48299

DESIGN AND IMPLIMENTATION OF A CORRECTION INFORMATION SYSTEM

Stuart J. Chagrin
Computer Systems Manager
New York City Department of Corrections
Norman C. Eisenberg
Principal Quantitative Analyst
Office of the Mayor, Bureau of the Budget
City of New York

INTRODUCTION AND BACKGROUND

Correction systems have been largely ignored in the past. Recent interest has caused examination of such systems in New York City. Since September 1970, the New York City Department of Correction has progressed to the point of implementing the Inmate Information System which was designed and developed through a joint effort by the Correction Department and the Management Services Staff of the Bureau of the Budget. It is geared to a large detention and sentence population encompassing areas of inmate status and location, inquiry responses, movement monitoring and control, automated reporting and operations control. The Inmate Information System (IIS) is a major first step in an overall plan for information systems within the Department of Correction (DOC). The first-step served to introduce computers to the Department, and to aid operations and planning. and planning.

The size of DOC and its characteristics affects the design of an information system. Approximately 400,000 cases are handled by the court system in New York City each year. About 100,000 of these cases produce over 400,000 movements (412,000 in 1971) of which 95% or 380,000 movements are between the courts and the institutions or are institutional transfers. There are at present nine different institutions in New York City. Their combined daily census is about 12,000 inmates. Approximately 60% of the population are detention cases and 40% are short sentence cases. All long sentence cases, an additional 1,500 cases, serve the major portion of their sentences in New York State facilities located outside of New York City while still officially in the custody of New York City Department of Correction. About 15% of the City-housed inmates are moved each day. Thus, there are around 1,800 movements each day most of which take place between the nine facilities and the 15 most used courts. In addition, nearly 2,000 inquiries about inmates are received each day from lawyers, relatives, judges, friends, and DOC personnel. In addition, the Department was staggering under a huge paperwork load, a shortage of personnel and a lack of information.

The design philosophy was to introduce systems in a modular fashion. Priorities were placed on various projects, recognizing that many projects were related and would be tied together in the future. The Inmate Information System was selected as the first module to design and implement mainly because it would provide an operational tool to resolve some crucial problems and serve to introduce the ideas of computerization to the whole Department at once. Since then, other systems work has taken place. Studies are continuing in the areas of food services, transportation scheduling, centralized personnel record-keeping, and maintenance.

OPERATING PROBLEMS

Once the Inmate Information System was chosen as the first step, a major study was undertaken to determine what difficulties existed and what would be done to alleviate them. The key problems encountered were:

1. There was a lack of centralized information. Every one of the mine institutions had its own inmate information hand written on cards which were filed, searched, updated and created manually. This meant that the 100,000 inmates who passed through each year generated several million record transactions including record creation, record updating and record discharging. Every inmate movement, 400,000 each year, required many updates, some to record a future appearance and some to record the movement to and from that appearance. Every time a bail was changed, or a charge was reduced, or an appearance was postponed updates were needed. Each inmate required fourteen forms containing similar information. Thus, updating could result in fourteen changes to these forms. Since each facility had its own independent system, every time an institutional transfer took place, most of the forms had to be newly created again, further increasing the volume of work. Furthermore, when any inquiry arose, it had to be directed at the institution where that inmate was housed. Redirecting inquiries to the proper facility resulted in many needless telephone calls and required increased staff to handle them. This problem brought much frustration to the Department, the public, the lawyers and the courts.

2. There was a duplication of effort. In every facility there were many forms that were nearly identical. Forms had to be filed two or three ways in some cases; by alphabetic order, by prison number order and by location. This system required

handwritten duplication at best in order to cut down on manual file searches or, at worst, since not everything was duplicated, secondary searching was required.

