IMPACT OF TECHNOLOGY ON ADULT CORRECTIONAL INSTITUTIONS

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July 1988

This project was supported by grant number GS-8 from the National Institute of Corrections, U.S. Department of Justice. Points of view or opinions stated in this document are those of the authors and do not necessarily represent the official position or policies of the U.S. Department of Justice.

this report. In particular we would like to thank from Dayton, Ohio, Superintendent Reginald A. Wilkinson and Assistant Superintendent David L. Johnson; from Augusta, Georgia, Superintendent Charles E. Burden and Pat De Loach; from Erie County, New York, Superintendent Frederick Netzel, former Superintendent J. Patrick Gallagher, and Officer T. J. Love; from Lieber, South Carolina, Warden P. Douglas Taylor, Ashley Denbee, and Betsy Battle; from Eastern Oregon, Superintendent E. Robert Wright, Assistant Superintendent George Baldwin, and Rusty Fisher; from Eastern Missouri, Superintendent Myrna E. Trickey and Assistant Superintendent Janet Schneider; and from Southern Desert, Nevada, Warden George Deeds and Marie Ashaw.

To those individuals in the various state Departments of Corrections as well as to those at the correctional facilities that were included in this survey we express our appreciation for providing the information on which this study largely is based.

We also wish to acknowledge the many useful suggestions provided to us by correctional officials, architects, contractors, and manufacturers that aided us in the design of this study and in the interpretation of many of these findings.

In addition, we ~~We also~~ greatly appreciate the financial support received from the National Institute of Corrections and the helpful advice and suggestions provided by Raymond C. Brown, Aaron A. Brown, Paul Macias, Dennis R. Liebert and Susan Hunter.

Finally to our copy editor, Karen Feinberg, and to the rest of the staff of the Department of Criminal Justice and the Institute for Policy Research who made this research possible, we extend our gratitude.

GLOSSARY

Air Packs - Breathing equipment that is used in the event of fire.

Body Alarms - A personal safety device which enables officers to notify other personnel when they are experiencing some type of problem.

Boosters - Signal or current amplification devices used to strengthen or enhance communications signals or electric currents. Boosters are normally associated with cable transmissions, but can be applied to wireless transmissions as well.

Bubble - A control room in the center of a housing unit.

Buried-Cable Motion Detector - A buried sensor cable used to detect motion on the ground surface above or near the cable.

Buried Sensor Cable - (see motion detector) Intrusion detection device which uses a transmitting cable buried close to the surface. Movement on the ground surface over or near the cable causes vibration or exerts pressure on the cable which alters the frequency of the transmission and trips an alarm.

Calibration - Determination or establishment of standards of measurement. For example, adjusting a scale so that it registers zero pounds of pressure when empty. In reference to intrusion detection systems, calibration refers to setting the sensitivity level of detection. (see recalibrate)

Campus - A number of individual buildings that are not interconnected.

Centralized mainframe - A large computer, usually located in the central office or state computer center that is capable of ~~that is capable of~~ multiple computing functions. Computer terminals are "linked" to this computer.

Clusters - A number of individual buildings that are interconnected.

Compartmentalization - Sections of buildings that can be closed off to prevent fire from spreading or provide an area of safety.

Courtyard - Linear cell blocks interconnected around a central enclosed courtyard.

Differential Proximity - The measurement and comparison of distance from a fixed signal transmission point. Using the "Doeppler Principle," intrusion detection devices transmit an electric, microwave or radio signal/field, and measure it's "echo" or return signal. Like radar, these return signals change in frequency depending upon the distance of the object reflecting the signal from the transmission source. When an object reflects the signal from a distance within a pre-set range, the device sounds an alarm indicating the presence of the object.

Direct Supervision - Frequent inmate-correctional officer interaction.

Eagle Posts - Small buildings outside the perimeter that are used for perimeter patrol vehicle stations.

Electronic Board - Control panels that are used to electronically open doors, activate communication systems, control video cameras and alarms. These boards can be comprised of switches or pressure sensitive panels.

Electronic Detection/Suppression System - A fire security system which detects heat and/or smoke and automatically releases water in the area. This activation is sometimes preceded by an alarm to a central control or monitoring post which provides a brief period to check the area and override the water release in the case of false alarms.

~~Electronic Intrusion~~ - Any ~~electronic~~ system employing sensors, cables, microwave, or infrared devices to detect a threat to the perimeter by intruders.

Electronic Lock - Locks which are operated electronically usually at main control center or unit control centers; advantages are the time saved locking and unlocking doors, and elimination of carrying keys.

Emergency Locators - (see Body Alarms).

Fire Assistance Compacts - Agreements that correctional facilities make with surrounding localities to provide assistances in case of a fire at the facility.

Fire Emergency Release Mechanisms - A device or mechanism that transmits a fire alarm when triggered (such as a wall lever or fire box). The alarm may be within the institution only or be transmitted to local fire departments.

Fixed Cameras - Cameras that constantly view a single location.

Fluoroscope - A device used for observing the internal structure or contents of an opaque object through the use of X-rays. This instrument allows the operator to "see" the contents of packages without a physical search. Fluoroscopes are often used to inspect carry-on luggage at airports.

Hamburger panels - See Pressure Sensitive Panels.

Hand-Held Friskers - (see Transfriskers, Magnetic Scanners) Small, relatively light-weight, magnetic scanners which create a short-range electromagnetic field. When passed over ferrous metals within the range of the field, receptors detect changes in the magnetic currents and trip an alarm.

Indirect Supervision - Supervision primarily by video cameras or security surveillance and limited inmate-correctional officer contact.

Infra-red Scopes - Telescopes on rifles that allow for night vision.

Ladder or Telephone Pole - Linear cell blocks arranged in parallel off a central connecting corridor.

Magnetic Scanners - (see Transfriskers, Metal Detectors) Search devices which create an electromagnetic field which is altered when ferrous metals are introduced into the field. Receptors mounted on the rim of the magnetic field detect changes in the force of the magnetic currents caused by the presence of metals and trip a warning alarm.

Man-Down Alarms - (see Body Alarms) A type of personal safety device which is generally activated automatically when the person wearing it is in a horizontal position.

Metal Detectors - (see Magnetic Scanners, Hand-Held Friskers) Portable magnetic scanners. Frequently advertised for use by the general public as "treasure finders," these devices create a magnetic field from a plate attached to the end of an arm to allow the operator to scan the ground without the need to bend. The device sounds an alarm when metallic substances disrupt the magnetic field.

Microwave Detection System - An electronic intrusion detection system based on line of sight. An alarm occurs when intruder passes between the receiver and the transmitter, thereby breaking the volumetric field.

MIS Links - The linking together of computers or terminals usually through a mainframe computer. MIS links allow computers to communicate with each other. (See networking)

Motion Detector - (see Buried Sensor Cable, Shaker Detection Systems) Intrusion detection devices which measure the presence of movement through changes in frequency of a transmitted signal caused by vibrations or pressure exerted on the cable. If the frequency is altered beyond a pre-set tolerance range, an alarm is tripped indicating excessive vibration or tension on the cable.

Multiplexing - A system whereby several messages can be transmitted simultaneously on the same circuit or channel. For example, in some correctional facilities both the perimeter intrusion detection and fire detection systems are transmitted over the same lines.

Networking - The linking together of computers or terminals usually through a mainframe computer. Networking allows computers to communicate with each other. (See MIS links)

Panic Alarm Pens - (see Body Alarms) A type of personal security device which is similar to an ink pen that the person wearing it can use to alert a monitor when they experience a problem.

Pneumatic Lock - A locking system in which dry air is used to drive the lock. These systems usually operate from a central control.

Pressure Sensitive Panels - Control panel switches that are activated by pressing them. These controls are usually found in the control areas and are used to electronically open doors, activate communications systems, and to control video cameras and alarms.

PR-24 - A baton designed with a short handle mounted at a 90 degree angle to the body of the baton. The design enhances the force with which blows can be delivered and facilitates use of the baton for defense, restraint, and "come-along" holds.

Recalibrate - (see Calibration) Adjusting the level of measurement. In reference to intrusion detection systems, adjusting the sensitivity of detection to either trip an alarm when less force/movement is detected, or to tolerate more force/movement prior to sounding an alarm.

Repeaters - See Boosters.

Retrofit - Installing new equipment in an institution that was not available when the facility was originally built.

Scan Cameras - Cameras that can be rotated to view different locations within an area rather than being focused on a single location.

Security Glazing - Glazing design to prevent intrusion by inmates yet provide visibility. Glazing that is virtually unbreakable even when struck violently or repeatedly by large, hard objects.

Shaker Detection Systems - (see Motion Detector) Fence-mounted intrusion detection systems which measure vibration or movement of fence fabric. These systems usually entail a transmitting cable mounted directly on the fence fabric which trips an alarm if the fabric is pushed or vibrates beyond a preset range. Strain on the cable caused by movement of the fence fabric to which it is attached changes the frequency of the transmission and trips the alarm.

Stun Guns - (see Tasers) A weapon, usually hand-held, which delivers an electric shock when applied to the skin of a target by sending a relatively mild current between two poles mounted on the weapon. In operation, the stun gun works like an electric cattle prod.

Tamper Defeater - A mechanism (such as lights on an electronic board) to warn of tampering with any electronic systems (fire, perimeter, etc.). This is not a regular alarm such as perimeter intrusion or fire, but a warning to check systems for cut wires, technical problems with circuitry, fuses, etc., or moisture in the system.

Tasers - (see Stun Guns) A weapon, usually hand-held, which fires two electrodes a short distance (15-30). The electrodes are implanted in the target and a relatively mild current is then run between them, delivering an electric shock which stuns the target. Unlike the stun gun, the taser allows the operator to deliver the shock from a distance.

Transfriskers - See Hand-held friskers.

Wheel, Spoke or Radial - Linear cell blocks that emanate from one central control area like spokes from the hub of a wheel.

Wireless Transmitters - Radios or telecommunication devices that operate on batteries.

CHAPTER 1

INTRODUCTION

Faced with increasing prison populations, many states and the federal bureau of prisons have embarked upon an ambitious program of construction. A recent issue of the American Correctional Association newsletter "On the Line" noted that states plan to spend over three billion dollars on prison construction. Much of this new construction will entail the use of sophisticated equipment to bring efficiencies to the operation of correctional facilities.

Over the past decade, technological innovation has spawned a proliferation of new devices which can be used to improve the efficiency of correctional institutions. Technological advances encompass many areas, leading to changing roles for correctional personnel. Computerized information processing systems have been introduced as a more affordable and comprehensive means of tracking inmate activities. Perimeter security has advanced from reliance on the human observer to comprehensive electronic sensing devices. Similar innovations have occurred in internal security — closed-circuit monitoring, advanced x-ray devices, magnetic "friskers" and officer tracking and alerting systems. Drug and alcohol abuse testing packages, telemetric devices, and videotapes for training are all products of advances in technology. Recent design innovations such as modular prison systems, which place less emphasis on barriers for inmates, have also led to a revisal of role definitions for correctional officers.

This "technological explosion" has not, however, been accompanied by a concomitant system for evaluating both the utility of the advancements as well as their potential impact on the correctional system as a whole. In the American Correctional Association winter conference of 1985, a recommendation

to explore and evaluate recent innovations in design features, equipment technologies and operating procedures was ratified. This appears to be in response to the lack of standards and guidelines for comparing products or evaluating positive and negative aspects of technology (Moore, 1985). With the increase in available products, it becomes necessary to assimilate information, categorize, and evaluate their utility so that informed decisions may be made regarding their use in a particular institutional setting. As technology continues to impinge on correctional officers' roles, a need also arises for a closer examination of their changing job requirements. This abundance of information and lack of standards or criteria for evaluation has led to an increased confusion of key personnel in the planning stages of a correctional facility.

In an effort to provide information that would be useful to planners and policy-makers in selecting technological equipment the National Institute of Corrections (NIC) awarded the University of Cincinnati's Department of Criminal Justice and Institute for Policy Research funding for a project designed to evaluate the impact of technology in correctional institutions. This project, which began in late 1986, had four major objectives:

1) To gather complete information on the most recent technology available to correctional facilities, including data on costs, reliability, and advantages and disadvantages of the equipment.
2) To categorize and evaluate this information using criteria developed specifically for this project.
3) To assess the various ways this technology impinges on the role of the correctional worker and the decision processes of management.

4) To develop a comprehensive summary of correctional technology to aid managers in the decision making stage of facility construction/renovation.

The initial task of the project was to develop an operational definition of "technology." A variety of technologies could have been included in the study, including "human technologies," such as classification schemes. We decided to focus upon machines, devices, and mechanical processes which were designed to assist prison staff in accomplishing the goals of security and safety. Next, we identified seven areas of technology -- perimeter security, locking systems, internal security, internal surveillance, communications, fire safety, and management information systems -- that provided the focus for much of this investigation.

The original goal of the evaluation was to examine not only the effect of technologies in terms of how well various innovations "worked" in meeting the needs of correctional institutions, but also in terms of how they affected the staff, inmates, and "climate" of the facility. This human aspect of the evaluation is an important component in the overall assessment of the impact of technology.

The design of the study was formulated with the intention of observing not only how well different types of detection systems or fire sensors and suppression systems accomplished the safety and security goals of prisons, but also how, if at all, they affected life in penal facilities. Our goal was not only to help identify appropriate technologies for prisons, but also to discover whether or not specific innovations were differentially suited to institutions depending upon supervision and management styles, characteristics of the inmate population, or other factors. Finally, we hoped to discover generalities which

would serve to warn of possible problem areas, and to propose solutions to those problems. In the pages which follow, the methods, findings, and conclusions of this evaluation of prison technology are presented.

The next section of the report describes the methodology employed to gather information about technological developments in correctional institutions at the correctional system and correctional institution levels of analysis. The instruments and techniques employed to gather information from these sources, and the methods and rationale behind the selection of samples for study are presented.

The third section of the report presents the findings from a survey of state and federal departments of corrections. These data describe the procedures and criteria used in the selection of various technological systems for use in correctional institutions, as well as present a summary of newly opened institutions, or those currently under construction.

The fourth section presents the findings from a survey of correctional institutions that had been built or renovated within the past ten years. Data gathered in this survey describe the types of technological equipment being employed in correctional facilities in the general areas of perimeter security, locking, internal surveillance, internal security, communications, fire safety, and management information. Additionally, these data provide an overview of satisfaction with technology and the impact of technology on the operations of correctional institutions.

The fifth section of the document presents the results of several case studies of correctional institutions which employ some of the most recent technologies. Each of these facilities was visited by a team of researchers. As part of these site visits in-depth interviews were carried out with a range

of staff and a survey of correctional officers was conducted. The data presented in these case studies allows a translation of the correctional department and institutional surveys to the level of facility operation and management.

The final section of this report summarizes the findings and implications of this assessment of the impact of technology on correctional institutions. In this section, the conclusions drawn from the data in each of the earlier sections are combined to provide a general overview of the impact of technology on correctional institutions. It is our hope that the information provided in this report will benefit correctional administrators, planners, and architects.

CHAPTER 2

METHODOLOGY

The research design used in this study consisted of five components: 1) a review of relevant literature and research; 2) a survey of departments of corrections; 3) a survey of correctional institutions that had been either built or substantially renovated in the past 10 years; 4) site visits at seven institutions that were using technologically advanced equipment; and 5) self-administered questionnaires which were completed by correctional officers as part of the site visits.

REVIEW OF LITERATURE AND RESEARCH

The review of research consisted of examining previous literature in this area and of collecting information from vendors and questioning correctional administrators and other criminal justice practitioners about their experiences with technology. To assist with this phase we also established a review panel, composed of correctional experts familiar with the issues surrounding technology.

Probably the most important element of this phase was to develop a working definition of technology in prisons and to determine what areas were to be the focus of this study. We chose to concentrate on eight areas: perimeter security, locking systems, internal surveillance, internal security, fire safety, communications, management information systems, and new security equipment. Questions of interest in these areas included the type of equipment that was being used, its cost, the amount of maintenance required, the type of training needed to operate it, its effect on security officers, its overall effect on the institution, and the factors involved in selecting a particular

system. We were also interested in the interaction between technology and the management philosophy of the institution, the physical design, the type of inmate population, the geography, and the resources available to the institution.

Among other things, we discovered that although rapid technological developments were occurring in corrections, there was little information on the effects of these developments. We found several studies that examined the impact of various technologies (e.g., Coughlin, 1987; Moore, 1985; Sechrest and Price; 1985), but most published reports were largely descriptions of the types of applications for various technologies; and much of the information was provided by the vendors of this equipment. Little systematic information was available on the type of equipment that was being used, where it was used, and the satisfaction of those who used it. Thus the objectives of this research were to gather systematic information on recent technological developments in correctional facilities, to evaluate this information, and to assess the ways in which technology affects correctional staff and the operations of correctional institutions.

SURVEY OF DEPARTMENTS OF CORRECTIONS

The next phase of this project involved data collection at the system level. All 50 state departments of corrections plus the Federal Bureau of Prisons and the District of Columbia received copies of a questionnaire by mail, together with a cover letter explaining the purpose of the survey and informing them that an interviewer from the University of Cincinnati would call them within the next several weeks to collect this information. (Copies of the cover letter and the questionnaire are included in the technical appendix.) We

mailed surveys to the departments before the interviews because much of the information requested, such as data on dates of construction or costs, required some advance research. This mail questionnaire/telephone follow-up approach also allowed the person who was responsible for completing the questionnaire an opportunity to gather the needed information from other staff members. In a number of instances the interviewers talked with several people in a state in order to collect this information. Some jurisdictions stated that they preferred to complete the information on the questionnaire and to return it by mail rather than conducting the interview over the telephone; we gave them this option. While the original contact for this survey was made with the Directors of Corrections, information was generally supplied by one of their designees such as a Deputy Director or research director, or by several people within the jurisdiction.

Information requested in this survey included background data on the institutions in the system, such as the year of opening, average population, staff size, and type of institution. We requested similar data on those institutions currently under construction. In addition, the questionnaire asked about any major renovations, conversions, or major technological improvements that had taken place in the jurisdiction in the last 10 years; the major factors involved in purchasing various types of technological equipment; the type of management information system used and its major functions; and litigation involving technological equipment.

A total of 46 of the 52 system questionnaires were completed. Among those jurisdictions that did not participate, one refused; one returned the survey but we did not receive it in the mail; three said that they would complete the survey, but we were never able to collect the information despite numerous

attempts; and one elected not to complete the survey because of a concern that providing such information might be prejudicial to a lawsuit in which the jurisdiction was involved.

SURVEY OF INSTITUTIONS

For the institutional survey we mailed questionnaires to a random sample of 131 prisons that had been opened in the past 10 years. Prison camps, juvenile institutions, and prerelease centers were not included in the population from which this sample was drawn. In addition to these prisons, we included a list of 21 larger, recently opened jails provided by the American Jail Association. We also included nine facilities that had been converted from other uses to prisons and which were identified in the system surveys. To gather information from the institutions we used the same mail questionnaire/telephone follow-up approach that we had employed for the system surveys. The initial contact for this survey was the warden or superintendent of the institution. Institution was most often provided by someone such as a deputy warden, chief of security, maintenance supervisor, or by several people in the institution. We collected data from a total of 117 institutions; 105 of these were prisons (including five conversions) and 12 were jails.

The institutional questionnaire contained a section on the background of the facility, including items on the number of inmates, total staff size, number of correctional officers, and security level. We requested information concerning the institution's perimeter security, locking systems, internal surveillance equipment, internal security, fire safety equipment, communications, management information systems, and new security equipment. For each of these areas we gathered data on the type of equipment, training, staff reaction, problems en-

countered, positive and negative features, and the impact of this equipment on the institution. Where appropriate, we included questions about the cost and maintenance of these systems, as well as any legal actions that had occurred as a result of their use. We also asked respondents to mention any technological development that they believed would improve the operation of their institution. The technical appendix contains the questionnaire used in this survey and a copy of the cover letter that accompanied it.

SITE VISITS

The system and institutional surveys were designed to provide an overview of the effect of technology on correctional facilities. We conducted the site visits to examine this technological equipment in the field and to collect more in-depth information about the effect of technological changes on an institution.

We used data from the system surveys in selecting sites. We looked for institutions that had various types of technological equipment which had been operational long enough to have an effect. We also wanted to examine equipment from different manufacturers and to include facilities that were regionally diverse and housed inmates at different security levels. Furthermore, we wanted to include an institution that had been converted from some other use to a prison. Because of proximity we chose the Dayton Correctional Institution as a test site for the procedures used in this phase of the study. In addition to Dayton, we visited the Augusta (Georgia) Correctional and Medical Institution, The Erie County (New York) Correctional Facility, The Eastern Oregon Correctional Institution, The Lieber (South Carolina) Correctional Institution, The Missouri Eastern Correctional Center, and The Southern Desert (Nevada) Correc-

tional Institution. All the institutions selected for these site visits agreed to participate and gave us complete cooperation.

Three or four members of the project team visited each institution between November 12 and December 15, 1987. In addition to touring the facility and examining the various types of equipment in use, project team members conducted in-depth interviews with about 15 staff members at each institution. Those interviewed held a range of positions including the warden and other administrative staff, maintenance personnel, correctional supervisors, and correctional officers who worked in the control room, perimeter security, and in the housing units. On average these interviews took about one hour to complete; like the institutional surveys, they covered perimeter security, locking systems, internal surveillance, internal security, fire safety, communications, management information systems, and the overall design of the institution. The technical appendix includes the data collection form used in this phase of the project.

OFFICER QUESTIONNAIRES

As part of these site visits, we distributed self-administered questionnaires to the correctional officers. This questionnaire included questions on the various areas of technology (except for management information systems, with which most officers were not familiar); it asked respondents to rate the training they had received on this equipment, how satisfied they were with it, and whether they felt that this equipment made their jobs easier and safer and helped them to control inmates. (A copy of this questionnaire is included in the technical appendix.)

A total of 351 officers completed surveys out of a total of 1,169 correctional officers at these institutions, for an overall response rate of 30 percent. Response rates for the individual institutions ranged from 18 percent to 40 percent. Several factors contributed to this relatively low response rate. Because not all officers were on duty on the days of the site visit, they did not receive questionnaires; in several cases questionnaires were not distributed to all shifts on the days of the visit. In addition, officers were asked to complete the questionnaires during their work hours; in most cases no time was set aside for this task, and officers did not receive additional compensation for participating in this survey. Because of the differential response rates between institutions the data have been weighted so that the proportion of officers in the sample reflects the proportion of officers in the seven institutions. In addition, the method of selecting the sites makes it impossible to generalize the findings from the sample of officers to any larger population. The results reported here simply reflect the feelings of the officers at these seven facilities about the impact of technology at their institutions.

Overall the various components of this design provide a comprehensive examination of the effect of technology. In this project we attempt to explore the impact of technology, from how decisions on technological equipment are made at the system level to how these decisions affect the correctional officer. The following chapters describe our findings.

CHAPTER 3

SURVEY OF CORRECTIONAL SYSTEMS

In our assessment of the impact of technology on correctional institutions, the initial phase involved a survey of the departments of corrections in the 50 states, the District of Columbia, and the Federal Bureau of Prisons. Fifty-two surveys were mailed, and we obtained responses from 46 correctional agencies. This section reports the findings.

The survey was designed to meet three research purposes:

1) to introduce the project and its goals to correctional administrators.

2) to provide an updated listing of recently constructed or renovated institutions in the United States;

3) to gather data about how decisions are made to acquire and use available correctional technology;

The first half of this survey asked for information about existing institutions including capacity, staffing, design, and security level. Most of the second half of the instrument concerned how decisions were made to purchase types of equipment (perimeter intrusion detection systems, locking systems, communications, etc.). Questions in this section included lists of factors pertinent to the decision, formal mechanisms (if any) for deciding on purchases (technical specifications, bidding procedures, etc.), and the principal decision makers. The final two sections asked about management information systems (if any) and sought overall reactions to available technology for correctional institutions.

RESULTS OF THE SURVEY OF CORRECTIONAL SYSTEMS

The data presented in Table 3-1 describe the current state of American prisons as reported by the 46 correctional systems that responded to our

Table 3-1. Characteristics of Prison Facilities*

Number of institutions currently in operation	616
Number of institutions built in the past 10 years	232
Number of institutions built in the past 2 years	32
Average inmate population	325
Average staff size	269
Number of prisons under construction	109
Type of supervision for prisons under construction	
Direct	99
Indirect	3
Combination direct and indirect	7
Number of states using electronic perimeter security in new construction	21
Number of major renovations in past 10 years	189
Number of conversions from other uses in past 10 years	57

* Data are based on 46 jurisdictions responding to the system survey.

original survey. In all, 616 institutions were reported to be in operation, with an average daily population of 325 inmates and an average staff complement of 269. Slightly more than one-third of these institutions (262) had opened within the past 10 years; about five percent (32) had opened within the past two years. An additional 57 facilities were conversions of existing buildings for inmate housing and major renovations had been carried out at 189 institutions. An additional 109 institutions were reported to be at various stages of construction. These new institutions are designed to house all security levels of inmates from minimum to maximum security. Most of these institutions will be operated with direct supervision. Twenty-one states reported using electronic perimeter security systems in some or all of their new facilities. An additional 57 facilities were planned as conversions of existing buildings for inmate housing; renovation was planned for 189 institutions. These new facilities range in size from those expected to house less than 30 inmates to one expected to serve a population greater than 7000 inmates. Staff sizes at these planned facilities range from four to 3100.

DECIDING ON TECHNOLOGY

In regard to factors affecting the decision to purchase specific types of technology, most states that responded to the survey said that some formal decision criteria were in operation. Table 3-2 presents data about major factors in the purchasing decision. With the exception of internal surveillance equipment (closed-circuit television, mirrors, etc.), over three-quarters of our respondents stated that both technical specifications and bidding procedures affected purchasing decisions. The responding jurisdictions were

Table 3-2. Major Factors That Affect Purchasing Decisions

	Technical Specifications	Performance Standards	Bidding Procedures	Other Formal Mechanism
Perimeter security	80%	72%	91%	9%
Locking systems	83	67	87	9
Internal surveillance	67	59	76	4
Internal security	78	70	85	9
Security glazing	78	67	89	11
Fire security	78	72	87	11
Communications	76	72	85	15

less likely to employ performance standards in selecting technological systems, although a majority of jurisdictions reported using such standards.

In addition to these general factors that affected the purchase of equipment and systems for institutions, respondents were asked to specify who the key decision-makers were and what elements were important in purchasing decisions for each type of system. The responses to this set of questions are presented in Tables 3-3 and 3-4.

For perimeter intrusion detection systems, the most frequently cited factor was performance and reliability, followed by cost and ease of maintenance. Less commonly named factors concerned the complexity of the system and included a number of idiosyncratic elements. The decision to purchase a particular type of perimeter intrusion detection system rested most often with the director or commissioner of corrections or the superintendent of the institution in question. This decision was not likely to be made by persons outside the corrections department, such as fire marshals or architects.

