

R-77-108

NCJRS

SEP 20 1977

LAW ENFORCEMENT ASSISTANCE ADMINISTRATION
POLICE TECHNICAL ASSISTANCE REPORT

ACQUISITIONS

SUBJECT: East Providence, Rhode Island; Preliminary Design
of a Computer-Aided Dispatch and Information System.

REPORT NUMBER: 76-219b

FOR: East Providence, Rhode Island, Police Department
City Population: 50,000
Police Strength (Sworn): 86
(Total): 101
City Area: 13 square miles

CONTRACTOR: Westinghouse National Issues Center

CONSULTANT: Robert W. Sutphen

CONTRACT NUMBER: J-LEAA-003-76

DATE:

43414

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FOREWORD

This request for Technical Assistance was made by the East Providence, Rhode Island, Police Department. The requested assistance was concerned with providing the preliminary design of a police computer-aided dispatch and information system (CAD), emphasizing needs analysis, relationship to existing systems, estimated budget and timetable for project implementation.

Requesting Agency: East Providence Police Department; Chief of Police, George Rocha

State Planning Agency: The Rhode Island Governor's Justice Commission;
Mr. Patrick J. Fingliss, Executive Director;
Mr. Stephen Zienowic, Field Representative

Approving Agency: LEAA Region I (Boston); Mr. Alfred G. Zappala,
Systems Specialist

1. INTRODUCTION

As a result of a fire that destroyed the Police Station, the East Providence Police Department is housed presently in temporary quarters until a new station is constructed. When the Department's new complex is constructed, the communications center and records section systems will be totally intergrated.

Last year, using the standard dispatch system and manual records system, there were 16,607 calls for service; 12,801 of which required reports. During peak hours, there are 12 marked patrol cars and 6 detective units available to respond to calls for service.

Under the existing system, the complaint call comes into the communications center where it is answered by the complaint operator/dispatcher. Pertinent information such as complaintant's name, type of event, location, and telephone number is taken down on scratch paper. If a unit is required to respond to the call, the dispatcher then contacts the available unit in that post and relays the required information. The officer proceeds to the assigned location, completes the assignment, and then returns to an available status. At the end of each shift, the officers must return to the station and record the reports for each complaint call assigned to them on one of nine color-coded record forms. The majority of information recorded on each type form is identical to that recorded on other colored forms. The color and title of the forms differ for ease of manually sorting and identifying the different types of crimes at a later date when the report cards are stored in the records section.

At the present time, statistical data and monthly reports are compiled manually from the individual reports. The Uniform Crime Reports (UCR) must also be generated manually from these data. As a result, meaningful data are being omitted from the statistical reports.

Statistical times (e.g., complaint call received, field unit dispatched, and field unit arrived at the scene) that are critical to evaluating the Department's resource allocation and deployment, are not presently recorded. Officer response time and time at the scene, which are important when determining workload, are also being omitted.

The automated records system would provide a more detailed listing of:

- Complaint Entry.
- Activity Reports.
- Calls for Service/Day/Hour
- Locations of Calls/Post/Day
- Criminal Arrests.
- Personnel Data.

- Uniform Crime Reports Data.
- Patrol Unit Status.

These listings could be generated on a daily, weekly, monthly, and/or yearly status depending upon the need.

The East Providence Police Department, therefore, requested Technical Assistance to develop a computer system that would: 1) Automate the information system from receipt of complaint to final disposition of report and; 2) develop reports formatted to inform the reader of all pertinent activities related to the calls for service within the jurisdictional boundaries of East Providence.

During the course of this study, the Consultant interviewed the following individuals:

- Captain Charles Goodwin, East Providence Police Department.
- Captain Charles Bradley, East Providence Police Department.
- Officer William McPherson, East Providence Police Department.
- Mr. Stephen Zienowicz, Field Representative, Rhode Island Governor's Justice Commission.
- Mr. Edward Macioci, Planner, Cranston, Rhode Island, Police Department.

2. UNDERSTANDING OF THE PROBLEM

The problem as originally stated in the task request was "to perform a preliminary systems design of a totally integrated communications and informations system" with emphasis on "needs analysis, relationship to existing system, estimated budget and timetable for project implementation." The Consultant did not find it necessary to deviate from the intent of the original task except to clarify that mobile digital and NCIC interface functions are not expected to become part of this system. A budgetary ceiling of \$150,000 was placed upon the system.

