime completed" because of higher priorities due to a response to a "crime in progress". A crime in progress will receive almost immediate response.

CM II pg. 86 — Generally the victims reported the crime after it was completed.

CPD response was within 5 minutes in the majority of cases. One-third of the battery and assault offenders were apprehended.

CM III pg. 7 — MTU's present lack of good continuous communications between the foot patrolman and the central dispatching sergeant cannot help but lower their impact.

LPD II pg. 51	Certain agent phones may be locked and force MTU train patrols to move to the street level to communicate with the CPD dispatcher.
CM III pg. 10	Limitations in mobility exist when encountering a felon on the opposite side of a dual platform station, and combined with communications difficulties, both interfere with police response to crimes.
LPD II pg. 50	There may be a break in communication between the District Dispatcher and the Lincoln Band Dispatcher, and also intermittent communication with MTU officers, thereby creating a longer response and an increase in personnel - patron vulnerability.
CM III pg. 25	Crime on the train can be handled by the motorman notifying the line supervisor of its nature and the supervisor calling CPD. The motorman can wait until CPD reaches the station and then pull the train into the station. This practice is used sparingly, and only when the probability of apprehension is high.
LPD III pg. 57	Radio communications are essential to initiate a response to the needs of patrons.
	Radio alarms may be applicable to patron assistance requirements, as well as those of CTA employees.
	They can be applied in changing the environment of a crime in progress, such as employing remote locking or camera activation.
CM I pg. 69	A-1 stations have a 10 minute longer response time. These are located in older neighborhoods with poorer auto mobility capabilities.
LPD III pg. 58	There is a need for a total train communication system which would solve intermittent deteriorating communication.
LPD II pg. 30	MTU officers working between 2:00 a.m. - 10:00 a.m. outside the subway route, would generally use the CTA phone system when available.

Why has the conductor been provided with a secure enclosure in the second car of a two car train?

CM I & II Appendix Table 18

Rapid Transit Victim Occupations
CTA employees were victimized more than any other occupational group.

CTA employees were the victims in 19.2% of all rapid transit crimes

LPD II pg. 20

Conductors must render aid to all passengers when the situation warrants it, and must initiate the summoning of aid.

Conductors are exposed to the same conditions as patrons and on certain trains carry $5 banks and collect fares.

He receives no training in responding to criminal or emergency situations.

LPD II pg. 49

The lack of protective inclosures and the on-train revenue collection system may expose the conductor to the same victim status as a patron and to coercive situations regarding theft of service.

Conductors receive no protective practice training in patron and property areas, and therefore might fail to comprehend and perform job responsibilities.

LPD I pg. 4

CTA employees are not always compliant with their crime prevention responsibilities and these rules have not been strongly annunciated, interpreted or enforced.

CTA employee crime prevention responsibilities do not now exist or are they carefully outlined according to the information now available.

LPD I pg. 5

Crime can be reduced with more contemporary design technique.

LPD I pg. 10

Lone victimizations may also warrant the use of defensive barriers.

SOLUTION #3

TRAIN MONITORING OF PATRON SAFETY

Alarm Actuator

Purpose of Device:

The alarm actuators associated with the train solution will be utilized by the conductor who, upon observing patron endangerment or being subjected to personal coercion, will initiate an assistance required signal off the train.

Description of Device:

Two activators will be required for each two-car train. The first unit will be located in a conductor enclosure. It will be similar to a standard unit used in the alarm industry which requires the activator button to be pulled outward from the unit, thus, avoiding accidental alarm conditions. The second unit will be a battery operated pocket unit which requires that buttons on opposing sides be simultaneously depressed. Activating either of the above actuators will cause an immediate radio frequency alarm transmission to any patrol unit within 1/2 mile of the train.

Application of Device:

The assistance actuators will be surface mounted in the conductor's enclosure and personally carried by the conductor. Activation of the personal unit will cause a circuit to close on a radio frequency alarm transmitter in the conductor's enclosure, which in turn will broadcast the call for assistance a distance of 1/2 mile to any patrol car in the frequency. These alarm actuators will not be available to the patron.

Stability of Device:

These alarm acutators are available in stable, low maintenance design. There is a support requirement in the use of the personal actuator in resupplying of fresh batteries.

Potential Device Modifications:

None.

Benefits of Device:

. Requires positive action by the conductor based upon perceived endangerment.

. Reduces accidental alarm transmission.

. Continuously available to the conductor permitting mobility through the personal unit or avoidance of coercive conditions when activated from the conductor's enclosure.

. Conductor can assure response of available police patrol in response to the next scheduled train stop while providing the motorman with an indication of the action required of him.

. Relieves the conductor of an inability to enforce fare collection from coercive patrons who may attempt theft of services.

. Makes the conductor more oriented to perceiving crime preventive opportunities by affording him an alternate course of action.

Potential Suppliers:

Mosler Electronic Systems Division
9 South Street
Danbury, Connecticut

Radio Alarm Transmitter

Purpose of Device:

The radio alarm transmitter will be used to provide a method of communicating a patron's perceived endangerment directly to a police patrol's personal radio receiver within 1/2 mile of the alarm initiating location.

Description of Device:

This device is capable of monitoring two alarm initiating points or with an expansion board up to six alarm initiating

points. An alarm initiating device will cause the transmitter to transmit a signal with up to thirty watts of radio frequency power direct to a patrol receiving unit. The device is provided with a coding technique which creates a unique identification signal in a subaudible technique. The initiating of an alarm from the transmitter creates a distinctive tone signal which is transmitted and which is repeated three times to guarantee reception in crowded channels. The transmission of the signal tone, such as a tone burst of three-one, would provide the distinctive identity of a specific train or split platform or in the case of subways, a specific location on a large platform. To assure a nondisruptive signal to primary police and radio transmissions, the subaudible identifying tone burst is accomplished three times in one minute intervals.

The alarm initiating devices can be hard wired to any (normally open) device similar to commonly utilized devices in the alarm industry. The unit is capable of operating from any 12 volt D.C. source, a self-contained rechargeable 12 volt battery or it can be utilized with battery chargers operating from 117 VAC. Simultaneously with the activation of the radio alarm transmitter a light, connected by hard wire to the motorman's enclosure, will indicate that a police response has been initiated and consistent with safe passage, he is to slow speed.

Application of Device:

The radio alarm transmitter will be mounted within the conductor's enclosure and connected to an external antenna mounted on the roof of the car. The alarm actuator will be mounted within the enclosure. The personal radio unit carried by the conductor and the enclosure activator will be used by a conductor in situations of developing duress or when he perceives patron endangerment. The radio alarm transmitter will transmit

a distinctive subaudible tone to any patrol unit within 1/2 mile of the train. Trains on different headings will have different signals while trains on the same heading will have similar distinctive signals. Train headways as practiced by CTA operations assures at least a 1/2 mile separation between trains in similar headings in the majority of cases. The receipt of this signal in the patrol unit will permit ease in identification as to the appropriate response location because of the heading and their ability to hear the sub-audible tone within their patrol tract in which they will have full knowledge of platform locations and relative distances between platforms. Simultaneously with the radio alarm transmission, a "hard wire" signal will be provided to the motorman indicating that a call for assistance has been initiated, and that safety permitting, the train should be slowed to permit near simultaneous arrival of the train and police at the platform.