3. A third difficulty was the legibility of the forms. With so many forms and so many people writing, reading them was difficult.
4. Another difficulty was the timeliness of the information. With such volumes, it was a struggle to complete reports on time. This struggle led to yet other sets of records, the various "journals" which held skeleton information in order to retrieve the most used information more quickly without accessing the major card files.
5. Also, there was the inability to produce any comprehensive reporting. Any special request for reports produced disruptions of normal activity. Information was merely collected and left in raw form, filed away.
6. A major procedure within the department is to account for inmates. Head counts during the day accomplish this accounting. Counts must allow for work gangs, movement outside to the courts, etc. Should a count have been short, recounting had to be done. Many times, this led to investigating individual whereabouts through the record system. An inmate's housing area assignment and his current location were facts that needed to be known both individually and in the aggregate. Obviously, getting this information was cumbersome and time consuming, leading to unnecessary overtime at shift changes since shifts are not released until the count is correct.
7. There was a shortage of personnel to perform all of the tasks originally envisioned in such a record-keeping function. The reduction of performance of basic tasks and file maintenance was necessary to keep up with the workload and, in fact, even this reduced workload was hardly maintained. This shortage further increased legibility problems, accuracy, errors, misfiling and work being not completed.
8. File accessing was barely adequate. In addition to those problems caused by misfiling, legibility and so forth, not all inquiries were requested in the same manner. If an alias or another criminal justice agency number (e.g. court docket number) was used, retrieval was impossible.
9. Last, history retrieval was medieval. The forms were stored in basement record rooms or City archives, depending on age, in random order broken out only by the year of discharge. Retrieving records meant that a time consuming search was necessary and successful retrieval was not always achieved.

The list of key problems above are not exhaustive. It can easily be seen, however, that some automation of the inmate records could be of major significance in resolving the difficulties.
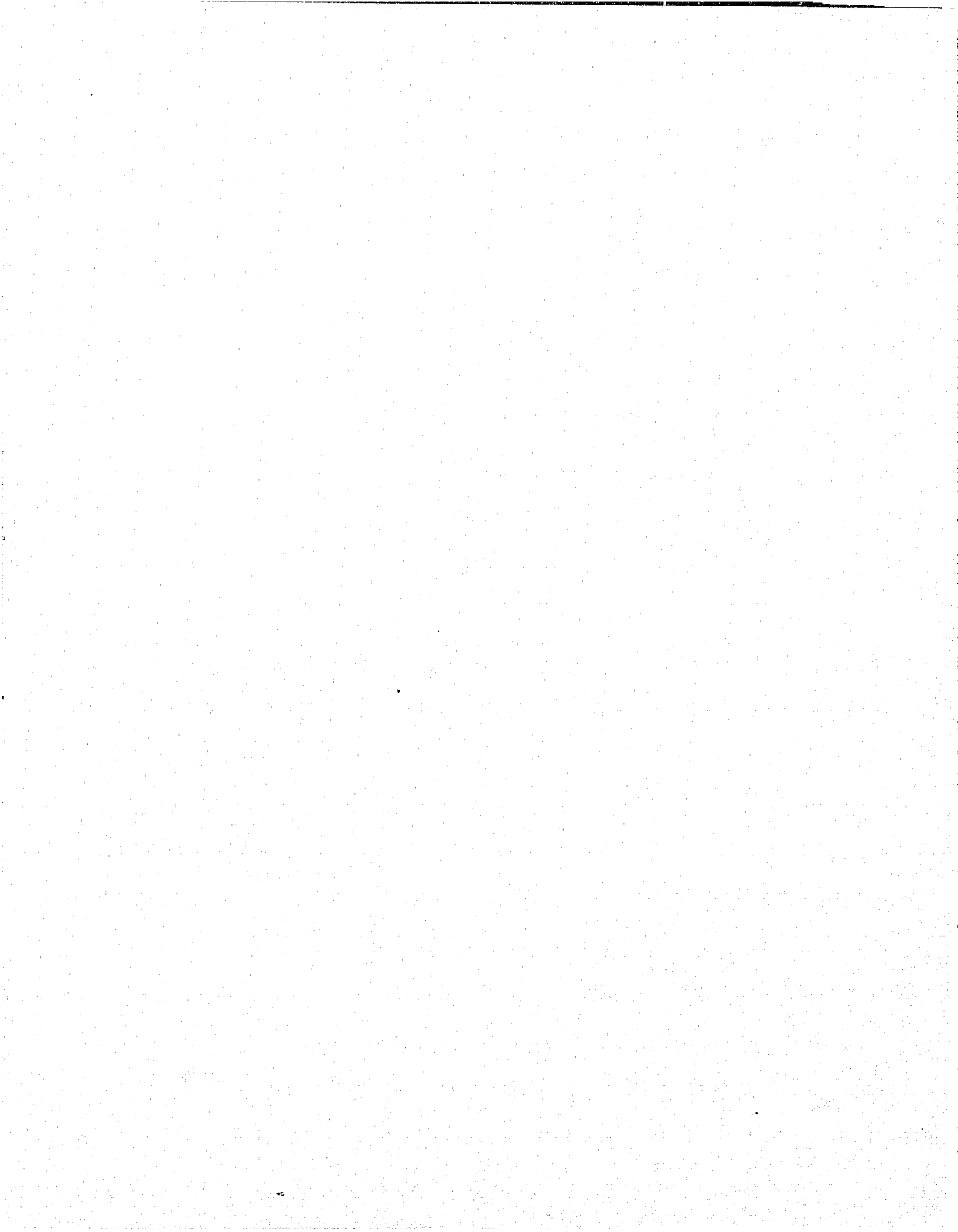
DESIGN OF THE INMATE INFORMATION SYSTEM

