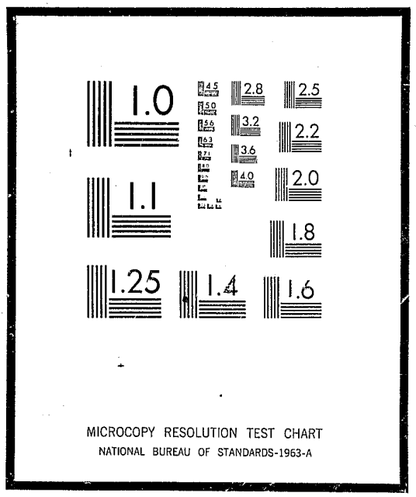

WASHINGTON OPERATIONS

PROJECT CARES: COLUMBUS ARMED ROBBERY ENFORCEMENT SYSTEM

DECEMBER 1973

Equipment Systems Improvement Program Report
prepared for

NILE&CJ

U.S. DEPARTMENT OF JUSTICE
LAW ENFORCEMENT ASSISTANCE ADMINISTRATION
NATIONAL INSTITUTE OF LAW ENFORCEMENT
AND CRIMINAL JUSTICE

MITRE

THE EQUIPMENT SYSTEMS IMPROVEMENT PROGRAM

Following a Congressional mandate* to develop new and improved techniques and equipment to strengthen law enforcement and criminal justice, the National Institute of Law Enforcement and Criminal Justice under the Law Enforcement Assistance Administration of the Department of Justice established the Equipment Systems Improvement Program. The objectives of the Program are to determine the priority needs of the criminal justice community to help in its fight against crime, and to mobilize industry to satisfy these needs. A close working relationship is maintained with operating agencies of the criminal justice community by assigning systems analysts to work directly within the operational departments of police, courts and corrections to conduct studies related to their operational objectives.

This document is a research report from this analytical effort. It is a product of studies performed by systems analysts of the MITRE Corporation, a not-for-profit Federal Contract Research Center retained by the National Institute to assist in the definition of equipment priorities. It is one of a continuing series of reports to support the program decisions of the Institute relative to equipment development, equipment standardization and application guidelines. Comments and recommendations for revision are invited. Suggestions should be addressed to the Director, Advanced Technology Division, National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U. S. Department of Justice, Washington, D. C. 20530.

Gerald M. Caplan, Director
National Institute of Law
Enforcement and Criminal Justice

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* Section 402(b) of the Omnibus Crime Control and Safe Streets Act of 1968, as amended.

PROJECT CARES: COLUMBUS ARMED ROBBERY ENFORCEMENT SYSTEM

LAWRENCE G. GUNN

Prepared for the Columbus, Georgia, Police Department
under the sponsorship of the National Institute of Law Enforcement and Criminal Justice
of the Law Enforcement Assistance Administration

DECEMBER 1973

The recommendations made in this report are those of the author and not necessarily of the Columbus Police Department or the National Institute of Law Enforcement and Criminal Justice.

THE MITRE CORPORATION
WASHINGTON OPERATIONS

ABSTRACT

Project CARES--Columbus (Georgia) Armed Robbery Enforcement System—is a plan for reducing armed robbery. It relies upon a sensor-transmitted silent alarm to alert police that a robbery is in progress, enabling police to reach the scene of the crime within a very few minutes. The goals of the project include reducing the incidence of robbery in Columbus, minimizing the number of injuries it causes, and reducing property loss due to robbery. Subsidiary goals include reducing the number of man hours required to apprehend robbery suspects, and increasing the rate of conviction for those arrested. Based on results obtained in Tampa, Florida with a similar system, the paper predicts an increase in robbery arrests for Columbus followed by a reduction of robbery incidence as a result of publicity.

CARES can be regarded as a test of whether sensor-transmitted alarms will reduce robbery in a medium-sized city.

ACKNOWLEDGMENT

This report was prepared for the Columbus, Georgia, Police Department through the auspices of the National Institute of Law Enforcement and Criminal Justice. It addresses a program funded through the Atlanta Regional Office of the Law Enforcement Assistance Administration. The author gratefully acknowledges the assistance provided by Mr. Jack V. Michaels of Martin Marietta Aerospace Corporation and Mr. William F. de Dufour of The MITRE Corporation with the technical specifications contained herein. Director Wesley E. Mott of the Columbus Police Department provided the operational expertise necessary to interpret and incorporate the suggestions and ideas we borrowed from police departments in Detroit, Tampa, Jacksonville, Miami, and Jackson, Mississippi. The police officers in these cities, who helped us so much, deserve a special thanks. Sylvia Halpern of The MITRE Corporation organized and prepared the text.

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SECTION I
INTRODUCTION

BACKGROUND

Project CARES (Columbus Armed Robbery Enforcement System) is a system which was designed in response to a robbery rate that had nearly tripled in Columbus, Georgia between 1968 and 1972.* Its purposes are to reduce the incidence of robbery, to reduce the injuries and losses associated with robbery, and to apprehend more robbery offenders.

The CARES anti-robbery plan relies on a sensor-transmitted signal, covertly activated by a clerk who is being robbed, and received by police positioned to respond very rapidly. The signal can be a radio-transmitted sound and/or a flashing beam of light emanating from the roof of the building being robbed. Prior experience with sensor-transmitted robbery alarms used in combination with police stakeouts in Tampa and Jacksonville, Florida, in Detroit, in Los Angeles, and in Jackson, Mississippi has led Columbus police officials** to hope that armed robbery offenses in Columbus might be reduced by as much as twenty-five percent by use of similar techniques in Columbus.

Project Objectives

The CARES system has been designed to accomplish the following:

- Reduce response time by CARES personnel to two minutes or less for robbery calls that are answered.
- Demonstrate the reliability and utility of sensor-transmitted alarm equipment as a tool for apprehension of both robbers and burglars.
- Hold injuries to victims, bystanders, police and criminals, as well as property losses, to an acceptable level.
- Reduce the number of manhours required for case clearances (apprehensions) by catching offenders while crimes are in progress.
- Increase the percentage of arrests resulting in convictions.

*Uniform Crime Reports of the FBI, 1968-1972. (Reference 1)

**The CARES project was initiated at the request of Chief of Police Curtis E. McClung and developed by Wesley E. Mott, Equipment Systems Improvement Program Liaison officer for the Columbus Police Department, and MITRE Field Site Representative Lawrence G. Gunn.

- Prevent robbery attempts through publicity about the project.
- Provide for smooth transition and transfer of the equipment, procedures and techniques developed and implemented by CARES (Columbus Armed Robbery Enforcement Section) into the Columbus Police Department Patrol Division.

SECTION II
OPERATING CONCEPT

The fundamental operating concept of CARES consists of deploying sensor-transmitted alarm units and bait money packs at targets selected by analysis; then monitoring these units during prime robbery hours with specially trained plain-clothes police officers. Stakeout units will use rented cars in order to prevent recognition of police cars.

