

Approved 4-8-92
Date

MINUTES OF THE House COMMITTEE ON Computers, Communications & Technology.

The meeting was called to order by George Dean at
Chairperson

12:00 ~~6:00 PM~~ Noon on March 19, 1992 in room 529-S of the Capitol.

All members were present except:

Representative McKechnie
Representative Kline
Representative Patrick
Representative Rock

Committee staff present:

Julian Efird, Research
Jim Wilson, Revisor
Donna Stadel, Committee Secretary

Conferees appearing before the committee:

Graig Brummer - Kansas Highway Patrol
Bob Ensley - Kansas Highway Patrol
Bert Cantwell - Kansas Highway Patrol
Warren Neudorff - DISC

Others attending: See attached list.

Chairman Dean called the meeting to order at approximately 12:30 P.M. Graig Brummer, Data Processing Manger, Kansas Highway Patrol appeared before the committee to speak regarding the Kansas Highway Patrol's Information Systems, and in particular, the needs of the agency in the coming years (attachment 1).

Chairman Dean wanted to know how much of the present hardware would be used; i.e., printers, terminals, etc. Mr. Brummer stated all the terminals and printers would be compatible with the new system; only items they are looking to replace would be some remote emulation boards. There would also be some conversion costs regarding the software. The proposed system is a follow-on product to the System 36, which makes most of the conversion more simplistic. The maintenance of the system is still being done by IBM.

Discussion followed regarding the needs analysis (attachment 2). Chairman Dean inquired about the compatibility of their PC's with the System 36. Mr. Brummer said the PC's do work with the System 36, that emulation boards had been used so they can dial into the system; however, it is driving the costs up, as they are using them more and more. He said they also have a law enforcement patchwork, which is a 3270 type device, totally separate and distinct from anything else remote staff does. This is driven by the Tandem law enforcement switch at DISC. They also have a few applications still residing on the mainframe.

Discussion followed concerning computer aided dispatch, incident based reporting and a total Kansas judiciary criminal computer system. Chairman Dean wanted to know if their case management system would be such that it could be integrated as a module into this total system. Mr. Brummer thought it could, especially since they are in the initial stages and based on what the other

CONTINUATION SHEET

MINUTES OF THE ~~House~~ COMMITTEE ON Computers, Communications & Technology,
room 529-S, Statehouse, at 12:00 a.m./p.m. on March 19, 1992

agencies have out there, he said believed his were consistent and compatible with them. There was discussion as to whether inventory control would be done under STARS. Julian Efird, Research, didn't believe it had been implemented yet in the KFIS programs; STARS is the accounting module and the inventory module has not been implemented yet. Mr. Brummer added they actually have two inventory systems; personnel inventory system which tracks all capital expenditures and a stores management which is used to track items in stock.

Mr. Bob Ensley, Kansas Highway Patrol, gave clarification of the telecommunications network Chairman Dean inquired about. He stated it was not KANS-A-N, but a network used primarily for connecting the state computer systems, known as the S & A network.

Chairman Dean asked Warren Neudorff, DISC, if the needs analysis met the guidelines requested by all the agencies? Although he hasn't read it in detail, he felt based on the discussions he has heard, it follows it well.

Julian Efird, Research stated since the Governor did not include financing in her recommendation and it was not added by the House for starting this project, lack of financing will be the problem the Highway Patrol faces. Bert Cantwell, Highway Patrol said he believed there was language in a document which cleared the House stating they felt the Senate should look at this further with the idea of implementing something.

Chairman Dean stated they will try to take some action. It was suggested the committee try to meet in the Speakers office at approximately 10:30 A.M., Friday, March 20. This met with everyone's approval and meeting was adjourned until then.

Testimony
to the
House Committee
on
Computers, Communications and Technology

Mr. Chairman, members of the committee, I am Graig Brummer, Data Processing Manager at the Kansas Highway Patrol. I would like to thank all members of the committee for allowing me the opportunity to speak to you this afternoon regarding the Kansas Highway Patrol's Information systems and in particular, the needs of the agency in the coming years.

The Highway Patrol has made significant strides in recent years regarding the automation of systems within the agency. These accomplishments include a law enforcement communications system that the Division of Information Systems and Communications (DISC) and the rest of the law enforcement community are now using as a model to upgrade the ASTRA (Automated Statewide Telecommunications and Records Access) network, a Time and Activity system that provides more timely and accurate information than the previous system, a Notice-to-Appear (ticket) system that replaced a cumbersome manual system, as well as numerous other smaller, but equally important automated systems that have made the Highway Patrol more efficient in the way they do business.

These accomplishments were made possible by investments that began between 1983 and 1986. These investments started with the acquisition of law enforcement communications terminals and printers at all Highway Patrol locations, continued with the installation of personal computers and DISC approved software at remote locations, and concluded with the approval to purchase an IBM System/36 for Headquarters in 1986. Each of these initiatives produced dramatic results in the way the Highway Patrol was able to conduct business. However, there have been no substantive new initiatives to maintain this technological edge in well over 5 years.

House CCT
Attachment 1
3-19-92

The systems installed by the Highway Patrol were very effective in addressing the needs of each project for which it was intended. Recently, however, the agency staff began to encounter difficulties maintaining these systems while at the same time implementing solutions to address new problems. For this reason, the Highway Patrol began a study in January of 1991. The purpose of this study was to determine all problems associated with the implemented systems, to perform a needs analysis and to define the system requirements of any future applications, and to map a strategy to eventually implement a coherent integrated Information Management system for the agency. The results of this study were completed last year and a copy is included within the document presented to this committee a few days earlier.

The following is a brief overview of some of the problems that were uncovered as a result of this study -

The agency has too many dissimilar systems implemented on numerous hardware platforms. This requires the data processing staff to be well versed in a multitude of software packages, a difficult task given the relatively small size of the staff.

The systems are implemented in a manner that prevents the sharing of information between applications. This translates into personnel in one section owning data that cannot be accessed by others members of the Highway Patrol. Continued development of new systems implemented in a scattered fashion will only compound this problem.

While the agency has grown by a magnitude of almost 50% within the last 5 years, very little has been done to ensure that the data processing department can continue to provide information to the extended staff within the agency. The only expansion over the last 5 to 6 years has been the acquisition of several small personal computer systems to address spot information shortages at a localized level.

The agency is spending rather large sums of money to simply maintain old equipment, money that could be used to purchase new equipment and thereby eliminate above normal maintenance costs.

Finally, there was no ability to participate in the overall statewide telecommunications network implemented by DISC. The Highway Patrol had been continuing to spend large sums of money to connect older equipment, whereas, if new equipment were purchased, the agency could participate in the SNA network and realize considerable savings.

The results of this study recommended beginning to implement an integrated management information system. That new system must provide a long term cohesive approach to all of the Highway Patrol's information needs allowing all agency staff access to any data they need in the course of their duties. The new system must allow for the present applications to be migrated to the new platform as simply as possible if it is determined that migration is necessary. The new information system must also have the capability to provide for other applications the Highway Patrol desires to implement in future years. Some of these systems include -

Computer aided dispatch - The Highway Patrol's present communications operators rely on pencils and radio cards to track all officers in the field at any given time. Within recent years, most law enforcement agencies of any size have begun using a CAD system to track it's officers and to provide the most up-to-date information to these officers and Troop staff. Lack of such a system means officers don't have access to all pertinent information at the very least and more importantly, if requiring assistance or injured in the line of duty, they could be without valuable assistance during crucial periods of time.

Accounting/Budgeting - While the Highway Patrol does make use of the State's STARS system, most of the journals and ledgers kept at the agency rely on manual record-keeping. The agency would like to follow suit with other state agencies that have automated the entire process and thereby provide more timely and accurate budgeting and accounting information.

Case Management - All investigations or cases worked by the agency are presently written and filed in manual systems and processed by the agency's record section. The agency has no ability to report any statistical information to the KBI or FBI using accepted IBR standards. The Highway Patrol would like to participate in the submission of IBR data as is presently done by the majority of state law enforcement agencies and also assist records section personnel with their duties.

Inventory control - All stores management for the entire agency is performed and tracked by logistics personnel using a manual card file system. An automated system could provide better inventory control and reordering methods, thereby eliminating waste and inefficiency.

To accomplish the objectives as set forth by the agency and to address the pressing needs to correct problems, the agency formulated an approach they feel will allow the agency to operate over the next 5 years. This new management system will allow the Highway Patrol to continue to develop applications in direct proportion to the size and the demands of the agency. The system proposed would allow the agency to meet all of its goals as set forth in the information management study including integration of all information and sharing of data, participation within the state's telecommunication network, support for all applications by a small staff via remote management facilities and growth potential that will allow for all agency needs in coming years.