Stability of Device:

This device should assure a long operating life and be relatively maintenance free because of its solid state weather resistant construction and relatively passive operating nature. Because the device will be located within the conductor's enclosure, it will be relatively free from tampering and vandalism and immune to weather, heat and cold characteristics.

Potential Device Modification Requirements:

The following modifications may be necessary in "off the shelf" hardware to assure total compatibility. Because of the potential broad application in mass transportation, such modifications are believed to be of relative insignificance.

- Potential modifications to assure transmission on appropriate police radio frequencies.
- Potential use of timing relay between the initiating device and transmitter to assure a thirty second delay in the signal transmission.
- Potential reduction in signal transmission power to limit signal transmission to 1/2 mile in distance.

Benefits of the Device:

This device assures a reasonably cost-effective application of protective hardware. The following predicted benefits will accrue from its use.

. Provide the conductor with a method of taking predictive, defensive action

. Provide a substantial reduction in police response

. Provide improved patron perception of police capability because he will respond either during the commission of a crime or prior to a felon's successful escape

. Provide improved perception of a potential felon's observation of the criminal opportunity resulting in a reduced likelihood that the criminal attack will be initiated

. Reduce the potential extent of injury to a patron because the interception of a criminal attack will take place earlier than has formerly been the case

Potential Suppliers:

Motorola Communications and Electornics, Inc.
1301 East Alqonquin Road
Schaumbery, Illinois

Transcience Corporation, Inc.
17 Irving Avenue
Stamford, Connecticut

Closed Circuit Television Surveillance

Purpose of Device:

The closed circuit television train system will be used to provide a method of witnessing a patron's perceived "distress" situation. Based upon the perceived endanger-

ment becoming a reality, the surveillance system will provide an identifiable record of a confrontation while permitting a monitoring individual to make a valid judgement as to the need for a police response.

Description of Device:

This closed circuit television camera shall be capable of monitoring a field of vision which shall include the potentially endangered patron. The unit shall provide 650 lines of horizontal resolution by solid state circuitry and shall be provided with an automatic light compensation of approximately 5,000 to 1 capable of providing a useable picture with as little as .5 footcandles illumination at the faceplate. The camera unit shall operate on 110 VAC source of power. The unit shall be capable of continuous operation with no material alteration in the quality of a transmitted picture. The camera shall be capable of operation in temperature ranges between 25°F and 140°F.

Lens - A wide angle *f*1.5, 8.5 mm lens system shall be provided which covers an approximate field of vision encompassing 57°. This shall be a fixed focus lens with good focus capability from foreground to an estimated distance of 50 feet and encompassing the majority of the motorman's car interior.

Camera Housing - Each camera shall be provided with a tamper resistant housing which will withstand reasonable forced attack. The unit shall be accessible by key only. There will be no environmental control factors required in this housing which will be mounted at ceiling height adjacent to the motorman enclosure.

Nine Inch Monitor - The 9 inch monitor located in the conductor's enclosure will provide a video picture of the car interior from which the motorman operates the train. The monitor shall be capable of providing 350 lines of resolution and a clear visual picture of the second car in which the conductor is not located. There shall be a coaxial cable interconnect from the camera in the motorman's car to the monitor in the conductor's enclosure. The design of the system shall be of a nature that assures interchangability between cars should operations find it necessary to change train makeup.

Application of Device:

The camera system shall operate continuously during the operating hours of the train. The camera shall provide a complete interior view of the motorman's car, reproducing that picture on a nine inch monitor in the conductor's enclosure. The conductor shall be able to view the interior of the motorman's car and should he perceive patron endangerment, he shall be capable of transmitting a radio frequency assistance required signal to patrolling police units as well as an indication of this action to the motorman. The enclosure will permit the conductor to make similar uncoerced observations of the car in which he is riding.

Stability of System:

Because of solid state design stability, it is rated as good. Preventive maintenance will be required at periodic intervals as well as inspection of the coaxial interconnect between cars. After protracted operation, vidicon tubes will require replacement. Quality in this area will determine life span.

Potential Device Modifications:

None.

Benefits of System:

The surveillance system will provide the patron with a good level of perceived protection in both the motorman's and conductor's car. The surveillance system will provide a clear perception of reduced opportunity for crime for any felon on board the train. The surveillance system will permit the conductor to avoid coercive situations except when duties require his exposure to the patron in which case, he has a personal alarm activator.

Potential Suppliers:

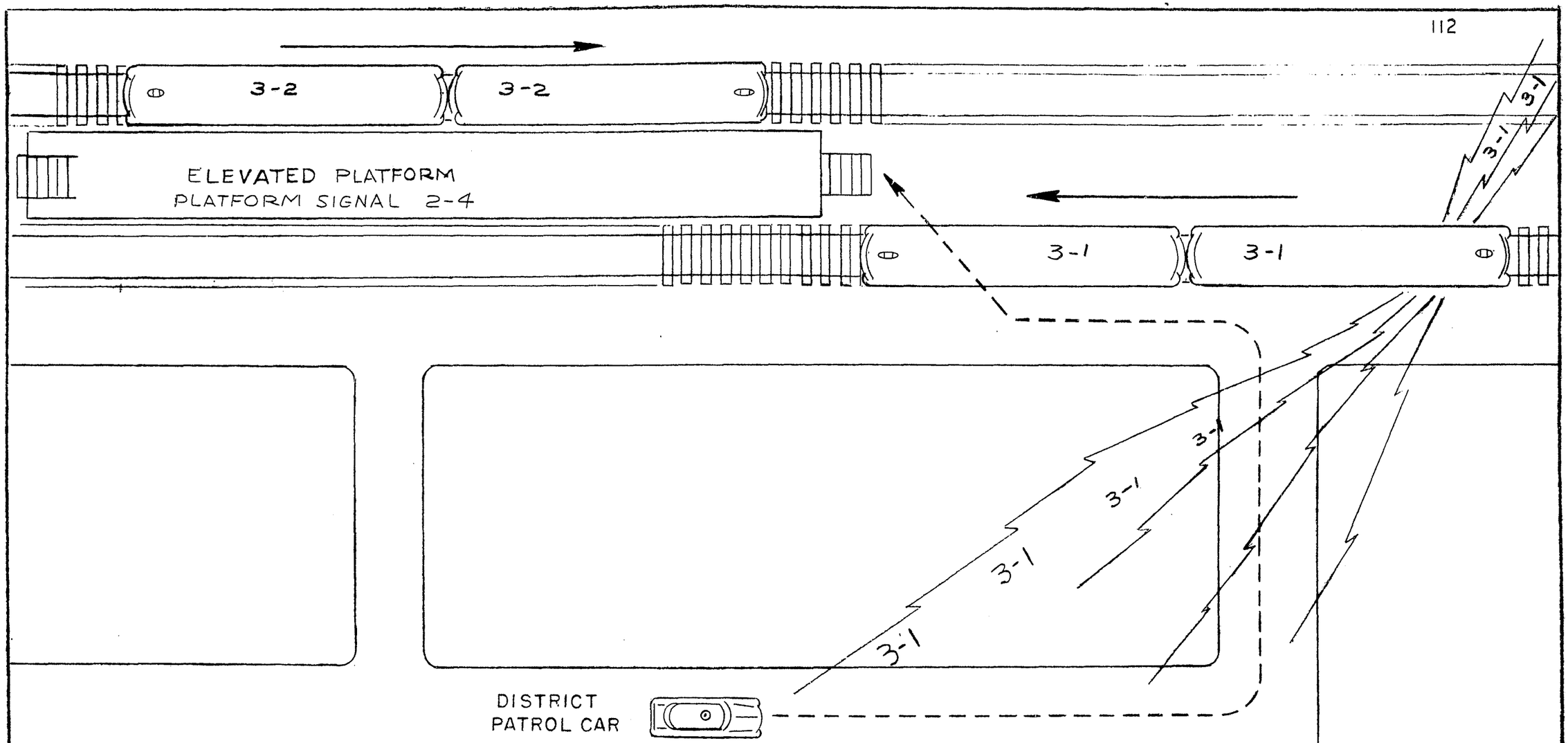
G.B.C. Corporation
74 Fifth Avenue
New York, New York