Figure 1 is a schematic diagram of a typical CARES alarm unit, its installation and workings. Alarm units, associated sensors and bait money packs are described in detail in Appendix I, Project CARES Equipment Specifications.

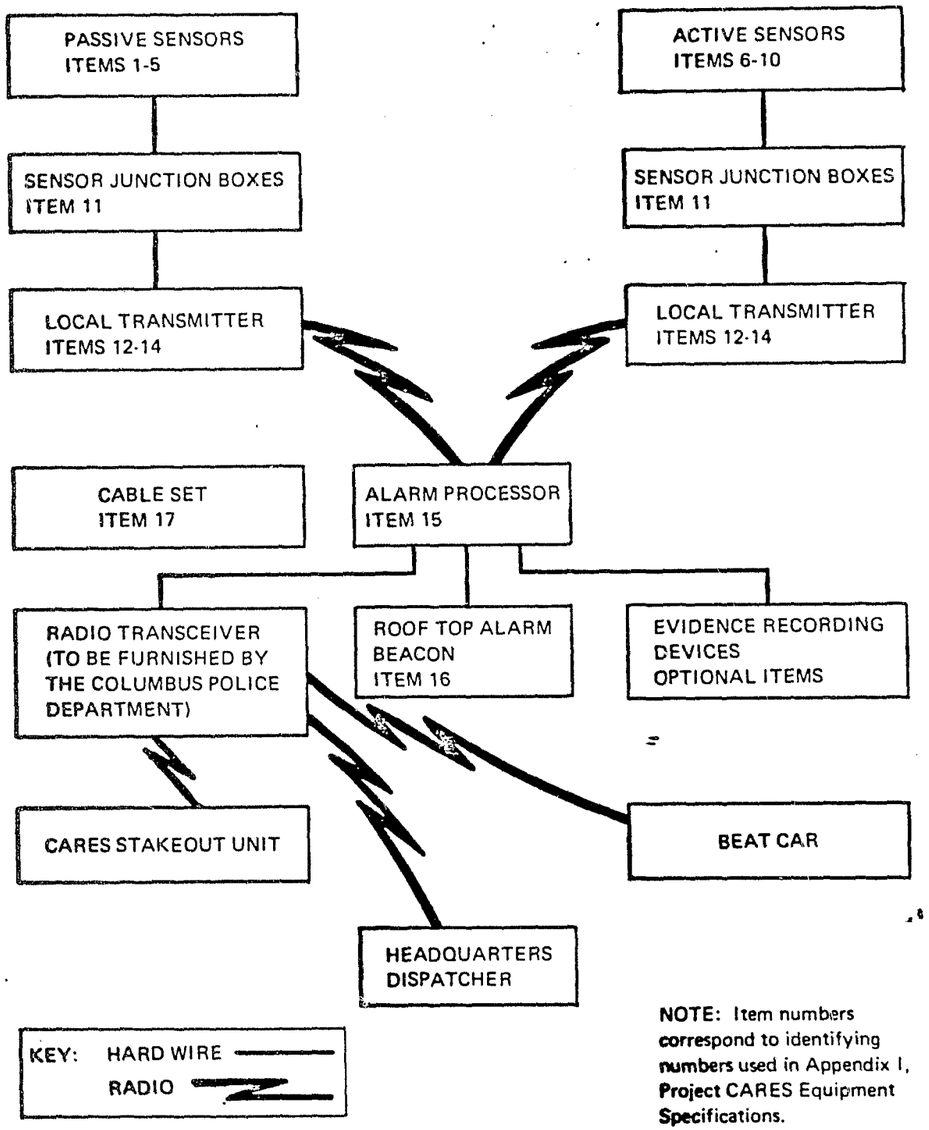

Figure 1
CARES Alarm Unit Deployment

SECTION III
METHODS AND PROCEDURES

Table 1 is a matrix which relates the methods and procedures of Project CARES to the project objectives.

TARGET POPULATION TRAINING

The methods and procedures envisioned in this area include development and publication of a brochure and provision of instruction by Project CARES personnel to small groups of proprietors and employees of the target population. Instruction will be provided in areas such as crime observation, physical evidence preservation, robber profile recognition, and hiring policies. Information on successful robbery prevention techniques will be disseminated. In addition, training will be provided on operating robbery sensors and bait money packs. In general, the training and education of the target population is considered a vital step in the success of the project. Therefore, considerable resources will be expended in this area to insure target population understanding and cooperation with Project CARES goals and objectives.

TRAINING OF TACTICAL UNIT PERSONNEL

Police officers from the Tactical Unit will receive training in the areas of surveillance techniques, actions to be taken in the event of an alarm, and crime scene investigation. Later in the Project, officers of the Patrol Division will receive the same training. Personnel will be trained in the best techniques for answering an alarm quickly and safely. Since the CARES vehicles will not have the advantage of emergency equipment, avenues of approach that are traveled relatively little and least likely to be congested will be selected.

Personnel will be trained in actions to be taken upon arrival at the crime scene. Since the apprehension of the armed robber represents probably the most dangerous moment in respect to the safety of all parties involved, the police officers will have a plan of action that has been prepared with the objective of holding injuries to bystanders, victims and police to a minimum.

Training in crime scene investigation will stress thoroughness, but at the same time will seek efficiency so as to reduce manhours required to accomplish the investigation. Officers will be instructed as to what information is vital to an investigation and how to go about obtaining that information in an efficient manner.

PUBLICITY FOR PROJECT CARES

Publicity for Project CARES will not be sought until the equipment evaluation goal has been met. Once the effectiveness of the alarm and bait money equipment has

TABLE I

Relationships Between Methods and Procedures and Project CARES Objectives

OBJECTIVES	TARGET POPULATION TRAINING	TACTICAL UNIT TRAINING	CARES EQUIPMENT	PUBLICITY
1. To reduce average response for armed robbery calls which are fielded by CARES personnel to 2 minutes or less.	X	X	X	
2. To demonstrate the reliability and utility of the sensor-transmitted alarm equipment & associated equipment as a tool for apprehension of both robbers and burglars.			X	
3. To hold injuries to bystanders, victims, police and criminals as well as property damage to an acceptable level.	X	X	X	
4. To reduce the number of manhours required for case clearance (apprehension).	X	X	X	
5. To increase the proportion of; $\frac{\text{convictions}}{\text{arrests}}$	X	X	X	
6. To enhance the deterrent effect of Project CARES through publicity.				X
7. To provide for smooth transition and transfer of the equipment, procedures, and techniques developed and implemented by Project CARES into the Columbus Police Department Patrol Division.	X	X	X	X

been determined, the deterrent aspects of Project CARES will be exploited through publicity. Even at this point, certain aspects of the Project will be kept confidential such as the techniques of placing and operating robbery and burglary sensors, the operation and physical appearance of the bait money packs, and, of course, the actual locations of the equipment.

SECTION IV
EVALUATION

In evaluating the efficacy of the system, quantitative and qualitative measures will be applied to each of the specific goals.