3. ANALYSIS OF THE PROBLEM

The primary objective of implementing a computerized complaint entry and information system at the East Providence Police Department is to reduce the number of written reports by entering all data generated from the communications center and field units into the computer and deleting the existing written files in the records department.

In order to describe the basic requirements and considerations established for the CAD system, the preliminary design set forth herein has been divided into three sections: System requirements, schedule, and costs.

3.1 System Requirements

The system requirements are subdivided into software and hardware. The intent of the CAD system's preliminary design was to identify major areas to be considered when developing detailed hardware and software system specifications. If Department personnel could assist in preparing the specifications, a more effective system would be realized. However, since the Department presently does not have any personnel with this expertise, it is recommended that two individuals from within the Department be selected to act in a programming/program management capacity on this project. Personnel should be selected based upon their potential ability to become competent computer programmers. Prior to developing detailed software requirements, these personnel should be sent to school for a period of approximately 6 weeks to develop programming skills in the selected language. Home study programs must also be considered as part of this training. In order to guarantee that the Department receives a return from sending these individuals to school, it is suggested a minimum 3-year contract be signed by the trained personnel.

During system software development, inhouse programmers should work closely with the systems architect. This will greatly reduce programming costs and, at the same time, develop inhouse capabilities to provide system expansion at a later date.

3.1.1 Software Requirements

A high-level language such as RPG II should be used rather than an assembly-level language. Such a language is designed specifically for handling records systems and would be more readily learnable.

The basic requirements of the operating system and the applications programs are addressed in the following sections.

3.1.1.1 Operating System

The basic operating system should be a Disk Operating System (DOS) capable of supporting RPG II. This operating system should perform the following functions:

- Interrupt Control--Both software and hardware interrupt levels should be assigned. The system should recognize and operate on that task with the higher interrupt.
- File Structure--Disk file structure should be maintained by DOS. This includes updating and ensuring the integrity of the file directory, allocating storage space, and providing direct and sequential data access methods.
- Device Drivers--DOS should provide programs to handle all standard devices (e.g., disk, tape, printer, CRT) using a common access technique to permit all devices to be used interchangeably.
- Memory Allocation--DOS should be responsible for allocation memory among the various tasks, as required.
- Multiprogramming--A multitasking control scheme should be provided that would permit any number of tasks to co-exist by passing control among them either explicitly or during I/O waiting time.
- Task Scheduling--A means should be provided for any running task to initiate or terminate itself or another task.
- Program Loading--The operating system should incorporate a means of loading relocatable program modules.
- Utility Programs--A text editor, program assembler, relocatable linker, on-line debugger, library editor, and hardware diagnostics should be included in the DOS library.

The DOS would require approximately 68,000 words of storage.

3.1.1.2 Applications Software

When developing the applications software package the following minimum requirements should be considered:

- Security-- Security is often overlooked in developing a police computerized information system; however, it is one of the most critical links in the system. Interlocks should be designed into the software to enable system access only by personnel with a security clearance. Each operator is given a unique I.D. number, and system access can only take place after the operator enters his name and I.D. number. A comparison is then made within the computer to verify the clearance level of the operator. If the name and I.D. match, the computer will then permit access to those areas predetermined to be used by the given operator. Once a report has been entered and final disposition takes place, only selected personnel should have access to those files to make additions or corrections.

- Startup, Shutdown, and System Failures-- When the system is implemented or restarted after a shutdown or failure, the following information should be entered:
 - Date.
 - Time.
 - Call-for-service number.
 - Report number.

When the system shuts down for reasons such as power failures and/or peripheral failures, all index registers should be saved along with the date, time, last call-for-service number, and report number. When computers are used to transfer data in a police dispatch center precautions must be taken to ensure that calls for service entered into the system but not processed are not lost if the system fails. This can best be accomplished by placing a low-speed line printer in the communications center. All entries made on the complaint/dispatch video terminal are outputted to this line printer. In the event of a system failure, the dispatcher can resort to this printout and dispatch those back logged calls. Reports and statistical data held in the system and not processed must also be stored on two different media to ensure data retrieval in the event of memory or disk destruction.