We obtained similar results in regard to locking systems. The most important factors in the decision to purchase a specific locking system were cost and performance or reliability. Here the decision was more likely to be affected by previous experience with the product, reflecting a longer experience with locks than with other forms of electronic technology in correctional institutions. The decision maker most commonly responsible for selecting a locking system was reported to be the director or commissioner of corrections or the superintendent of the institution. Again, the decision about locking systems was not likely to rest with someone outside the department of corrections.

Table 3-3. Decision Makers for Various Technological Product Purchases*

Decision-Maker	Product or System						
	Perimeter Security	Locking System	Internal Surveillance	Internal Security	Fire Security	Security Glazing	Communi-cations
Correctional administrators	59%	48%	43%	33%	40%	41%	43%
Correctional department staff	51	47	43	43	44	45	36
Outside corrections department	20	19	14	24	16	14	21

* Cell entries are the percentage of systems where decisions are made by various decision-makers. Column totals sum to more than 100% because more than one type of decision-maker could be involved in the decision to purchase these various products.

Table 3-4. Factors Important in the Decision to Purchase Different Technological Products*

Factor	Product or System						
	Perimeter Security	Locking System	Internal Surveillance	Internal Security	Fire Security	Security Glazing	Communi-cations
Costs	18%	14%	20%	24%	16%	17%	17
Reliability	33	38	22	19	33	28	31
Data/ evaluations	8	6	9	17	7	10	7
Formal requirements	5	8	8	8	17	8	7
Other	14	41	17	22	25	37	32

* Cell entries are the percentage of systems that reported a particular factor to be an important one in the decision to purchase different products.

We found the same general pattern of responses for other aspects of correctional institution technology. The primary decision maker tended to be either the director or commissioner of corrections or the superintendent of the institution in question. In the case of communications equipment, internal surveillance, and internal security systems, it was slightly more likely that someone outside the department of corrections, such as a state office of general services, was responsible for the purchasing decision, but this was still atypical. Factors deemed important in the decision to select a particular product were the same as those reported for the perimeter security and locking systems. In determining the purchasing decision, respondents were most likely to mention factors concerning purchase, installation, and maintenance costs as well as reliability.

MANAGEMENT INFORMATION SYSTEMS

We asked respondents a series of specific questions about their use of and satisfaction with management information systems. Although we asked similar questions of the individual institutions surveyed in the second phase of the project, we believed that a "central office" use of management information would be different from institutional uses. For this reason we selected management information systems for special coverage in the survey of correctional systems.

Thirty-six of the correctional agencies that responded to the survey stated that they used a centralized management information system (MIS). Table 3-5 shows how such systems are used by corrections departments nationally. The most common use is inmate tracking, including inmate counts and records of intake and release. The second major type of use is accounting, including

- Most decisions to purchase technological systems for penal facilities are made by correctional officials; directors of corrections agencies or superintendents of the institutions in question are the most common decision makers.
- Most states have some type of formal criteria for purchasing decisions; bidding procedures are the most common.
- Cost and reliability of technological systems are the most important factors in the decision to purchase.
- Most correctional agencies do not rely heavily on evaluation data or prior experience in deciding which systems to purchase. This tendency probably reflects a lack of such information.
- Most of the states reporting new prison construction say that some form of electronic perimeter security system will be installed.
- New prisons generally will operate with direct supervision of inmates.
- Most correctional agencies reported having a centralized management information systems and expressed satisfaction with their systems.
- Centralized management information systems are used most commonly for inmate tracking and for accounting.
- Few correctional agencies own and operate their own information systems; most agencies share service provided by a central state administrative services agency.
- Correctional administrators are most pleased with the ready availability of data provided by centralized MISs.
- Most agencies would like their MIS to be more "user-friendly."

- The greatest concern expressed with the operation of correctional information systems seems to reflect a sense that the systems are not performing all the tasks that could be computerized.
- Few lawsuits were reported as the result of implementing technological systems in prisons.
- It is not possible to determine whether prison technology has prevented lawsuits and if it has done so, how and how many.

CHAPTER 4

SURVEY OF CORRECTIONAL INSTITUTIONS

As described in Chapter 2, 117 institutions responded to this survey and provided information on perimeter security, locking systems, internal surveillance, internal security, fire safety equipment, communications, management information systems, and new security equipment. For each of these areas, data were requested on the type of equipment, training, staff reaction, problems encountered, positive and negative features, and the impact of this equipment on the institution.

PERIMETER SECURITY

Perimeter security has undergone significant technological development and is being used in a number of institutions. Generally it consists of some combination of four major components: fence/wall, towers, perimeter patrols, and intrusion detection systems. There are several different forms of intrusion detection systems, such as fence-mounted sensors, buried sensor cables, microwave detection systems, and infrared detection devices; each of these is used at a number of institutions.

The questionnaire used in the survey of institutions included questions on the various components of the perimeter security system. As the data in Table 4-1 show, the perimeter security at about 90 percent of the institutions surveyed includes some type of fence or wall; about 80 percent have either a vehicle or a foot patrol; 45 percent have towers; and about half have an electronic intrusion detection system. Such devices are more likely to be found in medium- or maximum-security institutions than in minimum-security facilities. None of the institutions surveyed used only electronic perimeter

Table 4-1. Types of Perimeter and Security Levels

Perimeter Types	Minimum	Medium	Maximum	Total
Fence/wall	75.0 (12)	98.0 (50)	86.0 (43)	105 (89.7)
Towers	18.8 (3)	43.1 (22)	56.0 (28)	53 (45.3)
Detection	18.8 (3)	68.6 (35)	40.0 (20)	58 (49.6)
Patrols	68.8 (11)	90.2 (46)	72.0 (36)	93 (79.5)
Total institutions	13.7 (16)	43.6 (51)	42.7 (50)	117 (100.0)

security. Twenty-seven of these institutions had all four components -- fence/wall, towers, perimeter patrol, and intrusion detection -- and 25 had a fence or a wall, perimeter patrol, and electronic detection, but not towers.

In deciding to purchase an electronic perimeter security system, correctional administrators are concerned with the initial cost of the system, maintenance costs, staff reactions to such a system, false alarms, and the system's dependability in detecting escapes or attempted escapes. This survey found that many institutions with perimeter intrusion detection systems were unwilling or unable to provide us with information on the cost of these systems, either because the systems had been installed several years ago and the cost figures were difficult to reconstruct or because the perimeter security system was part of the total construction package and no separate cost figure was available. Of the 58 institutions that had perimeter intrusion detection systems, 25 did not provide data on the initial cost. Among those that provided such information the average cost was found to be about $220,000, with a median cost of $125,000. The costs of these systems ranged from $2,375 for a nine-year-old fence-mounted sensor system at a minimum-security facility housing 112 inmates to $1.2 million for a combination microwave and fence-mounted sensor system at a minimum- and medium-security institution housing 1,400 inmates.

Maintenance

Maintenance of these electronic intrusion detection systems did not appear to present a great deal of difficulty for the institutions. When asked about the amount of perimeter security maintenance required, 51 percent of the respondents said that it was routine or about what they had expected and 22

percent said that their system required very little maintenance. On the other end of the scale, 16 percent felt that maintenance of their system was extensive and another 10 percent said that their system required a good deal of maintenance. The average intrusion detection system needed to be repaired 19 times a year at an annual cost of $5,500. Two institutions said that maintenance of their system did not result in any additional costs, while the highest reported cost for such maintenance was $20,000.

Twenty institutions reported that problems were caused by downtime resulting from maintenance of the electronic perimeter security system. Primarily these problems were reduced security when the system was down or the need to increase perimeter security checks during down periods.

These systems are maintained in a variety of ways, though institutions generally attempt to do as much maintenance as possible internally. Forty percent reported that all maintenance was done internally; another 36 percent do maintenance with some combination of internal, manufacturer, and other outside vendor service. In 20 percent of the institutions the maintenance is provided solely by outside vendors; the manufacturers provide maintenance for four percent. Among the institutions in which maintenance is provided by outside vendors, 30 percent felt that the response time by these vendors caused problems for the institution. Again, these problems were largely the result of reduced security because the system was down.

Overall the institutions surveyed in this study were satisfied with perimeter security maintenance: 39 percent were very satisfied, 27 percent somewhat satisfied, 17 percent somewhat dissatisfied, and 17 percent very dissatisfied. Although respondents express some concern about the extent of this type of maintenance and about problems resulting from downtime, main-

tenance of the electronic perimeter security system does not appear generally to be a significant problem.

Staff Reactions

We obtained a similar picture from information on staff members' reactions to the intrusion detection system. Six in 10 institutions reported general staff satisfaction with the system, while 41 percent reported staff problems. The problems most frequently reported were false alarms and the feeling that the system was not reliable.

A similar pattern emerges from data from the correctional officer surveys conducted as part of the site visits. Although these surveys were conducted at only seven sites, 74 percent of the officers from these institutions were satisfied with the perimeter security system. Forty-two percent rated the training they received as either excellent, very good, or good; 17 percent said it was fair. Although a fairly high percentage of officers (29%) said that they received no training on the perimeter security system, this finding results largely from the fact that many officers, such as those working in the housing units, are not involved in perimeter security. A majority of these officers also felt that the perimeter security system made their jobs easier (77%); made them safer (65%); helped them to control inmates (68%); and helped them do a better job (65%). Although staff members are troubled by the number of false alarms produced by electronic perimeter security systems and by concerns that the systems are not completely reliable, their overall reaction to such devices is generally positive.

Intrusion detection systems generally do not change the staff composition in an institution, although they may have some effect on staff size. Among the

institutions responding to this question, one in five said that the effect of such a system was to reduce the size of the staff; the remainder reported no change.

Training

Although most institutions that have intrusion detection systems provide some type of special training to operate these systems, such training does not appear to be highly formalized. Training to operate such equipment ranges from that provided as part of general officer training, to eight hours of special training, to some unspecified internal or on-the-job training. In more than half the cases, training on intrusion detection systems is internal and is given on the job. About 70 percent of the institutions reported that the training for their perimeter security system is given internally; 16 percent offer training internally and in conjunction with an outside organization; and in 16 percent of the institutions this training is given completely by an outside organization. Although in some instances the manufacturer provides formal training for operating these systems and maintenance personnel attend classes to learn how to maintain and repair them, for the most part training on electronic perimeter security systems is provided internally.*

Institutions differ in determining which staff members receive training on the perimeter security system. In about 40 percent of the institutions only the control room officers receive perimeter security training, while another 40 percent of these institutions provide such training to the entire correctional staff. Slightly over 20 percent provide special training for maintenance personnel; smaller percentages provide training for perimeter patrol officers and other selected officers and supervisors.

The predominantly internal training provided for perimeter security systems affects the reported cost of such training. More than 85 percent of the institutions responding to this question reported that there was no cost for such training or that the cost consisted of staff time only. The largest reported cost for perimeter security training was $3,500. These data reflect the way most institutions perceive this training. Because such training is largely provided internally, it is considered more a part of the officers' regular duties than as an additional expense associated with the perimeter security system.

Although most intrusion detection training is provided on the job and at

* We discovered on the site visits that maintenance people consider it extremely important that they be on site when the perimeter security system, or any electronic system, is being installed. Generally they feel that working with the manufacturer and the installer at this stage and examining how the system is set up is more valuable than any possible postinstallation training, and that it facilitates maintenance.

little additional cost to the institution, we found general satisfaction with the degree to which such training prepares staff members to operate the system. Almost 90 percent of the institutions felt that their perimeter security training prepared staff members adequately, while 12 percent thought that such training was not adequate. Similarly, 43 percent of the institutions were very satisfied with the type of perimeter security training that staff received currently, 32 percent were somewhat satisfied, 19 percent were somewhat dissatisfied, and only five percent were very dissatisfied. As mentioned previously, the correctional staff also seemed to be satisfied with their perimeter security training; 59 percent of the officers who received training rated it as excellent, very good, or good.

False Alarms

Whereas there appears to be general satisfaction with maintenance, training, and the cost of maintenance and training, false alarms present problems for many institutions. Of the 58 institutions with electronic perimeter security systems, 53 reported problems with false alarms, two systems were not in service, one did not know whether there were false alarms, and two reported that false alarms were not a problem. The number of false alarms ranged from three to 7,300 per year, with an average of approximately 1,000. The most frequent response to the question of the number of false alarms was "too many to count."

The data in Table 4-2 show that these false alarms result from a variety of sources. About half the institutions with electronic perimeter security systems reported that wind produced false alarms; other weather conditions such

Table 4-2. Reasons for Perimeter Security False Alarms

	%*
Wind	46
Birds	24
Animals	24
Rain	16
Weather (general)	14
System malfunction	10
Snow/ice	5
Installation	3
Fence fabric	2
Bad cables	2
Weeds	2
Water buildup	2
Radio interference	2
Don't know/undetermined	17
Not in service	3
No problems	3

* Total sums to more than 100% because institutions could provide more than one response.

as rain, snow, and general weather-related factors also caused false alarms in a number of institutions. Birds and animals were the next most frequent cause; birds landing of fences with a shaker detection system or ground animals entering an area with buried sensor cables or a microwave detection system produced alarms. General system malfunctions, poor installation, the fence fabric, bad cables, weeds, water buildup, and radio interference were also identified as sources of false alarms.

In view of the number of false alarms, it is not surprising that satisfaction with this aspect of intrusion detection is less than that for other areas. Only half the institutions were very satisfied or somewhat satisfied with perimeter security false alarms; half were very dissatisfied or somewhat dissatisfied. The number of reported false alarms might have led us to expect that dissatisfaction with the number of false alarms would be even higher than it was. Many administrators and officers, however, view such alarms not as "false" but rather as indications that the system is working. As Coughlin (1987) notes, "There is a correlation between probability of detection and false alarms. A highly sensitive system often is sensitive to all stimuli, real and false." During the site visits a number of respondents reported that they were not concerned when the perimeter security alarm went off because this was an indication that the system was working. When it did not go off for long periods they began to worry that it might not be working.

The key to dealing with perimeter security false alarms seems to be a willingness to accept a certain number of such alarms as part of the system and to calibrate the system to provide a balance between security and number of alarms. Institutions that accept "false" alarms as a consequence of installing an intrusion detection system have trained their staff to anticipate and

respond to such alarms; they have worked with the system manufacturer to maintain the proper calibration of the system and generally have been able to keep the number of false alarms within an acceptable range.

Achieving such a balance is not easy, however. Factors such as weather, climate, and soil composition must be considered in selecting an intrusion detection system. Birds and ground animals are a source of alarms in virtually any system, and correct installation is also important. In Coughlin's (1987:153) words, "A system that is installed incorrectly can be a source of false alarms that can reduce staff attention and response to a real alarm." Systems also vary in quality; in this study we encountered several systems that never worked and others with which the institutions were completely dissatisfied. It is virtually impossible to avoid this situation completely, but the process of purchasing such a system can be improved by realizing that a certain number of false alarms is inherent in any intrusion detection system and by recognizing the numerous factors that need to be considered in selecting such a system.

Environmental Factors

As demonstrated by the information concerning false alarms, environmental factors can affect intrusion detection systems. Forty-six of the institutions with these systems reported that the environment has such an effect. As the data in Table 4-3 show, environmental effects -- wind, rain, and to a lesser extent lightning and temperature change -- are quite similar to the causes of false alarms. Other factors such as snow and ice, humidity, extreme heat or cold, dust, and uneven terrain also can affect electronic perimeter security systems.

Table 4-3. Environmental Factors Affecting Perimeter Security Systems

	%*
Wind	53
Rain	31
Lightning	21
Temperature change	14
Snow/ice	10
Cold	3
Humidity	3
Dust	3
Heat	2
Uneven terrain	2
Don't know/undetermined	10
Not in service	3
No problems	10

* Total sums to more than 100% because institutions could provide more than one response.

The institutions can do little to reduce some of these factors, such as lightning. The most common response to conditions such as lightning, changes in temperature, or wind is to install grounding rods, to tighten or loosen the wire on fence-mounted sensors, or otherwise to adjust the sensitivity of the system. Other means of dealing with these problems are more situation-specific, such as using different components in the system or leveling uneven terrain; some institutions address these problems by shutting down the system when they occur or by increasing the number of perimeter patrols. Environmental factors do affect most intrusion detection systems and should be taken into consideration in making the decision to purchase such a system.

False alarms, environmental problems, and other technical considerations sometimes make it necessary to take the intrusion detection system out of use. Among institutions with these systems, 62 percent had to shut them down at some point. The reasons were related primarily to environmental conditions, particularly lightning strikes, or to some technical failure, such as a faulty electronics board. When such systems are taken out of use, the downtime is generally one of two types. Either the problems can be resolved quickly so that the system is down for only one or two days, or else the system is down for extended periods of time (three months or more); sometimes it cannot be made functional again.

Seven of the institutions surveyed had replaced their perimeter security systems within the past five years. Three of these systems were replaced because of too many false alarms; the others were replaced because of weather conditions or poor installation, or for increased security.

Escapes

Whether an institution has an electronic perimeter security system does not have a significant effect on the number of attempted escapes or on the success rate of these attempts. In the past two years, escapes had been attempted in slightly less than half of the institutions with intrusion detection systems and in a similar proportion of institutions without such systems. Approximately half of these attempts were successful in both types of institutions; the principal means of escape was climbing over the fence.

Furthermore, the presence of an intrusion detection system has no significant effect on the institution's satisfaction with the system in preventing escapes. Approximately half of the institutions with intrusion detection systems and approximately half without are very satisfied with the way their perimeter security prevents escapes; another one-third of each group are somewhat satisfied.

Positive and Negative Features

Finally we asked the institutions whether there was anything about their perimeter security that they particularly liked or disliked. Responses to these questions showed that no single feature of perimeter security gives either universal satisfaction or general dissatisfaction. In response to the question of what was liked about perimeter security the most frequent answer was "The system works," particularly among institutions with intrusion detection systems. Other favored aspects of such systems are ease of maintenance, ease of operation, a low false alarm rate, that it was not susceptible to weather, and that it provided the location and time of each alarm. Institutions without intrusion detection systems were more likely to feel positive

about more traditional aspects of perimeter security such as razor ribbon, towers, and double fencing. For the most part, however, no single feature at institutions either with or without intrusion detection systems was identified as the most positive aspect of perimeter security. What an institution liked about its perimeter security system depended on the particular institution.

The situation was slightly different with regard to the disliked features of the perimeter security system. Among institutions with intrusion detection systems the principal response was that there were too many false alarms or that the system did not work properly. Among institutions without such systems the dislikes tended to reflect the desire for additional equipment, such as the need for fence-mounted sensors, razor ribbon, or towers. Again, additional responses to this question varied greatly among institutions; they included the need for better lighting and the feeling that contraband could be thrown in.

Overall these survey data reveal that intrusion detection systems have been installed in about half the institutions that were built or that underwent major renovation in the last 10 years. Such systems generally involve fence-mounted sensors, buried sensor cables, microwave detection systems, or infrared detection devices. The impression is that these institutions are generally satisfied with the amount of maintenance necessary for such systems and with the cost of such maintenance; correctional staff members also tend to feel positive about such systems and to believe that they make their jobs easier and safer. The major problem reported with intrusion detection systems is false alarms. Every type of intrusion detection system is subject to false alarms; dealing with such alarms appears to be the most important factor in whether an institution feels it has an effective intrusion detection system or whether it views the system a nuisance.

Several factors should be taken into account in purchasing such a system. In addition to the quality of the equipment and the contractor's ability to install it properly, the institution should consider climate, vegetation, soil composition, terrain, wildlife and desired security level, as well as staff's ability to operate such a system and the training needed to enable them to operate it properly. Even when planning for such a system is done properly and when all these factors have been considered, a situation can still exist in which, as one institution described it, "The system needs frequent adjustment and repair. The equipment is complex. The training was inadequate and unsatisfactory. False alarms are frequent and too numerous to count. The system is affected by weather, and has been taken out of use." In this study, however, we found a number of intrusion detection systems that work well. If proper care is taken in selecting equipment, if the installation process strikes an appropriate balance between desired security and number of alarms, and if staff members are trained to view the number of alarms as a natural consequence of an intrusion detection system, such systems can be used effectively to increase prison security.

Summary

- About half of the institutions have some type of intrusion detection system.
- The average cost of a perimeter intrusion detection system is about $225,000, with the median cost being $125,000.
- While there is some concern about the extent of maintenance and problems resulting from down-time, maintenance of the perimeter intrusion detection system does not generally appear to be a significant problem.
- The general reaction of the corrections staff to intrusion detection systems is positive, though there is some concern over whether the systems are reliable and with the number of false alarms.

- False alarms are the biggest problem associated with intrusion detection systems. Such alarms are almost a universal problem and about 1,000 occur annually in a typical institution. These alarms result from a variety of sources such as wind, rain, birds, ground animals, and system malfunctions.

- The key to dealing with intrusion detection false alarms is a willingness to accept a certain number of such alarms as part of any such system and to calibrate the system to provide a balance between security and number of alarms.

- The presence of an intrusion detection system does not appear to have a significant effect on the number of attempted escapes nor on whether or not these attempts are successful.

LOCKING SYSTEMS

The next area of interest in this study concerned the locking systems used at the institutions surveyed. The data in Table 4-4 show that 45 percent of these institutions use a combination of manual and electronic locks, 34 percent use electronic locks only, 18 percent use manual locks only, two percent use pneumatic locks only, and one percent uses a combination of electronic and pneumatic locks. Minimum-security institutions tend to use manual locks, while a larger percentage of higher-security institutions use electronic locking systems. More than 95 percent of institutions with electronic locking systems have provisions for manual override of these systems.

As with perimeter security systems, most of the institutions were unable to provide data on the initial cost of the locking systems. Among the institutions that did provide information, the average cost was found to be over $200,000, but again, the mean was made higher by a few extremely costly systems; the median cost for the locking system was approximately $38,000. Locking systems costs ranged from $1,899 for a manual automatic lock system installed nine years ago in a 112-inmate minimum-security institution to $1.5 million for a combination manual and electronic locking system that has been in

Table 4-4. Types of Locking System and Security Levels

Locking System	Minimum	Medium	Maximum	Total
Manual	6 (40.0)	7 (14.6)	7 (14.6)	20 (18.0)
Electronic	3 (20.0)	15 (31.3)	20 (41.7)	38 (34.2)
Pneumatic	0 (0.0)	1 (2.1)	1 (2.1)	2 (1.8)
Manual and electronic	6 (40.0)	25 (52.1)	19 (39.6)	50 (45.0)
Electronic and pneumatic	0 (0.0)	0 (0.0)	1 (2.1)	1 (0.9)
Total institutions	15 (13.5)	48 (43.2)	48 (43.2)	111 (100.0)

operation for 2 1/2 years at a medium-security institution housing 1000 inmates.

Maintenance

More than half of these institutions felt that the maintenance required for their locking system was normal or about what they had expected; 18 percent reported that very little maintenance was required for their system. Roughly 10 percent of these systems required extensive maintenance and 15 percent needed a good deal of work. The annual cost of locking system maintenance averages slightly over $10,000 and ranges from $75 to $65,000.* More than 80 percent of these institutions maintain their locking system internally; 12 percent have this maintenance done through some combination of internal and outside vendor service; only five percent have it done solely by an outside vendor. Over three-quarters of these institutions reported no problems as a result of locking system maintenance. The problems that were reported were primarily inability to obtain parts and inability to use cells when the locks were broken. In view of this relative lack of problems it is not surprising that these institutions were generally satisfied with the maintenance necessary for the locking system. Thirty-seven percent were very satisfied with such maintenance, 47 percent were somewhat satisfied, 10 percent were somewhat dissatisfied, and only five percent were very dissatisfied.

* Locking system maintenance is another area where institutions vary greatly in what they consider maintenance "costs." Some consider only the cost of replacement parts or services provided by outside vendors as maintenance costs, while others include charges for locksmiths and other personnel. This lack of a common definition of maintenance costs, combined with the fact that many institutions were unable to provide us with any cost information, confounds this analysis. Therefore the figures reported here should be considered indicative of the type of costs involved in locking system maintenance rather than as the definitive costs of such work.

These locking systems also provide a relatively high degree of security; only one-quarter of these institutions reported that inmates were able to defeat the system in the past year. The type of lock made little difference in whether inmates were able to defeat it. Although certain institutions experienced problems with defeats of the locking system -- three institutions reported that their locks had been defeated 200 times in the past year and another reported 150 defeats -- on the whole, inmates were not able to break the locks. More than 40 percent of these defeats occurred because inmates jammed locks with paper, gum, or other objects; most others were the result of inmates beating on the locks or kicking them in. In only three reported cases were inmates able to escape from their cells because of the malfunction of an electronic system.

Staff Reaction

Three-quarters of these institutions reported that the correctional staff was generally satisfied with the locking systems. Institutions that reported staff problems tended to be those where the inmates had been able to defeat the locking system; the problems of the staff with the locking system reflected this situation. The most frequently reported problem was that the locks could be jammed, followed by general frustration with or lack of trust in the locks. Other reported problems included the need for heavier-duty locks and the need for master keys.

Data from the correctional officers' survey generally reinforce this positive evaluation of the locking systems. Sixty-four percent of the officers were satisfied with the locking system but 17 percent were very dissatisfied, a much higher percentage than that found for perimeter security systems. In

regard to training for the locking system, 55 percent of the officers rated it as excellent, very good, or good, 23 percent thought it was fair, 10 percent said it was poor, and 12 percent said that they had received no training. Sixty-nine percent of these corrections officers felt that the locking system made their jobs easier, 60 percent said that it made them feel safer, 74 percent thought that it helped them to control inmates, and 67 percent indicated that it helped them to do their jobs better. For the most part, the locking system had little effect on staff size or composition in the institution. In several cases the number of correctional officers was decreased because an electronic system increased efficiency, but these officers were assigned to other duties. In several other cases, however, the institution had to add a locksmith or maintenance personnel to accommodate an electronic locking system. Overall, a locking system has little effect on staff size or composition.

Training

Two-thirds of the institutions in this survey reported that they provided training for their locking system. Institutions with some type of electronic locking systems were more likely to provide training than those that had only manual systems. When training was provided, it was generally either on-the-job training to show the correctional staff how to operate the system or somewhat more extensive training for the maintenance staff or the locksmith. The personnel who received training on the locking system varied with the type of training provided at the facility: about 40 percent of these institutions provide training to maintenance personnel, 33 percent give training to all correctional officers, and 10 percent train all staff in operating the locking

system. At some institutions, locking system training is given only to control room officers or other selected correctional staff.

Training to operate and maintain the locking system is provided internally by two-thirds of these institutions; 16 percent provide this training through some combination of internal and outside support; training is given solely by an outside organization in 21 percent of these cases. As with perimeter security training, most of these institutions reported that there was no cost for locking system training or that it involved only staff time. Among institutions that reported some cost for this training, the average was $1,675 and ranged from $200 to $5,000.

There was general agreement among these institutions that the locking system training was adequate. Eighty-three percent felt that it prepared the staff adequately; only 17 percent did not. Correspondingly, 85 percent of the institutions were satisfied with locking system training and 15 percent were dissatisfied.