- To reduce average response time for armed robbery calls fielded by Project CARES to two minutes or less:

  The measure of effectiveness will be response time, defined as the period from actual commission of the crime to the actual arrival of a CARES unit. Data will be collected through field data forms completed by officers responding to the scene. A moving average of these data will be compared to the goal of 30 seconds. Should the difference between actual field data and the goal be significant, adjustments in tactics will be devised and implemented.

- To demonstrate the reliability and utility of the sensor-transmitted alarm and associated equipment as a tool for apprehension of both robbers and burglars:

  Reliability of the equipment will be measured in terms of false alarms. False alarms are expected from three sources: (1) human operator errors, i.e., proprietor or employee activation through carelessness, (2) improper installation by CARES personnel, (3) faulty equipment. Because of the high degree of sophistication of the equipment a relatively high rate of false alarms is expected; however, the Project Director feels that a rate of 2 or 3 false alarms a week is a tolerable rate. Should statistics and records indicate that this arbitrary threshold is being exceeded, remedial action will be employed through retraining of the target population and/or the police officers responsible for installation of the equipment. Further, the contract for procurement of the equipment will contain enforceable clauses for correction of equipment deficiencies.

  The utility of the equipment as a tool for apprehension of both robbers and burglars will be measured by the ratio of the number of apprehensions versus the number of robbery and burglary offenses which occur in businesses equipped with CARES equipment. Separate statistics for robberies and burglaries will be accumulated for the evaluation.

- To hold injuries to bystanders, victims, police, and criminals as well as property damage to an acceptable level:

  Records on injuries encountered by bystanders, the complainant, police, or the offender will be maintained and a CARES report filed for each injury. Evaluation of this goal, by its nature, will be subjective. The data collected will be used for revision of operating policy and procedures should injuries exceed the rate expected through previous experience.

- To reduce the number of manhours required for case clearance (apprehension).*

  Field data forms will include data on the number of manhours expended by the various parties participating in case clearance. Unfortunately, concise data on total police manhours expended on robbery and burglary cases are not available and therefore estimates have been used. However, during a three-month period prior to field operations with the CARES equipment, Project personnel will collect data on manhours expended on case clearance. The data collected during this time period should provide sufficient samples to improve on the estimates, thereby providing a base line for evaluation of this goal.

- To increase the percentage of arrests resulting in convictions:

  The use of the CARES equipment is expected to yield a higher proportion of on-scene arrests and lead to sounder cases. Records will be kept to show the disposition of cases, i.e., the number of criminals remanded to the corrections system, the percentage of convictions, and the number of additional cases cleared as a result of Project CARES apprehensions. These data will be compared with the Department's prior experience in these areas.

- To enhance the deterrent effect of Project CARES through publicity:

  Publicity concerning the new capability represented by the CARES equipment is expected to produce citywide impact on both robbery and burglary rates. During the last 2-1/2 months of the Project, a statistical analysis will be performed to determine if there has been a significant change in these rates. In addition, the project team will

*In public parlance, a case is "cleared" when an arrest is made. A primary goal of the CARES project is to make more robbery arrests at the scene of the crime. That would have the dual effect of raising clearance (or apprehension) rates and of reducing the manhours expended on investigation.

obtain interviews and statements from those apprehended in an attempt to obtain, firsthand, a measure of the deterrent effect of Project CARES.

- To provide for smooth transition and transfer of the equipment procedures, and techniques developed and implemented by Project CARES into the Columbus Police Department Patrol Division.

  Evaluations of this goal will be partially subjective and partially quantitative. Subjective evaluation will include the level of patrol division acceptance of the equipment, procedures, and techniques used by Project CARES. In addition, the evaluation of other Project goals will continue for the six-week transition and turnover period.

SECTION V
PROJECT STATUS

The project was officially approved 1 July 1973. However, in early April, two third generation Anti-Burglary and Robbery (ABAR) units were borrowed from the Jacksonville, Florida Office of the Sheriff. These units, built by the Martin Marietta Co. of Orlando, have been in use since the loan was arranged. No robberies have been experienced in the premises selected for installation of these units, but substantial operational experience has been obtained through their use. In addition, the following has been noted:

- Cooperation from the target population (management and employees) has been excellent. Training of employees in the operation of the equipment has been reasonably successful. One employee was fired because she did not cooperate.
- Employees develop a sense of security when the alarm is present. Several have quit when the alarm was moved.
- Response time has averaged 25–30 seconds.
- It was found that the alarm transmissions are picked up by portable radios in the premises, creating an artificial and unintended local alarm.
- The primary problem with present operations is the lack of a vehicle which cannot be associated with the police. The present stakeout vehicle was painted, and deluxe hubcaps were installed along with out-of-state plates, and conventional antenna. It still looks like a police car. Stakeout personnel have been physically located on several occasions by what appears to be deliberate reconnaissance effort.
- Officer boredom has been a problem with stakeout personnel.

In addition, a variety of operational techniques for approaching a robbery in progress have been worked out by the stakeout personnel.

Finally, several technical improvements have been developed as a result of experience with the ABAR units. These are covered in Appendix I, CARES Equipment Specifications.

SECTION VI
EXPECTED EFFECTIVENESS OF CARES ALARM UNITS

The following operational analysis is based on the Tampa Police Department's experience with sensor-transmitted alarm equipment (STAVS) similar to the CARES alarm units. Although the CARES units will improve on the Tampa program by including additional robbery sensors, allowing for more covert installations, and using rental automobiles instead of department owned civilian vehicles, the following analysis considers that equipment effectiveness will be essentially the same.

TAMPA EXPERIENCE

- Tampa installed STAVS in 12 target stores.
- The equipment was in use for two months.
- It operated five days a week, Tuesday through Saturday 1900–2400 (25 hours/week).
- Six robberies occurred in stores equipped with ABAR.
- Police effected five on-the-spot arrests.
- Ten criminals were incarcerated.
- Eleven (2.2/arrest) additional cases were cleared.
- 100% conviction rate has been obtained of all tried so far.
- No injuries have been suffered by police, citizens or criminals.

COLUMBUS, GEORGIA STATISTICS

- As of 31 July 1973 there had been 175 robberies

  $\frac{175}{213} = \frac{x}{365}$; x = 300 robberies predicted for 1973.

- In 1972, 60% of all robberies can be classified as commercial robberies. Therefore, 180 robberies are expected to occur in businesses which are compatible with the CARES operating concept.
- In 1972, 37 of 113 commercial robberies were cleared by arrest for a clearance rate of about 33%.
- Assuming the same success in 1973, .33 x 180 or 60 commercial robberies are expected to be cleared in 1973.

COLUMBUS, GEORGIA PREDICTIONS

- During Project CARES, 12 weeks are scheduled for concentrated field operations with 10 CARES Alarm Units (Tampa operated 12 alarms for 8 weeks).

Operating hours will be 40 hours per week (Tampa operated 25 per week). Therefore, Columbus will accumulate 4,800 alarm hours of operation as compared with 2,400 alarm hours accumulated by Tampa.