As can be seen by the documents provided to this committee earlier, there has been a great deal of evaluation performed before we reached these conclusions. This evaluation took into account several options, and are are discussed in length within the "study" and the "acquisition justification" documents provided to you. The following brief recap of these alternatives includes expanding the present hardware in an attempt to meet the agency needs. While the processor could be easily and inexpensively expanded to meet some of the demand, this processor could never meet all of the goals set forth by the agency, particularly sharing of information. The staff was reluctant to continue investing in old technology that will not meet all of the needs of the agency in future years. Other alternatives included migrating to new technology platforms. Of particular interest to the agency was migration to new open systems architecture. At present there are very few people who can provide information with regard to this option, including DISC staff. Research has been performed on this issue, and while this may still be a possible option, initial review indicates there would be substantial costs to migrate existing applications, exchange hardware, retrain support staff and provide systems support throughout the entire organization. The final alternative selected was initially the most attractive based on the features and capabilities provided by the system, but was admittedly expensive. However, with new announcements made as recently as 1 month ago, these costs have dropped dramatically and made this alternative even more attractive. Obviously, whatever system is selected, it will be procured via the state bidding process. Any new or further information obtained throughout this process could obviously be evaluated and acted upon accordingly if it's appropriate and germane to the needs of the Highway Patrol and the State of Kansas.

Attached to this testimony you will find a projected payment schedule that shows how the Highway Patrol plans to procure the system. This payment plan shows both 4 and 5 year payouts and includes an option for obtaining software that would allow the agency to realize the benefits of such a system more quickly and would also reduce the long term resources needed to support such a system. Please note that all funds used for this purchase would come from the agency's VIN inspection fee fund, however, the Governor has made recommendations for \$310,872 of expanded spending from the VIN fund in FY1993. If acquisition of this system were authorized, the expanded expenditure would have to be modified, effective FY1994.

Highway Patrol testimony to the House CCT committee
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In summary, the Highway Patrol feels that the proposed system can provide for the agency's needs in coming years at a cost that is not all that much more expensive than the original systems purchased in the form of communications equipment, personal computers and the midrange departmental processor. Further, this system could provide even further cost savings by making use of the State's telecommunications network and cost avoidances in the form of manpower resources and maintenance costs.

KANSAS HIGHWAY PATROL
 PROJECTED PAYMENT SCHEDULE C.O.P.
 INFORMATION SYSTEM UPGRADE
 3/10/92

	<u>OPTION ONE</u>		<u>OPTION TWO</u>
	<u>4 YEAR PAYOUT</u>	<u>5 YEAR PAYOUT</u>	<u>5 YEAR PAYOUT</u>
Total Estimated Cost	\$455,988	\$455,988	\$550,988
Downpayment FY93	<u>125,000</u>	<u>125,000</u>	<u>125,000</u>
Balance to be Financed	330,988	330,988	425,988
Interest @ 8%	<u>26,479</u>	<u>26,479</u>	<u>34,079</u>
Subtotal	357,467	357,467	460,067
First Payment FY94	<u>128,435</u>	<u>99,932</u>	<u>128,614</u>
Balance	229,032	257,535	331,453
Interest @ 8%	<u>18,323</u>	<u>20,603</u>	<u>26,516</u>
Subtotal	247,355	278,138	357,969
2nd Payment FY95	<u>128,435</u>	<u>99,932</u>	<u>128,614</u>
Balance	118,920	178,206	229,355
Interest @ 8%	<u>9,514</u>	<u>14,256</u>	<u>18,348</u>
Subtotal	128,434	192,462	247,703
3rd Payment FY96	<u>128,434</u>	<u>99,932</u>	<u>128,614</u>
Balance	-0-	92,530	119,089
Interest @ 8%	<u>-</u>	<u>7,402</u>	<u>9,527</u>
4th Payment FY97		<u>99,932</u>	<u>128,616</u>
Hardware/Software Cost	455,988	455,988	550,988
Interest @ 8%	<u>54,316</u>	<u>68,740</u>	<u>88,470</u>
TOTAL	<u>510,304</u>	<u>524,728</u>	<u>639,458</u>

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KANSAS HIGHWAY PATROL
 PROJECTED PAYMENT SCHEDULE C.O.P.
 INFORMATION SYSTEM UPGRADE
 3/10/92

	OPTION ONE		OPTION TWO
	4 YEAR PAYOUT	5 YEAR PAYOUT	5 YEAR PAYOUT
Downpayment	125,000	125,000	125,000
Total Payments	385,304	399,728	514,458
TOTAL	\$510,304	\$524,728	\$639,458

NOTE: - Option Two includes \$95,000 for the purchase of "packaged software".
 - Interest rate of 8% recommended by Kansas Dept. of Finance Authority.

KANSAS HIGHWAY PATROL
PROJECTED VIN FUND EXPENDITURES
W/C.O.P. FOR SYSTEM UPGRADE

	<u>FY92</u>	<u>FY93</u>	<u>FY94</u>	<u>FY95</u>	<u>FY96</u>
Carryfwd from Prior Year	41,544	320,222	117,243	118,000	118,000
Estimated Receipts	<u>1,236,096</u>	<u>1,236,096</u>	<u>1,236,096</u>	<u>1,236,096</u>	<u>1,236,096</u>
Total Available	1,277,640	1,556,318	1,353,339	1,354,096	1,354,096
 <u>OPERATING EXPENDITURES</u>					
7001 (Gasoline)	300,000	610,872	386,121	368,858	350,389
7004 S&W/OOE	<u>657,418</u>	<u>703,203</u>	<u>720,783</u>	<u>738,803</u>	<u>757,273</u>
Total Oper. Exp.	957,418	1,314,075	1,106,904	1,107,661	1,107,662
C.O.P. Payment-OP#1)	<u>-0-</u>	<u>125,000</u>	<u>128,435</u>	<u>128,435</u>	<u>128,434</u>
Total Expenditures	<u>957,418</u>	<u>1,439,075</u>	<u>1,235,339</u>	<u>1,236,096</u>	<u>1,236,096</u>
Carryfwd. to Next Year	<u>320,222</u>	<u>117,243</u>	<u>118,000</u>	<u>118,000</u>	<u>118,000</u>

NOTE: Projected expenditure for Program 7004 in Fiscal Years 1994-1996 includes an additional 2.5% for inflation.

By extending the Payoff one additional year an additional \$28,503 would be available for Gasoline, etc. in Fiscal Years 1994, 1995 and 1996.

Kansas Highway Patrol

Information System Acquisition Justification

(per DISC guideline 3608.00)

March 6, 1992

House CCT
Attachment 2
3-19-92

I. Summary

The Kansas Highway Patrol's primary mission is the "enforcement of the traffic and other laws of this state relating to highways, vehicles, and drivers of vehicles...". In addition, several departments within this agency take on the additional responsibility of providing the Capitol Area Security Patrol (CASP), the Vehicle Identification Number (VIN) inspection program, the Motor Carrier Safety Assistance Program (MCSAP), and finally, the Motor Carrier Inspection (MCI) program recently transferred from the Kansas Department of Revenue.

In order to fulfill the agency mission, the management staff of the Highway Patrol has become increasingly more dependent upon automated information systems to provide the data necessary for making decisions in the course of day-to-day business. This effort began in early 1980's with the acquisition of new law enforcement telecommunication equipment, continued into the mid 1980's with the purchase and implementation of personal computers at regional 'Troop' locations and ended most recently with the installation of a IBM System/36 at State Headquarters in 1986.

While tremendous headway has been made in the amounts and quality of the information that has been made available to the decision making staff of the Highway Patrol within the last 10 years, the agency has begun slipping behind in recent years with respect to the way this information is gathered and handled. Much of the original equipment purchased 5 to 8 years ago has become difficult and expensive to maintain. More importantly, this equipment no longer offers this agency the advantages of the latest software enhancements afforded other state agencies and businesses. Without the ability to capitalize on the latest software, the agency stands to lose new opportunities of productivity gains that might otherwise have been possible.

For this reason, the Kansas Highway Patrol began evaluating several possible solutions last year that would allow this agency the long term flexibility to meet its goals. The result of this evaluation is a proposal that the Kansas Highway Patrol staff believes will allow the agency to serve the citizens of the state to the best of their ability for the next 5 years. The hardware platform selected is clearly the best choice as a migration alternative from the current System/36 and the Patrol's current Data Processing Manager has a great deal of direct experience with it. This platform also affords a tremendous availability of software and also provides for extensive ability to upgrade. The selection also fits well into the overall State plan given the number of like processors in use by other state agencies, particularly other criminal justice agencies such as the Kansas Bureau of Investigation and the Department of Corrections. By utilizing this platform, the Kansas Highway Patrol stands ready to exchange information with these agencies via the Division of Information Systems and Communication (DISC) installed SNA network.

II. Business Case

In order for the data processing department to fulfill its obligation to the overall functions of the agency to the best of their abilities, the following 6 objectives have been set forth:

1. To provide information that is imperative to the safety of officers performing their duties and to the safety of the citizens of the State of Kansas.
2. To provide Troop captains and supervisors with accurate and detailed information allowing them to make decisions that will reduce costs and increase productivity within their departments.
3. To reduce the amount of time spent by troopers and sergeants performing administrative duties, thus allowing them more time to perform public service functions.
4. To provide essential information in a timely manner to agency management or related personnel upon which to base decisions which affect agency operations.
5. To reduce the costs associated with outdated and obsolete equipment and procedures.
6. To decrease time and resources spent by office and clerical personnel performing filing tasks, tracking records and purging files of outdated or obsolete records.