Positive and Negative Factors

As with perimeter security systems, likes and dislikes about locking systems were not consistent across institutions but tended to be specific to the institution. About one-quarter of the institutions gave a general positive evaluation of the system, expressing a sense that the locking system worked well and was effective. Beyond this, the following features of the locking system were regarded positively by more than five percent of these institutions: they required little maintenance, were simple to operate, and were easy to change. Other positive comments ranged from better control of inmates to freeing officers for other tasks.

Dislikes about locking systems were even more diverse. The most frequent complaints were that the locks were not secure enough, that too many keys were needed, that the locks were designed poorly, and that there were problems in getting the locks repaired; yet even these complaints were made by only about five percent of the facilities. Other dislikes included the cost of parts, excessive wear, and the location of the buttons on the control panel. On the site visits we also discovered negative reactions to the pressure-sensitive control panels used with some electronic locking systems. Officers complained that they were not always sure whether the door had been locked or unlocked with these panels and that it was easy to unlock a door accidentally by touching the wrong panel.

The data reported here provide little basis for concluding that an institution should install either an electronic or a manual locking system. The various types of locking systems showed no significant differences in the inmates' ability to defeat the system, staff satisfaction with the system, or satisfaction with the amount of training required to operate the system; the proportion of likes and dislikes of these various systems was roughly equivalent.

In the site visits one of the strongest arguments advanced for electronic locking systems was that they reduced the need for correctional officers to perform "turnkey" functions and freed them for other responsibilities. According to the data on "likes" about locking systems collected in this survey, a number of institutions feel positive about the override capabilities of electronic systems, their ability to open or lock a number of cells simultaneously, and the greater feelings of safety with such a system. Yet for each argument advanced in favor of electronic locking systems there seems to be a

counterargument in favor of manual systems. Institutions with electronic locking systems were more likely to feel that their locks were not secure enough or that they were picked or jammed too easily. Electronic systems generally require more maintenance, staff members require more training to operate such systems, and manual systems are described as easier to operate.

In general these institutions seem to be satisfied with their locking systems. This study found instances in which institutions were very satisfied with manual, electronic, and pneumatic locks and instances in which these different types of locks presented problems. Although the trend over the past 10 years has been toward installing a combination of manual and electronic locks or all-electronic systems, a number of institutions have recently installed manual locking systems.

In selecting a locking system, it is most important to choose a system which reflects the management philosophy of the institution. For example, an institution using direct supervision and attempting to create a normalized environment would be likely to have an electronic system in which inmates have keys to their cells. In addition, the security level of the lock should match the security level of the institution. Installing minimum-security locks in a maximum-security institution is an invitation to trouble from damaged locks. In choosing a locking system, correctional administrators also should be aware of the maintenance required for such a system; they should determine whether the maintenance can be done internally, how long it takes to obtain needed parts, and whether the institution can make its own keys. In a correctional setting, doors are locked and unlocked a great deal and locks are subjected to abuse by inmates. Therefore it is important to choose durable locks that can withstand a higher-than-average level of tampering. Quite obviously, there are

locking systems that work; what is required is to match the institution's needs with an appropriate locking system.

Summary

- Approximately 80% of the institutions surveyed use some type of electronic or pneumatic locking system.
- Correctional staff are generally satisfied with locking systems and feel that it makes their jobs easier and safer, helps them to control inmates and helps them to do their job better.
- The most frequently reported problem with locking systems is that the locks can be jammed, followed by general frustration with or lack of trust in the locks.
- These data provide no evidence that either manual or some type of electronic locking system is superior. There are examples of each type of system which work extremely well and with which the institutions are very satisfied as well as instances where facilities experience problems. The choice is, therefore, dependent upon the facility. The primary arguments in a favor of electronic locking systems are that they reduce the need for officers to provide a "turnkey" function, can lock or unlock a number of doors simultaneously, and provide greater feelings of safety. Relative to manual locks, however, electronic locking systems require more maintenance, are more difficult to operate, require more staff training, and can be jammed more readily.
- In selecting any locking system it is important to recognize that in a correctional facility, locks are constantly in use and are subject to abuse by inmates. It is critical, therefore, to select durable locks that are designed for a high degree of use and that the security level of the lock match the security level of the inmate.

INTERNAL SURVEILLANCE

The data in Table 4-5 show the types of internal surveillance equipment in use at these institutions by security level. About half of the institutions have no such equipment. In addition, a relationship exists between security level and internal surveillance equipment: the higher the security level, the more likely an institution is to have internal surveillance equipment.

Table 4-6 shows where this equipment is used. Internal surveillance cameras are used in many locations; half of the institutions that have internal surveillance cameras use them at the main entrance, while more than 20 percent

Table 4-5. Type of Internal Surveillance and Security Levels

Internal Surveillance	Minimum N (%)	Medium N (%)	Maximum N (%)	Total N (%)
Fixed cameras	3 (18.8)	6 (12.0)	20 (40.0)	29 (25.0)
Scan cameras	0 (0.0)	4 (8.0)	2 (4.0)	6 (5.2)
Both fixed and scan cameras	1 (6.3)	11 (22.0)	13 (26.0)	25 (21.6)
No internal surveillance	12 (75.0)	29 (58.0)	15 (30.0)	56 (48.3)
Total institutions	16 (13.8)	50 (43.1)	50 (43.1)	116 (100.0)

Table 4-6. Location of Internal Surveillance Equipment

	%*
Main entrance	48
Hallways	27
Visiting area	21
Housing units	20
Recreation area	20
Sally port	18
Segregation/maximum-security unit	16
Dining area	12
Perimeter	11
Courtyard	11
Throughout the institution	9
Rear gate	9
Control room	7
Work area	7
Intake area	7
Elevators	7
Hospital	5
Library	5
Education area	4
Administration building	4
Interior control points	4
Top of building	2
Garage areas	2
Parking lot	2
Lobbies	2

* Total sums to more than 100% because institutions could provide more than one response.

use them for monitoring hallways, visiting areas, housing units, recreation areas, and the sally port or rear gate. Other areas that are monitored frequently by internal surveillance cameras include segregation or maximum-security units, dining areas, and the perimeter.

In about 15 percent of the cases where internal surveillance equipment is used, some special requirements exist. Usually they involve special lighting in order to use the equipment effectively or special lenses that perform in a low-light environment.

As with the other cost data requested in this survey, a number of institutions did not provide information on the initial cost of their internal surveillance equipment. As expected, the cost of the video monitoring equipment varied greatly with the amount of such equipment in use. In this survey the cost of internal surveillance equipment ranged from $700 for two video cameras that were purchased 10 years ago to $200,000 for a system covering the visiting room, the intake area, the dining area, the sally port, and the main entrance.

Maintenance

Maintenance of internal surveillance systems generally seems to cause few problems. Two-thirds of these institutions reported that only routine maintenance of internal surveillance equipment was required; another 25 percent felt that their systems required very little maintenance. Less than 10 percent thought that this equipment required either much or extensive maintenance. The annual cost ranged from no cost or staff time only to $20,000 for a system that required extensive maintenance of the monitors; the average cost was approximately $2,400.

About half of the institutions that have internal surveillance equipment maintain this equipment internally; another 20 percent service it through a combination of internal and external support. Ten percent have this maintenance done by the manufacturer; 20 percent use another outside vendor. Three-quarters of these institutions reported that maintenance of this equipment presents no problems for them. Institutions that experience problems with internal surveillance maintenance said that they were due primarily to the downtime that such maintenance required or to delays resulting from outside vendors. Other problems are the cost of such maintenance and improper training of internal maintenance personnel. In view of these results it is not surprising to find that these institutions are generally satisfied with the maintenance necessary for their internal surveillance equipment. Thirty-three percent were very satisfied, 47 percent were somewhat satisfied, 16 percent were somewhat dissatisfied, and only five percent were very dissatisfied.

Staff Reaction

Institutional reports of staff satisfaction with internal surveillance equipment differed from those of the officers surveyed as part of the site visits. Eighty-five percent of the institutions reported that the corrections staff was generally satisfied with this equipment. Problems reported included blurred screens, the need for constant adjustment, the need for more equipment, and failures due to electrical storms.

Among correctional officers, however, a majority (56%) were dissatisfied with the internal surveillance equipment in use at their institution. In addition, 54 percent said that they had received no training on how to operate this equipment, 14 percent had training but rated it as poor, 14 percent

thought their training was fair, and only 17 percent rated it as good, very good, or excellent. These officers were also divided on the effects of this equipment on other aspects of their jobs: 53 percent felt that it made their jobs easier, 47 percent said that it made their jobs safer; 57 percent felt that it helped them to control inmates, and 50 percent believed that it helped them to do a better job.

The open-ended responses in the officers' questionnaires provide some insight into the source of this dissatisfaction. These responses indicated that officers did not seem to have problems with equipment failures or with monitoring equipment not working properly; rather, they complained about the lack of equipment and the need for more cameras and monitors in the facility. The officers' recognition of the limitations of current internal surveillance equipment and their concern over blind spots led them to believe that additional equipment would produce a more secure institution. Their concern is not that the equipment currently in use does not work but that more equipment is needed.

Training

Approximately 60 percent of institutions with internal surveillance equipment provide some type of training in how to operate and maintain these devices. For the most part this training is not extensive and consists of an on-the-job orientation, though several institutions provide more extensive training in maintenance. Institutions are divided about equally among those that provide training for maintenance personnel only, those that train control room officers only, and those that provide training for all correctional staff members. More than 80 percent of the institutions provide this training

internally; 13 percent use a combination of internal and outside support. In over 90 percent of the cases, the cost of internal surveillance training was reported as "staff time only"; $1,200 was the highest reported training cost. All institutions responding felt that this training prepared the staff adequately. Again, this finding is at odds with the data from the correctional officers' surveys, where only 17 percent rated such training as good, very good, or excellent. Over 90 percent of the institutions were satisfied with the type of training provided for internal surveillance equipment, but in view of the results of the officers' surveys, prison officials may want to reconsider the amount of equipment in use at the institution as well as the type of training provided to operate this equipment.

Positive and Negative Features

Although these institutions liked several different features of their internal surveillance systems, there was more consistency in these responses than for those concerning either perimeter security or locking systems. In addition to general approval of these systems because they were effective, the institutions viewed internal surveillance equipment positively because it permitted close observation, extra coverage in key areas, and good visual surveillance. Increased control of inmates, ease of maintenance, and reduced staff size were also regarded as positive features of these systems.

Over half of the institutions with internal surveillance equipment did not mention any negative features. Although the dislikes were more diverse than the features that were liked, the dominant theme was the need for new or better equipment. Several institutions mentioned the need for more equipment, additional coverage, cameras that scan, or wider-angle lenses as their prin-

cipal complaints. Although some technical problems were mentioned, such as blurred screens and the fact that storms disable the system, these data give the general impression that internal surveillance equipment works but that more of it is needed in many institutions.

Overall, these data demonstrate that internal surveillance equipment generally works well in the institutions that use it. In purchasing internal surveillance equipment, there are certainly technical considerations: cameras and monitors should be compatible, and cameras designed for indoor use should not be used outdoors. Beyond these basic considerations, however, the general conclusion from these data is that the more internal surveillance equipment an institution has, and the more features this equipment has (ability to scan and to zoom, and even a color monitor), the more secure the correctional staff will feel. As the amount of such equipment increases, it will be useful also to increase the amount of training that staff members receive in its use.

Summary

- Half of the institutions in this study have some type of internal surveillance equipment. The higher the security level the more likely the institution is to have equipment of this type.
- Internal surveillance equipment is most frequently used at the institution's main entrance. A significant number of institutions with such equipment also use it for monitoring hallways, visiting areas, housing units, recreation areas, and the sally port or rear gate.
- Correctional staff are relatively dissatisfied with internal surveillance equipment. In general, their complaints were not about equipment failures but rather over the need for more such equipment in the institution.
- Internal surveillance systems are generally evaluated positively because they provide the ability for close observation and for extra coverage in key areas.
- Although some institutions experienced some problems such as blurred screens or equipment failures, the principal complaint about internal surveillance equipment was the need for more of it.

INTERNAL SECURITY

Internal security is related closely to internal surveillance. As part of the institutional survey we asked these facilities whether they used metal detectors, X-ray machines, magnetic scanners, body alarms, or other types of internal security equipment. For each type of equipment that was used, we requested information on the number of units in use, whether special training was required to operate the equipment, whether this training prepared the staff adequately, whether the staff members had any problems with this equipment, and how satisfied they were with it.

Table 4-7 presents the findings for these questions. As indicated here, metal detectors are used in 86 percent of these institutions. Although the average number of metal detectors used is five, one-third of these institutions use only one and another 23 percent use two. Only 30 percent of the metal detectors require some type of special training; 89 percent of the institutions feel that this training prepares staff members adequately. One-third of the institutions with metal detectors reported some type of problem, but overall 80 percent were satisfied with this equipment.

Other types of internal security equipment are used in much smaller percentages of these institutions. Body alarms, for example, are used in about one-quarter of the facilities. On the average, 30 such alarms are used in facilities with this equipment. Slightly less than half of these alarms require special staff training; in more than nine cases out of 10 respondents feel that this training prepares staff members adequately. Thirteen percent of institutions with body alarms reported problems, and 84 percent were satisfied.

X-ray machines are used in about one-fourth of these facilities, and generally only one such machine is in use. Two-thirds of these machines

Table 4-7. Internal Security Equipment

Type	% of institutions that use	Average number in use (range)	% training required	% training adequate	% reporting problems	% satisfied
Metal detectors	86	5 (1-45)	30	89	33	80
Body alarms	27	30 (10-150)	42	92	13	84
X-ray machines	24	1 (1-2)	68	86	17	95
Magnetic scanners	14	7 (1-30)	37	100	24	89
Other internal security	8	13 (1-70)	20	50	20	100

require some type of special staff training; this training is believed to be adequate by 86 percent of the respondents. Problems with X-ray machines were reported by 17 percent of the institutions, and 95 percent were satisfied with this equipment.

Only 14 percent of the facilities use magnetic scanners; on the average, about seven scanners are used in these institutions. Special training on this equipment is required in about one-third of these cases; in all instances this training is considered to be adequate. One-quarter of these institutions report problems with magnetic scanners; the overall satisfaction level is 89 percent.

Ten of the institutions surveyed reported that they use some other type of internal surveillance equipment. Most of this equipment involves some type of alarm, such as a door alarm system on external doors or panic alarm pens for the officers, and also includes an infrared hand stamp for visitors and a fingerprinting machine. Only two of these other devices require special training; in one case this training was considered adequate and in the other it was not. Two of the institutions reported some type of problem with this equipment, but in each case they were satisfied with it.

The data in Table 4-8 demonstrate that internal security equipment is used in many locations throughout an institution, but the main entrance is a key location. More than half of the institutions with metal detectors use them at the main entrance; facilities with magnetic scanners or X-ray machines also tend to use them at this point. A fairly high percentage of institutions with metal detectors also uses them in visiting areas, at other interior control points, and at the sally port entrance.

Table 4-8. Where Internal Security Equipment Is Used*

	Metal Detectors	Body Alarms	X-ray Machines	Magnetic Scanners	Other
Main entrance	56.3	3.6	26.9	37.5	10.0
Visiting area	28.1	--	3.3	12.5	10.0
Interior control points	25.0	10.7	--	18.8	--
Sally port	17.7	21.4	7.7	18.8	10.0
Industry	6.3	7.1	--	6.3	--
Throughout the institution	6.3	60.7	--	25.0	10.0
Recreation yard	5.2	--	--	6.3	--
Intake	4.2	--	--	12.5	20.0
Housing units	2.1	--	--	6.3	20.0
Maintenance area	2.1	--	--	--	--
Mail room	2.1	--	38.5	--	--
Rear gate	2.1	--	--	--	--
Honor camp	1.0	--	--	--	--
Education area	1.0	3.6	--	--	--
Hospital	1.0	14.3	11.5	--	--
Administrative offices	1.0	3.6	--	--	--
Dining area	--	7.1	--	--	--
Library	--	7.1	--	--	--
Transportation officers	--	3.6	--	--	--
Secluded posts	--	3.6	--	--	--
Warehouse	--	--	7.7	--	--
Property room	--	--	3.8	--	--
Security department	--	--	3.8	--	--
Work gang	--	7.1	--	6.3	--
Special shakedowns	--	--	--	6.3	--
Towers	--	--	--	6.3	10.0
Control room	--	--	--	--	20.0
Elevators	--	--	--	--	10.0
Office stations	--	--	--	--	10.0

* Cell entries are the percentage of institutions with such equipment that use them in that particular location. Percentages sum to more than 100% because equipment can be used in more than one location.

As would be expected, body alarms are deployed differently from metal detectors. Most of the institutions that have body alarms reported that they are used by officers throughout the institution. When such alarms are used at specific points rather than throughout a facility they tend to be used at the sally port entrance, in the hospital area, and at other interior control points.

Because of its specific function, X-ray equipment is also deployed differently from other types of internal security equipment. It is used not only at the main entrance but also primarily in mail rooms; a smaller percentage of institutions uses X-ray machines in the hospital, at the sally port, and in the warehouse.

Although a much smaller percentage of institutions use magnetic scanners than metal detectors, they are used in similar locations in the facility. Institutions that have magnetic scanners tend to use them at the main entrance or throughout the institution, and at the sally port entrance and other interior control points.

There is considerable variation in the percentages of institutions that use the different types of internal security equipment examined here. Metal detectors are used in six facilities out of seven, while body alarms and X-ray equipment are used in about 25 percent of all facilities, magnetic scanners in 14 percent, and other types of internal security equipment in less than 10 percent. Deployment of this equipment within an institution varies as one would expect in view of their different functions: metal detectors and magnetic scanners are used primarily at the main entrance, X-ray equipment in the mail room, and body alarms throughout the institution.

These different types of equipment also vary in the amount of special training required to operate them. About two-thirds of the X-ray equipment requires special training, while only 30 percent of the metal detectors were reported to require such training. In virtually all cases the training provided for this internal security equipment is thought to prepare staff members adequately. Satisfaction ranged from 100 percent for "other" internal security equipment to 80 percent for metal detectors. Metal detectors also had the highest percentage of institutions which reported some type of problem with this equipment, 33 percent.

The problems reported with metal detectors are related primarily to calibration. Over half of the reported problems were that the settings were difficult to adjust, that frequent adjustments were needed, or that the equipment was too sensitive. Several institutions also complained that the detectors were not durable, that they would not detect items such as plastic, stainless steel, or small objects, that the cost of maintenance was high, or that they simply did not work. In the site visits we also discovered that metal detectors presented the most problems. In several instances the detectors were not in use; staff members were using hand-held friskers or patdowns to conduct searches.

Difficulty in adjusting controls was also the most frequent problem reported with magnetic scanners; half the complaints about this equipment involved setting the controls properly. Other problems reported with such equipment (by one institution in each case) were moisture damage, battery problems, lack of durability, poor service from outside vendors, and failure to detect stainless steel.

Problems reported for body alarms tended to be more diverse. Several institutions reported problems with false alarms; several complained that the

battery life was too short. Other problems with body alarms included dead spots, that the equipment was fragile, that generally it did not perform adequately, and that it was heavy and cumbersome.

Few problems were reported for X-ray machines; half of those that were mentioned were for failures of the equipment. Other problems noted — again in each case by one institution — were maintenance problems, radiation exposure, and that the equipment was time-consuming to use.

Staff Reaction

The results of the surveys of correctional officers on internal security were more favorable than those on internal surveillance, but not as positive as those for perimeter security or locking systems. Overall 59 percent of the officers said they were satisfied with the internal security equipment in use at their institution. Forty percent of these officers had not received training to operate this equipment; 30 percent rated the training they received as good, very good, or excellent, 14 percent thought it was fair, and 16 percent said that it was poor. Two-thirds of the officers responding felt that the internal security equipment made their jobs easier; 61 percent said that it made them feel safer; 57 percent believed that it helped them to control inmates better; and 60 percent felt that it helped them to do a better job. The open-ended responses to these questions indicated that many of the officers' complaints about internal security involved the metal detectors; officers were concerned that this equipment did not detect some items of contraband or small metal objects.

Positive and Negative Features

In view of the different types of internal security equipment and their variety of functions, it is not surprising to find a number of different responses to the questions of what institutions liked and disliked most about internal security. In some ways the responses to these questions indicate that internal security equipment basically does the job for which it is designed, and that little about it is either liked or disliked greatly. More than one-third of the institutions did not mention any aspect of their internal security equipment that they liked particularly; almost two-thirds did not report any particular feature that they disliked.

Even among institutions that mentioned some aspect of their internal security equipment as "most liked," the most frequent responses reflected general approval rather than satisfaction with any particular feature. These responses were that the equipment was adequate, that generally it worked well, and that it provided a more secure institution. Internal security equipment was liked specifically because it reduced the amount of contraband coming into the institution, was easy to operate, and permitted better control of inmates.

Dislikes about internal security equipment were more diverse and tended to be more institution-specific. Dislikes that were mentioned by more than one institution included that the equipment frequently did not work, that there were problems in adjusting it properly, that it was too heavy, that service was difficult to obtain and was time-consuming, battery problems, and problems with the metal detector.

These institutions also showed little consensus concerning the effect of this internal security on the operation of the facility. About two-thirds of the institutions did not report any change in operations resulting from this

equipment. The most frequent responses reflected the positive effects of this equipment on the institution, such as tighter security, increased safety, and reduced contraband. Other effects included reducing staff size and providing better response in emergencies.

Overall the technology available through internal security devices does not appear to have had a dramatic effect on correctional facilities. About 85 percent of the institutions responding to this questionnaire use metal detectors, approximately 25 percent use body alarms or X-ray equipment, 14 percent use magnetic scanners, and 10 percent use some other type of internal security equipment. Eleven percent of these facilities have no internal security equipment. For the most part, institutions are satisfied with their internal security equipment; the largest number of problems is reported with metal detectors. Beyond general satisfaction with this equipment, no particular aspect is liked or disliked; internal security equipment is perceived to have little impact on the overall operations of an institution.

Summary

- Some type of internal security equipment (metal detectors, body alarms, X-ray machines, magnetic scanners) is used in about 90% of the institutions in this study.
- There is considerable variation in the percentage of institutions that use different types of internal security equipment. Metal detectors are used in 6 out of 7 facilities, body alarms and X-ray equipment in about 25%, magnetic scanners in 14%, and other internal security equipment in less than 10 percent.
- Given their different functions, this various internal security equipment is also deployed differently throughout an institution. Metal detectors and magnetic scanners are used primarily at the main entrance, X-ray equipment is used most frequently in the mail room, and body alarms are used throughout the institution.

- The highest percentage of problems were reported with metal detectors. One-third of these institutions reported problems with this equipment, primarily with settings that were difficult to adjust, the need for frequent adjustments, and equipment that was too sensitive. There was also some concern among officers that this equipment did not detect small objects, stainless steel, plastic, or contraband.

- Institutions are generally satisfied with these different types of internal security equipment. The most dissatisfaction was with metal detectors, and even in this case 80% of the institutions reported satisfaction with the equipment.

FIRE SECURITY

Fire security, particularly electronic fire detection, is another area where recent technological developments have had a considerable effect on correctional facilities. The data in Table 4-9 show the percentage of the institutions surveyed that use 11 different types of fire safety equipment and measures. These data demonstrate the great importance accorded fire safety in a correctional facility. With the exception of an institutional fire department, each of these measures is used by more than half of the institutions. All but one of the facilities have a fire escape plan; more than 90 percent have fire doors and smoke detectors. On average, these institutions employ approximately eight of these measures; five use all 11 as part of their fire security system.

Close to 90 percent of these institutions use NFPA Standard 101, Life Safety Code, as a basis for their fire safety features. Institutions that do not follow this standard generally use state fire regulations in their fire safety planning.

For this study, we were most interested in institutions that had an electronic fire detection/suppression system. About two-thirds of these institutions had such systems. As with perimeter security and locking systems, most of the institutions were unable to provide data on the original cost of their system. The average cost of those systems for which data were available was

Table 4-9. Percentages of Institutions
Using Different Types of Fire Safety Measures

Type	%
Fire escape plan	99
Smoke detectors	93
Fire doors	92
Smoke control and venting	74
Sprinkler system	73
Fire wall	73
Electronic fire detection/suppression system	68
Fire assistance compacts	64
Prison compartmentalization	62
Fire emergency release mechanisms	55
Institutional fire department	34

approximately $210,000; costs ranged from $4,275 for a system installed in 1978 and a 112-bed minimum-security facility to $1.75 million for an eight-year-old system in an 875-bed medium-security institution.

Maintenance

Maintenance of fire detection/suppression systems presented problems for only a few of these facilities. Two-thirds reported that their system required only routine maintenance; an additional 15 percent reported needing very little maintenance; 10 percent of the systems required extensive maintenance and seven percent needed a good deal. The reported cost of maintaining these systems also varied greatly. The average was between $4,000 and $4,500; two institutions reported that maintenance incurred no additional cost, and $24,000 was the highest reported annual maintenance cost.

Fifteen institutions reported that maintenance of the fire suppression/detection system caused problems, but the nature of these problems was largely unspecified. As with other types of technology, maintenance of the fire security system is conducted in a variety of ways. About one-third of these institutions perform maintenance internally, 25 percent use a combination of internal maintenance and outside support, 27 percent use an outside vendor, and in 13 percent of the cases maintenance is conducted by the manufacturer.

In general, institutions were satisfied with the amount of maintenance required for their fire security systems. Three-quarters of them were either very satisfied or somewhat satisfied. Those institutions that were dissatisfied, however, tended to be very dissatisfied.

Staff Reaction

Institutional data on staff reaction to the fire safety system also indicated general satisfaction. More than 70 percent of the institutions reported that staff members were satisfied with the fire safety system. In almost half of the cases where staff problems were reported, they pertained to dissatisfaction with the number of false alarms. Other staff problems included general frustration or dissatisfaction with the fire safety system and that the system did not work properly.

Data from the officer surveys provide a similar picture. Two-thirds of the officers reported overall satisfaction with the fire security system. Sixty-two percent felt that the fire security system made their jobs easier, 68 percent said that it made them feel safer, and 56 percent thought it helped them to do their jobs better. The officers were divided about evenly on whether the fire safety system helped them to control inmates better; this finding is not surprising because inmate control is not the primary function of fire security. Nineteen percent of the officers did not receive any training on the fire safety system, 23 percent received training and rated it as excellent or very good, 19 percent thought it was good, 24 percent felt it was fair, and 15 percent rated it as poor. The ratings of fire security system training are generally positive among those who receive such training, but in view of the importance of fire security in a correctional facility, the survey revealed a fairly high percentage of officers who said that they had received no such training or who rated this training as poor.

Training

Three-quarters of the institutions with automatic fire detection/suppression systems reported that some type of special training was necessary in order to operate this system. Two types of training are most common: training of the maintenance staff in the upkeep and repair of these systems, and training in the operation of the system, which generally is provided either to all staff members or to all correctional officers. In about half the cases this training is provided internally, 30 percent of the time it is conducted by an outside organization, and 20 percent of the time it is conducted both internally and by an outside group.