- From 1971 UCR statistics, Columbus and Tampa robbery rates per 100,000 inhabitants are calculated as 129 and 344 respectively; therefore, a ratio of $\frac{129}{344}$ or approximately .374 is assumed for applying Tampa statistics to Columbus.
- Thus with essentially the same opportunity rate and with 10/12ths as many alarm units, operating 40/25ths as many hours, and 12/8ths as many weeks, Project CARES is expected to effect 3/4 as many or 3.7 on-scene arrests.
- However, with an assumed clearance rate of 33%, 1.2 of these robberies would have been cleared by conventional methods.
- Therefore, Project CARES would be responsible for 2.5 on-scene clearances.
- But, as was the case in Tampa, in addition to cutting manpower expended on each robbery and production of sounder cases, each on-scene arrest will net 1.7 offenders and clear an average of 2.2 additional robberies.
- Therefore, Project CARES is expected to net 2.5 on-scene clearances, arrests of about 6 criminals, and clear about 14 additional previous robberies.
- Project CARES' impact on commercial robbery clearance rate is estimated as:

$$\frac{\text{CARES ON-scene Clearances}}{\text{Robberies expected to be cleared in 1973}} + \frac{\text{CARES Clearance of Previous Robberies}}{} = \frac{2.5 + 14}{60} = \frac{16.5}{60}$$

27.5% increase in commercial robbery clearance rates.

The resultant expected clearance rate would become 33 + .275(33) = 42%.

- Assuming these predictions are correct, commercial robbery clearance will increase to 42% and 6 criminals will be incarcerated with the expenditure of less than 3,000 manhours of field services resources. This represents 1.1% of all field services manpower resources.

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APPENDIX 1
COLUMBUS ARMED ROBBERY ENFORCEMENT SECTION
(CARES)
EQUIPMENT SPECIFICATION

COLUMBUS ARMED ROBBERY ENFORCEMENT SECTION
(CARES)
EQUIPMENT SPECIFICATION

1.0 INTRODUCTION

The Consolidated Government of Columbus, Georgia wishes to procure an alarm system for use by the Columbus Police Department in detection of robberies and burglaries in progress. The system will consist of ten (10) alarm units for use by the Columbus Armed Robbery Enforcement Section (CARES) under field operational conditions. These ten alarm units are hereafter referred to as CARES alarm units. Proposals from industry are requested to provide the system components specified in the following pages.

2.0 TERMS AND CONDITIONS

2.1 GENERAL CONDITIONS

Signature on cover sheet verifies that the bidder has acquainted himself with and agrees with all these terms and conditions.

2.2 QUALIFIED BIDS

No bid will be considered unless bid price is firm without qualification. Conditional bids will not be accepted. Bidders may bid on specified items or acceptable equals where indicated, but not on both; i.e., bids offering more than one make/model are not acceptable.

2.3 OPTIONAL ITEMS

Several items have been included which may be bid at the option of the bidder. If a bidder includes optional items in his proposal, he shall insert appropriate language to document the City of Columbus, Georgia's right to exercise the option at any time during the period specified for each optional item. The terms and conditions of Section 2.0 shall apply to optional item bids.

2.4 DELIVERY

Bidders shall state their delivery time within their proposals. The alarm units complete with sensors and associated equipment shall be delivered to the Columbus Police Department, Office of the Chief of Police, Research and Planning Unit, 937 1st Avenue, Columbus, Georgia, within 90 days after contract award.

2.5 MANUFACTURERS' NAME AND APPROVED EQUIVALENTS

Any manufacturers' names, trade names, brand names, information and/or catalog numbers listed in this specification are for information, not to limit competition. Any

brand which meets or exceeds the quality of specification listed for any item may be bid. If bids are based on equivalent products, indicate within your proposal the manufacturer's name and identifying model number and indicate any deviation from the specifications as listed. YOUR BID, LACKING ANY WRITTEN INDICATION OF INTENT TO QUOTE AN ALTERNATE BRAND, WILL BE RECEIVED AND CONSIDERED AS A QUOTATION IN COMPLETE COMPLIANCE WITH THE SPECIFICATIONS AS LISTED ON THE BID FORM.

2.6 INFORMATION AND DESCRIPTIVE LITERATURE

Each bidder must submit in duplicate with his proposal, sketches and descriptive literature and/or complete specifications covering the products offered. Reference to literature submitted with a previous bid will not satisfy this provision. Bids which do not comply with these requirements will be subject to rejection.

2.7 MATERIALS AND EQUIPMENT SUPPLIED

All materials and equipment supplied, construction and installation practices used in completing the project shall be accomplished in strict accordance with all applicable codes, ordinances, rules, regulations, and these specifications. The requirements of the Project as stated in these specifications are considered to be minimum standards. Where exceeded by or conflicting with such applicable codes and regulations the applicable codes and regulations shall be the prevailing authority. However, where the requirements of these specifications exceed and/or do not conflict with such codes and regulations these specifications shall be the prevailing authority.

All materials and equipment supplied under these specifications shall be new, unused, free from defects, and specifically designed for the purpose in which they are utilized. Equipment damaged in transit, storage, installation or construction shall be replaced.

2.8 SERIAL NUMBER MARKING

All items with the exception of miscellaneous wiring, cable sets, non-rechargable, disposable batteries and conductive adhesive tape shall be indelibly and sequentially marked with serial numbers. The serial numbers shall begin with the prefix "CPD.".

2.9 ENGINEERING SERVICE

Five (5) man-days of engineering service for training of personnel in the installation, operation and maintenance of the system shall be provided to the Police Department in Columbus, Georgia immediately following the delivery of all system components.

2.10 WARRANTY INFORMATION

All bidders are required to submit with their proposals a completed warranty information form which is included as Attachment I.

3.0 SYSTEM UTILIZATION

The CARES alarm units will be designed and fabricated for simple and covert installation in designated premises for the purpose of detecting, automatically reporting and recording evidence of robberies and burglaries in progress. Detection will be accomplished through a variety of active and passive sensors which are specified in the following pages. Silent alarms will be communicated by radio to patrol cars and headquarters. Rooftop alarm beacons will communicate visual alarms to police helicopter.

The CARES alarm units shall have the capability of automatic activation of evidence recording devices such as video tape, still photography and tape recording equipments.

System components are listed in Table I. A schematic representation of a typical installation is shown in Figure 1.

Simplicity and covertness of installation are stressed in CARES operating concepts. The CARES alarm units must be portable and design must be such that an operationally oriented police officer can install the unit with relative ease. The requirement for covertness and ease of installation precludes the use of hardwire connections between local transmitters and the alarm processor. THEREFORE, ANY BID IN RESPONSE TO THIS SPECIFICATION WHICH PROPOSES THE USE OF CABLE/HARDWIRE CONNECTIONS BETWEEN SENSORS AND THE ALARM PROCESSOR WILL BE CONSIDERED NON-RESPONSIVE.