To this end, the Highway Patrol has implemented several successful systems during the last five years. Some of the most notable systems include the Time & Activity system, Notice-to-Appear system, Leave Balance system, Seizure system, and, presently in the process of being installed, a Fleet Management system. These accomplishments are discussed below along with the benefits that have been derived from implementing these systems. For more detailed information on these and other systems at the Highway Patrol, please refer to the Information Management Study accompanying this document.

One of the first systems installed at the Highway Patrol was the Time & Activity system. The present system has been in place since 1985 and provides the agency with detailed information regarding the activities performed by a trooper and the time spent performing each of these activities. While there had been a previous system in place, the Highway Patrol experienced a great deal of difficulty operating and managing this earlier system. In short, the previous system entailed scan cards that were filled out by troopers in the field and sent to headquarters. Headquarters then used an image scanner located at the Department of Revenue in an attempt to scan the handwritten information. This system, while unique in its desire to utilize state of the art technology, did not function as planned. The system was not able to recognize the handwritten input consistently and many times misinterpreted the data resulting in erroneous data being reported to agency staff. The new system relies on troopers completing time cards and submitting these timecards to their superiors. This information is then entered by operators into a personal computer at a remote site utilizing FOCUS software. While it does take time for an operator to enter the data in a conventional manner, this additional time was more than offset in time saved by troopers filling out scan forms in a manner which the scanner could recognize. This data can be manipulated at the remote site for supervisory purposes and summary data is uploaded to the central site processor for Headquarters information. The system has provided much better information to all personnel involved in a much more timely manner.

The second effort to automate a process at the Highway Patrol was the Notice-to-Appear (NTA) system. Previously, the NTA's, or tickets as they are often referred to, came to Headquarters and were hand sorted, tabulated and filed by clerical staff. The tabulation allowed some reporting to staff, however, any questions by staff regarding information that was not recorded during tabulation or not filed according to accepted procedures simply could not be answered. In short, this system was a massive paper operation with limited reporting abilities. The present system allows for data entry personnel to enter key information from the NTA's into the agency's IBM System/36 processor for reporting and recall purposes. This allows staff to recall information in any number of ways and allows reports to be generated according to whatever specifications are needed. The implementation of this system also allowed for the reassignment of several clerical staff responsible for tabulation and filing of NTA's to other critical areas within the agency.

Another small system recently implemented was the Leave Balance system. This system was implemented in conjunction with the earlier Time & Activity system and has allowed agency Personnel staff much better access to leave information thereby allowing them to report data through KIPPS much more efficiently. By utilizing existing hardware, the only outlay in costs was the time spent by programmers to implement the system and the minimal amount of time spent each month uploading data.

The Highway Patrol has also implemented a Seized Property Tracking system. This system was conceived because of the large amounts of property being confiscated by troopers in the course of their routine work. Prior to this system's conception, troop commanders had no easy way to track items seized and stored by patrol members. With the new system, troop commanders and their designees can locate seized property within their troop and determine it's disposition and location while allowing staff at headquarters the same abilities throughout the entire state.

Finally, the Highway Patrol has just awarded a bid for a new Fleet Management system. This software package replaces a very rudimentary system that has been in place at the agency since the early 1980's. The new Fleet Management system will capture detail information regarding all vehicles (cars, trucks, aircraft, motorcycles, snowmobiles, etc.) in operation within the agency. This information can be evaluated at the regional office by troop commanders, and also summarized and reviewed by logistics personnel at state headquarters. This capability will allow staff to spot any anomalies and correct the situation with problem vehicles and will allow for better projections with regard to future years budgeting.

During FY1991, The Data Processing Department at the Highway Patrol undertook a study to determine the results the last five years efforts on the agencies operation and to plot the direction of automation over the next 5 years. This study was completed and the final version published last year. A copy of this study, entitled "Information Management Study, Kansas Highway Patrol" is attached to this plan to help give interested parties detailed information regarding the Highway Patrols efforts.

The results of the Information Management Study indicate that significant headway has been made in automating procedures within the agency. The solutions that have been implemented have worked well for each particular project, however, the agency is experiencing a great deal of difficulty maintaining all of the applications currently in place. While the systems in use by the agency have provided the Highway Patrol with extensive information and saved considerable time, the systems are implemented on disparate hardware platforms using dissimilar software.

This requires the Data Processing department to be well versed in many different software packages and standards, a difficult task considering the relatively small size of the department. It also means that data cannot be shared between applications. This translates into personnel within one section owning data that cannot be accessed by any other member of the Highway Patrol. Continued development of new systems implemented with various hardware in a scattered fashion will only compound the problem. Failure to integrate the Highway Patrol's data processing needs into one or few support system(s) could allow the problem to become critical in nature requiring ever more resources in the form of both hardware and personnel.

The Highway Patrol data processing section would like to begin combining the present applications onto a single hardware platform and linking the software, permitting applications to share information. This technique allows any agency staff member to access all information in use by the Highway Patrol and would eventually lead to cost avoidance, both in training necessary for agency personnel and maintenance required by the different types of equipment. To be accomplished successfully requires that all agency information resource initiatives be addressed with a single common goal of an integrated support system in mind. With this plan, the Patrol plans to gain an advantage with regard to storage and flexibility of data, reducing labor and other costs and aiding the decision-making process with respect to personnel, logistics and financial considerations.

Several new initiatives will be pursued by the Kansas Highway Patrol Data Processing program. Foremost among these initiatives would be the replacement of the old computer system in use at the Highway Patrol Headquarters with a new generation of processor which succeeds the present equipment in the form of an IBM AS/400 model E20. The new equipment would provide increased capacity, more flexibility and capabilities, and most importantly, the ability to begin integration of all of the Highway Patrol's applications onto a single cohesive platform, thereby providing for a truly integrated support system. This approach is consistent with those guidelines set forth by DISC regarding overall state goals and would be extremely beneficial to the Highway Patrol data processing staff, preventing them from trying to maintain different systems using different software on different equipment. It also provides the advantage of eventually allowing access by all Highway Patrol staff to all information in use by the agency. Once an individual has access to the system, only security would restrict what he or she could access.

Acquisition of the new equipment would allow present applications to be migrated with reasonable ease and also provide the agency the opportunity to expand the services presently offered by the Data Processing department, including implementation of applications such as a Logistics/Inventory system, an Accounting/Budgeting system, a Case management system, an Accident Reporting System and a Computer Aided Dispatch (CAD) system at each of the remote troop locations. Each one of these proposed projects are discussed in further detail in the attached "Information Management Study".

In addition to the replacement of the central-site processor, equipment located at the agency's remote offices would be replaced with more modern equipment. The Highway Patrol has evaluated several alternatives that could be pursued as outlined in Section 9 of this document as well as the accompanying "Information Management Study". While any of the alternatives are workable, the Highway Patrol believes the best long term solution for the agency and the State is the implementation of small IBM AS/400 Model E02's at each of the 7 regional Troop locations. This solution provides the best integration of agency applications as discussed above and will ultimately result in the reduction of personnel resources in succeeding years. And by using the overall systems management capabilities inherent in the AS/400 family of systems, the data processing staff can readily support the seven remote systems, performing the tasks of system administration, problem determination, update and fix software, etc., all through the processor at the General Headquarters (GHQ). This approach is consistent with that of the Dept. of Corrections. As can be discerned from the Information Management Study, this would be the Patrol's choice even though it initially is a slightly more expensive solution.

Unfortunately, as the agency budget document and Information Technology plan were being prepared last fall, the E02 and E20 models were not yet announced by IBM and the processors being bid were considerably more expensive. Since that time, the announcement of the IBM AS/400 model E models has prompted the Highway Patrol to re-evaluate the proposed solutions and offer these new alternatives. The result is that for less money than proposed initially, the Highway Patrol can implement a solution consistent with those capabilities the agency desires.

III. Hardware Configuration

Central Site System (Highway Patrol Headquarters)

5360/D2K
3MB Memory
716MB Disk
24 terminals
1 Law Enforcement Controller terminal
7 personal computers
1 Law Enforcement printer
1 System printer
5 office printers

Remote Site Systems (Typical Troop Configuration)

2 Law Enforcement Controller terminals
2 Law Enforcement printers
1 Personal computer
1 letter quality printer

Proposed Configurations for Headquarters

Central System Configurations
1 AS/400 E-20 Computer system
48MB Memory
5.9GB Disk
6 additional terminals \ For the new Fleet Management
1 additional printer / and Data processing department
3 additional personal computers

Typical Proposed Remote Site Configuration

1 AS/400 E02 Computer System		1 5494 Controller
8 or 16MB Memory		1 law enforcement terminal
988 or 1388 MB Disk	(OR)	1 law enforcement printer
2 dual session law enforcement terminals		2 office terminals
2 law enforcement printers		1 office printer
4 office terminals		
1 office printer		

Total equipment needed for all remote sites

7 AS/400 E02s w/memory and disk
5 5494 type controllers (local sites attached to HQ)
52 terminals (both law enforcement and office use)
30 printers (" " " " " ")
9 personal computers

IV. State Communication Network Connectivity

The Kansas Highway Patrol is working closely with DISC to make use of the Systems Network Architecture (SNA) network utilized throughout the State of Kansas. The Highway Patrol envisions tying all remote locations into the SNA network thereby allowing these sites to access other Highway Patrol systems as well as any other relevant state systems needed within the State of Kansas. This can become quite beneficial particularly if the Highway Patrol is to become a full participant with other criminal justice agencies regarding the exchange of information.