Almost 80 percent of these institutions reported that there was no cost for fire security training or that the cost was "staff time only." The highest reported cost for such training was $10,000 annually. Eighty-five percent of the institutions felt that this training prepared the staff adequately to operate and maintain the system; 91 percent were satisfied with the training required for the fire safety system.

False Alarms

As with perimeter security systems, institutions that had electronic fire detection/suppression systems reported problems with false alarms. Although false fire security alarms were not as universal as perimeter security problems, 72% of the institutions with electronic fire security systems reported such difficulties. The median number of false alarms was about 50 per year, and ranged from one to more than 10,000 in one institution.

Several common causes of false alarms were identified. Dust was the most frequently mentioned source, followed by inmates setting them off intentional-

ly. Smoking, general system malfunctions, defective parts, and poor installation were also mentioned by several institutions. In about one-fourth of these cases institutions have been able to reduce the number of false alarms.

Although most institutions were satisfied with the number of alarms produced by their fire detection system, there was a significant amount of dissatisfaction. Seventeen percent of those responding were somewhat dissatisfied with these false alarms; 23 percent were very dissatisfied.

Positive and Negative Features

The most liked and most disliked features of the fire detection/suppression systems varied widely and included institution-specific responses, such as "All areas of the institution are covered" and "The oil and gas systems shut down in case of an alarm." The most frequent responses were that the system was dependable and that it did its job well. One technological feature of these systems that was mentioned by five institutions was that they provided a printout of the time and location of alarms.

Many institutions did not mention any feature of their fire security system that they disliked particularly and the responses that were given also varied widely. The most common dislikes were too many false alarms, that the system was too sensitive, and that the system just did not work. Other complaints included poor installation, the need for more equipment, and the lack of indication of the location of alarms.

There was little evidence of operational changes in an institution due to the fire security system. The effect of the fire safety equipment was generally to improve fire safety and to make the institution better able to respond to

fires, but the system produced no substantial changes in the operations of the facility.

Overall, there appears to be general satisfaction with fire safety systems. Such systems tend not to produce major maintenance problems for the institution, and staff reaction to such equipment is generally positive. Where dissatisfaction with such equipment was identified, it was largely attributable to false alarms. Dust produces a number of these alarms, so consideration should be given to locating detectors in relatively dust-free areas or adjusting the sensing mechanisms to reduce this problem. Tampering by inmates is also a source of many false alarms; detectors should be located where inmates cannot tamper with them easily. Smoking also causes alarms, so locating a detector in a lounge or a common area where smoking occurs is likely to produce some false alarms (though a detector is needed in this area for safety). As with electronic perimeter security systems, a certain number of false alarms must be anticipated with an electronic fire detection system. Limiting these false alarms and responding to them appropriately are important elements in realizing the increased safety that such a detection system can provide.

Summary

- Approximately two-thirds of these institutions have some type of electronic fire detection/suppression system.
- The average cost of an electronic fire detection/suppression system is about $210,000.
- Corrections staff are generally satisfied with the fire safety equipment. Where problems are reported they are attributable largely to false alarms.
- Over 70% of the institutions with electronic fire detection/suppression systems reported problems with false alarms. Dust and inmates intentionally setting off the alarms were the most frequently mentioned causes.

- The effect of fire safety equipment is generally to improve fire safety and to make the institution better able to respond to fires, but produces no substantial changes in the operation of the facility.

COMMUNICATIONS

Communications within an institution are obviously important for the security of the facility, and is an area where technological equipment has been in use for the longest time. As part of this survey we requested information from institutions about their public address system, walkie-talkies, pagers, man-down alarms, emergency locators, tamper defeaters, and other types of communications equipment. For each type of equipment we collected information on the number of units in use, the satisfaction of the correctional staff, the training required to operate the equipment, and problems experienced with the equipment.

The data in Table 4-10 show that communications equipment is used extensively in correctional facilities. For example, 97 percent of these institutions use walkie-talkies, 83 percent use pagers, and 69 percent have a security public address system. Other types of communications equipment such as man-down alarms and emergency locators are used in a smaller percentage of institutions. As these figures indicate, satisfaction with this communication equipment is generally very high.

Not only are walkie-talkies used in virtually all institutions, but fairly large numbers are used within a facility. The average institution in this survey had over 35 walkie-talkies; the largest number (222) was employed in a medium-/close-security facility with 1,475 inmates and 265 line-level correctional officers.

About 40 percent of the walkie-talkies required special training; 92 percent of the institutions that provide such training felt that it prepared the staff

Table 4-10. Communications Equipment

Type	% of institutions which use	Average number in use (range)	% training required	% training adequate	% reporting problems	% satisfied
Walkie-talkies	97	38 (1-222)	39	92	30	91
Pagers	83	11 (1-75)	23	100	16	96
Security public address system	69	1 (1-4)	32	97	30	85
Man-down alarms	22	35 (3-100)	56	100	32	64
Emergency locators	9	51 (1-100)	58	100	8	100
Tamper defeaters	9	38 (1-232)	55	100	27	91
Other communications equipment	6	9 (1-22)	56	100	44	89

adequately. Thirty percent reported some problems with this equipment, but overall 91 percent of the institutions said that they were satisfied. The problems reported most often with walkie-talkies were limited range, batteries that ran down too soon, frequent breakdowns, and that they were too large or heavy and difficult to handle. Other problems included abuse by staff members, older equipment that malfunctioned more frequently, and having too many units on one frequency so that communications could not be made quickly or clearly. Therefore in purchasing walkie-talkies, factors to consider include an adequate range for the size of the facility, a high-quality battery that will not run down quickly, and a unit that is lightweight and not cumbersome. Another consideration is providing enough frequencies so that communications are not jammed; further, it should be recognized that the performance of even the best equipment will decline as the units grow older and that they must be replaced periodically.

Pagers likewise are used in a high percentage of institutions (83%), but generally the number of pagers used in a facility is less than the number of walkie-talkies. In this survey the average number of pagers was 11, three-quarters of the institutions had 10 pagers or fewer, and only one used as many as 75. Only 23 percent of these pagers required special training, and all the institutions that provided such training considered it adequate. Relatively few problems were reported with pagers; half of those that were mentioned involved their limited range. Ninety-six percent of the institutions with pagers were satisfied with their performance.

A security public address is a key component of communications in a number of institutions, and two-thirds of the facilities in this study had such a system. One-third of these systems required special training, and this

training was thought to prepare the staff adequately in 28 cases out of 29. Problems with the public address system were reported in 30 percent of the cases, and were distributed fairly evenly among needing constant repair, not being designed for the institution's needs, not being comprehensive, and difficulty in obtaining repairs. Other complaints included poor quality, the need for more equipment, and improper installation. Of the institutions with a public address system, 85 percent reported satisfaction with their equipment.

The other types of communications equipment for which information was collected in this study--man-down alarms, emergency locators, tamper defeaters, and other communications equipment*--are used in a smaller proportion of institutions. Man-down alarms are used in about one-quarter of these facilities; emergency locators, tamper defeaters, and communications equipment are used in less than ten percent. For each type of equipment, special training is required in about half the cases; in each case the institutions were satisfied with the training required. Because only a relatively small number of institutions used these types of equipment and because few of them reported problems, no generalizations can be made about the difficulties experienced with these devices. Problems with man-down alarms reported by more than one institution were too many false alarms and that the batteries ran down too quickly. Problems reported with tamper defeaters were that they needed frequent adjustment and were easy to defeat, that moisture caused failures, and that severe weather created problems. The problem reported with the emergency locators was that the system was not fully operational, while the problems reported for other communications equipment were the need for frequent repairs, dead spots,

* Other communications equipment included mobile radios, base radio stations, and (in one institution) a telephone system used for all internal communications.

and interference.

Staff Reaction

In view of the satisfaction levels and the relative absence of problems discovered at the institutional level, it is not surprising to find that the correctional officers opinions concerning communications equipment were quite positive. Only nine percent of the officers said that they did not receive any training on communications equipment, the lowest percentage of any of the areas examined; 61 percent felt that this training was excellent, very good, or good. More than four officers out of five viewed the communications equipment favorably in terms of its effect on various aspects of their jobs: 84 percent felt that it made their jobs easier; 81 percent thought that it helped them to control inmates better; 81 percent said that it helped them to do a better job; and 80 percent believed that it made their jobs safer. Overall 63 percent said that they were satisfied with the communications equipment.

Positive and Negative Features

The positive and negative features of communications systems cited by these institutions reflect their generally positive views about such equipment. About 30 percent of the institutions did not mention any feature of their communications equipment that they liked particularly; the most frequent responses indicated a general satisfaction with the system. Most institutions made general comments regarding the system's reliability, its dependability, or the fact that it met the needs of the institution. More specific likes about the communications equipment were ease of operation, the convenience of the public address system, that it provided access to all personnel, and that it allowed communication with other organizations.

Dislikes concerning the communications equipment were mentioned less frequently and tended to be more diverse. Over half the institutions did not mention any particular feature that they disliked. The negative features that were named most frequently were not problems with the equipment but more often the need for additional resources. Too many units operating on the same frequency was the most frequently mentioned dislike (demonstrating some need for additional frequencies), followed by a general need for more equipment. Several institutions complained about the need for too many repairs, expressed the perception that the equipment was not dependable, and mentioned dead spots, problems with batteries, the equipment being too fragile, the need to update the equipment, and the lack of an intercom system.

Communications equipment, particularly walkie-talkies, pagers, and security public address systems, is employed in a high percentage of correctional facilities. Satisfaction with this equipment is high both at the institutional level and among corrections officers; the general impressions are that such equipment is reliable and does what it was designed to do. Communications equipment is not totally problem-free, however. Reported difficulties include batteries that run down too quickly, limited range, units that are too heavy or cumbersome, and interference resulting from too many units on a given frequency. These problems are seen as correctable, however, and the general sentiment seems to be that the more communications equipment an institution uses, the more secure the facility will be.

Summary

- Communications equipment is used extensively in these institutions. Virtually all of the facilities used walkie-talkies, 83% had pagers, and 69% had a security public address system. Other types of communications equipment such as man-down alarms and emergency locators are used in a smaller percentage of institutions.

- Correctional staff are generally satisfied with the communications equipment. Large majorities feel that it makes their job easier, that it helps them to control inmates better, that it helps them to do a better job, and that it makes their jobs safer.

- Institutions evaluate their communications equipment positively. Problems that were discovered indicate some of the features that should be taken into account when deciding on communications equipment: the equipment should have an adequate range for the facility; batteries should be of high quality and not run down quickly; equipment should be lightweight and not cumbersome; and there should be sufficient frequencies so that communications can be made quickly and without interference.

MANAGEMENT INFORMATION SYSTEMS

In Chapter 3 we discussed the management information systems (MISs) operating at the system level. This section describes the use of such systems at the institutional level.

Of the 117 institutions surveyed, 99 reported having a management information system. This number was somewhat higher than had been anticipated in view of the information available at the system level. Table 4-11 shows the percentage of institutions with MISs that use them for various purposes. On average, institutions use their management information systems to perform six of the 10 functions listed in Table 4-11. Approximately 90 percent use their systems for inmate tracking and intake/release; about two-thirds use them for the inmate-related functions of sentence computation and inmate count. Similarly, about two-thirds of these institutions use their information systems for business functions such as payroll or commissary accounts. Smaller proportions use them for call-outs, visitors' lists, or correspondents' lists.

Table 3-5. Uses of Management Information Systems

	Inmate count	Inmate tracking	Intake/ release	Payroll	Commissary accounts	Planning evaluation	Medical
Number using system	31	37	35	23	23	27	13
Percentage	69	82	78	51	51	60	29

payroll and inmate commissary accounts. Over half of the responding correctional agencies noted that they also used their management information systems for research and evaluation, while less than one-third used the systems to maintain medical records.

We asked agencies to specify other ways in which they used management information systems, and they responded with a number of functions. As with inmate records, the most commonly cited use was the tracking of probation and parole caseloads. Other uses included compiling national statistics, client classification, fiscal and personnel reporting, and inventories.

In answer to a question about how long they had used a management information system, most of the respondents (25 of 41) reported that their systems had been in operation for 10 years or less. This finding confirms a fairly widespread belief that correctional agencies lag behind other criminal justice agencies and behind the private sector in developing and adopting technological innovations. Further, only 17 agencies reported that they operated their own systems; most agencies shared computer time and facilities with other agencies, such as a state department of general services.

Table 3-6 presents the responses to questions concerning satisfaction with management information systems and the reasons for those ratings. As the data indicate, most respondents expressed satisfaction with their systems (28 of 33 gave ratings). Satisfaction resulted most often from feelings that correctional operations were made more efficient by availability of data and by the capacity of management information systems to reduce record-keeping burdens. Dissatisfaction was attributed most often to problems in the operation of the system, including slow response time and unavailability of some desired data.

Table 3-6. Satisfaction with Management Information System

Overall Rating	%
Very satisfied	46
Somewhat satisfied	39
Somewhat dissatisfied	9
Very dissatisfied	6
	100%
	(N=33)

Reasons for Satisfaction

Category	# Satisfied
Availability of data	13
Programs meet needs	6
Client information	7
Improves operations/management	4
Can house increasing inmate population with limited staff	3
Saves time and money	2
Accurate account-of-inmates' movements	1

Reasons for Dissatisfaction

Category	# Dissatisfied
Slow response	2
Needs expansion	2
Bugs in system	1
More security uses	1
Requires data request in writing	1
Need for historical information	1

When asked to report any problems in the operation of a management information system, respondents named a variety of weaknesses including the need to upgrade and expand systems, lack of training, and difficulties in modifying the systems to adapt to changing information needs. The benefits of management information systems, presented in Table 3-7, centered around efficient record keeping for inmate tracking and the ability to store a great deal of data.

TECHNOLOGICAL PROBLEMS AND PROSPECTS

The final section of the correctional system survey asked respondents whether they had experienced any litigation concerning issues related to technology, and to identify any areas in which they believed technological advances were needed. Responses to these items are presented in Tables 3-8 and 3-9.

As indicated by the data in Table 3-8, few jurisdictions reported any litigation arising from technological developments. Only 12 respondents reported facing lawsuits; these suits stemmed from 10 areas. The most commonly litigated issues were overcrowding and structural deficiencies in the institutions. Fire safety, health, and security concerns were the basis for most of the remaining suits. From these data it is not possible to learn the effect of technological developments on inmate litigation. In view of the relatively short time in which many technological advances have been in use in correctional institutions, it may be that not enough time has passed for lawsuits to develop. On the basis of our responses, however, technological innovation does not appear to cause any significant number of new suits to be filed against correctional agencies. Unfortunately it is not possible to measure whether these new technologies have averted lawsuits.

Table 3-7. Benefits of Management Information System

Category	# Consider Benefit*
Record keeping	27
Speedy information collection	10
Tracking offenders	8
Classification	3
Stores a great deal of data	3
Inmate accounts satisfaction	3
Evaluation	2
Current data available	2
Does more with less staff	1
Reduces paperwork	1
Total responses	60

* Sums to more than the number of jurisdictions because jurisdictions could provide more than one response.

Table 3-8. Respondents Involved in Litigation Related to Design or Technology

Involved in Litigation	%
Yes	36
No	64

Reasons for Litigation	# involved*
Overcrowding	4
Structural deficiency/institution	4
Fire security	2
Upgrading living environment	2
Inadequate security/program area	1
Health and safety in isolation	1
Locking systems	1
Sealed windows	1
Use of space	1
Design CCTV surveillance	1
Responses	18

* Sums to more than the number of jurisdictions involved in litigation because jurisdiction could give more than one response.

Table 3-9. Technological Improvements Needed

Category	#
Increase computerization	6
Improve perimeter detection system	4
Coordination between criminal justice agencies	3
MIS aggregate data	3
Personal alarm systems/officers	3
Detection systems (contraband)	2
Improve remote security systems	2
Retina/fingerprint scan	2
Effective intrusion/detection system	2
Improve telecommunications system	2
Improve economical/mechanical system	1
More cost-effective system	1
Razor wire	1
Electric system as backup	1
Funding for new technology	1
Drug detection	1
Computer energy management system	1
High-quality security glazing	1
Better locking	1
Integrate prefab housing with existing systems	1
Prison population projection model	1
Improve identification of visitors	1
Effective nonlethal weapon	1

With regard to future developments in correctional technology, our respondents expressed a desire for improvement in available technologies, especially management information systems, more often than they identified areas in need of any initial technological innovation. Many of the comments seemed to reflect a desire to adopt available technologies, such as improved identification procedures (retina and fingerprint scanning), rather than a feeling that these technologies needed to be created. Respondents expressed a need for improvement in existing technologies to make them more effective in detecting drugs and contraband or preventing escapes.

CONCLUSIONS

The survey of correctional systems was designed to gather information about central office-level concerns with technology for correctional institutions and with management information systems, and to introduce the project to correctional administrators. Data obtained from this survey formed the basis for sampling in later stages in the research. In general the results indicated a high degree of activity in constructing and opening new, renovated, and converted correctional facilities.

Several general conclusions may be drawn from responses to the correctional system survey. The most pertinent as follows:

- A total of 616 correctional institutions are in operation in the United States.
- An additional 109 facilities are in various stages of construction.

Table 4-11. Percentage of Institutions with Management Information Systems Which Use Them for Various Functions

	%
Inmate tracking	90
Intake/release	86
Sentence computation	70
Inmate count	67
Payroll	65
Commissary accounts	62
Call-outs	30
Visitors' lists	20
Correspondents' lists	12
Other	80

Eighty percent of those institutions with management information systems use them for purposes other than those asked about specifically in the questionnaire. The most frequent other uses include storing information on inmates' personal histories and background characteristics, inmate classification, disciplinary records, work rosters, and inventory. Table 4-12 shows the range of functions for which the institutions in this study use their management information systems. As these data demonstrate, MISs within correctional facilities are used for many inmate-related, business, research, training, and clerical functions.

A management information system can not only perform these functions, but also can provide valuable links both with other systems within the institution and with outside organizations. This study found very few links with other internal systems but considerably more links with outside organizations. Less than ten percent of the institutions with MISs have links internally with their communications, locking, or other systems. Four institutions have links between management information and communications systems, another has a link with the perimeter security system, another is tied into the locking systems, and in another the MIS is linked with a separate local area network.

More than 90 percent of these institutions are linked in some way with some other institution or with a central site. As Table 4-13 indicates, such links also can serve a wide variety of purposes. The most common link provides general information on inmates throughout the Department of Corrections, followed by a link providing specific information on inmate movement and inmate histories. Other applications such as payroll, personnel registers, or court dates are linked with other agencies in a smaller percentage of cases. Thus although it is possible to link an institution's management information with

Table 4-12. Other Functions Performed by Management Information Systems

Function	N
Personal history; background characteristics	16
Inventory	16
Work rosters	13
Disciplinary records	12
Accounts receivable	9
Electronic mail	9
Inmate rosters	7
Transfer lists	7
Budgeting	6
Personnel records	6
Word processing	6
Inmates' time computation	5
Medical records	5
Warrants; detainers	5
Research	5
Inmate training programs	5
Sentencing	4
Educational records	4
Inmates' personal property	4
Legal reference system	4
Inmates' banking	3
Inmates' grievances	3
Staff training	3
Probation; parole	3
Bids; purchasing	3
Bed space rosters	2
Review schedules	2
Program eligibility	2
Social welfare accounting	2
Problem offenders	2
NCIC	2
Inspector General alerts	1
Employment registers	1
Bail; bond	1
Employee locator	1
Law enforcement records	1
Enemy lists	1
Escape flyers	1
Fingerprints	1
Emergency notification	1
License number check	1
Charged programs disposition	1
Accreditation compliance system	1

Table 4-13. Purpose of Management Information System in External Link

	N
General information on inmates throughout Department of Corrections	34
Inmate tracking; inmate movement	26
Inmate background information	11
Sentence computation	7
Inmates' accounts	5
Payroll	5
NCIC	4
Warrants	3
Probation; parole	3
Budgeting	3
Personnel registers	2
Electronic mail	2
Inmate classification	1
Disciplinary records	1
Visitors' lists	1
Commissary accounts	1
Court dates	1
Missing persons	1
Inventory	1
Purchasing	1
OMIS	1

other institutions or with some central site, for a variety of purposes, the most frequent use is sharing inmates' background and tracking information.

Staff Reaction

Three-quarters of the institutions with management information systems reported that the corrections staff was generally satisfied with this system. Those institutions that reported problems most frequently with their MISs had difficulties with system downtime or with the system being slow. Three institutions reported management information system problems resulting from a lack of training, two felt that it took too long for the system to become operational, and two were disappointed that the system did not improve the institution's efficiency. Other problems, such as difficulty of access due to security or inaccurate information, were more institution-specific.

A management information system in an institution has a greater impact on staff size and staff composition than other technologies such as electronic perimeter security system or electronic locks. About three-quarters of these institutions reported that their management information systems had no effect on staff size, but seven percent said that the system decreased the number of staff; in 19 percent of the cases it resulted in increased staff size. Fifteen institutions also reported that the presence of a management information system produced a change in the composition of their staff: in most cases the number of technical staff members was increased, while in others there was some shifting of staff responsibilities. In about half of these institutions regular staff members are responsible for operating the management information system. Technical staff only operates the system in 16 percent of these cases; a combination of regular and technical staff members operates it in 32 percent.

Training

Virtually all institutions with management information systems reported that some type of special training was necessary in order to operate this system. The impression from this survey, however, is that most of this training is not extensive. For the most part it is conducted internally, though in 15 percent of the cases a state-level training course is provided. Training ranges from being provided solely on the job to a three-day course, and includes annual training courses and occasional seminars.

Positive and Negative Features

Institutional likes and dislikes concerning management information systems were much more consistent across institutions than for other areas of technology. Almost 40 percent of the institutions said that they liked their management information system because it provided easy access to data. Related positive features of these systems were that the information could be obtained for any inmate and that the data were more accurate and more up-to-date. A number of institutions mentioned increased efficiency and the elimination of paperwork as positive features. Other positive features included the ease of maintaining files, the speed of the system, and the links that it provided with other institutions.

Negative features of management information systems were similarly more highly concentrated. The most frequent complaint was the amount of downtime, followed closely by the system being slow. Although these features were mentioned most often as negative aspects of MISs, a number of institutions encountered several other problems. One such problem was the lack of training provided for operating this system; another was limited access to the system in

situations where the system was not available 24 hours a day or could be used by different departments only at specific times. Other complaints included incompatibility with other systems, the inability to produce custom reports, and the fact that the system was outdated even though it was less than 10 years old.

Overall the effect of management information systems on correctional facilities seems to be positive. Such systems generally accomplish what they were designed to do in providing better access to information and consequently improving the efficiency with which the institution operates. Information provided by such systems is also felt to be more accurate and more current than other information. Some problems were experienced, largely system downtime or the slowness of the system, which led to decreased efficiency. Some institutions also reported that the effect of the MIS was to increase demands on the staff. Overall, however, these institutions believe that the effect of a management information system is to produce a more efficient, better-run institution.

Summary

- Eighty-five percent of these institutions have some type of management information system.
- Institutions most frequently use management information systems for inmate tracking and intake/release. Other frequent functions performed with these systems are sentence computation, inmate count, payroll, and commissary accounts.
- Most management information systems were linked with other institutions or to a centralized site. The most common purpose of such linkages was to provide general information on inmates.
- At about 20% of these institutions the management information system increased the staff size, generally due to the additional technical staff.

- Management information systems were generally viewed positively because they provide easy access to data. Such systems are also liked because data tend to be more accurate and more current, and the efficiency of the institution is improved.
- The most frequent problems encountered with management information systems are down-time and the system being too slow.

NEW SECURITY EQUIPMENT

The final type of technology investigated in this survey was new security equipment such as tasers and infrared scopes. We asked institutions whether they had purchased any such equipment in the last five years; only 23 institutions had done so. The types of new security equipment used in these institutions are listed in Table 4-14. As this table shows, tasers are the only type of new equipment that is being used in more than 10 percent of the institutions; infrared scopes and listening devices are used in three institutions, and other types of equipment are reported in only one institution each.

Because of the relative lack of use of such equipment among the institutions surveyed and the differences in the types of equipment, it is difficult to generalize about its effect on correctional facilities. Even so, the information that was collected on this equipment indicates generally positive reactions. In all cases but one, the correctional staff were said to be generally satisfied with the equipment; where this equipment had an effect on the staff's feelings of safety, the effect was to make them feel more safe.

Although in most cases special training was required in order to operate this new equipment, there were no reports of extensive training being required. Most of this training was provided internally; all institutions that reported a cost for training said that it involved staff time only. In all cases but one the institutions felt that the training prepared staff members adequately, and they were satisfied with the amount of training necessary.

Table 4-14. Types of New Security Equipment

Type	N
Tasers	11
Infrared scopes	3
Listening device	3
Laser beams	1
Electronic shocking device	1
Ballist shield	1
Pepper foggers	1
Night vision binoculars	1
PR-24	1
Stun shields	1
Grenade launcher	1
Gas mask	1
Mine sweeper	1
Riot gun	1
Special reaction team hand weapons	1
Tactical team body armor	1
Laser scopes	1

Approximately half the institutions with this new security equipment reported that it had some effect on inmates. The most frequent effect was to make the inmates easier to control; this equipment seemed to serve as a physical deterrent. Six of these institutions reported that the equipment made the inmates more cooperative; six also felt that it reduced the number of physical attacks.

Half of the institutions consulted legal counsel before purchasing this equipment and in a number of cases either the director of corrections or the warden must approve its use. None of the institutions reported any legal action stemming from the use of this equipment.

In view of these rather positive results it is not surprising that the reported positive features of the new security equipment outnumber the negative. What these institutions like about the equipment largely reflects its effects on the institution. The most frequently mentioned positive features were that it reduced the need for physical force and that it was a deterrent to inmates. More generally, such equipment was viewed positively because it provided a more secure facility and another means for dealing with inmates.

Four institutions registered some complaint about this new security equipment. One felt that it was not dependable, another reported problems in obtaining service, a third was concerned that the staff could be injured with the equipment, and a fourth thought that it was too costly.

Overall the impact of this new security equipment on correctional facilities is positive. Although its use is not widespread, the changes that this equipment has produced in institutions have resulted in more secure facilities, a staff better equipped to handle physical confrontations, a reduction in such confrontations, and more secure observation.

Summary

- Only a small percentage of institutions have new security equipment such as tasers or infra-red.
- The correctional staff generally seem to be satisfied with this equipment, and its impact has been to make them feel more safe.
- The effect of this equipment on inmates has been to make them easier to control and to serve as a deterrent to physical attacks.
- No legal actions were reported stemming from the use of this equipment.

NEW TECHNOLOGY

After we questioned the institutions about these various aspects of technology and their impact, we asked if there were any new technological developments that would improve their operations. Slightly over one-third did not mention any new developments; those institutions that did respond named technologies that were in use at other institutions but which were not currently available at their facility.

As the information in Table 4-15 demonstrates, the most frequently mentioned need was for video surveillance equipment, followed closely by an improved computer system. This equipment, as well as the other items listed in this table (such as intrusion detection equipment, body alarms, and two-way radios), is currently available but is not used in every institution. According to the responses to this question, the corrections administrators do not feel that new technology needs to be developed to help them operate more secure and more efficient facilities. They need more resources to purchase currently available technology.