Finally, the utilization concept is actual operations under field conditions. THEREFORE, TO BE RESPONSIVE, BIDDERS MUST PROVIDE DOCUMENTED EVIDENCE OF RELIABLE, SATISFACTORY OPERATION UNDER FIELD CONDITIONS FOR AN ACTUAL OR SIMULATED PERIOD OF MONTHS OF ALL KEY ITEMS OF THE CARES SYSTEM. THIS SHALL BE ACCOMPLISHED EITHER THROUGH DOCUMENTED PAST EXPERIENCE OR THROUGH ACCEPTANCE TESTING,CONDUCTED IN THE VICINITY OF THE BIDDER'S FACILITY. Should acceptance testing be required, the City of Columbus, Georgia reserves the right to observe all phases of testing.

4.0 COMPONENT UTILIZATION AND REQUIREMENTS

This section provides descriptions of items listed in Table I and specifies respective operational requirements.

Table I
CARES System Components

Item:	Nomenclature:	Quantity:
1	Pocket Money Clip Sensor	3
2	Cash Register Sensor	15
3	Body Sensor	3
4	Foot Sensor	20
5	Door Sensor	20
6	Window Sensor	15
7	Vibration Sensor	3
8	Mass Sensor	3
9	Acoustic Sensor	3
10	Motion Sensor	10
11	Sensor Junction Box	20
12	Class A Local Transmitter	15
13	Class B Local Transmitter	15
14	Class C Local Transmitter	15
15	Alarm Processor	10
16	Rooftop Alarm Beacon	3
17	Cable Set	10
18	Operator's Manual	12
19	Bait Money Packs	20

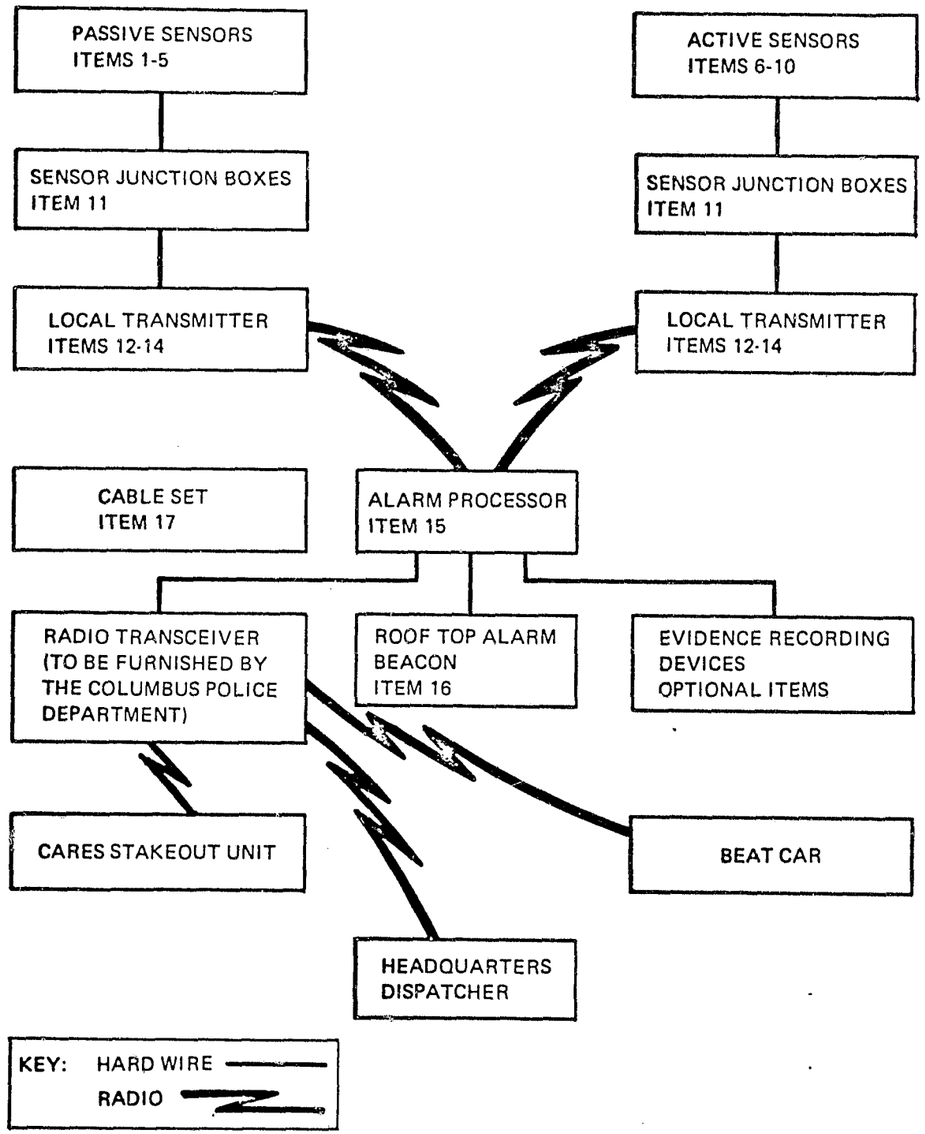

Figure 1
Typical Installation and Function of a CARES Alarm Unit

Items 1 through 5 comprise the robbery sensor set, and items 6 through 10 the burglary sensor set. Item 11, Sensor Junction Box, provides the means to couple more than one sensor for transmission via a single local transmitter.

Items 12, 13 and 14 are the three classes of Local Transmitters used in designated premises to communicate alarms from the sensors to Item 15, the Alarm Processor, also located in the premises. The classes A, B and C denote the identity codes assigned to the Local Transmitters and relate to the Alarm Processor functions specified in Section 4.12.

Any number of sensors and local transmitters may be employed in a designated premise. However, only one Alarm Processor and one Radio Transceiver, (furnished by Columbus Police Department), are employed. The Radio Transceiver will be a multi-purpose component in that it provides the means for two-way communication during CARES alarm unit installation and checkout as well as an alarm transmission medium for CARES stakeout units, patrol cars and headquarters.

4.1 POCKET MONEY CLIP SENSOR (ITEM 1)

The pocket money clip sensor shall be configured for carrying in a person's shirt pocket. The purpose of the sensor will be to provide covert alarm capability to an employee who discharges his duties in an open area, such as a gas station attendant. A reliable, spring-loaded clip shall be provided for insertion of an alarm money bill. Removal of the bill shall provide a turn-on signal to a local transmitter which shall be carried in the person's trousers pocket. A connector and cable shall be provided for inconspicuous local transmitter hook-up.

The pocket money clip shall be functional from the points of view of both employee duties (i.e., frequent removal and insertion of non-alarm money) and employee alarm activation and shall be designed so as to minimize false alarms due to normal activities of the employee.

4.2 CASH REGISTER SENSOR (ITEM 2)

The cash register sensor shall be configured as a false bottom for a cash compartment in the cash drawer of a cash register. A reliable spring-loaded clip shall be provided at the rear for the insertion of a money bill. Removal of the bill shall provide a turn-on signal to a local transmitter.

Space shall be provided in the cash register sensor to house a local transmitter beneath the false bottom. A connector and cabling shall be provided for local transmitter hook-up.