Motorola Communications and Electronics, Inc.
1301 East Algonquin Road
Schaumbery, Illinois

Conductor's Enclosure

The conductor's enclosure will be provided in a fashion which also encloses door operating controls. It shall be provided with a lockable door and viewing window of break resistant material. The nine inch monitor will be situated in such a fashion that the conductor when normally viewing the car interior in which he is situated will also be capable of viewing the nine inch monitor.

Construction of the enclosure includes some limited engineering and modifications to car interior which are best evaluated by CTA engineering staff.



TRAIN MONITORING OF PATRON SAFETY - SOLUTION 3

TRANSIT SECURITY STUDY
CITY OF CHICAGO

CONTRACT #35811

DESIGNED BY 5/30/73
LOSS PREVENTION DIAGNOSTICS INC.
810 PASSAIC AVE., W. CALDWELL NJ

PATROL VEHICLE RESPONSE BASED UPON RECEIPT OF SUB-AUDIBLE DIGITAL TONE PROVIDING DISTINCTIVE FACILITY AND EQUIPMENT IDENTIFICATION

SOLUTION #3 (APPLIED)

The application of this solution to the train configuration is based upon a desire to maintain a continuance of the patron's perception of protection capability as well as afford the CTA employee (conductor) a capability of exercising uncoerced judgement in initiating an appropriate response to a crime. Because of the distance limitations imposed on the radio alarm transmission, it is our belief that no serious response error will be initiated in responding to the next intervening platform of a train in progress. The distinctive radio subaudible signal will indicate the direction of train travel on an individual police patrol track.

We believe the following hardware will be required for application to cars one and two of the two-car train.

Hardware required for Solution #3
(Applied to one two-car train)

1 Television camera with low light level capability and with 1.5*f* 8.5mm 57° lens in tamper-resistant housing and mounting brackets.

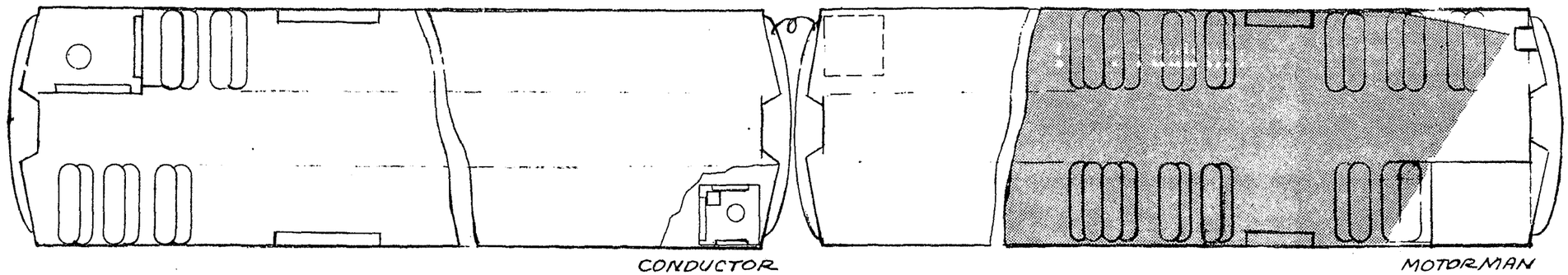
1 Conductor radio activator switch associated with radio alarm unit as personal unit.

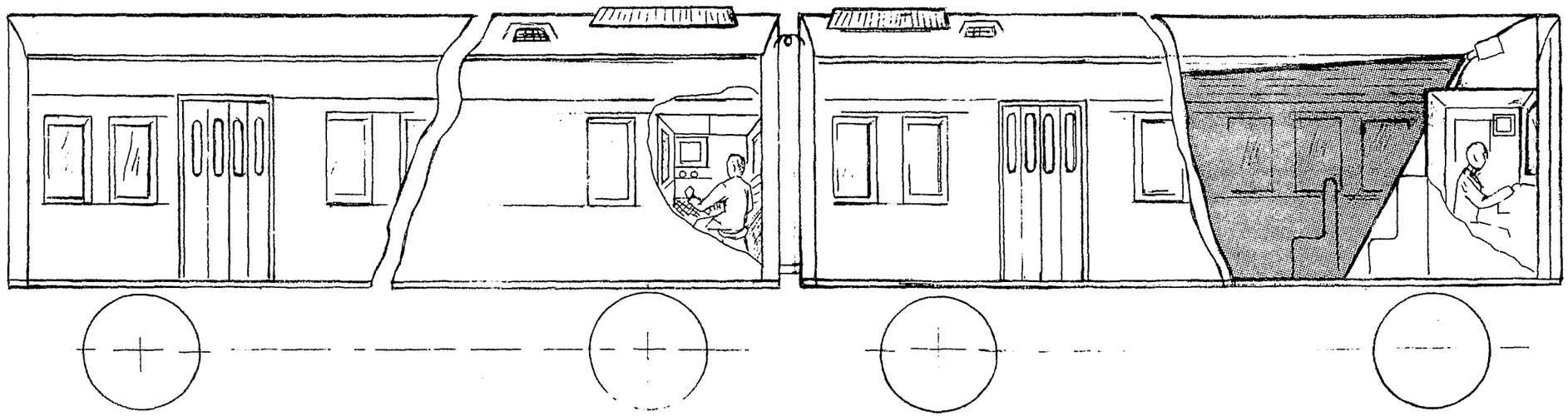
1 Radio alarm transmitter with capability of broadcasting a subaudible digital tone a distance of 1/2 mile.