- Program Control-- Function keys on the CRT keyboard should be utilized to initiate the applications programs and perform other system functions such as:

Function

Call Incident Report Format

Call Unit Status Update Format

System Initialization

Suspect Search

Complainant Search

Report/Incident Retrieval

Insert Incident Call Received Time

Insert Enroute Time

Insert Arrival Time

Insert Call Completed Time

Print Incident Reports

Print Arrest Reports

Print Calls for Service/Day/Hour

Print Location of Calls/Post/Day

Print Criminal Arrests/Day/Hour

Print UCR

- Incident Data Entry-- Data are entered initially into the system through the complaint/dispatch keyboard located in the communications center. A fixed format should be developed to assist the operator in making this entry; the exact format should be determined during the system design phase. Table 3-1 illustrates the data required for the incident data record. During 1976, the East Providence Police Department handled 16,607 calls for service or approximately 46 calls for service per day. Sufficient data were not available for the Consultant to determine peak loading for busy days; therefore, an assumption was made that an increase of 50 percent could be used during busy days to raise the call volume to 69.

TABLE 3-1

INCIDENT DATA ENTRY RECORD

<u>FIELD</u>	<u>SIZE</u>	<u>DATA</u>
1	3	Incident Number
2	10	Incident Location
3	10	Incident
4	10	Caller
5	10	Address
6	4	Telephone
7	2	Time Received
8	2	Time Dispatched
9	2	Time Arrived at Scene
10	2	Time Completed
11	3	Date
12	1	Post
13	2	Unit Number
14	10	Officer's Name
15	2	Disposition
16	3	Report Number
17	2	Complaint/Dispatch Operator
18	<u>250</u>	Narrative

318 Computer Words

Based upon this assumption and specifying a 48-hour limit for retaining the full narrative, a file with 138 records each 318 words in length would be required to hold the full reports for a 48-hour period. This equates to a total of 43,884 words stored on disk. At the end of the 2-day period, the narrative would have been outputted to a line printer, removed from disk, and replaced with another report. The other 17 fields shown in Table 3-1 would also be moved from this file to a statistical file where the information would be held for 1 year. Based upon a 5 percent increase in call volume, the calls for service next year could be expected to reach 71,437. A file comprised of 17,437 records each 68 words in length for a total of 1,185,716 words would be required for this file.

As noted in Table 3-1, the computer would automatically enter the following information:

- Incident Number.
- Time Received.
- Time dispatched.
- Time arrived at scene.
- Time completed.
- Date.
- Officer's name.
- Report number.
- Complaint/dispatch operator.

Each time an Incident Number is assigned to a record, the computer increments the number by one to be used on the next record. An internal timer should be used to assign time in hours and minutes. The time should be recorded using military time, not making it necessary to keep track of A.M./P.M. Time should be assigned through the use of Function Keys on the CRT terminal. The system should be designed in such a way to enable the insertion of the four required times by depressing one unique function key for each of the required times. Date of the year should be assigned automatically

to each incident record. As the internal clock rolls over to zero, the date should be updated. This routine would be made to recognize the month and thereby have the intelligence to update to the first of the next month at the end of the preceding month, eliminating the operator's need to enter corrections for months with 28, 29, or 30 days. At the beginning of each shift, on-duty officers would have their names and unit numbers entered into the system. When a unit is assigned to an incident by the operator, the computer would look up the officer assigned to the given unit number and then automatically enter that officer's name into the record for that incident. If a Report Number is required the complaint operator or records clerk could recall that incident, depress a Function Key on the CRT Terminal, and automatically have the computer assign a Report Number to the incident. Once the number is assigned the computer could increment the Report Number register by one and the system would be ready to assign an updated Report Number to the next incident requiring such a number. Standard Operating Procedures should require CRT operators to sign-on and sign-off when operating and leaving each position. Once an operator signs on, the computer would remember which operator was at each terminal. Therefore, when an incident is initiated from any given terminal, the operator on duty would have his name assigned to all incidents entered from that terminal until he signs off.