By utilizing the State's SNA network, the Highway Patrol has been informed by Mr. Andy Scharf of DISC that the Highway Patrol will be able to realize cost savings approaching \$30,000 to \$40,000 per year. The Highway Patrol envisions making use of these cost savings to acquire new equipment that will allow attachment to the SNA network and with enhanced line speeds, thereby realizing the full potential of the network to the Highway Patrol and the State of Kansas.

By connecting all Highway Patrol systems together along with the Law Enforcement Communications Switch, the Highway Patrol can access Computer Aided Dispatch (CAD) Systems on the remote AS/400 while at the same time accessing important information available through the National Crime Information Center (NCIC) in Washington, D.C., the National Law Enforcement Telecommunications System (NLETS), and a host of other relevant databases used by the law enforcement community. This would also include the recently developed AMVANET system developed by the Federal Government for the tracking of commercial drivers licenses (which the Highway Patrol is required to have access to statewide). The Highway Patrol will also be able to provide a complete electronic mail and messaging system to its employees. Likewise Troop locations will be able to exchange data between other Troop locations and the Headquarters system. Finally, the data processing support staff located at the Central site will be able to provide much needed systems maintenance on the remote systems making use of IBM's remote systems management facilities available only through the SNA network. The State's SNA network appears to offer a great deal of advantages to the Highway Patrol while at the same time producing considerable savings of roughly 50% in annual costs.

V. Detailed Costs

GENERAL HEADQUARTERS (GHQ) REQUIREMENTS

IBM Hardware Configuration

AS/400 Model E20	\$ 77,649.00
- 48MB memory	
- 5900MB disk storage	
- 5 communications lines	
- 525MB cartridge tape drive	
- battery back-up	
8mm Cartridge Tape Drive	5,538.00
- 2300MB capacity	
Color Console	1,272.00
Migration Data Link	4,715.00
Electronic Customer Support Modem	699.00
Hardware Sub-Total	<u>\$ 89,873.00</u>

IBM System Software Configuration

OS/400 Operating System	\$ 11,451.00
- including support publications	
COBOL/400 and RPG/400	4,164.00
Application Program Driver	1,065.00
Application Development Tools	2,028.00
WindowTool/400	450.00
S/36 to AS/400 Migration Aid	1,260.00
Performance Monitoring Tool	1,620.00
OfficeVision/400	5,482.00
- including U.S. dictionary	
Query	1,638.00
Communications Utilities	4,237.00
PC Support	2,527.00
Remote Systems Manager	5,283.00
Self-paced Education Software	4,834.00
- system administration/management	
- application programming	
- OfficeVision	
Software Sub-Total	<u>\$ 46,039.00</u>

Five-Year Extended Warranty \$ 10,000.00 (estimated)

<u>Installation Assistance/Support</u>	
IBM Installation Quickstart	\$ 2,910.00
IBM Migrate 'N' Grow Option	<u>2,995.00</u>
Installation Sub-Total	\$ 5,905.00

<u>Education/Training</u>	
Combination of formal classroom offerings and on-site assistance	\$ 12,500.00 (estimated)
Customized OfficeVision Training	<u>2,500.00</u>
Education/Training Sub-Total	\$ 15,000.00

<u>Building Wiring</u>	
Additions to existing wiring system to accommodate new devices	\$ 3,000.00

<u>End-User Terminals, Personal Computers, and Printers</u>	
Law Enforcement System Terminals (2)	\$ 1,560.00
Data Processing Terminals (2)	1,560.00
Fleet Management/Logistics Terminals (4)	2,360.00
Replacement 386-based Personal Computers(2)	5,000.00
386-based Personal Computer for Administrative Officer (1)	2,500.00
Law Enforcement System Printer (1)	585.00
Laser Word Processing Printer (1)	2,500.00
Five-Year Extended Warranty	2,000.00 (estimated)
End-User Sub-Total	\$ 18,065.00

<u>GHQ TOTAL COST</u>	<u>\$ 187,883.00</u>
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REMOTE TROOP REQUIREMENTS - Kansas City, Wichita, Salina

IBM Hardware Configuration

AS/400 Model E02	\$ 14,171.00
- 16MB memory	
- 1388MB disk storage	
- 3 communications lines	
- 525MB cartridge tape drive	
- battery back-up	
Color Console	1,272.00
Electronic Customer Support Modem	699.00
Hardware Sub-Total	<u>\$ 16,142.00</u>

IBM System Software Configuration

OS/400 Operating System	\$ 1,188.00
OfficeVision/400	1,502.00
- including U.S. dictionary	
Query	356.00
PC Support	553.00
Software Sub-Total	<u>\$ 3,599.00</u>

Five-Year Extended Warranty \$ 3,500.00 (estimated)

End-User Terminals, Personal Computers, and Printers

Law Enforcement System Terminals (3)	\$ 2,340.00
Command Center Personnel Terminals (3)	1,770.00
Replacement 386-based P.C.s (1)	2,500.00
Law Enforcement System Printer (2)	1,170.00
Laser Word Processing Printer (1)	2,500.00
Five-Year Extended Warranty	1,300.00 (estimated)
End-User Sub-Total	<u>\$ 11,580.00</u>

TOTAL PER SYSTEM COST \$ 34,821.00

X 3 locations

TOTAL COST \$ 104,463.00

REMOTE TROOP REQUIREMENTS - Norton, Garden City, Topeka, Chanute

IBM Hardware Configuration

AS/400 Model E02	\$ 9,728.00
- 8MB memory	
- 988MB disk storage	
- 3 communications lines	
- 525MB cartridge tape drive	
- battery back-up	
Color Console	1,272.00
Electronic Customer Support Modem	699.00
Hardware Sub-Total	<u>\$ 11,699.00</u>

IBM System Software Configuration

OS/400 Operating System	\$ 1,188.00
OfficeVision/400	1,502.00
- including U.S. dictionary	
Query	356.00
PC Support	553.00
Software Sub-Total	<u>\$ 3,599.00</u>

Five-Year Extended Warranty \$ 3,500.00 (estimated)

End-User Terminals, Personal Computers, and Printers

Law Enforcement System Terminals (2)	\$ 1,560.00
Command Center Personnel Terminals (3)	1,770.00
Replacement 386-based P.C.s (1)	2,500.00
Law Enforcement System Printer (2)	1,170.00
Laser Word Processing Printer (1)	2,500.00
Five-Year Extended Warranty	1,200.00
End-User Sub-Total	<u>\$ 10,700.00</u>

TOTAL PER SYSTEM COST \$ 29,498.00

X 4 locations

TOTAL COST \$ 117,992.00

REMOTE LOCATION REQUIREMENTS - Remaining Facilities

Hardware Configuration

5250-Type Control Units (5) \$ 13,750.00
1 each at Hays, Salina Training Center,
CASP, MCIT/MCSAP, Maintenance Garage

End-User Terminals, Personal Computers, and Printers

Law Enforcement System Terminals (4) \$ 3,120.00
1 each at Hays, Salina Training Center,
CASP, MCIT/MCSAP
General Purpose Terminals (10) 5,900.00
2 each at Salina Training Center, CASP,
MCIT, MCSAP, Maintenance
Replacement 386-based P.C.s (2) 5,000.00
1 each for Salina Training Center and
Aircraft
Law Enforcement System Printer (3) 1,755.00
1 each for Salina Training Center, CASP,
MCIT/MCSAP
Laser Word Processing Printer (3) 7,500.00
1 each for Salina Training Center, CASP,
MCIT/MCSAP
Letter-Quality Dot Matrix Printer (3) 2,025.00
1 for Aircraft and 2 for Maintenance
5250 emulation adapters and cables (3) 1,500.00
1 each for existing P.C.'s at CASP,
MCIT, and MCSAP
 End-User Sub-Total \$ 26,800.00

Five-Year Extended Warranty \$ 5,100.00 (estimated)

TOTAL MISCELLANEOUS EQUIPMENT COST \$ 45,650.00

TOTAL COSTS

GHQ System Requirements	\$ 187,883.00
Remote Troops	104,463.00
- Kansas City, Wichita, Salina	
Remote Troops	117,992.00
- Norton, Garden City, Topeka, Chanute	
Other Remote Locations	<u>45,650.00</u>
TOTAL COST	<u>\$ 455,988.00</u>

Optional "Packaged" Application Software
Chiefs, Inc. integrated law enforcement \$ 95,000.00
system

VI. Implementation Issues/Costs

The Kansas Highway Patrol will be looking at this implementation project in three phases as follows:

* Phase 1 -

Migration of the Kansas Highway Patrol's existing S/36 and PC-based applications to the AS/400 at GHQ and the implementation of the Fleet Management software for the Logistics Division. Additionally, the first of the remote troop systems will be installed at GHQ for testing, customization, and user training in preparation for Phase 2.