Table 4-15. Technological Developments Needed

Type	N
Video surveillance equipment	29
Computer system; management information system	27
Improved perimeter security	15
Body alarms	5
Biometric identification system	5
Infrared scopes	4
Better lighting systems	3
Two-way radio equipment	3
Electronic gates	3
Improved public address system	3
Security detection systems	2
Multiplexing for different systems	2
Improved locking system	2
Improved fire detection	2
Improved reliability of equipment	2
Drug detection equipment	2
Improved phone system	1
Laser beams	1
Roof alarms	1
X-ray equipment	1
Office monitoring equipment	1
Tasers	1
Infrared detectors	1
Reduced cost of repair	1
Cable television	1

CONCLUSION

In the final question in this survey we asked respondents for any additional comments they would like to make. Only 25 percent of the institutions made such comments; they ranged from general comments about the role of technology to complaints about a specific technological use. Several institutions made a couple of related comments which capture the essence of these responses. One was that electronic devices are not a replacement for staff and the technology is only as good as the people using it. The other was that what correctional facilities need is not more technology but the resources to use that which is currently available.

As shown by the results presented in this chapter, all technologies — electronic perimeter security, locking systems, communications, or the like — present some difficulties. For the most part, however, these institutions are satisfied with their technological equipment and feel that it does the job for which it was designed. Technological equipment, however, is no better than the people who operate it; although it can help to provide a more secure environment, technology alone cannot solve an institution's problems. The resources to acquire people and to train them to operate existing technology properly is more of a "technological" problem than any failures of equipment.

CHAPTER 5

CASE STUDIES

The final phase of this project involved the selection and on-site visit of seven penal institutions. In order to examine the interaction among management philosophy, physical design, different inmate populations, geography, and technology, we chose a range of institutions. We examined institutional and system surveys to identify technologically sophisticated institutions--that is, institutions which provided examples of newly developed technology. We attempted to choose institutions where various technologies worked, as well as those where technological problems existed. We also wanted to include one jail and one renovated facility and to choose sites which were geographically diverse, covered a variety of climates, and represented different security levels. Each of the seven institutions initially designated for study agreed to participate; no restrictions were imposed. The seven correctional institutions visited were as follows:

Augusta Correctional and Medical Institution (Georgia)

Dayton Correctional Institution (Ohio)

Eastern Oregon Correctional Institution (Oregon)

Erie County Correction Facility (New York)

Lieber Correctional Institution (South Carolina)

Missouri Eastern Correctional Center (Missouri)

Southern Desert Correctional Center (Nevada)

All the site visits were conducted between October 14 and December 15, 1987. Three or four project staff members made each visit, which lasted approximately two days. The Dayton Correctional Institution was selected as a pretest site because of its proximity to the project staff.

In order to gather information about the use and impact of technology at these seven sites, staff members conducted two data collection activities at

each facility. The first consisted of in-depth interviews with correctional administrators and staff. The personnel interviewed included the warden and his or her administrative staff; maintenance personnel, including locksmiths; fire safety officers; correctional supervisors; technical staff, such as computer operators; control room operators; and other correctional officers. On the average, 15 interviews were conducted at each site. These interviews were structured, and required an average of one hour to complete. We asked administrators and staff members questions concerning their job responsibilities, work experience, and general attitude toward the institution as well as specific questions about their experience with the various areas of technology. These areas included perimeter security, locking systems, internal surveillance and internal security, communications, fire safety, and management information systems. Each area included questions about interviewees' use of the equipment, training, strengths and weaknesses of the equipment, how the equipment affected their job, ease of use, negative effects, consequences of failure, and how safe they felt because of the equipment.

The second data collection activity was a self-administered questionnaire, which was given to correctional officers. These instruments were handed out at roll call or were given to the supervisors for distribution. Most of the instruments were gathered at the sites, but several were mailed back. In all, 351 questionnaires were completed. These instruments contained questions on the same areas as in the interviews except for questions on management information systems, which were not relevant to most correctional officers. Most of the questions were closed-ended. Demographic and work experience questions also were included, and several open-ended questions gave the officers an opportunity to go into detail. The technical appendix contains examples of the

two instruments. The results of these questionnaires are given in the descriptions of the site visits.

These site visits provided an opportunity to see at first hand the effect of technology in different physical and organizational environments. We chose institutions that were generally satisfied with their systems as well as those that were generally dissatisfied.

AUGUSTA CORRECTIONAL AND MEDICAL INSTITUTION

The Augusta Correctional and Medical Institution (ACMI) is a predominantly close-security prison located in Grovetown, Georgia. The institution was opened in 1982 and originally was designed for 535 inmates. Currently it holds 683 inmates. ACMI is unique in that it is a medical institution as well as a correctional facility; all persons incarcerated in the state of Georgia who develop medical or emotional illnesses are transferred to ACMI. As a result, the institution also houses female inmates, although the population is predominantly male. In addition, the classifications of these inmates range from minimum to maximum. Both of these circumstances present problems unique to ACMI. There are 400 staff members, 200 of whom are direct-line correctional officers. ACMI is a podular design institution with intermittent surveillance: officers walk periodically through the living areas, but are not continuously in the housing area.

A site visit was held at ACMI on November 12 and 13, 1987. During this visit, we conducted 18 structured interviews with staff members ranging from correctional officers to the superintendent. In addition, we distributed self-administered questionnaires to all correctional officers. Thirty-five officers responded to this questionnaire.

OVERALL DESIGN AND OPERATION

In general, most of the staff members whom we interviewed were relatively positive about the facility. When asked what they liked best about the institution, many responded that they felt it was a very secure environment. They attributed much of this security to the technologically advanced equipment employed by ACMI. In addition, some staff members felt that the campus design decreased tension in an otherwise volatile environment.

Staff members' dislikes about the design were much more mixed. A particular problem was adjusting the technology to the institution. ACMI was designed initially as a minimum-security facility, and many adjustments were needed to adapt the design to a close-security institution. As the one supervisor put it, "We've had trouble with everything." The mix of inmates also presents security problems. For example, many of the medical patients occasionally must be transported to local hospitals; security during this transportation is sometimes problematic. Another design problem is the presence of false ceilings: inmates frequently are discovered to have hidden contraband in these ceilings. Overcrowding and low staff-to-inmate ratios also were cited as problems.

PERIMETER SECURITY

ACMI has an electronic intrusion detection system for both the internal fence and the rooftop. In addition, the institution has a microwave system for the sally port gate. Double fences surround the facility (internal: eight feet, external: 12 feet), with four strands of razor ribbon on the external fence. ACMI also uses a perimeter vehicle and has four towers.

In general, the staff was satisfied with the perimeter security system when it was functional. One of the primary complaints about the system was that

weather conditions, particularly lightning, could incapacitate it. ACMI was built on donated land which, unfortunately, is located on high ground. As a result it attracts lightning, which causes power failures. This is a problem for most institutions with electronic perimeters, but at ACMI, lightning causes electronic and power problems when it strikes within a five- to eight-mile radius, rather than producing problems only when it strikes directly. When the system fails, lights around the fence are activated automatically, a sign to the inmates that the electronic detection system is not working. Not surprisingly, as a result of these frequent failures, many correctional officers felt that the towers provided much more security. The four towers were constructed after a successful escape, when the perimeter fence system had failed. False alarms also were cited as a problem with the detection system, but the false alarm rate has been minimized with adjustment. In addition to the problems with the electronic fence, the roof system was not functional. Many officers were unaware of this, however, and believed that the roof system was another line of defense against escapes.

Boredom was regarded as the primary problem for officers in the tower and in the perimeter vehicle; staffing patterns prevent officers in either of these positions from taking breaks. Numerous other problems were cited, such as the formation of the land, which causes blind spots, the perimeter bordering on private property, and excessive need for maintenance of the perimeter vehicle.

Officers generally are trained on the job in the use of this equipment, although recently ACMI has instituted a field training officer program. New officers go through a four-week training program followed by two weeks with the field training officer. Most of the officers interviewed felt that the training was minimally adequate.

Of the 35 officers who completed the self-administered questionnaire, 63 percent expressed satisfaction with the perimeter security system. Only 46 percent, however, felt that the training for this system was good to excellent; fully 34 percent stated that they had received no training. Seventy-six percent felt that the perimeter system made their jobs easier; 65 percent felt safer with this system. Seventy-eight percent felt that the system helped them to control inmates; 76 percent agreed that the perimeter security system in general helped them to do a better job.

Locking Systems

ACMI uses both manual and electronic locks. Housing units are operated predominantly by electronic locks with a manual override.

Initially, a major problem with the electronic locks seemed to be due to the construction of the doors. Inmates could defeat the door indicator by making a gap between the door and the frame. As a result, the control panel indicated that the door was locked, although in fact it was open. To correct this problem, metal plates were welded to each door frame. As one consequence of this initial problem, some staff members believe that inmates eventually will discover an alternative method of defeating the system. Consequently manual door checks are encouraged to ensure that the locks are functioning properly.

The officers believed unanimously that the most positive aspect of the electronic locks was the decreased need to lock and unlock cells manually. Some mentioned that they felt much safer because they did not need to carry keys. In addition, all the officers felt that lock maintenance was quite good; many reported that malfunctions generally were fixed within one day. One supervisor reported that there had been problems with repairs because the locks operate on direct current, whereas the electrician was trained on alternating

current, and because the locksmith has difficulty with the electronics. Even so, the system has been maintained without outside resources.

Most officers reported that the electronic locks have simplified their jobs greatly. When the institution was designed initially, however, the control rooms in the housing units were designed for two officers. Thus the control panel was set up to accommodate two officers (one panel for each wing of the housing unit). Yet because of staff shortages, one officer is required to work the control panel, which can become cumbersome at times. Training generally is given on the job, but most officers felt that it was adequate. One positive aspect of the locking system is that during power failures or malfunctions, the doors lock automatically. In addition, if any disturbances occur at the facility, inmates can be locked down quickly and efficiently.

Of the 35 officers completing the self-administered survey, 79 percent reported that they were satisfied with the locking system. Sixty percent rated the training as good to excellent; 79 percent felt that their jobs were made easier by the electronic locks. Seventy-six percent felt safer; 87 percent felt that the locks helped them both to do their jobs better and to control inmates more effectively.

Internal Surveillance/Security

Internal security equipment at ACMI consists of one walk-through metal detector, hand-held metal detectors, an X-ray machine for the mail room, and mirrors in the medical units. Because of the campus design of this facility, there is very little surveillance equipment.

Although all housing units are equipped with hand-held metal detectors, random searches are the primary method of maintaining internal security. One reason for this is the primary complaint about the metal detectors: they do

not detect glass and other nonmetal contraband. Another frequent complaint was that they needed constant adjustment and calibration. In general, however, all of those interviewed felt reasonably comfortable with the equipment and believed that the detectors did a good job of picking up even small metal objects.

Staff members who had experience with the walk-through metal detector (used for visitors) felt that it was essentially worthless. When it was functional (often it was not), it was frequently unable to pick up even large metal objects, such as keys. To compensate for this deficiency, inmates are searched routinely after visitation when it is known that the metal detector is not working. The fluoroscope for packages was rated positively, although most staff members were unaware of its existence.

Training in the use of this equipment (primarily the metal detectors) was viewed as adequate, generally because it was simple to use.

The most often cited complaint about internal security was the need for more equipment. Many staff members stated that they would like man-down alarms, video camera/surveillance, and stun guns. Mirrors are used only in the medical units; correctional officers expressed a desire for mirrors in the housing units as well, to view all portions of the unit without leaving the control booth. Financial difficulties preclude obtaining additional equipment.

Because of this lack of equipment, only 24 percent of the 35 officers who completed the self-administered questionnaire reported feeling satisfied with the internal surveillance equipment. Seventy percent, however, reported being satisfied with internal security. In regard to internal surveillance, three percent felt that the training was good to excellent, while fully 77 percent reported having no training. Fifty percent felt that the internal surveillance equipment made their jobs easier; 42 percent felt that it made their jobs

safer; 38 percent reported that it helped to control inmates; 47 percent said that it helped them to do a better job. Ratings of the internal security equipment were quite different: 40 percent rated the training as good to excellent, while 37 percent reported having no training; 82 percent felt that the internal security devices made their jobs easier; 74 percent felt safer with this equipment; 70 percent reported an increased ability to control inmates; 77 percent felt that the equipment in general helped them to do their jobs more efficiently.

Fire Safety System

The fire safety system at ACMI includes fire walls and doors, smoke detectors, a sprinkler system, a fire emergency release mechanism, an electronic detection/suppression system, and air packs on the housing units. In addition, fire extinguishers are located throughout the institution.

All staff members who were surveyed felt that the fire safety system worked well. The most frequent positive response about this system was the 30-second delay between the alarm and activation of the sprinkler system: if the detection system activates when there is no fire, correctional officers have 30 seconds to reset before the sprinklers open.

The most frequent complaint was the sensitivity of the smoke detectors. When four or five inmates are smoking near the smoke detectors, the alarm goes off. As a result, inmates' smoking has been restricted and smoke detectors have had to be relocated.

Other complaints were about the plastic used to construct the extinguishers, which tend to break easily; the reset button, which is not centrally located; and that on rare occasions the alarm does not go off when there is a fire. False alarms were cited only rarely as a problem with this system.

Positive comments included the regularity of equipment checks and the fire doors installed on the top floors of the housing unit. In addition, if a sprinkler valve is turned off, an audible alarm sounds in the control room; this feature is viewed as an added safety mechanism.

Training generally was viewed as adequate, although there were some exceptions. Fire drills are held twice a month; they involve assembling the equipment and vacating the buildings. The fire marshal trains the staff in the use of the equipment.

Eighty-eight percent of the officers who completed the self-administered questionnaire reported feeling satisfied with the fire safety system. Sixty percent rated the training good to excellent; only nine percent reported that they had received no training. Eighty-nine percent felt that the fire safety system made their jobs easier; 88 percent felt that it made their jobs safer; 74 percent felt that it helped them control the inmates; 82 percent reported that it assisted them in doing their jobs more efficiently.

Communication System

The communications system at ACMI includes walkie-talkies, pagers, an intercom system, an executive-style telephone system with emergency features, and recently added wireless transmitters.

Overall, the most common positive comment about this system was the ease of use. Ten codes were used to operate and communicate with the walkie-talkies; all officers reported being satisfied with this system. One correctional officer reported feeling very secure, as he had three methods of communicating: the walkie-talkie, the intercom, and the phone system. He demonstrated that merely by taking the telephone off the hook, central control is notified and can monitor through the telephone.

All officers reported needing more walkie-talkies. Many officers did not have them because of shortages and problems with batteries. Decisions regarding the allocation of walkie-talkies were made according to where the officer was assigned. In addition, these walkie-talkies were operated on the same frequency used by county officers, which contributed to heavy "traffic" and interfered with their functioning. Other complaints were the inability to monitor inmates' conversations, the phones not connecting quickly enough, and computer problems with the telephone. Lightning disables the computer, and when that occurs the phone system is incapacitated.

The maintenance of the system has been problematic because switches wear out and must be replaced. One supervisor reported that the communication equipment has greatly increased the work load of the maintenance staff. Training in the use of this equipment was viewed generally as adequate because it is simple to use.

Of the 35 officers who completed the self-administered questionnaire, 68 percent reported satisfaction with the communications equipment. Fifty-seven percent said that the training was good to excellent; 88 percent felt that the equipment made their jobs easier; 91 percent agreed that having the equipment made them feel safer. Eighty-seven percent reported that the communication equipment helped them to control the inmates; 89 percent agreed that the equipment helped them to do their jobs better.

Management Information System

ACMI has no computerized management information system at present. It has a small personal computer which can count and track all inmates, although typically much of this task is done with a card catalog system. One administrator reported that there is a software problem; thus the staff can

computerize only a limited number of variables. This administrator said that he has purchased personal computers to enable computerization of the system, although they are not yet in operation. In addition, there are no plans to network with these computers. He also said that the state has plans to centralize its tracking system, but it has not done so yet and he was unsure when the process would begin.

Because of the lack of a system, most staff members were not knowledgeable about what was used. In addition, questions about the management information system were not included on the self-administered questionnaire.

Summary

ACMI is a newly constructed and generally technologically advanced institution which uses intermittent supervision. Although classified as a close-security facility, ACMI houses all levels of security. In addition, it has a hospital and medical units, houses all HIV-positive inmates from Georgia, and includes a mental health unit. This mixed population presents unique problems for the institution.

Planning appears to be a crucial problem for ACMI. The facility was constructed to house minimum-security inmates, and needed many modifications to convert to close security. The location of the institution presents many weather-related problems for the operation of the equipment, as well as producing blind spots. The need to construct towers after the opening of the facility points to the problems with planning.

Lack of resources was a common complaint among many staff members. Although they viewed most of the equipment positively, many officers felt that they needed more equipment, especially walkie-talkies. Although the perimeter security system is functional only approximately 70 percent of the time, staff

members viewed this system positively. Many, however, said that they felt much more secure with the construction of the towers. Regarding the equipment in use at ACMI, one administrator put it most succinctly: "It's the difference between a jeep and a Lamborgini. We need a jeep. We need less sophisticated equipment that is more durable and of better quality."

Officers' rating of training varied depending on the system, but overall 79 percent of the officers rated the training as adequate to good. One officer pointed out that the manner in which officers are recruited facilitates a positive attitude.

Many officers pointed out a lack of communication between administration and the line staff. They were concerned that expressing their opinion, requesting transfers, and generally providing input might jeopardize their employment. Indeed, 60 percent reported having little to no input in decision making at ACMI.

Not unexpectedly, overcrowding and staff shortages were cited as major problems. Although ACMI is newly constructed and uses advanced equipment, 10 of 27 officers commented on the self-administered survey that the equipment was outdated. Yet 27 officers felt that the equipment was good, although they requested more training.

DAYTON CORRECTIONAL INSTITUTION

The Dayton Correctional Institution (DCI) is a 480-bed medium-security institution which opened in 1987. This facility has four podular housing units operated under direct-supervision unit management. The operational philosophy of this institution is to attempt to create an atmosphere as close to normal as possible inside the facility while maintaining a secure perimeter to discourage any escape attempts. This philosophy is reflected in the type of security

equipment used in the institution: perimeter security consists of several overlapping and complementary systems, whereas inside the facility there is relatively little internal surveillance equipment and no public address system. To promote a "normalized" environment, inmates are given keys to their cells.

The site visit at the Dayton Correctional Institution was conducted on October 14, 1987. We held interviews with four administrators, four correctional supervisors, three correctional officers, and three members of the maintenance staff. Twenty-seven correctional officers completed self-administered questionnaires.

Overall Design and Operation

The general attitude toward this institution is positive, particularly among the managers of the facility. The overall impression is that DCI provides a positive environment for inmates and that this is facilitated by the technological equipment in use, particularly the perimeter security system. The secure perimeter provided by this system permits less internal restriction; it is a key element in promoting the more normalized environment that is necessary for effective management of an institution under the unit management-direct supervision approach. Line-level officers, however, are somewhat less positive about DCI than are administrators. Some officers feel that they are not respected by inmates because they lack disciplinary power, that better communication is needed between management and staff, and that there is some friction among line-level staff members. Although the line-level officers generally are satisfied with the technological equipment at DCI, they believe that the institution works well more because of newness, lack of overcrowding, and the type of inmate housed there than because of the technological equip-

ment, and they feel that more training in the use of this equipment should be provided.

Perimeter Security

The perimeter security system at the Dayton Correctional Institution consists of a 12-foot-high double fence with an electronic fence-mounted shaker. In addition, there is a microwave detection system at the sally port entrances, a buried-cable motion detector between the fences, razor ribbon, and two perimeter patrol vehicles.

DCI administrators are particularly satisfied with the perimeter security system. They believe that the various components of this system---electronic detection, razor ribbon, and vehicle patrol—make the perimeter virtually unassailable. This sense that inmates will not escape enables the institution to adopt a fairly relaxed atmosphere internally. Inmates receive a relatively high degree of freedom within the institution because the administration is confident that they will not escape through the perimeter security system.

The administrators acknowledge that during the first several months of operation birds, animals, wind, and the like produced an excessive number of false alarms in the system. The manufacturer worked with the institution to recalibrate this system, and now there is general satisfaction with the number of alarms. The administrators seem to believe that a certain number of alarms are to be expected in an electronic detection system; if not excessive, such alarms should be viewed not as "false" but rather as indications that the system is working and as a means of keeping officers alert to potential breaches of the perimeter. The only remaining problems with the system, in the administrators' view, are 1) that it is somewhat difficult for the officers in the control room to monitor the perimeter security system adequately during

peak periods and 2) that the patrol vehicle assignment can be so boring that the officers do not always function properly. These problems, however, are thought to be fairly minor.

The maintenance staff and the correctional officers have a somewhat different perspective on the perimeter security system. Both of the maintenance workers interviewed at DCI were on site while the perimeter security system was being installed; they believe that their presence at that time was crucial to providing adequate maintenance of this system. They are also highly pleased with the assistance and support they have received from the manufacturer in determining the sources of problems and correcting them. Maintenance staff members also think that the correctional staff is not trained adequately to use the perimeter security system and that some maintenance problems could be avoided with more complete training. Although the correctional officers are generally satisfied with the perimeter security system (67 percent) and think that it makes their jobs easier (70 percent) and safer (65 percent), they also express the need for better training. One-third of the officers who completed questionnaires had received no training on the perimeter security system; another one-third felt that the training they received was fair or poor. The officers also mentioned the problems of stress in the control room and boredom in the patrol vehicles, and were more dissatisfied than the administrators with the number of alarms produced by the system.

Overall, there appears to be a high level of satisfaction with the perimeter security equipment used at DCI, but some improvement could be made in the training that officers receive in the use of this equipment. In addition, rotating the patrol vehicle officers every two or four hours might reduce some of the boredom of this assignment.

Locking Systems

The locks to the cells in the housing units at DCI are electronic, with provisions for manual override. Each inmate has a key to his cell and is generally free to move in and out except during lockdown periods. All locks in a housing unit are also controlled centrally by the housing unit officer. The locking control panel allows this officer to lock or unlock each of the cells in the unit individually or all the cells as a group.

The design of the locking system is suited ideally to the management philosophy of the institution. Possession of their own keys fosters a sense of responsibility among inmates and contributes to a more normalized atmosphere in the facility. This arrangement also eliminates the need for correctional officers to perform many of the "turnkey" functions that are necessary in institutions where inmates do not have their own keys. It frees them for more interaction with inmates, which is central to the direct supervision approach.

The locking system at DCI seems ideal in theory but has not worked well in practice. Administrators, maintenance personnel, and correctional officers all reported a number of problems with this system. The most significant problem is that the electronic doors pop open for no apparent reason. When this occurs the console may indicate that a cell door is locked when it is actually open, creating an obvious security problem. Although the reason for these "mystery doors" is not known, it is suspected that they are the result of a lightning strike, a factor that should be taken into account in considering a locking system. In addition it is felt, particularly among the maintenance staff, that the locking system was not designed for the level of use it receives. The result is a continual need to replace circuit boards, locks, and broken keys. Some of these parts also must be ordered specially from the manufacturer, so that timely maintenance is virtually impossible.

In addition to these problems, DCI staff members felt that the locking system was too complex and that the training provided for using this system was inadequate. As one administrator said, "The locking system is too complex; it is very difficult for the staff to comprehend how to operate it. The training provided by the manufacturer was inadequate." His thoughts were echoed by a maintenance person, who reported, "The staff are not well trained in the system and how it operates."

From a design standpoint, another problem with the locking system is the position of the control consoles in the housing units. These units are designed so that some of the cells are behind the officer when he or she is at the console, thus creating a potential security risk.

As a consequence of these various problems, the DCI correctional staff feels that the locking system should be improved. Although 79 percent of the correctional officers feel that the setup of the locking system makes their jobs easier, they do not believe that they have received adequate training in the use of this system. Twelve percent said that they had received no training on the locking systems; 69 percent felt that their training was only fair or poor. Less than half of these officers believed that the locking system made their jobs safer.

Internal Security

Relatively little internal surveillance equipment is in use at DCI. The institution has five video cameras, a walk-through metal detector at the main entrance, an X-ray machine in the mail room, two hand-held magnetic scanners, and 24 man-down body alarms.

The internal security devices in use at DCI appear to give general satisfaction and create very few problems. This equipment is thought to be fairly easy

to use, and does not require much training for operation. The training is provided on the job and tends to be rather informal. Correctional officers are generally satisfied with both the internal surveillance (67 percent) and the internal security equipment (78 percent). They also tend to feel that the internal security equipment makes their jobs easier (82 percent) as well as safer (71 percent).

A few problems were discovered with the internal security equipment. For example, some false alarms were reported with man-down alarms, and the alarm button is difficult to reach in case of trouble. In addition, fog poses a problem for the video cameras. These problems, however, are generally felt to be minor, and the internal security equipment is viewed positively. In fact, the biggest complaint concerning internal security equipment is that there is not enough of it; the addition of several cameras and more monitors in the control room would enhance an already good system.

Fire Safety

The fire safety system at the Dayton Correctional Institution includes several components. In addition to a fire wall, fire doors, smoke detectors throughout the facility, and a sprinkler system in the housing units and offices, DCI has an electronic fire detection system.

The attitude toward this fire safety system is somewhat mixed, largely because of the number of false alarms that occurred in the first several months of operation. Much of this problem was traced to dust from construction collecting in the heads of the smoke detectors. A number of these detectors were replaced and the false alarm problem has been reduced considerably, but some dissatisfaction remains with the number of false alarms produced by this system. There is also some lingering doubt as to how well the system would

work in case of fire. Given the number of false alarms, would staff and inmates respond appropriately if a fire occurred, or would they think it was just another false alarm?

There are similarly mixed feelings about the training for operating this system. The initial training was thought to be inadequate, but control room personnel and maintenance staff received additional training and became more familiar with the system, so that now they can use it more effectively. There is still some question, however, as to whether the line staff members are trained to use this system properly. Among correctional officers, 28 percent said that the training they received was excellent, very good, or good; 48 percent rated it as fair or poor; 24 percent said that they received no training on the fire security system.

It is agreed generally that the fire safety system could be very good, but initial problems with false alarms and a lack of training have decreased its effectiveness. The problems experienced with this system have been or are being corrected. If the false alarms can be reduced and kept at a fairly low level and if staff members, particularly correctional officers, receive additional training which enables them to understand the system better, then DCI's fire safety procedures should be quite effective.

Communications

The attitude of DCI personnel toward the communications equipment in use at this institution is summarized best by the respondent who said, "Everything works and does what it is supposed to do." This equipment includes 24 walkie-talkies, eight pagers, and tamper defeaters on manual pull stations and cabinets.

This equipment is fairly easy to use; no special training is required to operate it. It is also durable, and the correctional staff members are confident that it will work. The staff feels that this equipment makes their jobs easier (83 percent) and safer (83 percent) and helps them to do their jobs better (76 percent); generally they are satisfied with it (65 percent).