- Arrest Entry-- Arrest records would usually be entered from the CRT terminal located in the records section, although the entry could be made from any terminal. This arrest record entry routine would be called automatically to the CRT by selecting the proper Function Key. Table 3-2 illustrates the data fields associated with this file. The exact I/O format could be decided upon at a later date. Although the Consultant did not obtain the number of arrests per year, a file of 500 records should be signed for this set of data. The file would, therefore, consist of 31,500 words to be stored on disk. When using this routine, the computer only enters the Folder Number and Report Number; all other information must be entered by the operator.
- Field Unit Status-- Unit Status should be displayed constantly on one of the two CRT display terminals located in the communications center. Status could be displayed on the CRT located in the records section if the Status Function Key is depressed on that terminal. Table 3-3 illustrates the data fields associated with this file. The file has been sized for 25 units to be in service per hour. Since

TABLE 3-2

ARREST RECORD ENTRY

<u>FIELD</u>	<u>SIZE</u>	<u>DATA</u>
1	2	Folder Number
2	3	Report Number
3	10	Arrested By
4	10	Name
5	10	Where Arrested
6	1	Post
7	1	Color
8	1	Tour
9	1	Sex
10	3	DOB
11	1	How Arrested
12	10	Charge
13	<u>10</u>	Finger Print Class

63 Computer Words

TABLE 3-3

FIELD UNIT STATUS FILE

<u>FIELD</u>	<u>SIZE</u>	<u>DATA</u>
1	100	On-Duty Available
2	100	In-Route
3	100	Arrived at Scene
4	<u>100</u>	Out-of-Service
	400 Computer Words	

the system will not use mobile digital terminals, status update must be the responsibility of the dispatch operator. Each time a field unit changes status, the dispatcher must call up the status format by depressing the Status Function Key; entering the Unit Number; and finally entering ON for available, IN for In-Route, AR for Arrived at Scene, or OU for Out-of-Service. The computer would then transfer the unit to the new status column and automatically assign the time of day. An interval timer should also interface with this routine. Predetermined maximum times could be entered into the system for units In-Route and Arrived At Scene. If a unit exceeds these given times for any reason, that unit's I.D. number would begin flashing on the Status CRT, alerting the dispatcher to take corrective action.

- Report Entry -- The records section operator should be responsible for entering the information turned in by the field units at the end of each tour. This could be accomplished by depressing the Incident Function Key and entering the Incident Number. That record would then be displayed on the records section CRT and the operator could enter all outstanding data including the narrative. Once final disposition of the report had been entered, the data of that record could be called up for observation. However, the system should only allow key personnel to modify these records with the entry of their I.D. numbers.
- Statistical Files -- These files are derivatives of the Incident, Arrest, and Field Unit Status files. Management could use these files to report an accurate and revealing summary of its operations and progress. As a minimum, management would have the following statistical data at its finger tips.
 - Activity Reports -- The Activity Report details each type of offense committed and then subdivides each type into hows and wheres committed. Table 3-4 illustrates a portion of this report. In addition to those examples listed in the table, there are a total of 550 major and minor sub-headings. A disk file of 16,560 words would be required to support this data file.
 - Calls for Service/Day/Hour -- Manpower distribution by tours can be derived from this report. Management would be able to immediately determine the busy day and busy hour of each day by studying this report. Table 3-5 illustrates the format of this report. A file of 1,620 words must be reserved on disk for these data.

TABLE 3-4

Activity Report Format

MANSLAUGHTER:

Knife	2
Firearm	<u>1</u>
Total Manslaughter	3

NATURAL DEATH:

Home	20
Hospital	5
Other	<u>1</u>
Total Natural Death	26

RAPE:

Of Adult	3
Of Minor	1
Assault with Intent	4
Attempt	10
Other	<u>2</u>
Total Rape	20

TOTAL DEPARTMENT - JANUARY TO DECEMBER 197X.49

TABLE 3-5

Calls for Service

<u>HOUR</u>	<u>SUNDAY</u>	<u>MONDAY</u>	<u>TUESDAY</u>	<u>WEDNESDAY</u>	<u>THURSDAY</u>	<u>FRIDAY</u>	<u>SATURDAY</u>	<u>TOTAL</u>
2400	10	20	30	40	60	50	80	290
0100	100	200	400	500	700	900	800	3600
0200	150	350	450	600	400	200	500	2650
0300	1000	900	600	300	200	100	300	3400
0400	350	550	650	750	350	250	500	3400
0500	600	700	500	400	200	300	100	2800
0600	500	400	200	600	300	700	800	3500
0700	200	100	400	600	500	200	300	2300
0800	800	500	600	200	700	100	400	3300
0900	700	400	500	600	200	300	500	3200
1000	200	300	200	900	800	700	600	3700
1100	100	400	300	500	200	600	800	2900
1200	400	200	500	400	300	200	900	2900
1300	200	300	100	600	200	300	200	1900
1400	300	600	100	200	300	500	500	2500
1500	300	200	200	400	400	500	600	2600
1600	700	800	900	800	200	300	200	3900
1700	500	400	300	200	100	600	500	2600
1800	600	400	200	400	500	200	100	2400
1900	300	500	400	600	800	300	200	3100
2000	100	300	200	300	300	400	100	1700
2100	300	400	500	200	200	500	100	2200
2200	200	100	500	200	100	300	200	1600
2300	400	200	600	500	200	200	300	2400
TOTAL	9010	9220	9330	10790	8210	8700	9580	64840