* Phase 2 -

Development of the new application software systems to address the issues reviewed under 'Business Case'. This development will undoubtedly consist of a combination of custom programming and packaged software modified to meet the needs of the KHP. All remote systems and other equipment will also be implemented during this phase to facilitate communications between all offices of the KHP and to be better positioned to implement Phase 3.

* Phase 3 -

Roll-out of the new applications to the remote systems and user training to ensure acceptance and use.

PHASE 1

Utilizing the "S/36 Environment" feature and the S/36 to AS/400 Migration Aid will significantly minimize any difficulties associated with Phase 1 of this migration. This allows the data processing applications, files, and word processing documents to be restored to and run "unmodified" on the AS/400. The "S/36 Environment" function is a standard feature of the OS/400 Operating System and the cost for the S/36 to AS/400 Migration Aid was reviewed earlier.

IBM also provides AS/400 implementation support through a service offering known as Installation Quickstart. For \$2,910, IBM assumes a project management role and will work with the Kansas Highway Patrol, DISC, and Facilities Management to ensure that the physical installation and set-up occur in as nondisruptive a manner as possible. IBM will further provide, under this offering, on-site operations training to ensure the data processing staff of the Kansas Highway Patrol understands the operational differences between the two systems.

IBM has also introduced a new migration support offering entitled AS/400 Migrate 'N' Grow. Under this program, IBM will provide all migration planning documentation, all migrated application code and documents (clean compiled), as well as telephone and electronic assistance for migration problem resolution. The Kansas Highway Patrol is subsequently responsible for application testing, validation, and system integration. Additionally, Data Systems International, Inc. (DSI), an IBM Business Partner, will also work very closely on-site with the data processing personnel of the KHP to ensure that the entire migration process is performed smoothly and with minimal disruption to operations. Through the IBM Business Partner program, this support will be offered at no-charge to the Highway Patrol.

There will be no visible impact on any aspect of the use of information systems within the agency by this migration during Phase 1. All existing terminals and printers will use the current cabling in place to attach to the AS/400 and the communications link to the State Mainframe will remain as it currently is. Users will interact with the various applications just as they are today. There will be differences between DisplayWrite/36 and AS/400 OfficeVision for current word processing users at GHQ. The self-paced education included in the software costs, along with a one-day "Differences" class, will facilitate bridging any gaps for these users. This "Differences" class will be offered by DSI, through the IBM Business Partner program, at no-charge to the Highway Patrol. For the new users at each of the Patrol's remote Troop locations, a joint effort between the KHP and DSI will ensure that these new personnel receive at least 1 1/2 days of OfficeVision training. This training will be patterned after DSI's existing curriculum of one-half each for Basics of OfficeVision, Advanced OfficeVision including data/text merge, and Calendars & E-Mail. The cost for DSI's assistance in these training programs has been reflected earlier.

The current personal computers in Topeka will each be attached to the AS/400 to provide direct access to the information maintained on the system, as well as providing access to the State network for purposes of accessing other State systems and eventually remote systems in place at the KHP.

As for as human data processing resources, the Kansas Highway Patrol intends to continue to utilize only the existing FTE's assigned to data processing. The added capacity, the self-management features, and the enhanced application program development features of the AS/400 will significantly improve the productivity and morale of the KHP's data processing personnel. In fact, the KHP anticipates not filling a currently open Programmer IV position if this total recommendation is approved because the AS/400 and the purchase of an integrated law enforcement software system will allow the efforts of the existing personnel to be able to be diverted to these new development activities instead of spending time supporting and continually maintaining the existing applications on both the Personal Computers and the S/36.

The \$10,000 set aside for education and training, along with the Computer Assisted Training software, will further provide the agency's existing data processing staff with the skills necessary to very rapidly become as proficient on the application development and system operations features of the AS/400 as they currently are on the S/36. Additionally, the current Data Processing Manager of the Kansas Highway Patrol, Graig Brummer, already has extensive experience with an AS/400 through his managerial stint at the KBI (Graig was the supervisor responsible for the KBI's migration to the AS/400 in 1989).

It is anticipated that most of this aforementioned "formal" training will be available through either IBM's Kansas City Education Center or local organizations. Many of the AS/400's currently in use in the State have similar support staffs to the one in place in the Kansas Highway Patrol. Besides, the prevalence of AS/400 systems in use in the State provides a built-in "users group" to share ideas and information with.

PHASE 2

This phase should commence approximately ninety days after the start of Phase 1 with the installation of the equipment in all of the remote troop locations across the State. As was discussed earlier in this document, the establishment of these remote systems can greatly enhance the effectiveness and timeliness of correspondence and overall communications between the remote Troops and GHQ. Initially utilizing these remote systems for applications such as law enforcement communications and OfficeVision (with the aforementioned training) will greatly facilitate user acceptance. This will also provide the advantage of replacing the older Law Enforcement System equipment which is beginning to demonstrate the reliability problems associated with age and will begin cost avoidance measures associated with the present equipment maintenance contracts.

Once this statewide network is operational, work will begin on the development of the new applications. The Kansas Highway Patrol has already begun research on various alternatives which can address these new functional requirements documented earlier. Based on this preliminary research, it is apparent that there is "packaged" software which comes very close to delivering the integrated system which the Highway Patrol desires. One of the leading software packages is offered by Chiefs, Inc. and consists of a series of integrated modules covering each of the following areas:

- * Offense reporting (consistent with Federal Incident Based Reporting standards)
- * Case management including,
 - intelligence
 - field interrogation
- * Accident reporting
- * Citation management
- * Evidence (including seized property)
- * Personnel system
- * Inventory control

While the purchase price for this entire system is \$ 95,000, the savings realized by the KHP by not being required to expend the man-years of effort to perform in-house development coupled with the expedient availability of the system to field personnel and the lower on-going maintenance investment can justify this up-front outlay. It is also obvious that the purchase of such a system, coupled with the system management and productivity enhancements offered by the AS/400 would allow the KHP to eliminate the Programmer IV position currently open. The \$95,000 price tag also appears to be consistent, if not a little lower than, similar offerings from other software organizations specializing in Law Enforcement systems.

Phase 3

Assuming the Highway Patrol procures a system such as the one offered by Chiefs, Inc., the roll-out of this Integrated Support System to all of the remote Troop locations and subsequent user training should commence in the spring of 1993 and be completed by the end of the summer.

If however, an integrated software package is not obtained, it would necessitate the eventual filling of the Programmer IV position if the Highway Patrol hopes to develop the systems described above in-house. This will require several man-years of analysis and programming efforts to complete and would then require increased technical support by data processing staff in future years.

Finally, Computer Aided Dispatch (CAD) is an application area which the Highway Patrol once again has several options. While several very good software packages exist at this time and could be installed of the proposed equipment, these software packages are very expensive and quite frankly have more features than the Highway Patrol could ever hope to utilize. For instance, most packages are designed for metropolitan police agencies and maintain information on previous calls made to a particular address or location. The very nature of the Highway Patrol's business would mean they would not make use of this very expensive piece of the software. There are also modules for fire and ambulance that the agency could not use. Unless the agency can find a simplistic and inexpensive software package for CAD that meets our needs, it would appear to be in the States best interest if the agency were to develop their own CAD software and integrate into the appropriate systems.

VII. Related Savings and Benefits

Many of the related benefits of this new system are tied to the applications discussed in the Information Management Study performed last year under the heading 'Proposed Systems and Major Modifications'. Everything that section deals with has a direct benefit to the Kansas Highway Patrol in some manner, either tangible or intangible. It is difficult to place a traditional dollar value on the benefits this type of Integrated Support System will have for the KHP. The amount of information the KHP must maintain is continuing to grow parallel with the need to speed up the retrieval of that information. The entire focus of the application systems which will be developed is to increase the productivity of troopers, their management, and their support staffs as they respond to requests from citizens, the Kansas Legislature, all levels of government, and of course, for handling emergency situations.

Because of the prevalence of cumbersome manual record keeping along with antiquated automated systems, the GHQ of the Highway Patrol will be forced into the difficult situation of hiring additional clerical personnel to simply keep pace with where they are today. Exactly how many people and when they would need to be hired is impossible to answer, but this is clearly not a period of time when the hiring of additional staff or increasing operational costs is prudent. However, hiring additional personnel for processing the ever increasing amounts of information will be the only alternative unless an investment is made in automation. Conservatively, the KHP estimates it would take one additional clerical person every two years to remain status quo if present trends continue as in the last 4 years.

There are indeed very tangible and definitive savings areas which this new Integrated Support System affords. Most of these have been discussed in earlier documents, but are worth mentioning again here:

- * The avoidance of paying ever increasing maintenance charges on the equipment currently in use.
 - Law Enforcement System
 - Personal Computers
 - System/36
- * The travel time and expenses associated with data processing personnel travelling across the State to support the personal computers and their applications.
- * The avoidance of paying software support charges on the FOCUS software product utilized for the time/activity and leave balance systems.