In order to resolve the situation, a centralized information system was designed with access to the nine facilities in a real-time, interactive mode. The design was performed inhouse. The system, as originally conceived, required a CRT terminal, a low speed printer and a badgereader (plastic card reader) at each of the nine institutions. Also, the badgereader would be needed at the hospital prison wards and the court detention pens. This equipment together with a centralized data base allowed access by all of the required users, gave a hard copy option and took advantage of faster data entry.

The software to tie this system together needed to have editing features, name search routines, search by various inmate identifiers, multiple repeat of data fields, and message switching as well as usual telecommunications front end, file management and transaction and backup procedures. This system is illustrated in Exhibit 1.

The centralized system solved many problems. Inquiries could be handled at any point in the system regardless of where an inmate was housed. Upon an institutional transfer, only the assigned location data field needed to be updated alleviating paperwork, recreating records, etc. Approximately 24 forms were made obsolete since their function was performed by the computer. The volume of transactions was thereby greatly reduced. File searching was also greatly reduced since each inmate record could be accessed faster via the computer and by a number of methods including name, alias, NYSIIS number, docket number or indictment number. We were also able to go to a centralized number, the NYSIIS number. Previously the DOC number system reflected the independence of each facility and did not allow access by the law enforcement agencies other than by a proper name. Legibility was no longer a factor except with the source document which was also redesigned to cut down on writing by using as many "check-off" item selections as possible. Accuracy was also improved through this form as well as by the visual editing done on the CRT at data entry.

In addition information was now more timely due to on-line creation, updating and discharging of records. Reports were to be on time; some produced on-line and some off-line and the running "journals" of skeleton information were to be eliminated. Special reports could now be done by programming, reducing disruptions. Information could now be processed rather than being left in raw form and many more reports were added as a matter of routine. Accounting for inmates was aided by a "running count" to which the head counts could be matched. When the counts disagreed, the computer "occupancy file" could immediately give the aggregate housing assignments by each area so that the search time for the difference in the count could be isolated and any individual record search time reduced. Since the system operates faster and reduces some of the workload, the problems associated with the personnel shortage were also to be reduced. Finally, a