A number of correctional officers interviewed would like to have a public address system installed. They believe that it would help greatly in tracking down inmates or locating other staff members when needed. The administration recognized the potential utility of such a system but feels that it would detract too much from the normalized environment which has been created at Dayton.

Management Information System

Dayton Correctional Institution has two distinct management information systems. One is used for inmate rosters, inmate tracking, and inmate scheduling; the other is used by the business office for such tasks as payroll and commissary accounts. Only a few staff members have contact with the management information system; they agree that it is rather limited. One of the obvious problems is that the two systems are not linked; as a result, some information is duplicated and one system cannot access data stored in the other.

Overall these systems appear to perform their current tasks well, but it is recognized that they are limited; much more could be done if they were interfaced or if additional resources were used to develop a more complete system. Although no dissatisfaction was expressed with the current system, staff members are aware that the technology is available to accomplish much more in this area than is being attempted at the present.

Summary

The effect of technology on the operation of the Dayton Correctional Institution appears to be somewhat mixed, varying from highly positive for the perimeter security and communications systems to negative for the locking system. Whereas administrators are generally positive about the effect of technology, maintenance personnel and the correctional staff are more divided on this issue. Much of this division seems to be a result of the initial difficulties experienced with the perimeter security and fire safety systems and the continuing problems with the locking system. In addition, the need for additional training in several of these areas is evident in the correctional staff.

Whereas 22 percent of the correctional officers thought that the overall training received by employees was excellent or very good, 39 percent rated it good and 39 percent rated it fair or poor.

The mixed reactions to technology are exemplified in the attitudes of two of the staff members interviewed. One individual stated that the technology at DCI "makes it possible for us to do our job of keeping people in better than has ever been done before." The other, however, said that they "don't care much about all this technology. If you gave me a computer I wouldn't use it." Such positions reflect the problems and prospects of the use of technology at the Dayton Correctional Institution.

EASTERN OREGON CORRECTIONAL INSTITUTION

The Eastern Oregon Correctional Institution (EOCI) is a medium-security prison located in Pendleton, Oregon. It was opened in 1985 and originally was designed to house 400 inmates in dormitories. Since then, crowding pressures in the Oregon correctional system have resulted in the housing of 421 inmates

at EOCI at the time of the site visit (November 1987). Plans have been made for expansion to house nearly 1,200 inmates by July 1989. Double bunking would allow the number of inmates in each dormitory to be increased from the design capacity of 50 to an actual capacity of 65.

A three-member team of interviewers visited the Eastern Oregon Correctional Institution between November 22 and November 24, 1987. During that period questionnaires were distributed to the correctional officers at roll call, and interviews were conducted with 17 staff members. Forty-four correctional officers completed and returned the survey.

The institution is a retrofit of a state mental hospital constructed in 1912 and now closed. At the time of the site visit, one four-story building was in use for housing the general population. Another building had been converted to cells and serves as the institution's segregation unit. Current plans and construction call for the installation of two-man cells in nine additional units. In November 1987, the total staff complement at the institution was 192, of whom 109 were correctional officers. The institution operates with direct supervision.

Overall Design and Operation

All the staff members whom we interviewed had a generally positive regard for the institution. When asked what they liked best about EOCI, managerial and supervisory staff members were most likely to name good community relations or high morale among staff members. Line staff members generally responded that the best things about the institution were the perimeter security or, as one officer stated simply, that "everything works pretty well."

When we asked what aspects of the facility the staff members found troublesome or did not like, we received a variety of answers. The most common

complaints focused on perimeter security, dormitories, and staffing. As one supervisor said, "Oregon is a 'tower state.'" The lack of perimeter towers, combined with the institution's location within the city of Pendleton, raises more concerns about the introduction of contraband into the institution than about escape. Housing unit officers and other staff members were dissatisfied with dormitory housing for inmates and expressed a general concern about the effects of increasing occupancy in the dormitories. Housing unit staff members in particular appeared to feel threatened by their inability to lock down inmates. One said, "The inmates know all the sources of alarm help in the units, so if they really wanted to take over, they could." This officer's solution was to increase staffing to two officers per unit.

Several respondents mentioned insufficient staffing as a problem in the institution. Because EOCI is a retrofit of a mental hospital with dormitory housing, demands on staff were felt to be greater than in a traditional cell-block design. Inmates' freedom of movement around the unit and blind spots caused by the design of the building made surveillance difficult for officers. In addition, the institution does not use unit management, and inmates are moving continually to the dining hall or to program areas. As one officer noted, "I feel like we're understaffed a great deal. As the institution grows, the staffing is not going to grow to keep up with the demand. People are already working a lot of overtime; there is burnout."

One comment which was heard commonly from all levels of staff was that the institution was a study in "making do." One administrator said, "We're in the business of making do with the resources we have." In summarizing the institution's design and operation, a correctional officer echoed this sentiment, saying, "They did a good job with what they had." One administrator noted that EOCI has a higher staff-to-inmate ratio than other Oregon institutions, but

because of the design, the facility probably requires more staff than a traditional prison or a facility constructed specifically for use as a correctional institution.

Perimeter Security

EOCI has approximately a 5000-foot perimeter. No towers are used at the facility; the perimeter is secured by a combination of patrol, walls, fences, and sensors. A 12-foot wall runs across the front of the institution at the administration building. The remaining front portions of the perimeter, the sides, and the back are enclosed behind a double 12-foot fence. The inner fence rests on an underground curb, which encloses the institution. The outer fence is attached to posts anchored in cement. The fences are 20 feet apart, and the fence is made of a nonclimbable mesh. A motion detector system is mounted on the inner fence. The outer fence is protected with razor ribbon. Two 30-inch coils rest on the ground, supplemented by a 60-inch coil at the base of the fence. Two more 30-inch coils rest on top of the 60-inch coil. Thus 10 feet of razor ribbon extend from the outer fence toward the inner fence, and up. Additional fencing and intrusion detection equipment are mounted on the top of the administration building and the front wall. Finally, a two-vehicle, 24-hour patrol monitors the perimeter.

Planners for the facility visited a number of other institutions and corresponded with colleagues across the country before deciding what systems to use. They acknowledge their gratitude to the Federal Bureau of Prisons for assistance in selecting their perimeter security system. The rear sally port is operated from the central control room. The officer on duty at the sally port is in radio and telephone contact with the control room, and the sally port area is monitored by closed-circuit television.

Nearly everyone interviewed was satisfied with the perimeter security system. Several respondents mentioned that the deterrent effect of the system was strengthened by having inmates sign a release to indicate their understanding that they might be shot for breaking the intrusion barrier. No escapes or escape attempts were reported, although correctional officers stated that inmates periodically tested the system by allowing basketballs and baseballs to pass the sensors. Quick response by the patrolling vehicles convinced the inmates that the perimeter works. Initially most of the staff members were skeptical about the electronic security system, but now they report that they are comfortable with it. An administrator said, "It is a learned confidence." Another official noted that one important factor in gaining the staff's acceptance of the electronic perimeter system was having a technician who could explain the system. Most staff members are satisfied with the system's ability to prevent escapes, but respondents at all levels indicated some uneasiness about the lack of towers to prevent contraband from entering the institution and to allow officers to monitor large groups of inmates in the yard.

One reported strength of the system was the fact that there were actually two systems at work--a microwave sensor and a motion detector mounted on the fence. Each system serves as a backup for the other. Problems with the system were that patrol vehicles required a great deal of maintenance, that the vehicles were not air-conditioned, and that the location of the driver's weapon (behind the seat) rendered the seats unadjustable and made them uncomfortable for taller officers. Two accidents involving the patrol vehicles had occurred, both involving inattention on the part of drivers. In this vein several staff members reported that the patrol assignment was "boring." On the other hand, staff and administrators also reported that the perimeter security system made it unnecessary to assign many officers to the boredom of tower duty.

Other problems with the perimeter security system included a sensitivity to weather, especially ice, rain, or severe temperature changes. A technician stated that over time it was possible to adjust the sensitivity of the sensors to prevent many unnecessary alarms. The original design called for installation of motion-detector cables in conduits mounted on the fence, but the conduits filled with water and caused alarms. Removal of the conduits seemed to have solved that problem. Lightning had caused problems early in the history of the facility, but grounding rods were installed every 50 feet around the perimeter, and these problems were reduced greatly.

Animals also caused alarms. During one interview in the administration building, the alarm sounded and the perimeter patrol officer responded to check the roof. A squirrel had set off the detectors on the roof, and the officer could not see the area from the roadway.

The perimeter patrol road was designed to be separate from other thoroughfares. Unlike similar roads at many other institutions, this road does not pass through the parking lot. The administrators at EOCI believe that this arrangement allows for a more secure perimeter patrol and quicker response time, and reduces the chances of accident. In addition, the grounds and perimeter of the facility contain scores of trees. Community leaders in Pendleton were concerned about the fate of some of the oldest and largest trees, so the Corrections Division agreed to let many of them stand. The trees complicate observation and perimeter security, but create a more pleasant atmosphere.

Forty-four correctional officers completed surveys about the impact of technology at EOCI. Nearly 84 percent of those responding reported being satisfied with the perimeter security system; 75 percent rated the training on the system as fair to excellent; 79 percent agreed that the system made their

jobs easier. Nearly 85 percent felt that the perimeter security system made their jobs safer; 60 percent felt that the system helped them to do their jobs better.

The perimeter security system at EOCI was regarded positively by almost all respondents. A great deal of planning and consideration was devoted to selecting and installing the system, and the managerial staff was involved fairly widely in the developmental stages. Continued maintenance and testing, combined with efforts at explaining the system to the staff and the community, added to this positive regard.

Locking System

The correctional officers at EOCI expressed nearly universal satisfaction with the locking system. Almost 70 percent of custody staff members who completed the survey reported being satisfied with the locking system; 74 percent said that it made their jobs easier. Nearly 80 percent felt that the locking system helped in the control of inmates; 64 percent said that it helped them to do their jobs better. Nearly 55 percent felt that the system made their jobs safer. Seventy-five percent rated the training they received on the locking system as fair to excellent.

EOCI is equipped with a pneumatic locking system designed by an Oregon company; it earned high praise from the administrators whom we interviewed. The strengths named were low maintenance costs, ease of operation, and inmates' lack of understanding of how the system operates. Weaknesses were said to include the fact that maintenance personnel must understand pneumatics, especially the need for dry air to drive the lock system. Although some respondents reported isolated problems with the locking system, there was general satisfaction with the pneumatic locks. One officer, for example,

recalled when a housing unit officer had been unable to enter the dormitory. A fuse had blown so that the door could not be operated remotely from central control, and the officer had no key. On the whole, however, the locking system is appreciated for its ease of operation and for the quickness with which doors can be opened and locked.

Maintenance problems have been minimal. A maintenance technician observed that problems with the locking system were common about every six months, "when correctional officers go through position changes." Heavy use of the doors (many openings and closings) creates some play in the locks, which sometimes results in false indications that a door is open. Staff members said that there had been no problem in securing service and assistance from the contractor when they needed parts or advice.

In regard to manual locks, it was reported that keys broke relatively often. One lock company was said to be a problem because keys for its locks are designed and cut specially, and replacements can be ordered only through the company. This situation led to long delays in securing replacement keys and/or made it necessary to keep an expensive inventory of spare keys for these locks throughout the institution. When compared to reports of staff members at other institutions we visited, the locking system at EOCI was not a great cause of concern, and few problems were reported. Planners expect to install the same locking system in the new housing units to be opened at the facility.

Internal Surveillance and Security

Internal surveillance and security systems at EOCI consist of a half-dozen stationary closed-circuit cameras, two walk-through metal detectors, hand-held "transfriskers," and an X-ray machine. The X-ray machine and a black light are used to inspect mail and packages for contraband. The metal detectors are used

to shake down inmates and to check for weapons on visitors to the institution. The cameras are located in the visiting areas, in the exercise yard for the segregation unit, in the medical area and the elevator to the medical wing, and at the back sally port.

The metal detectors are not entirely satisfactory, as they were found to be either insensitive or (on a number of occasions) highly susceptible to outside interference. EOCI also has a new walk-through sensor which is less prone to outside interference and more sensitive to contraband. Staff members appreciate this newer sensor, but bad experiences with the original equipment have left a high degree of suspicion. As one administrator stated, "I don't stake my life on metal detectors and I don't advocate that for staff either." An additional drawback to the use of metal detectors is that they do not detect drugs, plastics, wooden implements, or other contraband.

The cameras have aided in surveillance of certain areas, especially in the unobtrusive or less obtrusive monitoring of inmate visits. Problems with the television system include spider webs in the camera housings, installation errors, and operating difficulties. Because the sally port is operated from central control, the control room officer relies on the remote camera for surveillance. Manufacturer's directions call for the transmission signal to be amplified at least every 600 feet, but installers have created a system with no amplification for over 1,000 feet. Mirrors are not used much at EOCI because, as one respondent put it, "If you can see them, they can see you."

Most correctional officers, especially the housing unit officers, mentioned that they would like to see more cameras installed throughout the institution. Largely because of the dormitory nature of the housing at EOCI, these officers would feel safer if they knew that they were being monitored. Not all respondents wanted more cameras, however. One supervisor felt that it would be

better to place cameras in the exercise yard and other activity areas than in the housing units. None of the respondents mentioned the possibility of using such cameras for monitoring staff members' performance of duties, as was the practice at some other institutions.

As weaknesses in the camera system, respondents named the existence of blind spots, such as the area immediately below the camera, problems with picture clarity when the sun was shining directly on the camera, and the fact that all cameras are fed into two monitors, so that the control room staff must flip the picture continually to monitor every area. For improvements, staff members suggested not only more stationary cameras, but also additional zoom lenses and movable cameras, as well as the installation of recording capability to assist in gathering evidence (if needed) for trial or disciplinary hearings.

In view of the limited amount of internal surveillance and security equipment in use at EOCI, it is not surprising that officers who completed the survey expressed little satisfaction with this technology. Only 36 percent said that they were satisfied with internal surveillance equipment; only 54 percent felt they had received at least fair training on the equipment. Almost 55 percent felt that this equipment made their jobs easier; 49 percent reported that it made their jobs safer. Sixty-one percent felt that this equipment helped to control inmates; fifty-nine percent believed that the equipment helped them to do their jobs better. Responses to questions about internal security equipment were similar. Only 47 percent were satisfied with security equipment; 59 percent felt that their training in the use of this equipment was at least fair. Sixty-two percent stated that the security equipment made their jobs easier, 56 percent that it made their jobs safer, and 64 percent that it helped to control inmates. Sixty-three percent of the respondents indicated that internal security devices helped them to do their jobs better.

Because of the wording of the questions, we could not determine how these officers felt about the potential for such equipment. It may well be that we observed a description of the current status at EOCI; in view of the limited availability of such equipment, internal surveillance and security equipment are not as important in the officers' day-to-day activities as are other aspects of technology. Yet with wider availability, responses might have been more positive. Respondents said that housing unit staff members do not deal much with this equipment; therefore it has little effect on them. One supervisor said, "You could have more cameras, but if the officers weren't doing their job, it wouldn't make any difference." This respondent went on to observe that a failure of the internal security and surveillance equipment has no real consequence, as the officers provide internal security at any rate.

Fire Safety System

When asked about the fire safety system, one of the respondents answered, "What fire safety system?" Our interviews elicited one of two responses about the fire safety system at EOCI: ignorance or dissatisfaction. The respondent quoted above was not ignorant of the system; she was commenting on the fact that it did not function well. Another respondent simply replied, "It's a disaster." Line officers stated almost unanimously that the fire alarm system was so unreliable that they did not trust the alarm panel; they monitored for fires as if no alarm system were in place. The continual state of alarm meant that officers could not tell whether a fire had broken out. Several officers reported small fires which were not detected by the alarm system, and frequently the alarm sounded because of steam escaping from inmates' showers.

One officer stated, "We might as well not have the general alarm system. There have been too many false alarms; nobody believes them. I'm not sure that

the sprinkler system works, but I wouldn't want to bet my life on it...Everyone on staff knows it (the fire system) doesn't work." The fire system was described as a joke, a disaster, a farce, a mistake, and a problem. One supervisor said, "You get to the point where you just don't pay any attention to the alarm." An administrator noted that staff members are frustrated by the number and frequency of false alarms, inadequate training, and poor service by the vendor. He felt that the equipment probably was sound, but that the design and installation of the system were faulty. Another administrator echoed these observations and concluded, "We'll not do business again with (fire safety system vendor)."*

As might be expected, fire safety was the area in which the respondents expressed the least satisfaction. Nearly 90 percent reported dissatisfaction with the system; 65 percent rated their training in the use of this equipment as poor or nonexistent. Seventy-five percent felt that the fire safety system actually made their jobs harder; 80 percent reported that it did not make their jobs safer. Only 10 percent believed that the fire safety system helped in the control of inmates; 82 percent felt that the system did not help them to do their jobs better.

Communication System

EOCI uses walkie-talkies, pagers, telephones, and a public address system for communication. Some of the walkie-talkies have the capability of providing emergency locator signals. For the most part, the management and administration of EOCI are pleased with the communication system available to them, but they noted some problems with the public address system. This system consists

* Since the site visit, EOCI has had architects, engineers & contractors redesign the system.

of components from a variety of manufacturers; it does not always work and requires constant maintenance.

Those interviewed reported being pleased with the radio communication available at the institution; they suggested only that it might be beneficial to acquire more radios. The training was felt to be adequate. Several officers noted a problem with the radios: officers did not keep track of the charge status of the batteries. In addition, the audio on the intercom/public address system was said to be unintelligible on many occasions. Because of continual problems with this system, staff members have begun to rely on telephones. One administrator thought that probably the staff had no strong feelings either way about the communication system except for the radios, which he believed everyone liked.

Radios are not used by officers in the housing units, but given the problems that occurred with the intercom system, some officers believe that radios would enhance communication and safety for housing unit staff members. The sally port officer, the perimeter vehicles, the Shift Lieutenant, and the yard officers have radios. The rest of the staff must rely on the intercom or the telephone for communication.

Administrative staff members wear pagers so that they can be contacted quickly if needed. One respondent felt that the pagers did not have sufficient range, but were adequate otherwise. Nearly everyone felt that no training was required for the use of the communication equipment. The EOCI radio system does not require the use of codes; therefore officers and staff members can speak normally over the radio. Many of those interviewed felt that the intercom system was adequate for housing unit officers to contact the control room, and for announcements from the control room. The major problem appeared to be in the passive listening capability of the system. If the control room

staff or the shift supervisor wanted simply to listen in on an area, the transmission was often fuzzy and inaudible.

For the most part, the one administrator interviewed seemed to be in touch with the staff's attitudes toward the communication system. No respondent showed any strong feelings about the communication system, except for the radios: almost all line staff members expressed a desire for radios to be issued to the housing unit staff. The presence of an alternative means of communication, the telephone, may explain why respondents did not express the frustration and anger that accompanied discussions of the fire safety system, although problems with the intercom system were mentioned frequently.

Of those who completed our survey of correctional officers, 59 percent were satisfied with the communication system; nearly 73 percent felt that the training was adequate. Nearly 80 percent felt that communication equipment made their jobs easier; 70 percent that it made their jobs safer, and 74 percent that it helped them to do a better job. Finally, 74 percent felt that the communication equipment helped them to control inmates.

Management Information System

At the time of the site visit, no management information system was in operation at EOCI. The institution had some limited software and microcomputers, which were used primarily for word processing and for some electronic mail. It is also possible to retrieve presentence investigation reports and to process purchase orders through the existing microcomputers. The institution is linked to the Law Enforcement Data System, which allows checks of criminal records and permits the issuance and clearance of warrants. The microcomputers are used for some inventory and accounting functions; plans are under way to expand the system and its capabilities.

Our survey included no questions about a management information system. Most of our respondents were unaware that any management information system was available at the institution. One supervisor stated that the information system was "for staff who work in the word processing center." Another stated, "We don't have a system now; everything is done manually--clipboards and notebooks."

Although they recognized the enormous potential of a management information system, the administrators wanted to be cautious in development. The first step, they stated, was to conduct a needs assessment to discover the possible uses of such a system and how it might meet their needs best. They anticipated that as the institution grew, so would the management information system.

Summary

The Eastern Oregon Correctional Institution is an interesting mix of the old and the new. A great deal of planning and research went into the development of the institution, and it is hoped that continual testing and adaptation can work the bugs out of the technology and practices employed there. The top administrators were involved in the planning of the institution almost from the beginning, but much of the technical support staff was hired later.

For the most part, the administration and the staff were satisfied with the equipment available to them. To be sure, most wanted more equipment, such as television cameras and radios, but they were pleased with all but the fire safety systems. Many of the correctional staff members at EOCI were hired from the pool of workers who had been laid off by the closing of the mental hospital. These employees were familiar with the institution, but not with corrections. Again, in this sense, EOCI is a mixture of the old and the new.

In view of certain structural inadequacies of the mental hospital for use as a penal facility, the apparent mode of operation at EOCI is to adapt to what is available. Compromise is a part of the culture of the institution. This feeling of cooperativeness is threatened, however, by the proposed expansion. Many staff members and administrators were concerned that when the institution was completed, the size of the population, staff, and physical plant would change the atmosphere of the facility. They also expressed concern that the larger population would be more likely to consist of more dangerous and more troublesome inmates. As one officer stated, "As the population increases, officers and inmates are starting to feel the tension. It can only get worse as the population increases---problems increase geometrically."

The officers who responded to our survey were asked to rate the value of their overall training and in general to assess the equipment used at the institution. Less than 30 percent had any negative comments about the equipment; 77 percent rated their overall training as fair to excellent. Perhaps more telling, nearly 70 percent reported feeling that they had at least some voice in decision making at the institution. One supervisor related how the institution's management staff helped allay some fears among line staff members: "Glass in the control center makes people feel uncomfortable, as a result of the riots in New Mexico. We tested the control room glass---burned it, fired at it, beat it with sledge hammers. I feel real comfortable with it. A videotape of the testing is shown to new employees to make them more at ease."

Because this is a study of the impact of technology on prisons, we did not explore community relations as deeply as we might have done otherwise. One of the most remarkable things about EOCI, as most persons who are attempting to locate new prisons would acknowledge readily, is the good relationship between

the prison and the community. The prison is not only accepted but welcomed; one of the reasons is the ability of technological advances to allow the secure custody of correctional populations without "looking like a prison."

One refrain that we heard repeatedly from our respondents was that the available technology is only as good as the staff members who operate it. As one administrator said, "The staff are the key, and we have a fine staff. You have to emphasize training and job rotation so that staff are diversified. Properly train and support them, and they'll get the job done."

ERIE COUNTY CORRECTIONAL FACILITY

The Erie County Correctional Facility (ECCF) is a minimum/medium-security institution located in Alden, New York. The facility was opened in December 1985 and was designed for 402 inmates. It currently holds an average of 365 inmates. Inmate counts vary daily because of the nature of the facility. ECCF is not in the state system, nor it is classified as a jail. All inmates have been convicted and are serving a maximum sentence of one year. Because sentences may be consecutive, however, some inmates are incarcerated for longer than one year. There are 193 staff members at this facility, 136 of whom are direct, line-level correctional officers. ECCF has a podular design with direct supervision.

A site visit was held at ECCF on November 19 and 20, 1987. During this visit, 17 staff members participated in structured interviews and 32 officers completed the questionnaire.

Overall Design and Operation

In general, most of the respondents had a positive opinion about the facility. ECCF is relatively new in construction; its previous location was an

old linear intermittent-supervision facility. Many of the officers had worked at the old institution and thus were able to make comparisons. The most common positive response regarded direct supervision; although many officers felt that housing units should be supervised by two people rather than one, direct supervision generally was seen as decreasing the tension at the facility. Some officers commented that they missed the camaraderie and contact with other officers from the old facility, but they saw the present design as reducing stress. One administrator reported that aggressive behavior by inmates definitely had decreased.

The most common negative comment concerned blind spots in the housing unit. All officers believed that there were invisible areas in these units. Many felt that the solution to this problem was to assign two officers per unit. Although most respondents felt that the design of the institution was good, some said that the allocation of space was problematic. One administrator believed that 24-man housing units were a waste of space; another felt that there was not enough space for programs such as education. The control room was described as a "design disaster." It is constructed on two levels; the upper level provides a view of the second-level housing units. Because of injuries on the stairs, however, the upper level is used now only for storage.

According to one ECCF administrator, one of the positive aspects of the institution is the well-developed programs. He stated that although money is always a problem, the philosophy at ECCF is to develop programs which will help the inmate to become independent and responsible. In this regard the administrator has developed liaisons with both public and private employment agencies to help place inmates in jobs. An in-house television channel has been established to communicate public service messages as an adjunct to GED training. This administrator reported that over 200 GEDs were granted in one

year at ECCF. Other program facilities include an extensive library, community services, in-house training shops, and advanced educational facilities. The administrator feels that the increased emphasis on programming leads ultimately to decreased recidivism. Over the short term, he feels that involving the inmates in activities decreases the stress and tension at the institution.

Perimeter Security

ECCF employs an electronic intrusion detection system which includes a fence sensor and a differential proximity sensor system. The facility also uses a microwave detection system. It is protected by two fences, eight feet and 16 feet high, a 10-foot wall, and single- and double-coil razor ribbon. A perimeter vehicle patrols 24 hours a day; five closed-circuit cameras scan the exterior.

Overall, nearly all the staff members interviewed were satisfied with the perimeter security system. The fence protection system was viewed as good but sensitive to weather conditions. The microwave system was seen as more reliable, although sea gulls in the area frequently set it off. Although bad weather affects both aspects of the fence protection system, the electronic intrusion system is particularly sensitive. Heavy rains can shut off the perimeter system, and it cannot be reset until it dries. As a consequence, it works only 80 percent of the time. Some officers report that the fence protection system goes into alarm between three and 100 times per day. As it approaches 100 times (with bad storms), it is taken out of service. Even so, officers felt that when an alarm sounded, the perimeter vehicle responded quickly. In general, only five or six alarms were reported per shift, a number which was not viewed as a problem. Two escapes had been made from ECCF, although these occurred before the electronic perimeter was functional. Power

failures are not a problem because ECCF is equipped with two emergency backup generators.

Another problem cited frequently was the poor external lighting. ECCF uses five cameras, which sweep the exterior continuously. At night the outside lighting is very low, thus decreasing visibility and limiting the usefulness of the cameras. Lighting is also a problem for the perimeter vehicle, which patrols 24 hours per day.

By far the most frequent negative comment concerned the lack of training, especially for officers in central control. Although training was provided initially by the vendor, it was given only to a select few. Training now is given predominantly on the job; control room officers feel that this is completely inadequate. The design of the control room is complex, with sophisticated maps for the perimeter system. In addition, all locking and fire safety systems are managed in central control. In general, two to three officers are stationed in this area, but officers feel that this number is not sufficient during lunch and busy times. Other negative comments included the vulnerability of the front of the institution; for aesthetics, there is only one fence for the sally port gate, and that the perimeter vehicle has been pulled for other duties.