4.3 BODY SENSOR (ITEM 3)

The body sensor shall be mounted on a belt, black or brown in color, and designed to be easily adjusted to the wearer's waist. There is no requirement that the belt take on the appearance of a normal outer garment since it will be concealed beneath the wearer's clothing. The sensor shall be activated by the wearer's pushing out his stomach. The sensor shall not activate during physical activities such as sitting, sneezing, coughing, etc. The sensor activation shall provide a turn-on signal to a local transmitter which may be carried in a pocket or worn on the belt.

An antenna for the local transmitter shall be incorporated in the belt. Cabling and connectors shall be provided for local transmitter hook-up.

4.4 FOOT SENSOR (ITEM 4)

The foot sensor shall be activated by a force of less than ten (10) pounds. The sensor activation shall provide a turn-on signal to a local transmitter.

The foot sensor shall consist of a floor tape switch with the approximate dimensions of 3/4 inch wide, 3/10 inch thick, and 14 inches long, and cabling and a connector for local transmitter hook-up:

4.5 DOOR SENSOR (ITEM 5)

The door sensor shall be activated by the protected door being opened one (1) inch, which shall provide a turn-on signal to a local transmitter. The sensor shall be designed so that it will operate anywhere on the door.

The door sensor shall consist of a magnetic plate for affixing to the door and a normally open magnetic switch in a housing for affixing to the door jamb. The housing shall provide for affixing a local transmitter which alternatingly may be located remotely, and cabling and a connector shall be provided for local transmitter hook-up.

4.6 WINDOW SENSOR (ITEM 6)

The window sensor shall be activated by the protected window being broken or opened one-half inch, which shall provide a turn-on signal to a local transmitter. The sensor shall be designed so that it will operate anywhere on the window.

The window sensor shall consist of conductive adhesive tape with peel-off backing for affixing to the glass, a magnetic plate for affixing to the window frame, and a normally closed magnetic switch in a housing for affixing to the window jamb. The housing shall contain continuing sensing circuitry which shall operate on an internal battery which shall be provided. The battery shall be commonly available and capacity shall be sufficient for

a 30-day standby operation. The housing shall provide space for affixing a local transmitter which alternatively may be located remotely, and cabling and a connector shall be provided for local transmitter hook-up. A supply of one hundred (100) feet of conductive adhesive tape shall be provided with each window sensor.

4.7 VIBRATION SENSOR (ITEM 7)

Vibration sensors shall be Public Safety Laboratories, Inc. Model VS-1 or equivalent. Performance specifications for this device are included as Attachment II.

4.8 MASS SENSOR (ITEM 8)

Mass sensors shall be Public Safety Laboratories, Inc. Model MS-1 or equivalent. Performance specifications are included as Attachment III.

4.9 ACOUSTIC SENSOR (ITEM 9)

Acoustic sensors shall be Public Safety Laboratories, Inc. Model AS-1 or equivalent. Performance specifications are included as Attachment IV.

4.10 MOTION SENSOR (ITEM 10)

Motion sensors shall be Public Safety Laboratories, Inc. Model OS-1, or equivalent. Performance specifications are included as Attachment V.

4.11 SENSOR JUNCTION BOX (ITEM 11)

The sensor junction box shall provide the capability to couple as many as four (4) and as few as one (1) sensor to one (1) local transmitter. The junction box shall contain four (4) connectors for mating to the sensor connectors and cabling and a connector for local transmitter hook-up.

4.12 LOCAL TRANSMITTERS (ITEMS 12, 13 AND 14)

Local transmitters shall be of a design to provide for radio transmission between the sensor and a local receiver housed in the alarm processor (Item 15) within a frequency region which will minimize the probability of radio frequency interference in the Columbus, Georgia electromagnetic environment. Frequency selection shall minimize the probability of false alarms resulting from signals external to the CARES alarm unit and shall be in full compliance with Federal Communications Commission rules, regulations and guidelines. Each of the local transmitters shall be capable of generating at least three (3) discrete tones above the voice communications radio passband with tone selection to be adjustable in the field. These three discrete tones, hereafter referred to as Class designations A, B and C corresponding to Items 12, 13 and 14 respectively, shall be separated in frequency by at least five (5) kHz.

Power output of the local transmitter shall be sufficient to provide reliable reception by the local receiver in the alarm processor (Item 15) at a minimum distance of 150 feet and a maximum distance of 300 feet in the open when a one-quarter (1/4) wavelength wire antenna is employed with the local transmitter. Antenna wires shall be provided with each local transmitter.

The local transmitters shall be housed in a package no larger than 1 x 2 x 4 inches. The housing shall contain external connectors for sensor hook-up. The local transmitters shall operate on an internally contained, commonly available battery with sufficient capacity to transmit continuously for three (3) hours.

A momentary push-button switch shall be provided on the exterior of each local transmitter housing. This switch shall provide for testing the local transmitters during installation and for using them as pocket-carried distress or panic buttons.

4.13 ALARM PROCESSOR (ITEM 15)

The alarm processor shall provide the capability of determining when an alarm is to be transmitted to the police and initiating the transmission.

The alarm processor shall contain the following elements:

Local Receiver
Class A, B and C Decoders
Programmer/Controller
Alarm Message Generator
Power Supply
Carrying Case

4.13.1 LOCAL RECEIVER

The local receiver shall operate with the local transmitters specified in Paragraph 4.12. The output level of the receiver shall be sufficient to operate the Class A, B and C decoders that respond to the respective local transmitters.

4.13.2 CLASS A, B AND C DECODERS

The Class A, B and C decoders shall each operate on the respective discrete tones used for the identity codes of the Class A, B and C local transmitters, and shall provide the function of activating the Programmer/ Controller.

4.13.3 PROGRAMMER/CONTROLLER

The programmer/controller shall provide the function of activating the radio transceiver and evidence collection devices which are described in Section 5.0, Optional Items.

A day/night switch and master timer shall be provided on the control panel of the alarm processor. The functions provided by the programmer/controller as a consequence of the switch and master timer settings, and local transmitter signals are specified in Table II.

4.13.4 ALARM MESSAGE GENERATOR

The alarm message generator shall provide the alarm message which is transmitted by the radio transceiver. The output impedance of the drive circuits shall match the transmitter. An output volume control shall be provided to achieve optimum modulation in the transmission medium.

The alarm message shall be a recorded voice repeating the serial number of the CARES Alarm Unit preceded by the word "Unit." The serial numbers used for the ten (10) alarm processor units will be unique for each alarm processor and shall use the digits 701–710. For example, the message in unit serial number 701 shall be: "Unit 701, Unit 701, etc." The alarm message shall continue as long as the time period of the Master Timer setting or until a CARES alarm unit is manually reset. Upon reset, the alarm message generator shall be in the state to immediately generate the alarm message if required.

The electrical and mechanical design of the voice portion of the alarm message generator shall allow for the component to be replaced with a tone-coded message generator if such a modification is required in the future.