NETWORK

CRT = Tube Display
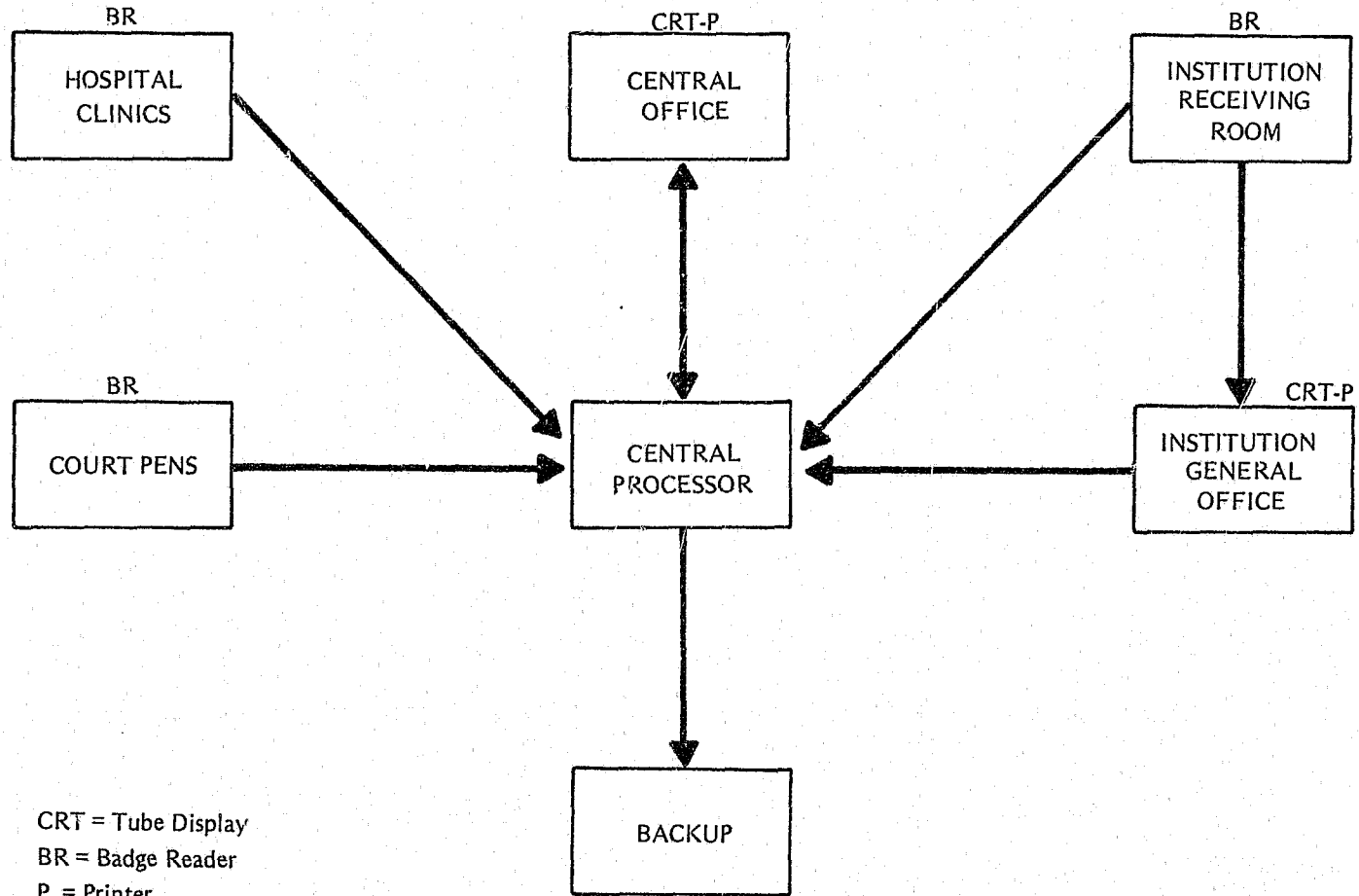BR = Badge Reader
P = Printer

EXHIBIT 1

history file was to be maintained on tape so that the information could be much more readily available.

Inmate movement presented difficulty under the manual system. The computer system was designed to keep track of inmate movement via the badge-readers. Whenever an inmate was to leave the institution, his plastic identification card with machine readable code was inserted into the badgereader, a destination code was to be entered and an automatic update was to occur. Just as the inmate was logged out, he was also to be logged in. This procedure keeps constant track of an inmate, and it gives point to point movement volumes by time of day. It is easy to see how this data could be used for planning — perhaps, forecasting inmate movements in advance for the purposes of transportation scheduling.

Regarding automated reporting, three types of operational reports are produced. The appointment reports list those inmates who are to appear at hospitals, courts, etc. These lists are produced both by destination and by housing area location so that gathering the inmates and sending them in groups to the proper destination is facilitated. The occupancy reports are produced in alphabetic order, floor layout format and floor summary formats. These aid in assigning housing, returning inmates to previously assigned housing and as manual backup in case of computer failure. The last type of reports are the management reports. These include simple census reports, reimbursement reports, movement reports, analyses (profiles) of inmate population, length of stay analyses, bail distributions, etc.