Of the 32 officers who completed the self-administered questionnaire, 53 percent expressed satisfaction with the perimeter security system. Only 13 percent, however, rated the training as good to very good (none rated it as excellent); fully 41 percent stated that they received no training. Fifty-two percent agreed that the perimeter system made their jobs easier; 46 percent felt that it improved the safety of their jobs; 42 percent said that it helped them to control the inmates; 52 percent said that the system helped them to do their jobs better.

Locking Systems

ECCF has both manual and electronic locking systems, but most of the locks are operated electronically. All entrance locks to the housing units are operated through central control; individual cells are operated through a control booth in the housing unit. All electronic locking systems can be overridden manually.

In general, the locking systems at ECCF were viewed positively by the staff. Although one correctional officer felt that initially there was some apprehension because unit managers cannot let themselves out of the housing units, officers adjusted quickly to this situation. Many respondents stated that the locking system enhanced security because officers do not carry keys; thus inmates cannot overpower them to escape.

Initially ECCF experienced some problems with fuses blowing and consoles dying because two separate manufacturers had built the electronic control and the locks. These problems have been resolved. Occasionally there are problems with the mechanical construction of the locks: screws back out of a lock, freezing it shut. The screws must be hammered back in so that the lock will operate. If the doors are rattled violently, the position switch is thrown out of adjustment; the electronic device interprets this situation as an unlocked door. The electronic system then pulls the bolt, which opens the door.* Yet many officers are not aware of this problem, and it has not been important. In addition, the locks overheat occasionally from extensive use, and require repair. False readings were rarely reported.

Maintenance generally is done in house, although the manufacturer supplies

* Since the site visit ECCF staff have minimized these problems by assigning a specially trained technician to maintain the system.

the parts to rebuild the locks. The chief of security stated that frequent use of keys in the locks disrupts the electronics and causes maintenance problems. One design problem with the locks is that a single electronic card controls three cells. Thus if the card malfunctions, three cells are out of commission.

Officers had mixed opinions about the adequacy of training. Training was described typically as on-the-job, although one officer reported that all staff members received two hours of training. Central control officers felt that training was inadequate for the complexity of the equipment they had to operate, but most unit managers felt that it was generally adequate.

Of the 32 officers who completed the self-administered questionnaire, 84 percent reported being satisfied with the locking systems. Forty-seven percent rated the training as good to excellent; only 16 percent reported receiving no training. Fully 90 percent of the officers agreed that the locking system made their jobs easier, although only 63 percent felt safer with the electronic locks. Eighty-one percent reported that the locks helped them to control inmates; 70 percent agreed that the locks generally helped them to do a better job.

Internal Surveillance/Security

ECCF has 14 fixed closed-circuit cameras for internal surveillance. In addition, the facility has one walk-through metal detector, hand-held metal detectors, and body alarms for the officers, which are built into the walkie-talkies.

Officers generally were satisfied with the present equipment, although a few expressed the desire for more. The overwhelmingly negative aspect of the system was problems with the cameras and lighting. Almost all the respondents reported that bright lighting or sun glare in the hallways (where all 14

cameras are located) washes out the screen, thus decreasing the usefulness of the cameras. One correctional officer stated that one camera needs to be covered 10 to 12 times a day in order to darken the screen. Several officers complained that the cameras should sweep the halls rather than being stationary, thus providing better surveillance and decreasing the blind spots.* Some officers felt that cameras also should be installed in the housing units. One administrator stated that the cameras should have higher resolution. In general, most officers felt that the cameras were good, as inmates often travel the hallways unescorted.

The metal detectors generally are used only during visitation. Yet because contraband from visitors is a problem, the detectors were seen as only moderately effective. The walk-through metal detector was viewed as unreliable because it does not pick up nonmetal contraband. One administrator felt that for this reason the walk-through metal detector was "mostly symbolic."

Several officers expressed concern about the body alarms, such as the speed of response if they were activated or the problem that might arise if an officer left his or her assigned unit. In general, however, the alarms were believed to provide some sense of security.

Although many officers reported little or no training, few complained that their training was inadequate, probably in part because use of the equipment is limited for most officers.

Of the 32 officers who completed the self-administered questionnaire, 76 percent expressed satisfaction with the internal surveillance equipment. In contrast, only 53 percent felt satisfied with the internal security equipment. Only 19 percent rated the training on surveillance equipment as good to very

* Since the site visit reflective film has been placed on the problem windows, and cameras have been repositioned to enhance corridor coverage.

good; 47 percent reported receiving no training. For security systems, however, 29 percent rated the training as good to excellent and only 22 percent reported receiving no training. Sixty-nine to 77 percent felt that the internal security/surveillance equipment made their jobs easier; 76 to 82 percent felt safer with the equipment; 70 to 73 percent felt that the equipment helped them to control inmates; 68 to 74 percent stated that the system helped them to do their jobs better.

Fire Safety System

The primary fire safety system at ECCF is a fire suppression system that combines smoke and heat detection with a sprinkler system. ECCF also has fire doors, extinguishers, a fire pump, manual pulls, and air packs. The fire alarm registers to an external fire department, although it provides time to correct the alarm if it is false.

Most respondents felt that the fire system was good to excellent. The most positive aspect of the system was the relatively small number of false alarms. The smoke detectors can be activated by dust, although this occurs infrequently. Each individual cell has its own sprinkler system; the sprinkler is activated only in case of an alarm. Thus the entire facility is not affected; respondents regard this as a strong point of the system. The system is reported to work perfectly when a fire breaks out.

Other positive aspects noted were the backup power source for the fire suppression system, low maintenance for the air packs, and the maintenance agreement with the manufacturer for the fire suppression system, which was described as expensive but "well worth it."

Training on the fire safety system received mixed reviews. The training program presently is being reworked to provide more extensive training to all

officers. Although some officers rated the training as adequate, many (mostly those who had worked in central control) viewed it as totally inadequate. As one officer put it, "If I'm supposed to monitor this system and do a good job, then I should feel as comfortable with it as I do putting on my shoes. I don't feel that way at all." The control room layout is quite complex; the fire suppression system periodically goes into alarm at pseudopoints and needs resetting. The entire system can be wiped out by entering one code, although this code is not given to officers. These features lead to feelings of uncertainty on the part of control room officers, which they believe could be allayed by more training.

Of the 32 officers who completed the self-administered questionnaire, 87 percent expressed satisfaction with the fire safety system. Forty-eight percent rated the training as good to excellent; only 19 percent reported receiving no training. Seventy-eight percent felt that the system made their jobs easier, fully 97 percent felt safer with the equipment, and 78 percent felt that it helped them to do their jobs better.

Communication System

The communication system at ECCF includes an intercom, which is part of the phone system, walkie-talkies, and two telephone systems: a security system and the regular system.

The communication system generally was viewed quite positively. The security phones were seen as the most positive feature of the system, with the capability of monitoring conversations, paging, tapping into the door intercoms, and calling on other phones. In addition, inmates can be paged, a feature which gives them more responsibility. One problem cited is that there

are not enough security phones (only 17 in the entire facility) and that some key locations have no phones.

Even so, there were some negative comments about the system. Some officers felt that the public address system sounded garbled at times; one officer stated that of the 200-plus intercom points, only 165 are connected at the present.

The walkie-talkies also were viewed positively. Shortages are not a problem at ECCF, as they are at other institutions. As in most places, however, recharging of batteries is a problem because of constant use. In addition, the officer alarm is incorporated into the walkie-talkie. Unfortunately, the communication capability of the walkie-talkie is disconnected as soon as this alarm is activated.

Training generally was viewed as adequate, although some officers felt that it could be better. Most respondents believed that the equipment facilitated communication because it provided more than one way of locating an officer. Although some officers felt that walkie-talkies should be used only in an emergency, many believed that they were the fastest way of reaching an officer.

Seventy-seven percent of the respondents expressed satisfaction with the communication system. Training on this equipment was rated as good to excellent by 61 percent of the officers; only nine percent reported receiving no training. Fully 97 percent of the officers felt that the equipment made their jobs easier; 93 percent felt safer because they had the equipment. Ninety percent believed that it helped them to control the inmates; 93 percent agreed that the equipment generally helped them to do their jobs better.

Management Information System

At present, ECCF does not have a computerized management information system. Inmates are tracked by paper and pencil, although the facility is moving toward a computerized system.

ECCF has purchased personal computers, although they are not networked and there is no plan for networking. The personal computers contain basic employee and inmate data, but because the system is not networked, information must be downloaded for transfer to another computer. The programming for the system is being written in house with the use of the commercial data-based management software. The equipment was rated as excellent, although respondents said that they could use more computers.

One administrator would like to see a mainframe in use, much the same as that in the county system. ECCF, however, has the capability of tying into the county system. The facility also was in the process of developing a link with the central police system.

Because most staff members were unaware of the management information system, none had any comments. Questions about this system were not included in the self-administered questionnaire.

Summary

The Erie County Correctional Facility is a technologically advanced minimum/medium-security institution that uses direct supervision. Relocation and construction were planned carefully; input was solicited from correctional officers. As a result, the transition from the old facility to the new one was generally smooth.

In general the staff was satisfied with the systems employed. Once the systems were installed in the facility, several problems were discovered both

with the perimeter and with the locks, although they were viewed as relatively minor and not unexpected. It was felt that the opportunity to provide input facilitated the transition.

Sixty-nine percent of the officers who completed the questionnaire felt that they had more than a little input into decisions made at the institution. Although some officers were apprehensive about the change from intermittent to direct supervision, most have become comfortable with this arrangement and feel that it decreases tension at the institution. Increases in programming also were viewed as contributing to low levels of stress and aggression.

Most staff members at ECCF rated the equipment at the institution positively; adjectives ranged from "adequate" to "state-of-the-art." Sixty-three percent expressed positive opinions about the existing technology, but training in the use of this equipment was seen as a major problem. Almost 20 percent of the respondents felt that the training was poor. Although the exact numbers varied with the system in question, in general only 55 percent rated training as good to excellent. Fortunately, superior officers are aware that this area is a weakness, and are making plans to correct this problem.

LIEBER CORRECTIONAL INSTITUTION

The Lieber Correctional Institution is a medium/maximum-security prison located in Ridgeville, South Carolina. It was opened in 1986 and was designed originally for 696 inmates. Currently it holds 870 male inmates, most of whom are classified as medium security. There are 440 staff members, 317 of whom are security personnel. Lieber is a modular design institution with direct supervision.

A site visit was held at Lieber on December 1 and 2, 1987. During this visit, 21 staff members participated in structured interviews. Self-ad-

ministered questions also were distributed to all correctional officers at Lieber. One hundred and ten officers completed the questionnaire.

Overall Design and Operation

Most of the staff members whom we interviewed had a positive opinion of the institution. When we asked them what they liked best about the facility, the most frequent response was unit management and direct supervision. Most respondents felt that there was good communication between the staff and the inmates, and that the open layout of the prison promoted a positive environment. When we asked staff members what they disliked about the design, the most frequent responses were blind spots in the housing units and the yard and flooding in the dorms. Lieber was modeled after the federal prison in Phoenix, where the lower levels of the housing units are built into the ground. Because of the heavy rains in South Carolina, flooding occurs in the lower level of the housing units. One staff member also commented, "If we stayed within capacity, we could help some inmates reduce recidivism. As the number of inmates grows it will lessen the impact we have on the inmates; you spend all your time fighting problems because of overcrowding; guys get in trouble not because they want to, but because of survival."

Perimeter Security

Lieber has an electric sensor perimeter system with a double fence and razor ribbon, one 40-foot tower for the recreation area, and three perimeter vehicles which operate out of eagle posts. The facility also has a microwave detection device, but this works only in a limited area. Lieber tested a number of electronic, microwave, infrared, and motion detection systems before purchasing and installing the present system. The choice was based on considerations of reliability, maintenance, and cost.

Nearly everyone interviewed was satisfied with the perimeter security system. All the electronic perimeter systems that we encountered were sensitive to weather conditions, and Lieber was no exception. The weather conditions near Lieber, particularly high winds, lightning, and heavy rains, caused some false alarms. In addition, birds could activate the alarm. The false alarm problem was not noticeable, however, and did not become a nuisance. When an alarm was sounded in the control room, officers simply dispatched one of the perimeter vehicles to the scene. (The alarm rate was very low.) The respondents also felt that the system was easy to use and that the training was adequate; the staff felt safer because of the system. They were also pleased with the service they received from the manufacturer. As one administrator said, "There have been no attempts to escape through the perimeter security system because the inmates know they can't get out."

Of the 110 correctional officers who completed the surveys, over 84 percent were satisfied with the perimeter system; 70 percent rated the training as "fair to good"; 87 percent agreed that it made their jobs easier; 81 percent said that it made their jobs safer; over 76 percent felt that it helped them to do a better job.

The perimeter security system at Lieber was viewed positively by nearly everyone whom we interviewed and surveyed. A great deal of thought had gone into the selection of the perimeter system; the Lieber administrative staff planned adequately and was involved sufficiently before the institution was built.

Locking Systems

Lieber has both manual and electronic locking systems. The medium-security housing units have manual locks; this system was chosen because it was cheaper than an electronic system. Inmates have keys to their cells in these units. The sally port, gate, and maximum-security housing units have electronic locking systems which use both Class 5 and Class 3 locks from several different manufacturers. The control panels in the maximum-security housing units are pressure-sensitive ("hamburger").

The locking systems at Lieber received mixed reviews from the staff. The major complaint is that the keys break too easily and that replacements take a long time to receive from the vendor. Staff members cannot cut their own keys because the keys are cut at a slant and are available only from the manufacturer. Replacement parts for the locks also were a problem; orders took months to receive. One of the manufacturers was described by an administrator as the "world's worst company" because of its failure to supply keys and parts adequately. The inmates in the medium security housing units enjoy having their own keys; according to the staff, it gives them a sense of privacy and security. Sometimes, however, the locks jam. As a result the override keys do not work in some cases, but this was not regarded a major problem.

By far, most of the complaints about the locks concerned the maximum-security housing units and the electronic locking systems. Respondents

reported doors popping open and false readings on the control panels. The switches on the control panels malfunction, and a great deal of maintenance is required. One officer reported that the staff knew which lights were bad and simply worked around them. Respondents also complained that the pressure-sensitive panels left no room for error; if a button was pushed by mistake, nothing could be done. The staff did not trust the electronic locks in the maximum-security housing areas, and generally viewed them as unreliable.

Overall, 60 percent of the staff members who responded to the survey were satisfied with the locking systems; over 67 percent rated the training they received as good and 12 percent rated it as fair. Nearly 65 percent felt that the locking systems made their jobs easier; 62 percent said that it made their jobs safer; 74 percent felt that it helped them to control the inmates; 67 percent said that it helped them to do a better job.

Generally, the problems with the manual locking systems at Lieber were considered an inconvenience but not a major problem. The electronic locks were rated from very good (sally port and gate) to poor (maximum security housing units). The electronic locks in the maximum-security housing units appeared to be growing worse over time. Frequent maintenance was required, and the officers were beginning to lose their confidence in the system.

Internal Surveillance and Security

Internal security equipment at Lieber consists of two walk-through metal detectors, hand-held transfriskers, mirrors, an X-ray machine, and closed-circuit cameras in the maximum-security housing units. Recently Lieber purchased additional closed-circuit cameras, but they have not yet been installed.

The satisfaction level with the internal surveillance equipment ranged from satisfied to very dissatisfied. According to our respondents, the only major equipment problem was the walk-through metal detectors. They simply did not work properly, and they were being repaired constantly. As one administrator put it, "The walk-through metal detectors are not worth a damn; they're not operational, and we have no confidence in them." Maintenance staff members said that the detectors could not be calibrated properly because of the amount of metal surrounding them. This was a common problem at all the institutions we visited. No problems were reported with the hand-held transfriskers or the X-ray machine.

The maximum-security area has four observation cells equipped with cameras. The cameras worked properly, but the officers complained that they could not see the front of the cells because of the location of the cameras. They were concerned that they could not monitor suicide attempts. No problems were reported with the observation mirrors.

The self-administered questionnaire contained a series of questions on internal surveillance and a series on internal devices. Slightly over half the respondents (52 percent) were satisfied with the internal surveillance; 67 percent were satisfied with the internal devices. Only about 25 percent of the officers rated as good the training they had received on internal surveillance and internal security devices; over 60 percent said that they had received no training in this area. Over 63 percent of the officers felt that the internal surveillance and security devices made their jobs easier; 59 percent said that the internal surveillance made their jobs safer; 65 percent said that the internal security devices made them safer. Nearly 60 percent felt that internal surveillance and security devices helped them to control inmates; over 60 percent said that these features helped them to do a better job.

The internal security of Lieber elicited mixed responses from those whom we interviewed. Although they were not pleased with the walk-through metal detectors, they appeared generally to be satisfied with the internal security and equipment. The atmosphere was relaxed, yet controlled. Nearly everyone felt safe, and there was a general feeling that the staff was in charge.

The responses to the questions on internal security showed a relatively high percentage of negative attitudes. Because very few officers operate the metal detectors, we assume that the dissatisfaction is a reaction to a lack of internal surveillance and devices rather than unhappiness with the present equipment.

Fire Safety System

The fire safety system at Lieber includes smoke detectors in all areas, sprinklers in each inmate's cell, fire emergency release mechanisms, fire extinguishers, air packs, and an electronic fire detection/suppression system with control panels in each housing unit.

Most of our respondents were satisfied with the fire safety system at Lieber, but they mentioned some problems with the equipment. Many felt that the system was too sensitive and there were too many false alarms. Electrical storms disabled the system, and the system was totally inoperative in one of the housing units because lightning had struck the building. Another problem was that the ceilings in the housing unit cells were so low that the inmates could tamper with the sprinklers and smoke detectors. The sprinkler system was equipped with alarm buzzers, but they never worked. The system was also hard to reset; in one of the housing units six of the alarm lights were lit constantly. There had been one fire, and one inmate had flooded his cell with the

sprinkler. No alarms went off in either situation. The respondents also said that they had some difficulty with service from the contractor.

The questionnaires revealed that despite these problems, over 78 percent of the respondents were satisfied with the fire safety system. Fifty-four percent rated the training as good; 22 percent rated it as fair. Over 78 percent felt that the system made their jobs easier; 78 percent said it made their jobs safer; 65 percent indicated that it helped them to control the inmates; 70 percent reported that it helped them to do a better job.

The fire safety system appeared to be operational in most of the institution, with the notable exception of the housing unit that had been struck by lightning. Complaints about tampering by inmates and alarms from dust and cigarette smoke were common, but we heard such complaints at every institution we visited. The false alarm rate was high, but the maintenance staff members said that they had located the source of the problem and were fixing it. Despite these problems, most of the staff were satisfied with the fire safety system. The false alarms were considered an inconvenience, but not serious enough to necessitate turning off the system.

Communication System

The communication system at Lieber includes walkie-talkies, pagers, an intercom, internal phones with emergency features, and radios in the mobile units.

The staff members were highly satisfied with the communication system with one notable exception, the maximum-security housing unit. One officer said, "If you have to rely on the intercom system in the max area, you're dead." The noise level in the maximum-security area made it virtually impossible to hear through the speaker system. As a result, the officers in the cell block had to

shout to the control room officer. This was a problem when cells were being opened because the officer had to shout the cell number. If the control room operator did not hear the number, the wrong cell would be opened. We were unable to determine the cause of this problem. The maintenance staff attributed it to poor training and misuse of the intercom, while the officers blamed it on faulty equipment.

Except in the maximum-security housing units, the communication equipment appeared to be functioning properly. Those whom we interviewed were particularly pleased with the safety features of the phones and with the ease of using all the equipment. Everyone felt that they could communicate for assistance if they required it.

The responses from the questionnaires also were positive; 68 percent of the respondents were satisfied with the system. Nearly three-quarters of the officers rated the training they received as good; 14 percent rated it as fair. Eighty-four percent said that the system was easy to use; 81 percent stated that it made their jobs easier; 84 percent felt that it helped them to control the inmates and to do a better job.

In sum, the communication system at Lieber worked properly with little maintenance or downtime. The only exception was in the maximum-security area, where a major contributing factor was the noise level. The staff felt that the communication system would summon assistance if necessary.

Management Information System

Lieber's Management Information System (MIS) is part of a statewide network that ties Lieber with the central office. Information for classification, inmates' records, disciplinary hearings, transfer records, inmates' accounts, daily counts, inmate tracking, and inventory are available through the system. In addition, Lieber has one personal computer that is used primarily for word processing. Access is provided through CRT terminals; training is conducted at the central office and on site.

Everyone with whom we spoke was satisfied with the MIS. Respondents described it as user-friendly, and said that it provided virtually everything they needed to know. There was very little downtime, but the system was not on line 24 hours a day because of the cost. The self-administered questionnaires included no questions about the MIS.

Summary

The Lieber Correctional Institution is a technologically advanced medium/maximum-security prison that uses direct supervision. A great deal of planning went into the design of the institution, and the administrative staff was involved from the very beginning.

In general the staff members were satisfied with most of the equipment and systems. Notable exceptions were the locks and some aspects of the fire safety system. The problems appeared to be most prevalent in the maximum-security housing units. When asked to describe the equipment at Lieber, 40 percent of the respondents were positive in their opinions, 33 percent were neutral, and 19 percent were negative.

Before Lieber was operational, the staff was sent for training at other institutions in the state. Newer staff members are not given this opportunity

but are trained by experienced staff members. When we asked the officers to rate the overall training they had received, 70 percent rated it as good or better; only six percent rated it as poor.

The staff members at Lieber were positive about the institution, and most of them appreciated the equipment and the systems. It was also apparent that the female officers received the same opportunities as male officers. One respondent said, "We don't have male officers and female officers, only officers." We also noted a great deal of support for direct supervision, particularly among the newer staff members who had never worked at a traditional institution. When asked whether they had some input in decision making, 59 percent responded positively.

MISSOURI EASTERN CORRECTIONAL CENTER

Missouri Eastern Correctional Center (MECC) is a high medium-security institution situated on 42 acres of wooded countryside in Pacific, 35 miles west of St. Louis. Construction started in December 1978; MECC began full operations in September 1981. It was designed originally to hold 512 inmates and presently holds approximately 1,000.

MECC was the first new prison built in Missouri in 18 years, and the Missouri Department of Corrections wanted a different approach from the traditional prison. The design is campus-style and consists of four housing units, a programs building, a gymnasium, and administrative offices. Each of the four X-shaped housing units consists of four wings, each housing 252 male high medium-security inmates. The X-shaped units allow the staff optimal observation and access because control units are located in the junction of the four wings. This design also facilitates the functional unit management concept used at MECC; unit staff offices also are located in the junction area.

The institution has a total staff of 270, including 167 correctional officers. MECC operates with remote surveillance; officers have inmates under constant surveillance from an enclosed control room.

On December 8-10, 1987, three members of our research team visited Missouri Eastern Correctional Center and conducted 16 structured interviews. In addition, we received 59 completed surveys from correctional officers and supervisors.

Overall Design and Operation

The general attitude toward the design and operation of the institution was highly positive. To quote one respondent, "The overall design is pretty good--a nine out of ten." When we asked staff members what they liked about the institution, responses ranged from feeling that their institution was one of the safest in the state, with a very low rate of violence, to cleanliness, good programs, and good staff-administration relations.

Most staff members liked the open-door management policy of the superintendent and other administrators, and felt that communication was generally good. The administration's philosophy is to "treat the inmates with respect and they will give it back." One officer felt that this philosophy kept the crime level down (there have been very few assaults on inmates or staff) and at the same time encouraged professionalism among officers and administrators.

Line officers, however, wanted better communication among themselves and with their supervisors. They felt that the inmates sometimes received more consideration than themselves. This situation may be due partly to a quality circle program implemented by the administration. In this program inmate representatives, chosen by the unit managers, meet once a month to discuss their problems and possible solutions. The superintendent then meets with them

to discuss their suggestions. Usually she must modify their solutions somewhat, but the inmates feel that they have some control over their lives and the quality of the institution.

The design of the institution facilitates effective unit management supervision. As one captain said, "Each housing unit has their own unit manager, case worker, classification assessment, housing unit sergeants, and officers. They have their own little world; it is consistent and standard in each unit."

When we asked correctional officers what they did not like about the institution, they responded frequently that the radios were old and did not hold a charge; some thought that the institution needed better perimeter security (such as an infrared system or motion detectors); many disliked the uniforms. Officers also suggested the need for more training in several areas, such as firearms, self-defense, and the fire system; in addition, as in most institutions, they felt that more staff was needed.

Maintenance and security staff members complained that the flat roofs and dropped ceilings in the educational and other areas posed a security risk. In addition, crowding has caused equipment problems such as overworked heating/ventilation and sewage systems, hot water shortages, food service storage problems, and staff shortages in all departments. Maintenance staff members also disliked the high cost and the frequency of repairs that occur in an all-electric institution such as MECC; they did, however, like the cleanliness of the electrical system.

One of the most common complaints concerned the muddy, often slippery, poorly lighted perimeter security path. Evidently MECC was built on a swamp; natural underground springs cause this condition.

An overall positive feeling toward the institution's design and operation was reflected in one administrator's comment: "We've got a lot going for

us...being close to the city, the overall attitude of my staff, day-to-day operations. All sections try to work together toward one major goal."

Perimeter Security

MECC is enclosed by a double 12-foot fence with 18- and 24-inch stainless steel razor ribbon halfway up the fence and at the top. The intrusion detection system consists of fence sensors and microwave equipment in the sally port area and on top of the administration building. In addition, five 35-foot towers are positioned around the outside of the perimeter. The towers have a control panel for the fence sensor system and a printer showing the location of alarms. A walking patrol officer checks the fence at the beginning of each shift; one perimeter vehicle is used as needed, as in fog or in response to a perimeter alarm.

As with other electronic perimeter systems, extreme weather conditions--thunderstorms, heat, lightning--trigger an alarm. Initially the many false alarms caused dissatisfaction among staff members, but adjustments by the manufacturer have alleviated this problem. Most of the staff members whom we interviewed felt that the equipment was easy to use, and made their jobs safer and easier. One respondent, however, echoed the sentiments of several others when he said, "Towers are a very necessary part of perimeter security even for psychological deterrence only. For the inmates, there is nothing like the click of a shotgun."

One administrator felt that the external training given to maintenance staff members did not prepare them adequately to maintain it. Many of the problems were due to installation, and the staff now is satisfied with the performance of the system when it is working properly. This administrator believes that

perimeter security at MECC is "ideal for high security, and makes the population manageable."

Staff members felt that inmates have a "healthy respect" for the electronic perimeter system, and often test it by throwing rocks to see how fast the control center officer arrives in the vehicle. There have been no escapes or attempted escapes through the system.

Of the 59 correctional officers who completed surveys, over 74 percent were satisfied with perimeter security; 30 percent rated their training as good or better, 34 percent rated their training as fair, and 25 percent said that they had received no training at all. Over 70 percent of the officers said that perimeter security made their jobs easier; 55 percent said that it made their jobs safer and helped them to do their jobs better; 61 percent said that it helped to control inmates.