- * The KHP has recently completed negotiations for the procurement of a vehicle fleet maintenance package for the System/36. The vendor will sell this package for the same price if procured for the AS/400 initially, but has a \$ 5,000 charge for data conversion if their system is later migrated from a System/36 to an AS/400.
- * The savings associated with not using dial-up communications facilities for mainstream applications and with converting KHP's isolated dedicated circuits communicating into the Law Enforcement Switch to the existing State SNA backbone.
- * If the packaged software approach is utilized, the current Programmer IV position would not remain, as the Highway Patrol could obtain software quite quickly that otherwise would normally would take years to develop. Likewise, the Highway Patrol would rely on the vendor for support of this software.

The following sheet highlights the five-year operational cost comparisons associated with maintaining the existing systems in use today versus migrating to the Integrated Support System as proposed.

Kansas Highway Patrol

Five-Year Operational Cost Comparison

	<u>Current Systems</u>	<u>Proposed Systems</u>
Purchase of new GHQ system	-0-	\$ 187,883
Purchase of remote Troop systems	-0-	104,463
	-0-	117,992
Purchase of other field equipment	-0-	45,650
Purchase of "packaged" software	-0-	95,000
Maintenance charges		Included
- Law Enforcement equipment	\$ 91,500	
- Personal Computers	10,000	
- System/36	13,148	
Additional clerical personnel	155,340	-0-
- \$ 25,000/yr (salary/benefits)		
- one hired FY1994		
- one hired FY1996		
- 3% COLA annually		
FOCUS software support	6,000	-0-
DP Staff Travel Time	21,000	-0-
Programmer IV	222,984	-0-
- \$ 42,000/yr (salary/benefits)		
- 3% COLA annually		
Communications lines costs		
- present dial-up costs (incl. operational fleet mgmt. system)	158,760 *	-0-
- Law enforcement network charges	420,000	210,000
- attachment to DISC SNA network		108,000 **
- modem costs	48,240	68,400 **
Savings from vehicle maintenance data conversion avoidance	-0-	(5,000)
System/36 resale value	-0-	(2,000)
TOTAL OPERATIONAL COSTS	\$ 1,146,972	\$ 930,388

* NOTE: DISC believes these costs can be reduced substantially if the packet switching network is utilized. This network does not, however, support the functions desired in the proposed system.

**NOTE: These are the costs as the system could presently be supported by DISC. DISC is committed to reducing these costs substantially by carrying all Highway Patrol communications traffic over a single network.

VIII. Hardware Resource Capacity Analysis

Attached to this document is the output of the IBM AS/400 Quick Sizer. This Quick Sizer utilizes the SMF resource utilization output from the existing System/36, applies logic regarding the anticipated new applications and their usage, and factors in a steady growth rate for each of the various identified workloads.

This document shows that an AS/400 Model E20 is targeted to last the GHQ of the Highway Patrol, and an AS/400 Model E02 is targeted to last a remote troop location, assuming no deviation from the workloads identified, at least two years without any upgrade. Naturally, any additional systems implemented beyond the scope of this document and this study may require additional resources. As the Highway Patrol continues to advance in its use of automation, this type of tool will need to be regularly utilized to effectively manage the resources of various AS/400 systems. The performance monitoring tools software priced earlier will provide this capability.

IX. Options Evaluated

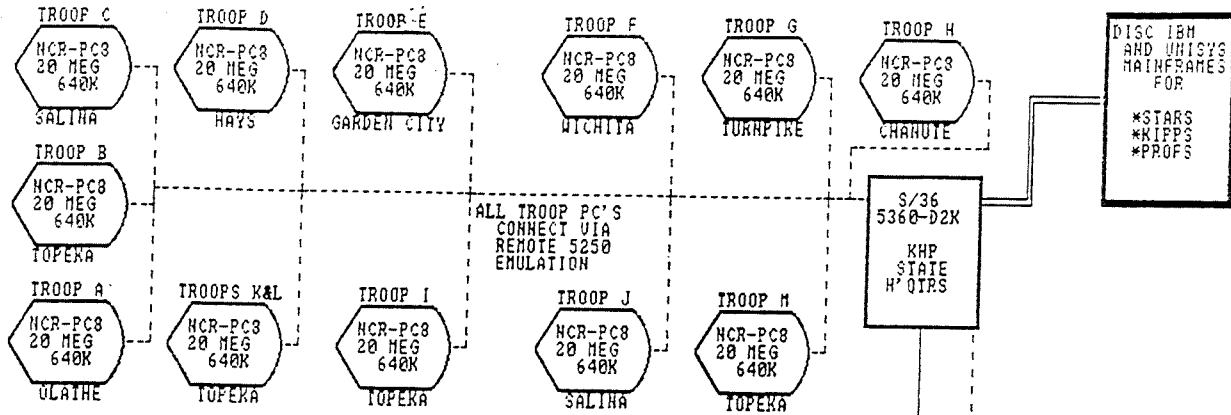
The Kansas Highway Patrol began studying their Management Information systems in January 1991. Throughout the entire process, numerous alternatives have been evaluated and the benefits and liabilities of each studied in detail. The alternative being proposed by the Highway Patrol in the preceding discussion is the result of agency staff's determination of that which represents the best long term solution to the agency's needs. What follows are some of the other alternatives that were reviewed and presented to staff before their decision.

The first alternative was for the Highway Patrol to simply continue operating as it had for the past several years. While this would mean that no additional funds would be expended in the form of capital outlay, there were significant costs associated with maintaining this operation. As one can quickly see by glancing at the "Five year operational cost comparison" chart in section 7, this option actually represents a long term increase in costs as opposed to the system being proposed by the agency. The agency had little desire to throw money at maintaining old equipment or more manual systems.

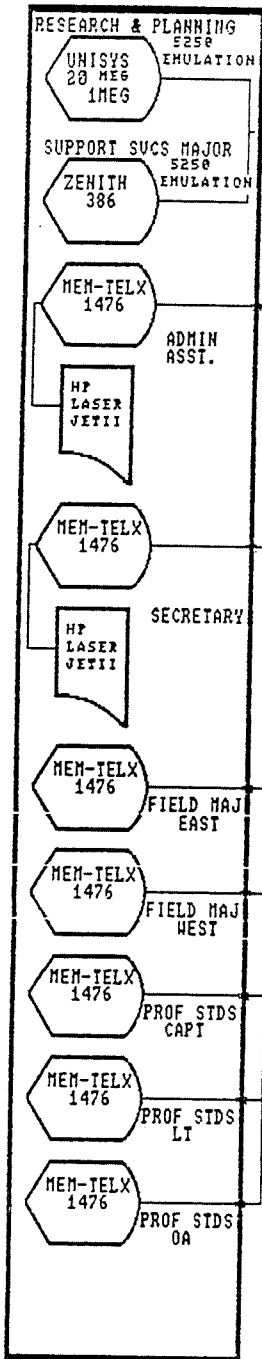
The next alternative was an upgrade of equipment both at Headquarters and the remote Troop locations. The remote Troops could have replaced the existing law enforcement telecommunications equipment which is six years old with new controllers, terminals and printers. This would allow remote personnel to access the law enforcement switch in much the same manner as done now, however, the dual host controllers would also allow remote staff to access the Patrol's central site processor at the same time. In fact, multiple sessions could be established on a single terminal allowing an individual to "hot key" between applications on either processor to fulfill their information needs. Because of the extremely high cost of maintaining the old equipment presently in place, a payback could have been realized in approximately 4 to 5 years. While this appeared to be a partial solution, it does not compete well with the option chosen when costs and capabilities are compared. Included within this alternative is the replacement of the 5 year old personal computers with new PC's. These personal computers are used for word processing, the Time and Activity system, the Leave Balance system, the Seizure system and the Inventory system. These machines are beginning to experience many problems and several printers no longer function properly. Once again, given the money being expended to maintain these systems, there would have been a payback, although it would have been greater than 5 years. This does not however solve the problems associated with fragmented system and the support that needs to be provided by Headquarters data processing staff. Finally this solution included upgrading the current central site processor from a D2K to a D2M and adding 716 MB of disk space (\$ 48,360), adding 4 MB of memory (\$ 16,660), an additional workstation controller (\$ 2,475), and an additional communications controller with ports(\$ 2,250). It becomes very obvious that if maintaining this equipment as outlined in the first alternative was too expensive, purchasing additional hardware to expand the system is going to be even more expensive. For this reason, this alternative was abandoned.

Another alternative examined placing local area networks (LAN's) of personal computers at each remote troop location. This allowed the communications operators access to the law enforcement switch, and also provided for the support of other applications such as CAD, an office system, and continued maintenance of the Time and Activity system, Leave Balance system, etc. While the initial outlay in funds to obtain this equipment was slightly less than the alternative chosen, the resources necessary to support a multitude of LAN's scattered throughout the state quickly made up the difference in cost. It became apparent in conversation with other agencies supporting local area networks that the KHP would need to not only retain our Programmer IV position, but would also eventually have the need for technical support manpower resources at the remote locations if we decided to implement the other systems the Highway Patrol desires.