- Location of Calls/Post/Day -- Incidents of crime within geographic locations of the city can be plotted using these data. Post assignments could be evaluated to determine if it might be necessary to rearrange the post boundaries to more efficiently combat crime. Table 3-6 illustrates the format of this report. A file of 780 words would be required to store this information on disk.
- Criminal Arrest Report -- By use of the UCR format as an example, there are 41 major classifications for arrests of an adult. The Criminal Arrest Report is an abbreviation of the UCR, listing only the type of crime and number of arrests made per offense. A file of 817 words must be reserved on disk for these data. Criminal arrests based upon the calls-for-service per hour by the day of the week could also be listed in a manner similar to the format illustration in Table 3-5. A file of 1,620 words would be required for these data. Criminal arrests based upon posts by the day of the week could also be tabulated as was the data in Table 4-6. A file of 780 words would be required for these data. Another criminal report, listing arrests by age, sex and color can be a useful set of data. By use of the UCR age ranges, there are a total of 22 age groups. Under the classification of male and female, the report should list number of blacks, whites, and others arrested in each age group. A file of 900 words would be required to store this information on disk.
- Patrol Unit Status Report -- This report should be formatted as follows:

<u>NAME</u>	<u>I.D.</u>	<u>AVAILABLE</u>	<u>ENROUTE</u>	<u>AT-SCENE</u>
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Management would be able to determine the exact amount of time each officer is on-duty and available, traveling to the incident scene, and average time required to cover the given assignments. The file length of this data set should consist of 2,580 words.

- UCR -- Two UCR files should be developed: One for adults and one for juveniles. These reports should be formatted for suitable output to the Federal Bureau of Investigation. A file length of 22,000 words would be required for the adult report and a file length of 11,000 words required for the juvenile report.

TABLE 3-6

Location of Calls

<u>POST</u>	<u>SUNDAY</u>	<u>MONDAY</u>	<u>TUESDAY</u>	<u>WEDNESDAY</u>	<u>THURSDAY</u>	<u>FRIDAY</u>	<u>SATURDAY</u>	<u>TOTAL</u>
1	100	200	400	600	700	100	500	2600
2	200	300	300	500	600	200	600	2700
3	300	400	200	100	500	400	400	2300
4	200	500	100	200	400	300	200	1900
5	400	600	600	300	300	200	300	2700
6	500	700	500	400	200	100	500	2900
TOTAL	1700	2700	2100	2100	2700	1300	2500	15,100

- Storage Requirements -- Forty thousand words should be reserved for the applications software.
- Street-To-Post Files -- This file was discussed during the consultant's interview with East Providence Police Department personnel; however, no decision was reached regarding its inclusion in the system. Department personnel thought the Rhode Island State Road Department might have a street file of East Providence that could be modified to serve as the street index file for this system. If this State file is complete and could be modified for this system's use, then it would be cost effective to include the Street-To-Post Files in the Police Department computer system. Disk storage size must then be increased by 50 words per street address. If the Street-To-Post files are included, disk requirements would rise sharply. If the Street-To-Post files are included, this requirement should be resolved during the detailed systems design phase.

3.1.2 Hardware Requirements

The minimum hardware configuration required to support the software defined herein consists of the following:

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1	1	Minicomputer W/128K words of core memory
2	2	Line printers, 60 line/minute 132 column 64 character.
3	2	CRT keyboard/video display, 128 character set, 1920 character display, 16 function keys, keyboard w/26 upper and lower case letters, and numeric 0 through 9.
4	1	CRT video display, 128 character set, 1920 character display
5	2	Disk drive, fixed/removable, 5 MW

The disk units have been sized for future growth since the present system requires approximately 1.5 million words. Two disk controllers were specified for redundancy. If one disk unit is destroyed, the basic operating system and all data files could be retrieved from the standby disk unit. When the primary disk unit has been returned to an on-line status, the data files from the standby disk unit would automatically be transferred to the primary unit.