4.13.5 POWER SUPPLY

The alarm processor shall operate from 110–120 volts, 60 Hz, A.C. power and shall incorporate an internal rechargeable battery which will automatically continue operation of the alarm processor during commercial power failure. The internal battery shall be capable of sustaining operation for a minimum of 24 hours. Switch-over from commercial power to internal power, and vice versa, shall be accomplished automatically and without causing the alarm processor to generate a false alarm.

AC power shall be applied to four (4) outlets at the rear of the alarm processor case when power supply is turned on.

An on-off switch for the power supply shall be provided on the control panel of the alarm processor. A panel light shall be provided to indicate that A.C. power is applied to the power supply.

Table II
Program/Controller Functions

Day Setting	Night Setting
Class A Alarm Received–	Class A Alarm Received–
Within three (3) seconds, the transceiver is activated. Operation continues for one (1) to ten (10) minutes as determined by master timer setting or until reset manually.	Operation is identical to day setting.
Class B Alarm Received–	Class B Alarm Received–
A single Class B signal of three seconds minimum and not sustained for more than ten (10) seconds duration will initiate a 30-second window or timing gate. Receipt of another Class B signal within the timing window will initiate radio transmission. Operation will continue for the duration preselected on the master timer or until reset manually. A Class B signal sustained for ten (10) or more seconds will initiate radio transmission at the end of ten (10) seconds. Operation continues for the duration of master timer setting or until reset manually.	One or more Class B signals will start a 30-second timer. At the end of the 30 seconds a window will open through which Class B signals can pass to initiate radio alarms. This window will remain open for 120 seconds during which time two separate Class B signals or a single Class B signal sustained for ten (10) seconds or longer will initiate radio alarm transmission.
Class C Alarm Received–	Class C Alarm Received–
The alarm processor will not respond to Class C signals while in day setting.	Class C signals are elevated to Class B signal status in night setting. Operation is as described above.

A fuse shall be provided for A.C. power. A fuse post which prevents the insertion of over-rated fuses shall be employed.

4.13.6 CARRYING CASE

The alarm processor shall be housed in an attache case with the maximum dimensions of five (5) inches high, 18 inches wide and 12 inches deep. The attache case shall be equipped with a built-in combination lock.

The cover of the case shall be fitted to provide storage for 12 sensors, sensor junction boxes, or local transmitters, the radio transceiver, and the elements of the cable set specified in Section 4.15.

The alarm processor shall be fitted in the bottom of the case. The control panel shall be recessed sufficiently that nothing extends beyond the lower lip of the case. The controls shall be arranged horizontally from left to right and labelled in the following order:

On/Off Switch
Power-on Light
Day-Night Switch
Master Timer

The fuse post shall be located vertically to the left of the on/off key switch.

A panel for connectors and outlets shall be provided at the rear of the case. The panel shall be recessed sufficiently that nothing extends beyond the bottom of the case. The connectors and outlets shall be arranged horizontally from left to right in the following order:

Local Receiver Antenna Connector
Radio Transceiver Connector
Rooftop Alarm Beacon Connector
Four (4) A.C. Outlets
One (1) A.C. Receptacle
Three (3) evidence collection device connections

4.14 ROOFTOP ALARM BEACON (ITEM 16)

The rooftop alarm beacon shall be a weatherproof self-contained component including rechargeable battery. The mechanical design shall allow the component to lie securely on rooftops with the flashing mechanism maintained in a vertical position.

The flashing intensity shall be no less than 1,000,000 candle-power and the beacon shall flash not less than one time per second over a full 360-degrees in a 180-degree arc around the vertical. The flash color shall be blue.

Activation of the rooftop alarm beacon shall be controlled by the alarm processor via cable. A screw-on, weatherproof connector shall be provided on the housing of the beacon.

A 12-volt rechargeable battery, not of the lead acid type, shall be provided in the housing. The battery capacity shall be sufficient to operate the beacon for at least three (3) hours. It shall not be required that the battery charge be maintained by the CARES alarm unit.

A one hundred (100) foot weatherproof cable with screw-on connector at both ends will be provided with each rooftop alarm beacon.

4.15 CABLE SET (ITEM 17)

A cable set shall consist of ten (10) sensor cables, two (2) sensor junction box cables, six (6) local transmitter antennas, two (2) alarm processor-radio transceiver cables and two (2) A.C. power cords. Sensor and sensor junction box cables shall be at least three (3) feet in length. The alarm processor-radio transceiver cable and A.C. power cord shall be at least ten (10) feet in length. Cabling shall be provided with adequate shielding, connectors and protective jackets and shall be compatible with the operational concepts of frequent and rapid installation and removal of components. Manufacturer's model numbers of the police department furnished portable transceivers to be used will be provided at contract award.

4.16 OPERATOR'S MANUAL (ITEM 18)

Operator's Manuals for use by police department personnel in installing, operating and maintaining the CARES system shall be provided. Sufficient information shall be provided for using the manual as a training aid. In addition, sufficient detail shall be provided for trouble shooting system by communications personnel. These shall include theory of operation, circuit diagram and part numbers.

4.17 BAIT MONEY PACK ITEM (ITEM 19)

Bait money packs shall be I.C.I. America, Inc. SECURITY PAC model AP or their equivalent.

5.0 OPTIONAL ITEMS AND FEATURES

5.1 INTRODUCTION

The following paragraphs describe optional items and features of the CARES Alarm System. These items and features are loosely specified in terms of operational concepts in order to allow for maximum innovation on the part of bidders. Each paragraph contains an operational concept and a time period for which the option shall be exercisable by the City of Columbus.

5.2 EVIDENCE COLLECTION DEVICES

The operational concept of Project CARES includes the possibility of using evidence collection techniques such as video tape recording, tape recording, motion photography, still photography (conventional and self-developing) and other innovative approaches to record evidence during robberies and burglaries. These devices must be capable of automatic operation in conjunction with the equipment specified in Section 4.0. Bidders shall furnish an explanation of utility within the operating concept of Project CARES and a discussion of the admissibility of evidence collected by each device. Bids on these items must include guaranteed prices which may be accepted by the City of Columbus for a period of one hundred and twenty (120) days after contract award for the items specified in Section 4.0. Prices should be for a purchase of a quantity of from one (1) to three (3) of these devices.

5.3 SENSOR INNOVATIONS

The operational concept for Project CARES is primarily concerned with reliable detection of robbery and burglary in small business establishments. This will be accomplished through the use of Police Department owned alarm systems which will include a variety of sensors, some of which are specified in Section 4.0. Innovations are sought which will improve the array of sensors already sought. Bids shall include a statement of operational utility, installation procedures, and a firm price for a period of ninety (90) days after contract award for the items specified in Section 4.0. Experimental quantities of three (3) to five (5) of these items may be purchased.