1 Radio alarm activator switch in conductor's enclosure.

1 9 inch monitor in conductor's enclosure portraying surveilled area in motorman's car.

Special Note: *The cost for construction of a conductor's enclosure, coaxial interconnect between cars, indicator light regarding the activation of the radio alarm in the motorman's cab and conversion of power sources require special engineering and cannot be estimated at this time.*





TRAIN MONITORING OF PATRON SAFETY
SOLUTION #3 APPLIED

CONTRACT # 35811
DESIGNED BY 5/30/73
LOSS PREVENTION DIAGNOSTICS INC
810 PASSAIC AVE. W. CALDWELL, NJ

SOLUTION #3 (APPLIED)

ESTIMATED COST

The estimated costs set forth below do not include special engineering required by CTA in the fabrication of a secure conductor's enclosure, modification of power source from train power. A 10% allowance is included for special engineering in the development of necessary equipment interconnect from car to car. Maintenance costs in test program are negotiable in view of the vendor's vested interest in an effective program. This solution is applied to a two-car train.

	Hardware	Capitalized Cost	
1	Low light level camera	$ 1,100	
1	*f*1.5, 8.5mm, 57° wide angle lens	70	
1	Tamper resistant housing	140	
1	Heavy-duty mounting bracket	40	
			$ 1,350
1	Alarm actuator (pull type)		60
1	Alarm actuator (personal)		40
1	Radio alarm transmitter		1,200
	Special Engineering Estimated 10%		265
	Cost of installation estimated at 110% cost of hardware exclusive of car modifications and enclosure construction		2,915
	Total Estimated Hardware Cost		$ 5,830

SOLUTION #4

THE OPEN PLAN

SOLUTION #4

THE OPEN PLAN

Introduction

The description of Solution #4 is set forth in a series of considerations intended to compliment the "Open Plan". We endorse the use of the Open Plan Platform as a serious contribution to the passive prevention of criminal confrontations involving patrons. The Open Plan Platform by our descriptions, is one which maximizes the visual opportunity to predict a potential confrontation as well as improve the capability of law enforcement to respond. In this regard several platforms constructed in 1969 on the West-South route of the Lake Street-Dan Ryan Line and West-Northwest route of the Congress-Milwaukee Line in the Kennedy Expressway are representative of "Open Plan" construction. It is of interest to note that while the existing open plan applications provide a reasonably high visual opportunity from the adjacent roadways, these roadways are not conducive to immediate exit to local street level from which a response would initiate.

Our review of the open plan is designed to suggest future improvements and the endorsement of some existing characteristics.

Where appropriate we have documented excerpts from previous research conducted in this study in support of improvements or existing characteristics we believe appropriate. The format for the balance of this solution will present the desirable characteristic and the supporting material where appropriate.

"OPEN PLAN" PLATFORM

PREVENTIVE CHARACTERISTICS

The following discussion sets forth the characteristics of preventive design which should become an integral consideration in Open Plan Platforms. We have set forth below a definition of the Open Plan as set forth in "Technical Evaluation of the Chicago Transit Authority" as published on December 15, 1971.

> "The term 'open-plan for central areas' refers to a passenger safety concept adopted by the Chicago Transit Authority. The basis of this concept is the reduction or elimination of potential hiding places in a station. The elimination of interior obstructions and the addition of modern lighting will provide total visibility from outside the station. The concept will also include the elimination of total station heating and the introduction of platform heaters. This change is being adopted to discourage loitering in the Chicago Transit Authority stations. The 'open-plan' system is in use on the Dan Ryan and Kennedy lines."

RESEARCH SUPPORT FOR SOLUTION #4

The extracted documentation is identified by its source in accordance with the coding set forth below.

Source Codes for Extracted Justifications

CM I	Carnegie-Mellon University's I. Data Collection and Analysis
CM II	Carnegie-Mellon University's II. Profiles of Crime on the CTA
CM III	Carnegie-Mellon University's III. Existing Security Measures on the Chicago Transit System
CM IV	Carnegie-Mellon University's IV. Survey of Security Devices and Techniques
UI-CM	University of Illinois' findings presented in Carnegie-Mellon University's Survey Highlights
LPD I	Loss Prevention Diagnostics, Inc.'s Review and Analysis of Crime Profiles - Work Element I
LPD II	Loss Prevention Diagnostics, Inc.'s Existing Protection Resources, Chicago Transit Authority - Work Element II
LPD III	Loss Prevention Diagnostics, Inc.'s Stable State of the Art, Review of Protection Hardware - Work Element III

Editorial Note: *Carnegie-Mellon's analysis of Crime/Ridership reflects that the majority of crime committed in rapid transit occurs between the hours of 5:00 p.m. and 3:00 a.m. (63.3%). The analysis indicates that over 90% of all victims were alone when confronted. This solution deals with the issue of low patron density and high criminal incidence. During high patron density periods and corresponding lower criminal incidence periods, the solution improves patron perception of protection.*

The "Open Plan" platform should provide maximum visibility from adjacent streets, including the streets from which response would usually be initiated. The high visibility factor should include the means of access to an egress from the street level to the platform. The rampways may be constructed of transparent break resistant materials to offer side visibility. The roof areas may be similarly constructed if appropriate materials can be found. These would be particularly valuable where the platform level was lower than local street level. In cases where the "open plan" concept is utilized above street grade, efforts should be exercised to limit the height above street level to assure a maximum visual angle from the street.

CM I pg. 18	There is poor visibility on platforms because of columns and sign panels, etc.
CM I pg. 18	Clear visibility is associated with security (long unobstructed sight lines). Open plan is now required by CTA for all new or remodeled stations.
LPD I pg. 5	Visibility is important to the perception of on security and also gives the patron the capability to evaluate his vulnerability. Visibility and illumination have high degree of correlation.
CM I pg. 12	Renovations related to security were clearly the most preferred kinds of improvements according to the Broad and Columbia Subway Development Study.
LPD II pg. 46	In stations other than "open plan" there are locations for unobserved attacks.
CM IV pg. 9	No-hide architecture and high intensity lighting would prevent the potential criminal from hiding or concealing his offensive acts.
LPD II pg. 46	Deterring Criminal Opportunity: The Open Plan permits surveillance and the determinance of response need. The visibility from the agent's booth and from the entrance to platform is very good. There is an absence of hidden areas in the Open Plan.

LPD II pg. 44 — The subway's typical island platform is better for police response, except for the extremely long platforms.

LPD II pg. 44 — Median Strip Platforms offer good visibility from the street and have a single entrance.

LPD II pg. 43 — Generic descriptions:

El stations have platforms with almost no visibility from street level and one narrow access to the platform.

LPD II pg. 43 — Els have poor visibility of the platform from the agent's booth and low lighting levels.

LPD II pg. 43 — Els possess side boarding areas making definitive response to the platform difficult. Els are typically without a PA system and have limited communication.

CM I pg. 70 — CPD's response time to side platform stations is seven minutes longer than that of island platform stations.