The data on each inmate can be categorized into four main areas: inmate data, location data, court data and miscellaneous. The following is a list of the major items of each category:

1. *Inmate Data*
   Name   Address
   Number   Relative Data
   Aliases Descriptors

2. *Location Data*
   Assigned location
   Current location
   Future appointments
   Past appearances

3. *Court Data*
   Docket number (or indictment number)
   Arrest number
   Arraignment date(s)
   Jurisdiction
   Charge data
   Bail data
   Record of court appearances

4. *Miscellaneous Data*
   Reimbursement status
   Legal status
   Conviction data
   Warrants
   Court orders
   Property number
   Other numbers (FBI, etc.)

Implementation plans were also part of the design process. Careful plans were laid out because one of the prime goals was to succeed with the first attempt at systems and automation. Implementation did not turn out to be straightforward. There were many problems which caused design changes and schedule slippage.

IMPLEMENTATION PLANS

A great deal of planning for the implementation of this system was done in order to insure a greater chance of success. This section covers those parts of the plans for vendor selection, personnel, training, and some key decisions affecting the implementation.

A. Vendor Selection

In order to implement this system, the Department of Correction was forced to seek outside help since it had no computer system of its own and no programming staff. It was decided, since many different services were needed, to issue a facilities management contract to a single vendor. The vendor had to recommend hardware, software, backup methods, any design changes, and an estimate of programming development and site implementation time. It was requested that vendor responses be submitted in two parts; a technical and management part and a pricing part. The following procedure was used to evaluate the vendor bids:

1. Creating a team of five people to evaluate the bids representing three New York City agencies; the Department of Correction, the Management Services Staff of the Bureau of the Budget, and the Criminal Justice Coordinating Council.
2. Individually rating the Technical and Management part by each team member.
3. Dividing of vendors into "acceptable" and "unacceptable" categories based only upon the aggregate ratings of the Technical and Management part.
4. Evaluating of pricing in conjunction with the Technical and Management part ratings for the "acceptable" group.
5. Selecting a small group of the "acceptable" vendors to make oral presentations for further evaluation and checking the vendor references.
6. Final selecting of a single vendor.

Certain specifics were desired for the system and were considered in the final selection of a vendor:

1. Software
   a. What front end communications packages were offered by the vendor?
   b. What language was proposed for the programming?
   c. Would the software be compatible with other computers?
2. Mainframe
   a. What computer would be used for this project?
   b. How restricted to this computer system would we be?
   c. What backup would be permitted in the event of computer failure?
3. Terminals
   a. How fast did the terminal transmit (baud rate)?
   b. How compatible was the proposed terminal with other terminals?
   c. What printer attachments were available?
   d. What special features were available?
   3. What communications environment did the terminals need?

The vendor finally selected offered the following:

1. Highest technical competence within a competitive price range.
2. Prior experience in the Criminal Justice area.
3. Previous experience with the City of New York.
4. Availability of two proprietary software packages; one, a frontend communications monitor and the second, a report writer.
5. Understanding of the needs of the Department of Correction.

B. Some Key Implementation Decisions

It was necessary to decide whether to put all facilities on-line simultaneously or one-at-a-time. The simultaneous procedure would be far quicker at least in theory since all sites could operate and relate at once. However, the Department could not supply enough persons who could direct this effort or assist in the conversion process. The only practical way to proceed was sequentially, as shown on Exhibit 2. Personnel from each institution would be brought to an operating facility prior to installation at their own site. Thus, "hands-on" experience was to be obtained in addition to the formal classroom training. Also, each person's problems could be handled individually and all key personnel could devote their full attention to that location. This insured that at each new site there would be at least some experienced staff in addition to the conversion team.

The number of CRT's required at each facility had to be determined both for determining the number of operators needed to run the system and for the purposes of ordering the equipment. The number of CRT units depended upon the time needed to perform all of the intended functions. Time estimates were based on the following:

a. New inmate records	10 minutes
b. Update court returns	3 minutes
c. Movement	1 minute
d. Cell location changes	1 minute
e. Inquiries	5 minutes

Exhibit 3, which follows, summarizes the analysis that led to determining the number of CRT terminals.

The transaction volumes over the time of day were analyzed indicating that the majority of court returns and new admissions arrived at the institutions between 3 p.m. and 10 p.m., thereby requiring greater terminal access during this period. This fact was significant for planning purposes both for personnel shift assignments and for computer scheduling.