The communications center should have two CRT video terminals and one keyboard. One CRT would display Field Unit Status, the second CRT/Keyboard performs all other I/O functions. The CRT/Keyboard located in the records section should be capable of performing all functions as does the terminal located in the communication center. The records CRT terminal would be used primarily to input field reports from officers returning to the station at the end of their tour.

Two line printers are required for this system: One would be located in the records section and one in the communications center. All reports and statistical data would be outputted on the line printer located in records. The printer in the communications center would output all field unit status information and incident data. This would ensure that the information requiring calls for service is lost in the event of a system failure.

The computer has been sized to handle the operating system, the selected high-level program package, and the applications programs using dynamic memory allocation.

3.2 Schedule

Figure 3-1 illustrates the major events in the design, implementation, and acceptance of the CAD system.

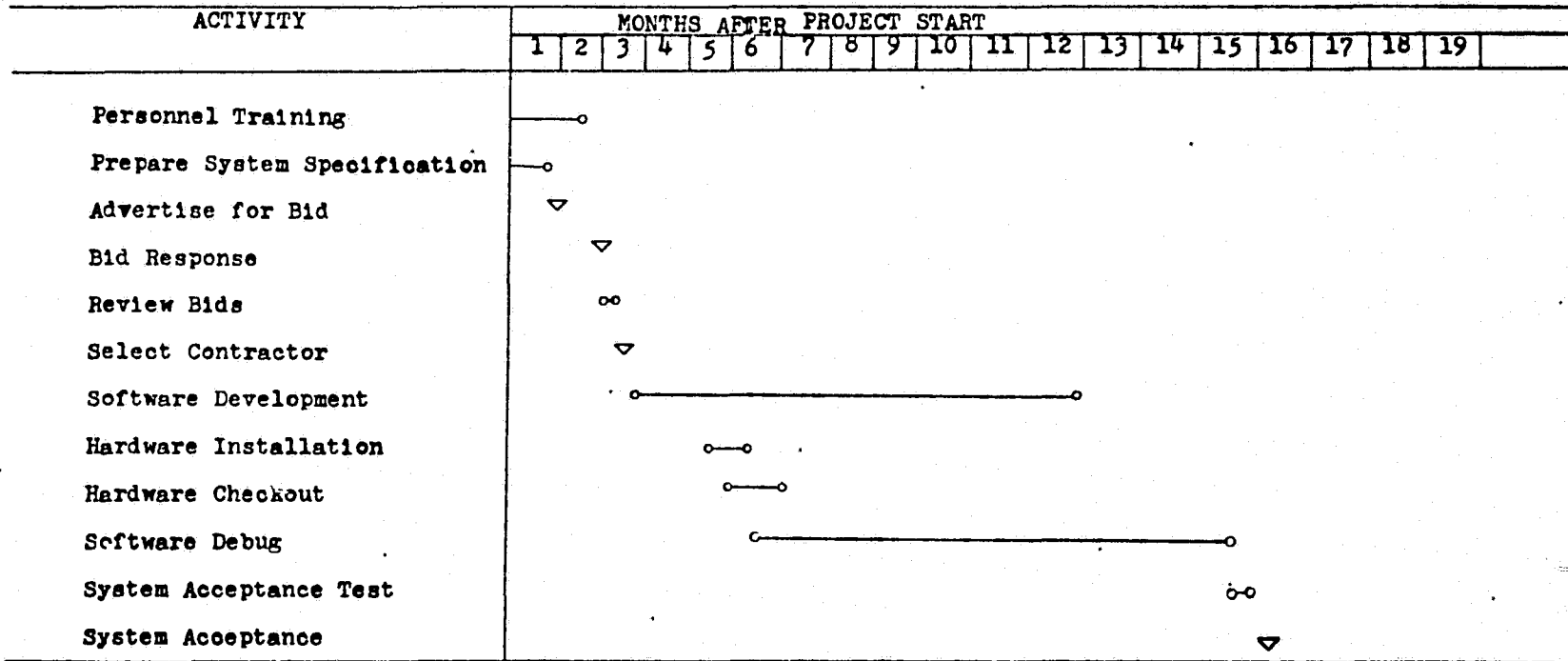
3.3 Costs

System costs are as follows:

Development of System Specifications.....	\$ 3,740
Hardware Procurement.....	\$113,300
Software Development.....	<u>\$ 51,600</u>
Total System Cost.....	\$168,640
System Maintenance*.....	\$ 10,692/yr.
(5 day/week, normal working hours)	

*Recurring

EAST PROVIDENCE POLICE DEPARTMENT COMPUTER AIDED DISPATCH/INFORMATION PROJECT



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3-11

Figure 3-1. East Providence Police Department -- Computer-Aided Dispatch/Information System Implementation Schedule

4. FINDINGS AND CONCLUSIONS

The basis for planning to automate the information system of the East Providence Police Department is justifiable from an operations standpoint. Under the manual system, information entered into the records system cannot readily be searched and analyzed to predict trends, identify trouble areas, improve Departmental efficiency, or generate monthly status reports.

A computer controlled information system would increase the efficiency of the East Providence Police Department by:

- Reducing the number of report formats from 9 to 1.
- Reducing the bookkeeping efforts of the dispatcher by automatically assigning to each incident the:
 - Time call for service was received.
 - Time dispatched.
 - Time field unit arrives at scene.
 - Time field unit completes assignment.
 - Date.
 - Officer responding to call for service.
 - Incident number.
 - Report number.
 - Dispatcher handling call.
- Uncomplicating Field Officer report writing procedures since one standard format would be used.
- Compiling data as they are entered into the system to generate statistical records such as:
 - Uniform Crime Reports.
 - Activity reports.
 - Calls for service/day/hour.

- Location of call/post/day.
- Criminal arrest records.
- Patrol unit activity.
- Displaying current status of all field units on duty.
- Steering all incident/reports for 48 hours, then outputting those reports to the line printer. Statistical data are retained for 1 year, then purged. The existing manual report files could be abolished once the automated system becomes operational.

Disk storage requirements for the present system require 1.5 million words. The disk units specified herein would require 5 million word units. This would allow for system expansion at the very slight increase in initial equipment costs. Police departments have not previously designed their systems for future growth, and within a 3-year period, many departments have had to replace the original system with a larger one. When this happens, a huge financial loss occurs.

Recurring costs are sometimes the final area of consideration when planning to embark on a CAD system. In this case, the Police Department must be able to justify a maintenance cost of \$891 per month to support the system described herein.

5. RECOMMENDATIONS

Based upon the Consultant's problem analysis, the following recommendations are proposed:

- Since the East Providence Police Department does not have any personnel with data processing experience, it is strongly recommended that a screening process be developed to determine which individuals in the Department are potential programmers. Two of these individuals should then be selected to attend a data processing school for a minimum of 6 weeks. During system design, these individuals should work closely with the contracting software staff in order to gain an understanding of the system software.
- The system should be flexible and expandable to allow for future growth. A general purpose computer that would be capable of performing future tasks other than computer-aided dispatch and records generation should be used.
- A high-level language such as RPG-II should be specified. This type language is designed specifically for managing data files and is an easy language to learn. This would enable the Department to become self sufficient, not requiring outside consulting and/or programming services.
- Security must be designed into the system. A number of law enforcement information systems in operation today can be accessed by anyone. A means of inhibiting anyone other than those individuals cleared to use the system must be developed.
- Since computer storage media are susceptible to damage and/or failures, identical data must be stored in two separate sections of the system to ensure accurate records. Two disk units utilizing separate controllers were selected for this system.
- Real time recovery during system failure is critical in a computer-aided dispatch system. There are law enforcement systems in operation that lack the ability to recover from an automated failure. In these systems, calls for service that have been entered into the system but have not been dispatched

are not available to the dispatcher when the system goes off-line. The line printer to be placed in the East Providence Police Department communications center would serve as the fail-safe device in this system. All calls for service would be immediately output to this printer as entered into the system. During system down times, the dispatcher would need only check the line printer to determine if the system was holding a backlog of calls when it went down.

- Since the preliminary design cost estimate exceeded the \$150,000 cost limit by \$18,640, it is suggested that the system specifications require each applications program to be listed and cost separately as options. This would allow the Department to select programs up to the specified cost limit. It is further recommended that the specifications require the contractor to explicitly list all file formats and programs to enable Departmental personnel to expand the system.
- Many software houses consider their programs as proprietary documents and refuse to supply listing or allow software modifications. The system specification must clearly state that the software package sold to the East Providence Police Department would belong to the Department and could be altered to meet the Department's future requirements.

END