CM III pg. 10 — Limitations in mobility exist when encountering a felon on the opposite side of a dual platform station, and combined with communications difficulties both interfere with police response to crime.

CM II pg. 86 — Platforms were the worse location for this crime and most victims were waiting for a train.

The majority of offenders were lone. There were instances involving gangs of four or more.

CM II pg. 84 — The main crime location was the platform where a victim was waiting for a train.

CM II pg. 86 — Most victims were lone travellers, and the most prevalent victim groups were CTA employees, students and service workers.

CM I pg. 46 — Riders face more danger on el segments than on the subway; the latter being much below the system-wide average in risk according to the Crime Indicies.

UI-CM

The people interviewed feel <u>least</u> secure while:

1. on stairs, rampway or tunnel to the el subway platform
2. waiting on the el subway platform
3. waiting in the el subway stations

CM I pg. 66

Felons exited from the platform mostly via stairs or ramps. Exit from the station was by door to the street. Exit from the train was at the next stop.

CM III pg. 10

The patrolling of many stations is time consuming because of supporting structures, booths, vending machines and signs. Covered rampways also present a sight-line problem because of their length of several hundred feet.

A method should be sought in the "Open Plan" platform which would provide the capability to limit the size of the platform available to patrons during periods of low patron density and corresponding high crime time frames. Limiting the size would be consistent with the reduced train size utilized to handle lower patron density. We have examined concepts which would consist of "roll out" walls whose origin would be in supporting structural pillars on the platform. Fully extended these roll out walls would limit the size of the platform to approximately the first one hundred feet from the agent's booth area. Fully extracted these walls would be contained within the exterior covering of the supporting pillar. As passenger density is lowered, the walls would be extended and as density is increased, they would be withdrawn. A major shortcoming is a lack of materials which would provide the transparency required and be capable of extension and withdrawal. If the roll out walls were not transparent, visibility would be severly limited, adding to the criminal opportunity.

CM III pg. 24 — At the present there is no method of physically restricting the size of the waiting platforms, which could prevent access to isolated areas in off-hours and restrict passengers to smaller areas in order to provide potential witnesses, which can act as a deterrent to certain types of offenders.

LPD II pg. 46 — Lengthy platforms increase unnecessary exposure of patrons at non rush hours. Wind screens often totally block the visibility of platform access on els and median strip stations.

Split platforms increase the opportunity for criminal attack.

CM IV pg. 10 — Passenger flow controls may be moveable partitions for the purpose of restricting passengers to a small group.

As is the case in several open plan applications, the agent's booth should provide a clear visual opportunity for the entire platform. Most typical of this characteristic is the Logan Square subway platform completed in 1970. Not only should the agent have a capability to judge a developing criminal confrontation, the patron should have a capability of perceiving that visual surveillance capability.

CM I pg. 69	The station agent has an important influence on the security atmosphere. An agent can act as a potential witness and his presence can have a possible deterrent effect.
LPD II pg. 21	The ticket agent's responsibility is to report all incidents and abuses, and is therefore, linked to the safety and security system of CTA.
CM II pg. 84	There were almost no witnesses to platform and train robberies.

The agent's booth should be constructed of substantial material which would serve to convince an offending felon that he has no opportunity to coerce the agent while within the enclosure. This substantial construction is further reinforced by the agent's capability to summon prompt and appropriate assistance. Among these areas of construction improvement are the following:

- Enclosure constructed of eight inch cinder block as opposed to light metal construction.
- Entry door of hollow metal, fire resistant construction with forced entry resistant locking device, hinge and door frame.
- Use of break-resistant viewing windows and change windows which would withstand substantial impact, but less than required for bullet resistance.
- Use of bank type "deal trays" at change windows which provide no opportunity for direct contact between the patron and the agent.

LPD I pg. 10	Most battery victims were lone individuals.
LPD I pg. 10	Many of these were CTA employees which implies that station agents and conductors are vulnerable to a coercion situation which degrades their ability to perform crime prevention tasks.
CM II pg. 84	Almost all robbery victims were lone travellers, who were principally CTA employees, students and service workers. Most offenders travelled in groups of two or three.
CM I & II Appendix Table 18	Rapid Transit Victim Occupations CTA employees were victimized more than any other occupational group. CTA employees were the victims in 19.2% of all rapid transit crimes.
CM II pg. 84	Robberies in the station lobbey were mostly directed toward agents.
CM II pg. 87	More than a majority of the victims were lone women, such as CTA agents, students and clerical workers. Most of the offenders were lone, some of the more serious crimes against persons had multiple offenders.

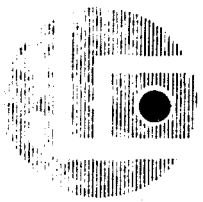
LPD II
pg. 46

Agent booths are not substantial to resist attack or robbery.

LPD I
pg. 11

Crimes against persons were committed against lone persons, particularly women, and involved public indecency. Frequently the crimes were against CTA women employees in fixed posts.

Public indecency does not lend itself to prediction, for it requires only the likelihood of successful commission and escape.



The patron entry area to the platform should be provided with a minimum of a seven foot barrier of transparent design, either in break resistant glass or in heavy metal grille work. This patron barrier would include a smaller turnstile entry area with similar barriers at a height of seven feet, which would be parallel to the passage area in front of the agent. There should be a capability to electro-mechanically release a barrier door for authorized nonpaying entrants to the system and for safe evacuation of patrons in a disaster situation. We believe these reconfigurations would actually prolong a felon's escape and would provide him with a lower perception of opportunity to complete a crime. We further believe, that where practical, patron access/exit to and from the platform should be restricted to one controllable area.

LPD II pg. 46 — In most stations limited barriers and service gates permit easy entrance and egress for those with unlawful intent.

LPD II pg. 44 — Subways have two entrances to the platform and low patron barriers and multiple exits via tunnel walkways. Subway platform lighting is better than the el's, but is only low to adequate.

LPD I pg. 11 — The felon leaves the scene in the same way as in a robbery and this suggests the need to protract his escape, thus, improving the time of response.

CM II pg. 86 — Felons escaped as fast as possible from the system, using stairs, ramps or the next train stop, always trying to avoid the station lobby.

CM II pg. 85 — The fastest escape exit was always taken by the felon. He most always used stairs and ramps from the platform, and the next train stop (felon remained on the train till then) to escape from the train.

The crime was almost always reported by the victim.

CM II pg. 87 — The felon's escape was at the first possible train stop. A significant number of crimes against persons occurrred on platforms and station lobbies, and 50% of these felons escaped via train.

CM IV pg. 6

Exit or escape devices might be employed in the form of emergency exit doors from stations and platforms. Small booths in which the patron can lock himself on trains or platform or station may also be appropriate.

Walls to isolate people within the system may also be helpful. All the above escape devices would have alarm devices to initiate a CPD response and therefore prevent the criminal from using them.

LPD I pg. 9

The victim must be able to perceive his potential status and take specific action to avoid the confrontation. Few felons were apprehended leaving the scene of the crime.

This is proven by the small amount of stolen property recovered.