When MECC was opened in 1981, it had a motion detection system that never worked properly. There were continuous false alarms; on those occasions all the zones on the control panels would light up, making it impossible to determine the location of the alarm. The institution finally received an appropriation to tear out the system and replace it with the present system. As one administrator commented, "It failed to operate properly due to poor design and installation."

Overall, the perimeter security system was viewed positively after the break-in period. MECC is satisfied with the manufacturer's attention to problems, but would like better training for maintenance people.

Locking Systems

MECC has both manual and electronic locks. Housing units are all manual except for the special management unit, which has electronic locks. Wing doors

are also electronic, and are operated by the central control room or by local control in the "bubble." Inmates in other housing units have their own keys during the day; all cell doors are open, as are the bubbles. Inmates are fairly responsible with keys because they are charged ten dollars if they lose one. There have been very few problems with inmates jamming locks, possibly because this is considered a serious violation.

The cells can be deadlocked, but the officer has to work each lock separately (except in the special management unit). Staff members generally feel safe and are satisfied with the locking system, although some individuals would like electronic locking systems in all housing units to allow for a more efficient lockdown and to give the officers more control. As an alternative, others expressed a desire for a better key control system such as standardization or consolidation to reduce the number of keys that officers must carry.

Maintenance is conducted internally; the only complaint is the high cost of replacement parts. Staff members felt that training was sufficient both for maintenance and for operation of electronic locks.

Almost 73 percent of the staff members surveyed were satisfied with the locking system; 61 percent rated training as good, while 25 percent rated it as fair; 74 percent said that the locking system helped them to do their jobs better and to control inmates; almost 70 percent agreed that the system made their jobs easier and safer.

The locking system works well for MECC and its staff. As one maintenance engineer stated, "The locking system is good; its strength is simplicity of operation."

Internal Surveillance and Security

Internal surveillance and security systems at MECC consist of one walk-through and approximately 16 hand-held metal detectors, along with closed-circuit TV. An X-ray machine is available in the medical area, but all packages are opened by hand.

MECC has one scanner camera in the program area, which covers the entire yard, but it was hit by lightning and is inoperative. The other cameras are stationary and located in the special management unit, the visiting room, the administrative segregation area, and the yard. The general consensus was that more cameras were needed; zoom lens scanners would be most desirable. Stationary cameras can be avoided by inmates and visitors, as they are seen easily. All cameras are monitored either through the control room in that particular section or through central control. Some staff members were concerned that the administration used cameras to monitor them, but most liked the cameras and felt safer because of them. As one maintenance engineer said, "People seem to like anything we do to increase security."

The walk-through metal detector was ineffective because it was extremely sensitive and almost anything set it off. "Everyone would have to be strip searched," commented one staff member. "Consequently, we usually just shut them off." Hand-held metal detectors work well for picking up metal, but they do not detect plastics, wood, glass, or other materials. As one officer said, "They can't take the place of a good pat search."

The responses to the survey in this area may not be a true indication of satisfaction with such internal security devices as metal detectors and cameras because few officers use them in their daily routine. Also, the questionnaire had separate sections regarding internal security and internal surveillance. Even so, 46 percent of the respondents found internal surveillance satisfac-

tory; 52 percent were satisfied with internal security devices. When we consider that not much training is needed on some internal security and surveillance equipment, the negative responses are to be expected: over 54 percent and 80 percent respectively said that they had received either fair training or no training. Less than 50 percent believed that internal surveillance made their jobs easier or safer; 59 percent and 46 percent respectively stated that internal security devices made their jobs easier and safer. Almost 53 percent of the officers said that both internal surveillance and internal security helped them to control inmates; 44 percent credited internal surveillance with helping them to do their jobs better; 56 percent agreed that internal security devices helped them to do their jobs better.

Although respondents indicated dissatisfaction with some of the internal surveillance/security devices, such as the walk-through metal detector, they liked the cameras and considered them "another set of eyes" as well as a "good deterrent just (by) sitting there." Staff members generally felt secure in the institution; their dissatisfaction seemed to result from the lack of internal security equipment rather than the quality of the equipment (with the exception of the walk-through metal detector). As in other institutions we visited, the major reason for shortages of equipment was lack of funds.

Staff members seemed supportive of each other, and we saw no problems with control of inmates. As one maintenance supervisor said, "Our surveillance is pretty good. It is a good system. We have a good staff of officers and they are observant."

Fire Safety System

Responses both in interviews and in questionnaires implied that a major problem with the electronic fire safety system was ignorance about its opera-

tion. One officer called the system the "pits." He didn't know whether the problem lay with the equipment or with installation, but he mentioned initial construction complications when the underground wire-carrying conduits filled with water. Another interviewee responded, "Because staff are not adequately trained, and because of the complexity of the system, it is very difficult to operate."

The fire safety system at MECC includes fire walls, fire doors, smoke detectors, heat sensors, fire emergency release mechanisms, smoke control and venting, prison compartmentalization, and an electronic fire detection/suppression system. Monitors for this system are located in central control, in each housing unit, and in each zone. Heat sensors are located in the furniture factory and the garage; smoke detectors are installed in the administration building and the housing units. The facility also has a fire escape plan and verbal fire assistance pacts. In addition, there is an institutional fire department, which the administration considers inadequately staffed.

When we asked staff members what they did not like about the fire safety system, responses included location of some fire panels, too many false alarms, lack of training, noise of false alarms (for control room officers), and complexity and expense of repairs.

Positive comments about the fire safety system generally concerned quick notification about a problem in a specific area, adequate fire equipment, and the trouble-shooting feature in the system. If a problem arises, such as when an alarm does not work in a housing unit, monitors show the problem area.

Despite the reactions of the interviewed staff members, over 52 percent of those who answered the questionnaire considered the fire safety system satisfactory. This response may be due partly to the security they felt because of the manual fire-fighting equipment (hoses, hydrants, breathing equipment),

adequate fire exits, and regular fire drills. Training, however, was rated as fair to nonexistent by 46 percent of those surveyed. Recognizing this as a problem, the administration has implemented a program and requires all personnel to attend an annual refresher course. The administration hopes to increase initial training to provide "practical application of theory." It was felt that the present training was inadequate to satisfy "institutional requirements of operation."

The fire safety system has been in operation for approximately six years. Initial installation and wiring problems caused much dissatisfaction with the system, but after major rewiring of underground cables and other repairs, the system seems to be operating satisfactorily. Extreme climate changes and component breakdown through normal wear are expected. One administrator stated, "This system is practical and realistic, and the difficulties encountered during the first six years of operation are in the original installation design/construction."

Communication System

Communication devices at MECC include pagers, walkie-talkies, a security public address system, an intercom, and telephones.

Pagers, which have a 50-mile radius, are used by the superintendent, the assistant superintendent, the head of maintenance, and duty officers. The only complaint was that garage door openers can cause false alarms. As one staff member said, "You're never truly off (duty)."

Telephone lines are used mainly for communication, not for emergencies, between housing units and the control center, other communications devices, the food service, and other points. A control room officer said that the phones

have an emergency signal; if an officer hits a certain number, an alarm is set off in the control center.

The outside public address system works so well that neighbors complain about the noise; they don't like to hear inmates being paged. Consequently, it receives little use.

According to one respondent, the intercom system from towers to control center is obsolete and parts are unavailable; consequently, it is not in operation. Radios now are used for communication between towers and the control center; this system seems to work well. The intercom system between the control center and the building that houses the visiting room, the hospital, and the conference room works well, as does the intercom system in each wing of the housing units. Special management unit officers complained that the inmates have no way to communicate with them; consequently they yell, creating a noise problem. The only other complaint concerned water flooding the underground conduits, which caused some initial installation problems.

MECC staff members use radios for communication and as security devices. Radios and telephones are an officer's main source of contact with central control, as MECC does not have "man-down" alarms. The radios work well; the only weakness reported was a need for better provisions for recharging batteries. One officer said, "Radios are good...staff like them, makes job easier and safer."

This satisfaction was reflected in questionnaire responses. Over 58 percent of the surveyed staff members expressed satisfaction with all communication equipment; in addition, 86 percent and 78 percent respectively agreed that the equipment made their jobs easier and safer. Eighty-three percent felt that it helped them to control inmates, while 85 percent felt that it helped them to do their jobs better. Training on communication equipment was rated as good to

excellent by 68 percent, and as fair or poor by approximately 25 percent of those surveyed.

In sum, there were few problems with the communication system. The equipment was easy to use, training was sufficient, and the staff felt safe. Maintenance consisted basically of recharging radios and replacing batteries. As the maintenance supervisor said, "I do not see too many officers having problems with the radio. Officers like them because they save steps and make them feel safer."

Management Information Systems

MECC and Missouri's other institutions are linked through the State Highway Patrol computer system. The Offender Management Information System (OMIS) and The Missouri Uniform Law Enforcement System (MULES) are the primary systems used. OMIS is used for corrections. MULES provides rap sheets, information on warrants, and parole information; sends messages to other institutions, states, and departments; and is connected to the National Crime Information Center. Other functions performed by the management information system include inmate counts, inmate tracking, intake/release, payroll, commissary accounts, call-outs, sentence computation, visitor lists, correspondents' lists, conduct violations, file updates, reclassification of inmates, and FBI and Missouri State Highway Patrol number tracking.

Those who use the management information system are pleased with the time saved and the information that can be obtained. The superintendent and several staff members indicated a need for an in-house personal-computer-based system which they could program. Some states have a system which combines the equipment used currently by MECC with a personal computer system; the MECC staff would like to implement such a system if funds become available.

Downtime seems to be a problem. One respondent said that the system had been down eight to 10 hours a week. "It seems to be according to the weather...there was a lightning strike and the system was down for three days. If the Highway Patrol we're linked to has problems, it takes us down. If Jefferson City has problems, the whole system is down."

Training varied for those responsible for data entry and records. One records office employee received a week of intensive training at Highway Patrol for the MULES system, and half a day to learn the OMIS system. It was felt generally that more training would be beneficial and that refresher courses should be held regularly. Various regular MECC staff members have inquiry capabilities; and some have both entry and inquiry capabilities. These staff members are required to be certified by receiving training from the Department of Corrections, Central Office, EDP Training Personnel.

The management information system has been in operation since the early 1970s. Staff members generally are satisfied with the performance, but would like a more comprehensive, more flexible system which they could program themselves. This system, however, does allow them to access information easily, rapidly, and accurately.

Summary

Missouri Eastern Correctional Center is regarded as a new approach in view of the continued high recidivism rates of inmates serving in traditional prisons. The Missouri Department of Corrections appropriated 25 million dollars to construct this innovative state-of-the-art facility. The primary goals of the department were to decentralize large-group functions in order to decrease tensions caused by overcrowding and to provide a secure rehabilitative environment "for the protection and development of the public welfare." A

combination of remote and direct surveillance is used; each housing unit is managed by a functional unit manager, who is supported by a team of social workers. The design of the facility enhances the functional unit management philosophy. This all-male facility is run by a female superintendent, who employs a participatory style of management and an open-door policy. She appears to be well respected by both staff and inmates.

Most of the interviewed staff members and survey respondents felt that the equipment at MECC was good; the one area of dissatisfaction was the fire safety system. In the overall ratings of equipment used in the institution, less than 30 percent were negative and over 40 percent were positive. As in other institutions that we visited, more equipment is needed; respondents to the questionnaires wanted more cameras, radios, and man-down alarms.

We also asked respondents to rate the overall training they had received in the institution and to evaluate the extent to which they had a part in decision making. Over 64 percent rated their training as good to excellent; only seven percent rated it as poor. When we asked respondents how much input they had in decision making, approximately 49 percent said "very little" or "hardly at all," 29 percent said "some," and 19 percent said "a great deal."

Flexibility of positions was considered good by most interviewees. In their on-the-job training, officers are assigned to each post for half a day to try it out. If an officer expresses interest in a particular area and is qualified, he or she can be trained for that position. Also, an officer can bid for a certain position if he or she wishes a change. The shift commander makes the decision.

Since the initial installation and construction problems encountered by MECC were corrected, there have been few serious problems either with technology or with management. As an experienced officer commented, "If they sent me to

another institution (an older one), I'd go reluctantly because this is a more professional, cleaner, nicer atmosphere in a more modern facility. Good equipment helps morale and performance is more professional."

SOUTHERN DESERT CORRECTIONAL CENTER

The Southern Desert Correctional Center (SDCC) is a medium/maximum-security prison located in Indian Springs, Nevada. It was opened in 1982 and was designed for 714 inmates. Currently it holds 1135 male inmates, most of whom are classified as medium-security. There are 187 staff members, of whom 153 are security personnel. The housing units are arranged in a spoke design with remote surveillance.

A site visit was held at Southern Desert on December 14 and 15, 1987. During the visit 13 staff members participated in structured interviews. Self-administered questionnaires were distributed to all correctional staff members; 44 officers completed the questionnaires.

Overall Design and Operation

The general attitude toward the design of this institution was poor. Virtually everyone interviewed was critical of the design and the construction. Comments ranged from "This place is a disaster" to "Nothing works well." Most staff members felt that the institution was poorly planned and that the workmanship was flawed. One administrator believed that the architects were more concerned with aesthetics than with function, and that the state had been sold on beauty, not on operation. Another complaint was that the housing units had false ceilings, and that the buildings were spread out too widely. According to several administrators, Southern Desert had been intended originally as a minimum-security prison.

Perimeter Security

When SDCC was opened an intrusion perimeter system was installed, consisting of microwave and infrared detectors, a double fence, 24-inch razor ribbon, 22 lights with clusters of 12 1,000-watt high-sodium bulbs mounted on 100-foot poles, and two perimeter vehicles that patrolled 24 hours a day. This system has never been operational; as a result SDCC has built five towers, one inside the perimeter and four outside. (There were two escapes in 1985, before the towers were installed.) Presently the perimeter vehicles patrol only during the midnight shift or in foggy weather. The facility also uses dogs to guard the perimeter and to help with inmate disturbances.

Nearly everyone whom we interviewed was satisfied with the present perimeter security system. Towers were seen as absolutely essential, especially in view of the problems with the electronic perimeter system. Everyone had been dissatisfied with that system. Shortly after the electronic system was installed, a flash flood damaged the electronic circuitry. The boxes containing the circuits had been buried underground without proper seals, and the water shorted the electronic components. The system emitted constant false alarms, averaging 70 to 80 per hour. Birds, animals, wind, temperature changes, tumbleweeds, and rainstorms all affected the system. Staff members also were highly dissatisfied with the service and maintenance provided by the manufacturer. In addition, the 24-inch razor ribbon snapped in the high winds and was replaced with 18-inch ribbon reinforced with a steel band. The lights functioned properly, however, and the maintenance department instituted a preventive maintenance program that helped to insure that problems were avoided. Staff members also complained about the perimeter vehicles, but

because these vehicles no longer were used regularly to patrol, these problems were not seen as critical.

Nearly 61 percent of the correctional officers were satisfied with the perimeter security system. Only 36 percent rated the training they had received as good, however; 16 percent rated it as fair. Sixty-six percent agreed that the system made their jobs easier; 56 percent felt it made their jobs safer. Less than half (45 percent) said that it helped them to control the inmates; 43 percent agreed that it helped them to do a better job.

Overall, the staff members at SDCC were satisfied with the present perimeter security system, which consists primarily of towers. The electronic system never functioned properly, and has been disconnected. Although several of those interviewed said that an intrusion detection system would be beneficial if it worked properly, the overwhelming majority had lost faith in such systems; the consensus was that towers would be the system of choice of Nevada in the future.

Locking Systems

Southern Desert has both manual and electronic locking systems, although most of the locks are electronic. Inmates in the medium-security housing units had keys to their cells, but because many of the keys had been stolen, lost, or sold, they were no longer issued to inmates. All locks in the housing units were controlled electronically from the "bubble," the control area in the unit. Manual override was possible, but the fire marshal would not permit individual locking of doors. SDCC employed two locksmiths to service the locking system.

The staff at SDCC was unanimously dissatisfied with the locking system. Inmates were able to jam the locks, kick out the doors, tamper with the wires,

and cause false readings on the control panels. As one officer said, "Fifty to 60 percent of the locks are inoperable at one time or another." Complaints about doors popping open were common, and it was believed that most inmates could leave their cells if they wished. The maximum-security unit was particularly problematic; in one wing nearly one-third of the cells had no locks at all. One staff member commented that "neither inmates or officers were safe" because of the locks. Maintenance staff members reported that they were constantly repairing locks and replacing switches, but that the equipment was not sturdy enough and took too much abuse.

Only 20 percent of the correctional officers were satisfied with the locking system, although 66 percent rated the training they received as good or fair. Thirty percent felt that the system made their jobs easier; 21 percent believed that it made their jobs safer; 36 percent said that it helped them to control the inmates; 27 percent said that it helped them to do a better job. These ratings appear to reflect accurately the condition of the locking system at Southern Desert.

The problems with the locking system at SDCC were more than an inconvenience; they were a major safety problem. The staff did not feel safe, and with good cause. The problem was more than a simple matter of maintenance; inadequate locks and poor installation resulted in a system that one officer described as a "total disaster."

Internal Surveillance and Security

Internal security equipment at Southern Desert consists of a walk-through metal detector, an X-ray machine, tasers, and closed-circuit cameras in the housing units, the recreation area, and the towers.

The satisfaction level with the internal surveillance equipment ranged from dissatisfied to very dissatisfied. The closed-circuit cameras were called "lightweight"; most did not work properly. Part of the problem stemmed from the fact that indoor cameras were being used outdoors, although, as one administrator said, "they don't work indoors either." These cameras were not well suited to the climate or the light. In addition, the cables for the cameras were run in the same conduit as the lighting system; the result was electrical interference that led to snowy pictures and blackouts. Officers complained that the cameras were disabled easily and that there were permanent shadows of light when the cameras were left stationary for extended periods.

The metal detector and the X-ray machine did not receive high marks either. The walk-through metal detector was referred to as "junk" by one maintenance staff member, who added that it had become "a running joke" among staff members. He also complained that staff members were unable to obtain service information from the manufacturer. The X-ray machine was used to screen packages, but it was inoperative much of the time and required constant maintenance. There were no complaints about the tasers, but they were available only to a small number of staff members and were used very rarely.

The results of the questionnaires reflected the dissatisfaction expressed in the interviews. Only five percent of the respondents were satisfied with the internal surveillance, but 41 percent were satisfied with the internal security devices. Two percent rated the training they had received as good, 11 percent rated it as fair, and over 47 percent said that they had received no training at all. Eight percent felt that internal surveillance made their jobs easier; only five percent reported that it made their jobs safer; eight percent felt

that it helped them to control inmates; eight percent said that it helped them to do a better job.

The overall response with regard to the internal surveillance and security at Southern Desert was extremely negative. Officers did not trust the equipment, and in general they felt that the internal security was too lax. The equipment did not increase their sense of security or safety; most staff members had lost faith in the equipment.

Fire Safety System

The fire safety system at SDCC consists of an electronic fire suppression system, one fire truck, smoke detectors throughout the institution, sprinklers in the warehouse and industry areas, eight air packs, and emergency release mechanisms. Southern Desert is approximately 20 minutes from the nearest civilian fire department, so the facility uses an inmate fire department.

Most of those interviewed were not satisfied with the fire safety system at Southern Desert, particularly the fire suppression system. According to one maintenance supervisor, they could not prevail on the contractor to service the system and they could not afford regular maintenance; as a result the system "slowly died." Several of those interviewed claimed that the system had not been installed properly, and there were complaints of false alarms (133 in eight months), malfunctioning light panels, and worn-out equipment. There had been two fires at Southern Desert, one in the laundry area and one in a housing unit. The alarm sounded in the laundry area, but not in the housing unit. Because of the large number of false alarms, it has become standard practice for the officers to reset the alarms without checking the building or the zone.

Staff members also complained about a lack of fire-fighting equipment, and said that much of their equipment was donated by area fire departments. According to one correctional officer, "It is worn out when we get it." Fire hydrants are located throughout the prison, but only one water line runs to the institution. This line also provides the drinking water; if the water is lost, the facility has no way to fight a fire. SDCC also has two 150-hp engines on the fire pumps, which send too much pressure through the valves. The fire marshal will not allow SDCC to reduce the pressure; therefore, in the event of a fire, the firefighters must open three hydrants to reduce the pressure before they can fight the fire. The air packs were the only equipment to be rated highly.

The questionnaires revealed that 43 percent of the respondents were satisfied with the fire safety system at Southern Desert. Only 11 percent rated the training they had received as good; another 20 percent rated it as fair; 30 percent said that they had not received any training. Thirty-one percent of the respondents said that the fire safety system made their jobs easier; 39 percent felt that it made their jobs safer; 24 percent said that it helped them to control the inmates; 22 percent reported that it helped them to do a better job.

The fire safety system at Southern Desert was rated as poor by most of the staff. From the information obtained, it appears that the system was never fully operational and that the problems grew worse over time. When one officer was asked how he detected a fire, he put his nose in the air and sniffed. When another officer was asked how the alarm system worked, he said, "We yell 'fire'."

Communication System

The communication system at SDCC includes a public address system, radios, a pager, and telephones.

Satisfaction with the communication system ranged from somewhat satisfied to somewhat dissatisfied. The major problem was the telephone system. Even though the equipment was installed in 1982, the switching equipment is obsolete and the phones are not considered dependable. Rain and heavy winds knock them out on an average of once a week for 30 minutes to two hours. The phone company is good at servicing the system, but the obsolescence of the equipment makes it difficult for the phone company's computer to interface with the switching equipment. The radios do not have sufficient range to reach the state highway patrol; therefore, when the phones are down, an officer is dispatched to the nearest city to tell the sheriff or the National Guard to be ready for an emergency. Staff members also complained about the range of the radios; most of those interviewed said that the radios needed repeaters or boosters.

Only 43 percent of the respondents to the questionnaires were satisfied with the communication system at Southern Desert. Nearly 48 percent rated the training they received as good; 25 percent rated it as fair. Sixty-one percent felt that the communication system made their jobs easier; 52 percent said that it made their jobs safer; 49 percent said that it helped them to control the inmates; 54 percent reported that it helped them to do a better job.

The communication problems at Southern Desert are exacerbated by isolation. When the phone system goes down, the only available communication with the outside is through a phone in the warden's office which is not part of the institution's main phone system.

Management Information System

The management information system (MIS) at SDCC is essentially a personal computer programmed and maintained by a correctional officer on special duty. The facility has a terminal that is tied into the state's mainframe, but it is used primarily for inmates' store accounts.

Information on the personal computer includes inmate count and rosters, payroll, classification, inmates' sentences, warehouse inventory, preventive maintenance records, and budget. The programs for this computer are written in house with the help of commercial data-based management software. The equipment was rated as excellent. The major problem is that SDCC has no money for equipment; the present equipment and software are owned by the correctional officer who programs the system.

Most of the staff were unaware of this system, although the administrators interviewed were very supportive of computerization.

Summary

The Southern Desert Correctional Center is an example of an institution where technology has not had a positive effect. Indeed, SDCC's experience with technology has resulted in a return to more traditional correctional practices. This institution was not well planned or designed, and it is paying the price.

In general no one was satisfied with the equipment or the systems except for present perimeter security system, which consists of towers. The electronic perimeter system was never operational, and was an expensive failure.

When we asked respondents to rate their training overall, seven percent rated it as very good, 14 percent as good, and 47 percent as fair. Only 17

percent were positive about the equipment at Southern Desert, although 42 percent felt that they had some voice in decision making.

Overall, SDCC suffers from many problems including purchases based on low bids, a lack of funding, isolation, and poor planning and construction. The persons responsible for the operation of SDCC had little if any part in planning the facility. The locking, fire safety, and communication systems contain major problems that pose a serious security and safety risk to the institution. Southern Desert is able to function despite these technological failures, but a tremendous amount of money has been wasted and the potential for disaster is ever-present.

SUMMARY

The site visits provided valuable information about the impact of technology. Although we make no claim that these seven institutions represent all penal facilities, we believe that they show accurately how technology has affected today's prisons. Indeed, the findings from these seven institutions closely resemble the data obtained from the 117 institutional surveys.

The findings from the case studies illustrate a wide range of technological problems and applications. Some institutions adapt readily to the available technology, while in others it becomes a handicap for both staff and administrators. Planning, design, climate, and management philosophy all affect the performance of technological systems.

Every institution reported some problems with technology. Many of these problems cannot be avoided because a prison is used 24 hours a day, 365 days a year, year in and year out, to house an unfriendly population. The institu-

tions that overcame these problems made technology work for them; others were forced to abandon their systems and to return to more traditional practices.

Not all the problems, however, can be attributed to prison conditions. Some of the equipment is faulty; in several instances systems by a certain manufacturer never worked. Manufacturer's service and support as well as proper installation also are important. Technology cannot solve all the problems of a correctional institution, but it can make the prison an easier place to manage.

CONCLUSIONS FROM THE CASE STUDIES

Based on the data obtained during the seven site visits, the following conclusions can be drawn concerning the impact of technology in corrections:

* Intrusion detection systems are either rated "very good" or "very bad." Most intrusion detection systems performed satisfactorily and required little maintenance, however there were several instances where the systems never became operational and had to be replaced. Manufacturer and installation appeared to be related to performance.

* All intrusion detection systems are affected by the weather and environment. Designing and selecting a system that is compatible with the physical environment is critical.

* Staff confidence is of major concern with any intrusion detection system.

* There was marked dissatisfaction with locking systems, particularly electronic locking systems. General problems included key breakage, doors popping open, false panel lights, malfunctioning "hamburger" panels, and unavailability of replacement parts.

* Locks are subject to tampering, jamming, and general abuse. It appears that it is well worth the initial investment to purchase the right lock for the job.

* X-ray machines and hand held metal detectors worked well. Walk-through metal detectors did not work.

* Complaints about closed-circuit cameras included poor illumination, blind spots, and low light problems. Cost was a factor. Again, it is probably worth the initial investment to buy high quality equipment.

* Most were satisfied with the communication systems available. The most common criticisms were battery failure, a shortage of equipment and phone service disruption, which was usually attributed to a "second-class" phone system.

* Fire safety systems were either rated as "very good" or "very bad." There were problems with false alarms, short circuits due to lightning and faulty smoke detectors.

* Staff confidence is of major concern with fire safety systems. Installation and maintenance appear to be related to performance.

* Comprehensive management information systems did not exist. Centralized, state controlled systems were most common, although stand-alone personal computers were increasingly being used for data management.

* Access, programming complexity, shortage of equipment, lack of networking, and control of data fields were the most common problems associated with MIS. Equipment was usually rated as excellent.

* Correctional institutions are not scratching the surface with regard to computer utilization. Problem is funding and a lack of computer awareness, not technology.

* Preventative maintenance programs can help alleviate some of the problems with equipment failure.

* Planning before construction plays a critical role in overall performance of institution and technological systems. Correctional officials that spend up-front time planning and researching the development of their facilities were more satisfied with the finished product.

* Direct supervision and unit management appeared to be preferred over traditional management practices.

* Technology was more successfully adopted in well-run, well-managed institutions. Technology alone does not produce a better managed institution.

* Training is an important factor, especially with fire safety systems, and communication systems.