EXHIBIT 2
TRAINING SCHEDULE

LOCATION	DATE OPERATIONAL	6/5*	6/12	6/19	6/26	7/3	7/10	7/17	7/24	7/31	8/7
CIFW	6/19	2	4	2	2	2					
Queens	7/17	2	3	2	2	2	2				
Manhattan	7/24	2	3	3	3	3	3	3			
Bronx	7/31	2		1	2	2	2	2	2		
Adult	8/7	2			1	2	2	2	2	2	
Adolescent	8/14	2			1	2	2	2	3	4	4
CIFM	8/21	2		1	1	1	2	2	3	4	4
Brooklyn	8/28	2					2	2	3	3	3
Branch Queens	9/14	2						1	1	1	1
Headquarters		2	2	2	2						
Academy		1	2	2							
Rikers Island Hospital	8/14			1							2
Kings County		1						1	1	1	1
Bellevue		1	1	1	1	1					
Court Pens		2									
Central Office		2									

* The week of June 5 was used for Executive Training Sessions

EXHIBIT 3
ESTIMATED TERMINAL USAGE

| | Volumes (9/1/71) | | Hours | | | | | |
	New Inmates	Court Returnees	New Inmates	Court Updates	Cell Transfers	Inquiry	Total (Hours)	Est. No. of Terminals
Brooklyn	43	102	7	5	3	23	38	3
Bronx	32	72	5	3	2	17	27	2
Manhattan	49	77	8	4	2	30	44	4
Br. Queens	0	14	0	1	1	5	7	1
NYCCIFM	87	20	14	1	1	37	53	4
Queens	19	90	3	4	3	14	24	2
NYCARD	99	164	17	8	5	41	71	5
Reformatory*	0	57	0	3	2	25	30	2
NYCCIFW	23	29	4	2	1	10	17	2

* Prior to use as a detention institution.

Another key consideration was the conversion of the data base. Current inmate records from all nine institutions had to be converted from the existing manual files onto the computer system via (a) the CRT terminals, or (b) transcribing all inmate records onto IBM coding sheets, punching the data onto cards and reading the cards into the computer off-line. In making the choice between (a) and (b), the effort needed to convert an entire prison was considered. Entering 1,000 inmates on-line would require 10,000 minutes or 165 terminal hours based on the ten minutes' record creation estimate. To complete this conversion in 24 hours, seven terminals would be required plus the system availability of 24 consecutive hours. Also, it would be spatially difficult to put seven terminals in any institution. Some terminals would have to be temporary since no institution required seven. The records could not be removed from the facilities for outside services. For these reasons data conversion via the CRT terminals was eliminated.

As for the punched card method, any number of people could be involved at any one time. Each record creation would also require ten minutes, but twenty people working eight hours could transcribe 960 records. Key punching could be performed by an outside firm and the cards could be read off-line in batch, all of which required no extra time from the conversion team.

C. Personnel

Personnel requirements were reviewed for two phases, the transition phase during which the computer system would run in parallel to the existing manual system and the on-going operations' phase of the system.

A study was made of the time required to perform the main functions in order to estimate the number of people required for the two phases. An approximate increase of 10%, or 16 persons, was necessary to insure successful transition and on-going operation. By implementing each site sequentially, these added persons could be used during the transition phase for data base conversion and for initial help while the regular staff developed their skills and became more confident in the system. Then this team of additional persons could move on to the next site to begin the initializing process again.

D. Training

Training was oriented to both the management of the Department of Correction and the operating personnel. Briefings were held with the commissioners, the wardens and department heads. They were made aware of the latest developments in the system, especially of any problems. It was essential to get their feedback on all critical aspects of the system. Prior to operator training and implementation, a final meeting was held to insure that they had a full understanding of all plans and procedures.

With an anticipated thirty terminals, seventy-two operators on a full-time basis over two shifts were necessary. A first group of approximately 135 persons would be taught to use the terminals. This would provide the seventy-two operators plus a backup pool.

Key aspects in setting up training classes for these people were the number of people per class, the duration of the class, and the number of people that could attend from any institution at one time. It was decided that one week would give each person sufficient time to understand the basic concepts of the Inmate Information System and enough practice sessions on the terminal. Five terminals were made available for the classroom. These terminals would subsequently be used at one

Fifteen people were in a class with three persons sharing each terminal. This schedule is detailed on Exhibit 2.