LPD I pg. 9

Since most felons fled the crime scene via stairs or ramps, reconstruction of barrier surfaces to prolong the escape time or force him through the lobby may be appropriate to reduce the motivation or criminal opportunity.

LPD III pg. 55

The use of access control devices is highly dependent upon the requirements for patron volume and traffic flow. Proper design can accomodate most of these problems, but cost might be prohibitive.

The Open Plan utilizes modern lighting levels which we believe is a definite deterrent to criminal opportunity. We believe footcandle levels in the area of fifty to be appropriate. These lighting levels create a high degree of observation from street level during dark hours, in our opinion. They provide a better opportunity to define facial and other identification characteristics, either by live witness or remote surveillance devices. Under this level of lighting intensity, care should be exercised in the selection of lighting methods to minimize glare on transparent surfaces.

CM III pg. 26 — Poor lighting probably encourages crime.

CM I pg. 16 — Through comparison it is suggested that CTA lighting standards are inadequate. Average lighting in stations, trains and on platforms should be much higher than they are. O'Hare Airport averages 70 footcandles in their terminals.

CM III pg. 26 — The lighting standard for new stations and renovated stations maintain an average light level of 35 footcandles in the area of the ticket agent's booth, 20 footcandles in all stairways and tunnels, and fifteen footcandles on waiting platforms. Newer or remodeled stations are well lighted, but older stations still use the 600 volt third rail as its lighting power source.

CM I pg. 16 — The level of illumination must be high for the use of CCTV in order to keep the camera cost low. Lighting is associated with security.

CM I pg. 17 — Problem of maintaining optimal passenger density is one of adaptible building design. This is associated with security.

LPD II pg. 46 — Lighting is very good and wind break enclosures are transparent to permit good street surveillance.

Forced air heaters induce patrons to stay in one area. Platform barriers are used to reduce the area during low density. Full patron barriers are a deterrent to thefts of service. Single and controlled access of a patron to the platform will deter juvenile crimes.

We believe housekeeping and maintenance have an impact regarding the criminal opportunity. We know from our business experience that poor housekeeping and plant maintenance plays a significant role in the creation of a permissive business attitude which can ultimately lead to higher accident rates, violation of protection procedures and in some cases, criminal acts. Because the open plan concept has as its origin a clear visual opportunity, it is perception oriented and therefore, subject to the creation of attitude of opportunity or the lack of opportunity.

CM IV pg. 13 — A rundown station appearance may communicate system negligence to both would-be criminals and victims, increasing the willingness of criminals to take risks and providing a sense of insecurity to the patron.

CM I pg. 2 — Renovations related to security were clearly the most preferred kinds of improvements according to the Broad and Columbia Subway Development Study, Final Report, August, 1971.

The use of space heaters in cold weather has the effect of causing patrons to cluster in the warmer areas at night when platform waiting time may be protracted. In this regard the controlled use of these heaters can have an effect similar to limiting the size of the platform, thus reducing the area in which a criminal confrontation would be likely to occur.

The location of a patron emergency telephone should be distinctly defined. This can be accomplished through color highlighting on the platform, distinct equipment color and light indicators and educational signs regarding the location, function and method of use.

SUPPORT CONSIDERATIONS

The materials below are included as suggested considerations in making Solutions #1, #2 and #3 more effective. These suggestions also serve to define an area of potential cost associated with effective implementation and testing.

Support Requirements of Law Enforcement

We recognize that Solutions #1, #2 and #3 introduces into police communication an additional burden. That burden, however, is not placed on the Central Police Communications function; rather it is placed on the individual patrol officer. Under the theory of direct radio frequency alarm transmission to a patrol unit radio in the vicinity, only the patrol units in the area will receive the distress response signal. While it is true these units may respond prior to advising Central Communications, it is within the existing procedure that Central Communications will be advised when a patrol unit goes out of service. The only procedural change required will be that the patrol unit will advise Central Communications that they are responding to a specific Rapid Transit location. This will permit Central Communications to maintain virtually identical knowledge of cars available for assignment as was the case before the application of these solutions.

We believe that the Rapid Transit alarm direct to the patrol unit and the immediate response is essentially no different than an officer on patrol who observes a mugging in process and leaves a patrol unit to ffect an arrest. In either case the officer would advise Central Communications of his intentions after he had initiated a response action but before arriving on the actual crime scene. In instances where officers are provided with personal radios, the concern which might be exercised in this area is further reduced.

The administrative changes which this system of solutions might require are well within the capability of the police executives. As regards the educational requirements for patrol officers, we foresee no major educational burden. While it is true there will be a "break-in" period where officers learn to distinguish the meaning of subaudible transmissions received on their radio, there will be no significant change in response since it will be similar to responding to a crime which is committed within the officer's visual presence.

Response Accountability

A further consideration in the subaudible tone response requirement is the issue of individual officer accountability to respond. It is conceivable that an officer may not acknowledge receipt of a radio frequency alarm signal, may not respond and a crime could be completed. Indivdual officer accountability is difficult to fix under this system, but the task is not impossible. Potential answers to the question of accountability may be as follows:

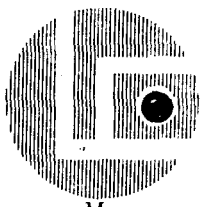
- Restructuring of patrol tracks to assure the proximity of a patrol car within the transmission distance with the central monitoring officer required to make an independent call to the District Dispatcher who in turn confirms the patrol response. Based upon the dispatcher's capability to reinforce the need for a response, specific accountability would be possible as well as the termination of other patrol cars within transmission distance, but beyond the backup requirements normally needed in such responses.

- Development of a primary/secondary response assignment to specific beat cars and a supervisory audit based upon documented central monitoring signals received from specific platforms within the beat in the last twenty-four hours.

- The potential use of compensatory time such as one cumulative hour for each response that is confirmed as being initiated by radio frequency alarm.

Alternate Consideration in Radio Frequency Alarm Technique

In Solution #1 and #3 we have recommended the use of radio frequency alarm transmission direct to patrol units as initiated by an endangered patron. We believe this will substantially reduce police response time and be cost-effective Both objectives are implicit in our contractual assignment. There is a capability ot utilize the platform radio frequency alarm to transmit direct to the communications center who would then dispatch an available patrol unit. While this process adds response time, it does solve the problems of accountability and while the received radio signals can be printed in hard copy, we believe it will greatly affect the cost-effectiveness, increase hardware, and dispatch function man hours substantially. It is possible to control this cost to a limited degree by automatic retransmission to the car with dispatch intervension based upon no patrol cars being available.



Measuring Solution Test Effectiveness

The implementation of any or all solutions will require significant effort during the testing stage. We foresee substantial man hours devoted to maintaining proper documentation in the areas of solution performance and effectiveness and the effect and cost sustained by government agencies who must provide support services to the solutions during the test period. There will be an additional burden in accurately fixing initial and changing patron attitudes as exposure to the solutions and their effectiveness becomes known. We would judge a continuing need for a test coordinator with substantial clerical support throughout the test period. The primary function would be to assure that all available valuable data was effectively recovered, compared and evaluated regarding all considerations of applied solutions. A matrix of these measurement considerations is subsequently provided in this text. An additional responsibility would be the maintenance of press relationship to assure accuracy in reporting of developing solution effectiveness to assure the patron receives accurate and impartial information which would not cause a pre-orientation of conclusions regarding solutions.