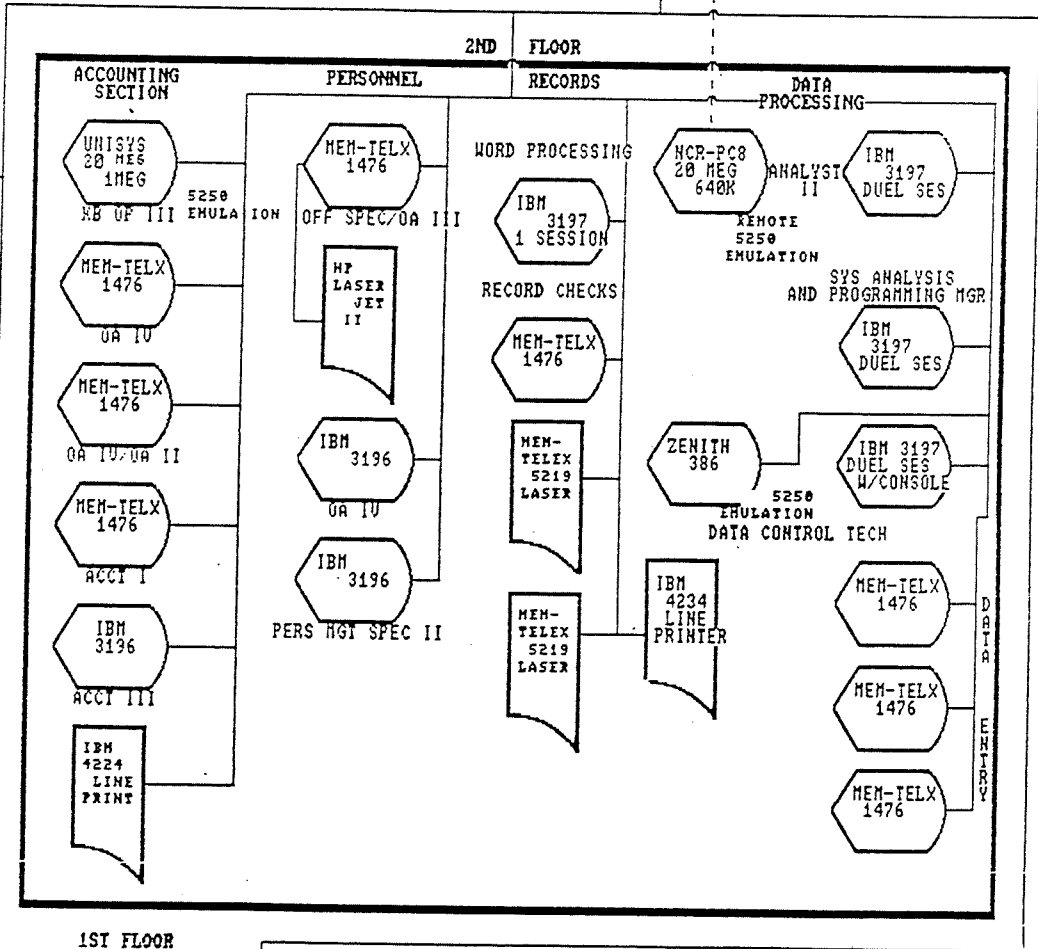
The final alternative, and the one chosen by the Highway Patrol is the replacement of remote terminal/printer equipment and personal computers with small IBM AS/400 model E02's with accompanying new terminals and printers. It also includes replacing the headquarters processor with an IBM AS/400 model E20. This alternative offers the advantages of a truly seamless information retrieval and exchange system among all agency employees. Like the dual port controllers mentioned above, these small AS/400's can access both the law enforcement switch and the Highway Patrol's central site processor simultaneously. In addition, they can access other processors on the DISC SNA network, including providing communications between remote processors at separate Highway Patrol facilities to exchange information or documents. It also allows headquarters data processing staff to support remote applications without traveling the state. The result is a system that meets all of the goals set forth by the agency to carry out it's mission over the next 5 years.



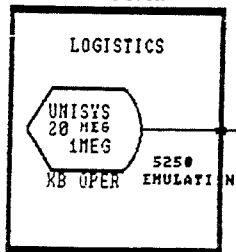
3RD FLOOR



2ND FLOOR



1ST FLOOR



KANSAS HIGHWAY PATROL

DATA PROCESSING RESOURCES

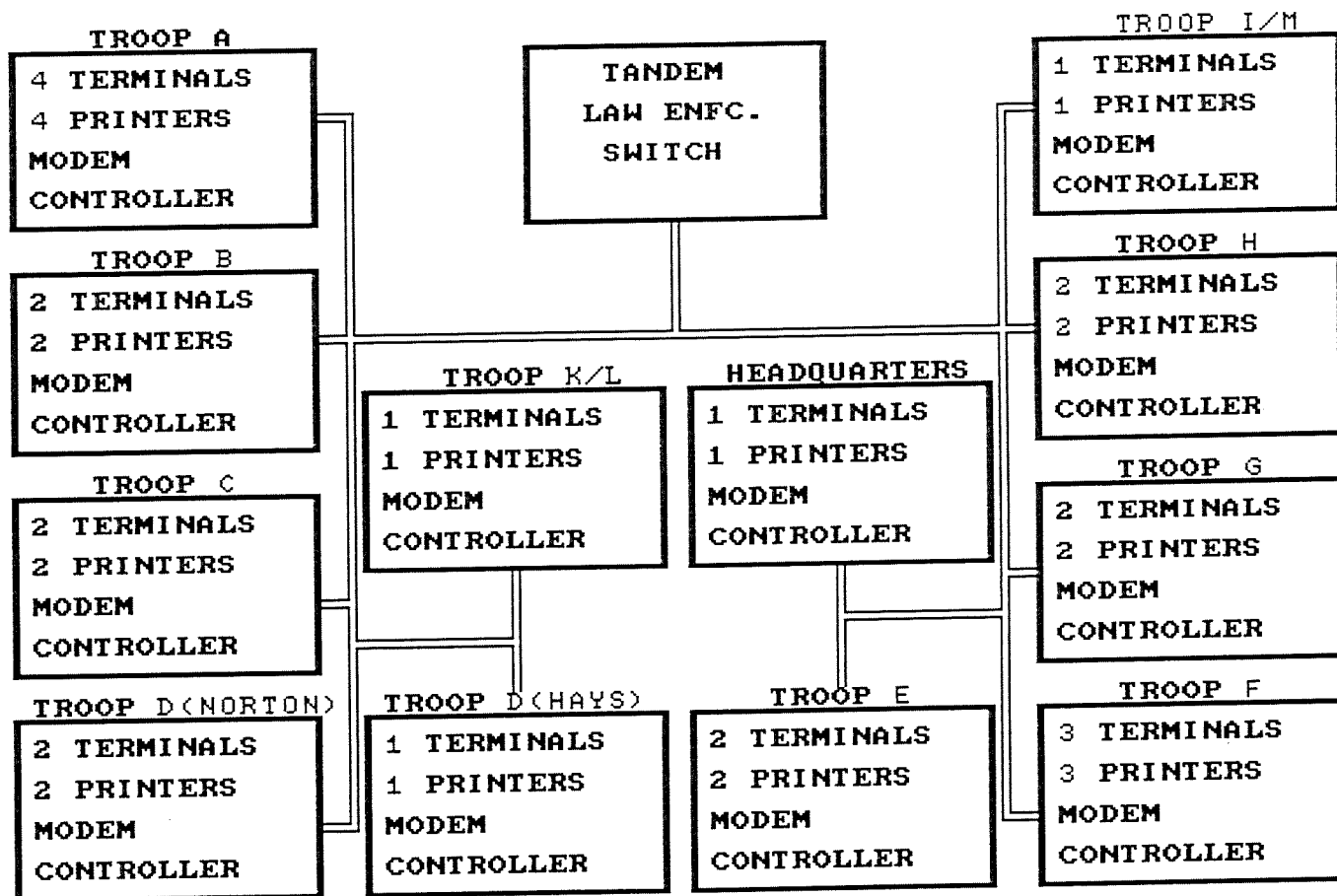
CURRENT CONFIGURATION

- DIRECT CONNECT TO S/36
- DIAL-UP CONNECTION
- == DEDICATED COMMUNICATION LINES

KANSAS HIGHWAY PATROL

KANSAS LAW ENFORCEMENT DATA NETWORK

CURRENT CONFIGURATION



Disclaimer

The performance estimates presented are approximations which are believed to be sound. The degree of success which you may achieve in the use of IBM equipment and programs is dependent upon numerous factors, many of which are not under IBM's control. Thus IBM neither warrants nor guarantees that you can or will achieve similar results. It is your responsibility to validate the estimates furnished and to determine their relevance to your operation.

Refer to MDLSYS to analyze response times and/or workloads that are not supported in this Quick Sizer.