Personnel selected to be operators were primarily those staff members already performing the functions manually in each institution's general office. These people were correction officers and civilians. The sixteen additional persons hired by the Department of Correction for this project were all civilians.

To aid the training, an operator's manual, a code book, and self-testing question and answer sheets were prepared. The operator's manual contained thorough descriptions of all phases of the system. It also described in detail the procedures of each operator transaction and an example of its use. The code book contained that information to be entered in an abbreviated or coded form. The question and answer sheets related to all phases of the system and gave the students a chance to evaluate their level of understanding throughout the training course.

It was intended that members of the Department of Correction Training Academy would attend the class for two weeks, giving them a solid grasp of the system. Academy instructors would then continue all of the subsequent training. After the nine week period, the Training Academy would thereafter train new operators as the need arose and acquaint every new correction officer with the general concepts and the importance of the system.

PROBLEMS AND CHANGES

As previously indicated, the actual implementation differed from its plans. This section will list some of the major problems encountered.

1. To get approval for most grant related items requires agreement of the Department of Correction, the Bureau of the Budget, Criminal Justice Coordinating Council, and the New York State Office of Planning Services. Time delays occurred while waiting for approvals. This red tape created a rigidity of ideas and left the flexibility of decisions a very difficult concept to achieve.

2. Upon selecting the CRT terminal, the manufacturer claimed that no additional electrical power was required. Immediately prior to the planned installation, a site survey was conducted at which time it was determined that extensive electrical work was needed. It turned out to be a very costly and time consuming effort. Electrical requirements at court detention pens and hospital prison wards have all but eliminated their function from the system at present. These facilities are not in Department of Correction buildings, causing red tape delays in the changes needed.

3. Badgereaders — it was intended to use a badge somewhat like a plastic credit card, as an inmate identifier. These

would be machine readable and allow the logging of inmates very quickly and accurately with no keying of information required. Well into the development phase it was determined that the selected company could not produce the desired terminal. It was necessary to alter our plans and use CRT's in many sites. A cutback on the total number of locations was made, since the higher price of the CRT's made installation at low traffic sites a luxury.

4. The implementation of each site, after the first one, was expected to be done in one week. It turned out to be unrealistic to convert all the records accurately and insure accurate maintenance of the system within one week. Two weeks, however, was sufficient for most installations.

5. Software — the program development ran longer tha\ expected. Once the system was put in, a great many bugs existed, creating great difficulty during the training phase and first site operations. The reliability was poor, many transactions operated incorrectly, and others did not work at all.

6. Telephone Lines — telephone line installation was lengthy and the lines turned out to be defective for some time. In addition, the telephone company required use of the lines occasionally to modify the network, disrupting the system of course.

7. The Training Academy never became fully accustomed to the system and constantly sent new people to "learn" the system rather than to help instruct. Thus, the training could not be assumed by the Training Academy for the nine week period. Delays in site implementation and software debugging were occurring simultaneously so that this training interference affected the development only slightly.

8. A detailed contract was written so that the vendor would know exactly what was expected of him. This somewhat more rigid contract turned out to be both a help and a hindrance. On the hindrances, there were times when the main purpose seemed to be adherence to the contract rather than to install a useful system. Also, major changes had to undergo the bureaucratic approval cycle. The main help that the contract provided was that it held the vendor to his promises as was originally intended.

9. The main computer site was closed down just before implementation was to begin. The site had been located at an exceptionally convenient location close to the major prison complex at Riker's Island as well as centrally to the rest of the facilities. The main site had to be switched to what had been the backup computer site in New Jersey. This switch caused delays, raised costs, and necessitated operational modifications. It also took time to decide on a new backup site and new backup procedures.

10. Although much time was spent in training and involving Department personnel, a full understanding of the difficulties of implementation was never achieved. No major crises resulted from this situation but it did tend to make things more difficult.

CONCLUSION

At this stage, about half of the institutions have been put on the system and are running well. Most of the problems that have caused delays have largely been first site experiences. The remaining institutions are expected to have the system installed according to plan.

END