RELATIONSHIP OF SOLUTIONS TO OBJECTIVES

The following section identifies primary components of all three solutions, and the objectives they are expected to achieve. Primary components are identified as devices which the patron or felon perceives, and/or which have a direct effect on the reduction of opportunity or the safety of the patron or apprehension of the felon. By comparing the identified objectives with a subsequent section regarding comparative measurement of results, a determination can be made as to whether implemented solutions were effective.

It should be remembered that the three solutions provided in this study are modular in design, and components of one solution may be applied to another solution providing a capability to adapt to new applications or change the environment of existing applications. This modularity assures a higher degree of effective application while maximizing the adaptive capabilities and providing for the inclusion of developing but currently unstable state of the art advances.

The evaluations of Solutions #1, #2 and #3 as proposed in this study requires some definition of the interrelationship between the components of each solution and their ultimate effect on the patron. It is the function of this section to reflect pertinent interrelationships involving the solutions and the patrons, as well as some suggested guidance in evaluating the solutions should they be implemented.

It is important to understand that many of the components of Solution #1, #2 and #3 represent different application of similar hardware for different purposes. Because of the modular design of the three solutions, various components can be joined in another solution to provide specific application to new crime environments. For example, it is within feasibility to utilize the radio alarm transmitter suggested in Solution #1 in the application of Solution #2. It is possible to use the video recording technique in Solution #1, Solution #2 and Solution #3 in an effort to provide assurances to conductors that they may be other than prime witnesses.

Each of the three solutions, however, is designed to create a higher level of protection perception on the part of the patron. Each solution is designed to initiate a more timely police response, thereby, effecting a higher apprehension rate and an improved perception of patron protection. Each solution is

designed to create an environment of reduced opportunity as perceived by the felon, and to provide the capability of creating a witness to a criminal confrontation with full disclosure of the fact to potential felons. Each of the three solutions is compatible with existing CPD and CTA protective practices.

Further analysis of the relationship of each solution and its component parts is subject to proof through implementation and a strict analysis of specific factors. The factors subject to analysis are subsequently detailed. Chart #A, which follows, lists the component part of each of the three solutions, and the predicted accomplishments we believe they will attain.

This discussion elaborates on the following chart which indicates that all primary component parts of Solution #1, #2 and #3 make a contribution to the objectives of this study. The chart reflects the interrelationship of the devices to the study objectives.

CCTV System

The use of closed circuit television surveillance in all three solutions provides the patron with an obvious indication of surveillance of their safety. It also provides the felon with real knowledge that his potential felonious considerations could easily become the subject of a criminal prosecution in the form of a witness not subject to coercion. The remote monitoring of a confrontation, as is the case in Solution #1, could result in additional definition of police response when the console operator communicates with the central communication function. The CCTV system in Solutions #1, #2 and #3 serves to provide full-time surveillance of 100 foot safe areas on a 24 hour, 365 day basis. The cameras do not require personal breaks, do not cost near the equivilent of police salaries, and are capable of as accurate perception of a developing crime through qualified monitoring as would be the case in Solution #1. It should be understood that CCTV does not totally eliminate the need for mass transportation unit patrol.

Patron Assistance Button or Phone

The use of appropriately placed patron assistance buttons or phones provides the patron with a method of seeking recourse through summoning police assistance. The location of the

assistance buttons within the highly identifiable surveilled area reinforces the patron's concept of safety. The felon can now recognize that a successful attack within the surveilled area will not only subject him to a high potential for prosecution, but the patron's proximity to the assistance button and its timely summoning of police response greatly increases the risk of apprehension. These factors reduce the felon's perception of opportunity. Because of the patron assistance buttons ultimately cause a definitive radio transmission of location, they define response, therefore, improving efficiency in response. This definition in response location will result in savings in a reduced need for district preventive checks as well as a shorter turn around time in total response to a platform and return to duty.

Radio Alarm Transmitter

The use of radio alarm transmission direct to police patrol vehicles substantially reduces response time resulting in a higher perception on the part of the patron. The same is true for the felon who will recognize that his time to initiate and complete a crime has been greatly reduced. Those felons viewing the nature of the timely response will have ample opportunity to evaluate their risk; we believe some felons will conduct such tests. The radio alarm transmitter is designed to provide distinctive location of alarm information and, therefore, will improve definition and time of police response. As part of the improved response technique relating to district response, the transmitter should have the net affect of reducing MTU manpower commitments to the mass transit system.

Multiplexing System

This system of signal processing serves to handle multiple information transmission over a single hard wire. As such, it is economical, fast and in Solution #1 provides the capability to abort unnecessary police response. The system cost-effectively provides burglary and hold-up protection at the cost of the sensors only.

The multiplexing system will not be one of the more apparent aspects of the system. In that regard, it is of less value to patron perception, but is more valuable to the CTA employee who represents a substantial number of the victims of mass transportation crime.

Video Recording

The use of video recording will provide the lone confronted patron with knowledge that a witness is available. While this fact alone does not deter victimization, it does improve perception because it creates the opportunity for prosecution. The video recording technique will assure the criminal that a lone patron within the surveilled area is not truly a lone victim with little recourse. In Solution #1, the console operator may remotely initiate recording, or in Soultion #1 and #2 the patron may initiate recording. In either case, the patron has established a position of recourse heretofore not available. The recording system will have the net effect of reducing the cost of a criminal investigation through the documentation of a confrontation. Ample evidence of definitive prosecution and reduced cost is available in the banking industry.

Central Monitoring

A central monitoring capability reinforces the lone patron's perception that they have a qualified individual available and capable of assisting in a judgement of personal endangerment. The same factor that affects the patron in a positive fashion has a negative affect on the felon and his perception of opportunity to commit a crime. The larger the application of Solution #1, the greater the savings in manpower allocation to patron protection. The additional ability for a central police monitor to be responsive to the crimes of robbery of an agent or burglary of an agent's booth at virtually no additional cost, the cost of sensors, assures a higher degree of cost-effective protection. The central monitoring capability to expand to other platform data links can prove cost-effective in future control capability.

Public Address Safety Messages

The use of public safety messages as a patron enters a platform in Solution #2 serves to reinforce patron awareness of the need to perceive endangerment, as well as creating an immediate awareness of the safety system that has been applied to the platform.

As the public safety message has a positive affect on patron perception, we believe it will also have a negative affect on felon perception of opportunity.

Agent's Booth Burglary and Robbery Alarm

There is a positive perception affect of these protective systems and they are a positive factor for the CTA employee who serves amply as a victim of crime in mass transportation. The use of the burglary system serves to protect property. This capability to initiate more timely police response will become a perceptive factor in reduction of the criminal opportunity as regards the felon. The system will also provide the definition as to location and type of criminal attack conducted at the agent's booth.