5.4 LOCAL TRANSMITTER TELLTALE

In spite of efforts to eliminate false alarms from the equipment specified in Section 4.0, some problems are anticipated. This item relates to Items 12, 13 and 14, which are described in Paragraph 4.12. This optional item would provide visual means of determining when a particular local transmitter has been activated, thus transmitting its coded signal to the Alarm Processor (Item 15). The telltale must have reset capability which neither requires disassembly of the local transmitter nor replacement of a part such as a fuse. This optional capability would be desired for approximately twenty-five (25) of the local transmitters should the option be exercised. Bids should reflect prices which

can be exercised for a period of ten (10) days after the contract award for the equipment specified in Section 4.0.

5.5 DUAL MESSAGE CAPABILITY FOR ALARM MESSAGE GENERATOR

Although the primary purpose of the Project CARES Alarm System will be detection of robberies and burglaries in progress, the requirement for using components in special operations is expected to arise. In this mode, it is anticipated that the Alarm Message Generator, a component of Item 15, will require dual message capability. That is, the capability to generate at least two distinct pre-recorded messages each of which will correspond to a unique coded tone from separate local transmitters. Should this option be exercised, three (3) Alarm Processors will require this capability. The successful bidder on the equipment specified in Section 4.0 will be notified at contract award of the City's intention to exercise or cancel this option.

ATTACHMENT I
WARRANTY INFORMATION

Request to Bid Number:

Equipment Specified: Ten (10) CARES Alarm Units and associated equipment

All blanks must be filled in and submitted with proposal.

MAKE AND MODEL OF EQUIPMENT PROPOSED:

Is there a warranty on equipment proposed? Yes No

Does warranty apply to all components or only part? (State explicitly)

Warranty period for parts ; Warranty period for service

Nearest source for parts and service:

Who will provide service and where in the event of failure within warranty period?

Phone No.

Will any voluntary service follow installation or delivery? Yes No

If so, by whom? When?

Who is highest authority (manufacturer, distributor, dealer, etc.) fully behind this warranty?

A copy of complete warranty statement is submitted herewith: Yes No

DATE: NAME OF BIDDER:

SIGNATURE:

PHONE NO. TITLE:

ATTACHMENT II
PUBLIC SAFETY LABORATORIES, INC.
Vibration Sensor, Model VS-1
Performance Specification

1.0 INTRODUCTION

The Model VS-1 Vibration Sensor is a device for detecting vibration from a small adult walking, drilling or pounding.

2.0 MECHANICAL

The sensor consists of (1) a vibration transducer; and (2) a control box.

The vibration transducer is mounted in an aluminum case which can be coupled to floors, walls or ceilings with screws, or double-sided adhesive. The case is approximately two inches on each side. A 2-wire connector is provided for connection to the control box.

The control box houses the electronics for adjusting the sensitivity of the sensor, and is packaged in high impact plastic. The approximate dimensions are four (4) inches long, three (3) inches wide and two (2) inches deep. Provision is made for an internal battery. Two 2-wire connectors are provided; one for the vibration transducer; and one for an alarm device.

3.0 ELECTRICAL

At the maximum sensitivity setting, the sensor can detect a small adult walking at a distance of 50 feet in a frame or masonry construction building.

The electronics include a frequency selective amplifier and trigger circuit with adjustable threshold for providing a contact closure to an alarm device. The contacts are rated at 10 VA at 24 volts.

The capacity of the internal battery is sufficient to operate the sensor on standby for 30 days.

4.0 WARRANTY

The Model VS-1 Vibration Sensor is warranted against defects in material and workmanship for a period of one year.

ATTACHMENT III
PUBLIC SAFETY LABORATORIES, INC.
Mass Sensor, Model MS-1
Performance Specification

1.0 INTRODUCTION

The Model MS-1 Mass Sensor is a device for detecting the presence of a mass of human proportions when it touches the object being protected. The sensor provides the capability to detect a burglar wearing gloves.

2.0 MECHANICAL

Connection to the protected object is provided by an alligator clip affixed to a 1-wire cable with a connector at the other end for connection to the control box.

The control box houses the electronics for adjusting the sensitivity of the sensor, and is packaged in high impact plastic. The approximate dimensions are 4 (four) inches long, 3 (three) inches wide and 2 (two) inches deep. Provision is made for an internal battery. Two connectors are provided: one for the alligator clip cable, and a 2-wire connector for an alarm device.

3.0 ELECTRICAL

At the maximum sensitivity setting, the sensor can detect one cotton-gloved hand being placed on a protected object when the wearer is standing on a bare floor and the object is not grounded.

The electronics include a frequency selective amplifier and trigger circuit with adjustable threshold for providing a contact closure to an alarm device. The contacts are rated a 10 VA at 24 volts.

The capacity of the internal battery is sufficient to operate the sensor on standby for 30 days.

4.0 WARRANTY

The Model MS-1 Mass Sensor is warranted against defects in material and workmanship for a period of one year.

ATTACHMENT IV
PUBLIC SAFETY LABORATORIES, INC.
Acoustic Sensor, Model AS-1
Performance Specification

1.0 INTRODUCTION

The Model AS-1 Acoustic Sensor is a device for detecting sounds generated by footsteps or human conversation while adapting to background noise to minimize false alarms.

2.0 MECHANICAL

The sensor is packaged in a 5-inch speaker enclosure and designed to resemble an intercom. Controls are on the back of the enclosure. A 2-wire connector is provided to connection to an alarm device, and the sensor can be shelf or wall mounted.

3.0 ELECTRICAL

At the maximum sensitivity setting, the sensor can detect footsteps of a small adult or normal human conversation at a distance of 50 feet. The sensor reacts to two or more sound pulses such as footsteps or words with an adjustable time interval of five to thirty seconds.

The electronics include a frequency selective amplifier and trigger circuit with adjustable threshold for providing a contact closure to an alarm device. The contacts are rated at 10 VA at 24 volts.

The capacity of the internal battery is sufficient to operate the sensor on standby for 30 days.

4.0 WARRANTY

The Model AS-1 Acoustic Sensor is warranted against defects in material and workmanship for a period of one year.

ATTACHMENT V
PUBLIC SAFETY LABORATORIES, INC.
Optical Motion Sensor, Model OS-1
Performance Specification

1.0 INTRODUCTION

The Model OS-1 Optical Motion Sensor is a device for detecting the motion of a small adult moving about in a confined illuminated area.

2.0 MECHANICAL

The sensor is self-contained in a high impact plastic case whose approximate dimensions are 4 (four) inches long, 3 (three) inches wide and 2 (two) inches deep. Provision is made for an internal battery.

The sensor contains optics which provide a 10 feet field of view at a distance of 20 feet. A 2-wire connector is provided for connection to an alarm device.

3.0 ELECTRICAL

The sensor detects the motion of a small adult moving at speeds of 0.1 to 10 feet per second after penetrating at least 2 feet into the target area. The sensor operates with a minimum brightness of 10 foot-lamberts and a maximum brightness of sunlight.

The detection of motion provides a contact closure to alarm devices. The contacts are rated at 10 VA at 24 volts.

The capacity of the internal battery is sufficient to operate the sensor on standby for 30 days.

4.0 WARRANTY

The Model OS-1 Optical Motion Sensor is warranted against defects in material and workmanship for a period of one year.

END