COMPONENT RELATIONSHIP TO STUDY OBJECTIVES

	Higher Patron Perception of Safety and Capability to Seek Assistance	Higher Perception of Reduced Felon Opportunity and Reduced Crime	Improved Definition and Police Response Reducing Crime and Improving Perception	Cost Reduction in Reduced Police Requirement or Reduced Crime Experience
CCTV System (Solution #1, #2 and #3)	X	X		X
Patron Assistance Button or Phone (Solution #1 and #2)	X	X	X	X
Radio Alarm Transmitter (Solution #1 and #3)	X	X	X	X
Multiplexing System (Solution #1)			X	X
Video Recording (Solution #1 and #2)	X	X		X
Central Monitoring (Solution #1)	X	X		X
Public Address Safety Message (Solution #2)	X	X		
Agent's Booth Hold-up and Burglar Alarm (Solution #1)		X	X	X

CHART A

RECOMMENDED COMPARATIVE MEASUREMENTS

It is recommended that the following comparative measurements be established for the implementation of Solution #1, #2 and #3. The following requirements are identified by the objective for which the data is collected. This data recovery and evaluation program will determine operational and cost-effectiveness of the solutions implemented. From this data the City of Chicago will be capable of making predictions as to the feasibility of solution expansion beyond the test stages.

* * *

IMPLEMENTATION FACTORS FOR ANALYSIS

Patron Perception

Effect of Implementation	Areas to Be Measured
Patron Perception of Relative Safety from the Criminal Confrontation	. Establish method of data recovery of patrons participating in the use of the protective system. . Determine the following on a monthly comparative basis at the test location to be compared against similar nontest location regarding first perception of protection. . Determine where and what patron first observed of system, i.e. .. Photoelectric sensing (Solution #2) .. Patron assistance button (Solution #1) .. Patron emergency telephone (Solution #2) .. Color coding surveilled area (Solution #2) .. Color coding activator locations (Solution #1 and #2) .. Visible camera locations (Solution #1 and #2) .. Timely police response (Solution #1 and #2)
Patron Threshold of Perceived Endangerment	. Determine where patron perceived highest endangerment. .. Entering platform .. On platform before train arrival .. On platform after train departure

Effect of Implementation	Areas to Be Measured
	.. Upon entering surveilled area .. Within the surveilled area .. Outside the surveilled area .. Upon leaving platform
	. Determine conditions under which patron would seek police response. .. As lone patron on platform .. As patron with coercive individual on platform .. As patron with coercive group on platform .. As one among many patrons on platform .. As patron expecting criminal attack .. As patron under physical attack .. As patron under property attack
Patron Understanding of System Objectives	. Determine if patron recognizes value of CCTV surveillance. .. As method of providing assistance .. As method of prosecution .. As a witness method
Patron Exposure to Actual Crime	. Establish method of data recovery regarding nature of criminal occurrences and location based on comparative nontest location versus test location. . Crimes to be broken down by category and periods as follows: .. Occurred at what time .. Occurred upon entry .. Occurred upon leaving .. Occurred in surveilled area .. Occurred outside surveilled area

Effect of Implementation	Areas to Be Measured
	. Crimes to be related to passenger load at platform
Patron Actual Perception of Police Response	. Determine time required in police response. .. Log time response request initiated .. Log time response arrives .. Determine approximate distance from platform when patrol received request
Police Commitment to Patron Perception	. Determine comparative data regarding the number of preventive platform checks made by district command in similar nontest stations to the number of preventive checks conducted on test platform.

IMPLEMENTATION FACTORS FOR ANALYSIS

Initial Maintenance

Effect of Implementation	Areas to Be Measured
Cost-effective System Maintenance	. Establish method of monitoring cost of system maintenance and operational malfunction.
Determine if preventive maintenance or demand service is best investment.	. Compare cost of monthly preventive maintenance service against actual job site hours by maintenance personnel.
Determine if premium payments for emergency repair is justified.	. Establish program of emergency maintenance and determine time required to respond. . Determine capability to make system operational. . Determine total time system inoperative.
Determine requirements and cost of maintaining back-up inventory.	. Establish method of determining component failure factors. . For each component of each solution, establish performance record, i.e. .. Hours of continuous operation .. Date of last service .. Did last service require replacement, on site repair. .. Cost of labor to replace device .. Cost of labor to repair device .. Cost of component repair parts .. Cost of component replacement

Effect of Implementation	Areas to Be Measured
Determine causative failure factors for each component.	. Determine indications for device failure. .. Device of poor quality in reference to operating requirements .. Device poorly applied in reference to operating requirements .. Device tampering evidence apparent .. Device improperly used by system operators .. Device improperly serviced

IMPLEMENTATION FACTORS FOR ANALYSIS

Initial Operation

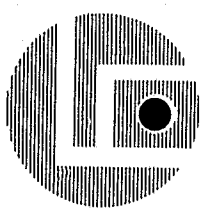
Effects of Implementation	Areas to Be Measured
Cost of System Operation by Manpower Allocation	. Develop comparative data of manpower allocation to test and nontest platform based upon police. .. Number of manhours assigned to test/nontest platforms for the period (MTU) .. Comparative purpose of assignment .. Number of manhours assigned to nontest platform by District Command in period .. Number of District Command manhours required to respond to unauthenticated confrontations in the period. .. Number of MTU manhours required to respond to unauthenticated confrontations in the period .. Number of tactical squad manhours required in the period for test platform and purpose .. Number of tactical squad manhours required in the period for nontest platform and purpose .. Number of manhours required per period for central console operation .. Number of supervisory manhours required for console operation .. Number of training manhours required for console operators .. Number of training manhours required by District Command to implement district response to platform radio alarm .. Number of manhours required to assure evidence not purged from video tape system .. Number of manhours required to extract evidence from video tape system

IMPLEMENTATION FACTORS FOR ANALYSIS

Crime Level

Effects of Implementation	Areas to Be Measured
Measurement of Comparative Actual Crime	. Establish method of data recovery of crimes on test and nontest platforms in each crme category relating to crimes against persons - crime against property. . Determine these specifics for each crime - each category - each location for each period. .. Patron or CTA employee location at time of criminal act .. Single or group confrontation of patron .. Patron lone or in group at time of confrontation .. Time of patron confrontation to completion of crime .. Time of police arrival at crime scene .. Method by which police response initiated .. Felon apprehended .. Felon escaped .. Did confrontation take place in surveilled area .. Did confronted patron make any attempt to initiate police response .. Was response initiated by console operator

Special Note: *It would be of value in this test program to determine the factors which made the suspect determine there was sufficient opportunity to complete the criminal act. Because obtaining this information might deprive the suspect of legal rights, we do not believe it could be done until prosecution was completed. Reconstruction costs would be expensive.*



LPD

EVALUATORS OF PROTECTION PROBLEMS AND IMPLEMENTORS OF PROTECTIVE SOLUTIONS . . .

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