YOU HAVE RESTRICTED YOUR OPTIONS TO LOW END MODELS ONLY.

The quicksizer has included allowances for ; checksum ; journalling ; DDM. The journalling is for physical files and access paths.

The following is your workload summary. The Key+Think is in seconds and throughput is per hour, except for Spooled Print, which is in Lines Per Minute (LPM). Batch throughput is estimated in disk I/Os per second under the proposed configurations section.

Workload	ID	Users	Key+Think	Disk	Growth%	Thruput/hour	
						Trans	Tasks
System Activity	1	0.5	15.0	0.	10.	100.	100.
Programmer	2	1.0	15.0	38.	10.	212.	212.
Simple (Native RAMP-C)	3	3.0	5.0	38.	10.	1800.	1800.
Average (Native)	4	3.0	20.0	38.	20.	480.	480.
Complex (Native)	5	2.0	25.0	38.	20.	248.	248.
IBM Office Benchmark V2	9	3.0	46.0	38.	10.	223.	77.
Correspondence Center	14	5.0	12.5	38.	20.	1200.	1000.
Batch (Seq.)	19	1.0			0.		
Batch (Idx. Rndm.)	21	1.0			0.		
Spooled Print Writer	22	7.0			20.	700.	LPM
3270 DE	23	2.0	15.0	0.	10.	450.	450.
5250 DSPT	24	0.5	15.0	0.	10.	113.	113.
Simple (Query)	30	1.0	80.0	38.	10.	43.	43.
Average (Query)	31	2.0	120.0	38.	10.	56.	56.
Simple (Native RAMP-C)	3	5.0	15.0	38.	20.	1125.	1125.

WARNING!!!!!! The following workloads have key + think times that are less than the STEADY rate. This may be unrealistic to assume a person can key that quickly. Adjust if necessary. Each typical key + think time is listed.
- Simple (Native RAMP-C) 15.0 seconds

Proposed Configurations

DRIVES! (Not Arms)
Disk Drives/Percent Busy

Inter. CPU CPU% Memory Batch Res. 6109 or 6107 or 6105 or 6100

2-33

	Users	Mdl	Busy	(Mb)	IO/Sec	time (988Mb)	(400Mb)	(320Mb)	(315Mb)	
System 1:	28.0	E20	58	19.5	9.1	2.1	4/41%	4/43%	5/37%	5/41%
OR										
System 2:	28.0	E20	54	22.5	9.9	1.8	3/46%	4/36%	5/30%	5/34%

System 2 has 15% more memory, which allows you to configure a system with a smaller CPU model, fewer disk drives, or both.

System 1 Growth Analysis

The System 1 table assumes a CALCULATED MINIMUM MEMORY REQUIREMENT. DO NOT ROUND DOWN THIS MEMORY AMOUNT. ROUND UP.

Refer to disclaimer.

Elapsed Months	DRIVES! (Not Arms)									
	Disk Drives/Percent Busy									
	Inter.	CPU	CPU%	Memory	Batch	Res.	6109 or	6107 or	6105 or	6100
	Users	Mdl	Busy	(Mb)	IO/Sec	time	(988Mb)	(400Mb)	(320Mb)	(315Mb)
0	28.0	E20	58	19.5	9.1	2.1	4/41%	4/43%	5/37%	5/41%
3	29.1	E20	60	20.0	8.7	2.2	4/42%	4/45%	5/38%	5/42%
6	30.2	E20	62	20.0	8.2	2.3	4/44%	5/37%	5/39%	5/43%
9	31.4	E20	64	20.5	7.7	2.3	4/45%	5/38%	5/40%	5/44%
12	32.6	E20	67	21.0	7.1	2.2	5/37%	5/39%	5/41%	6/38%
15	33.9	E20	69	21.5	6.6	2.3	5/38%	5/40%	5/42%	6/39%
18	35.2	E25	59	22.0	11.0	2.0	5/41%	5/44%	6/38%	6/43%
21	36.6	E25	61	22.5	10.4	2.1	5/43%	5/45%	6/39%	6/44%
24	38.0	E25	63	23.0	9.7	2.2	5/44%	6/38%	6/41%	7/39%
27	39.5	E25	66	23.5	9.1	2.1	6/38%	6/40%	6/42%	7/40%
30	41.1	E25	68	24.0	8.4	2.2	6/39%	6/41%	6/43%	7/41%
33	42.7	E25	71	24.5	7.7	2.3	6/40%	6/42%	7/38%	7/42%
36	44.4	E25	74	25.0	6.9	2.4	6/41%	6/44%	7/39%	8(>Max)

WARNING! Above CPU %Busy greater than 70%. Growth may be limited.

System 2 Growth Analysis

The System 2 table has 15% more memory than the preceding table. This will provide better response time and lower CPU and Disk %busy. DO NOT ROUND DOWN THIS MEMORY AMOUNT. ROUND UP.

Refer to disclaimer.

Elapsed Months	DRIVES! (Not Arms)									
	Disk Drives/Percent Busy									
	Inter.	CPU	CPU%	Memory	Batch	Res.	6109 or	6107 or	6105 or	6100
	Users	Mdl	Busy	(Mb)	IO/Sec	time	(988Mb)	(400Mb)	(320Mb)	(315Mb)
0	28.0	E20	54	22.5	9.9	1.8	3/46%	4/36%	5/30%	5/34%
3	29.1	E20	56	23.0	9.5	1.9	3/47%	4/37%	5/31%	5/35%
6	30.2	E20	58	23.0	9.0	1.7	4/36%	4/38%	5/32%	5/36%
9	31.4	E20	60	23.5	8.5	1.8	4/37%	4/39%	5/33%	5/37%
12	32.6	E20	63	24.0	8.1	1.8	4/38%	4/40%	5/34%	5/38%
15	33.9	E20	65	24.5	7.5	1.9	4/39%	4/41%	5/35%	6/32%
18	35.2	E20	67	25.0	7.0	2.0	4/41%	5/34%	6/30%	6/33%
21	36.6	E20	70	25.5	6.4	2.1	4/42%	5/35%	6/31%	6/34%
24	38.0	E25	59	26.0	10.8	1.8	4/46%	5/38%	6/34%	6/37%

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27	39.5	E25	61	27.0	10.2	1.7	5/37%	5/39%	6/35%	6/38%
30	41.1	E25	64	27.5	9.6	1.7	5/39%	5/41%	6/36%	6/40%
33	42.7	E25	66	28.0	8.9	1.8	5/40%	5/42%	6/37%	7/35%
36	44.4	E25	69	28.5	8.2	1.9	5/41%	5/43%	7/32%	7/36%

QSIZE400 will not select models marked with '*'.
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In the preceding tables, the memory listed is a calculated amount of memory and therefore may not be in the increments offered. Round up to the nearest increment of memory that is available for the listed system unit. DO NOT ROUND DOWN.

NOTE: Disks are specified as drives, with each drive containing the amount of space listed (Mb = megabytes).

Use the configurator to determine how you can mix drive types on each system, as Quicksizer does not provide for that capability. The Disk Drive % should be less than or equal to 40% (percent busy). For systems requiring only one actuator, the Disk Drive % can be up to 55%, higher if batch is active. If the Disk Drive % is much less than these guidelines, then more drives were added due to your disk space per user requirements.

The CPU %Busy does NOT include the batch processing. This is because batch is at lower priority than interactives, and batch will most always cause the CPU %Busy to be high (> 70%), which is normal.

The following average response times are provided to give you a rough idea of the response time you could expect. These are not meant to be a guarantee, but are meant to show the range of AVERAGE response times for these benchmarks. Individual response times for a workload may range from very small (0.5 seconds) to large (15 seconds), even though the average for the workload is small (2.0-3.0). The response times listed below are AVERAGES, not the range of individual response times.

The response times shown in the above tables are weighted averages of the individual average workload response times appearing below.

These response times include the cpu, disk, workstation controller, and memory components of response time for this AS/400 system only; remote line and target system components of the response time are not included.

Measured profile response times do NOT include workstation controller time.

Workload	R E S P O N S E T I M E A V E R A G E	
	with the Minimum	with the Minimum
	Calculated Memory+15%	Calculated Memory
System Activity	3.7	4.4
Programmer	2.1	2.6
Simple (Native RAMP-C)	1.2	1.4
Average (Native)	2.1	2.5
Complex (Native)	3.0	3.6
IBM Office Benchmark V2	1.9	2.3
Correspondence Center	2.5	3.0
3270 DE	0.6	0.7

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5250 DSPT	0.3	0.4
Simple (Query)	5.4	6.8
Average (Query)	15.8	19.0
Simple (Native RAMP-C)	1.2	1.4

2-36

Disclaimer

The performance estimates presented are approximations which are believed to be sound. The degree of success which you may achieve in the use of IBM equipment and programs is dependent upon numerous factors, many of which are not under IBM's control. Thus IBM neither warrants nor guarantees that you can or will achieve similar results. It is your responsibility to validate the estimates furnished and to determine their relevance to your operation.

Refer to MDLSYS to analyze response times and/or workloads that are not supported in this Quick Sizer.

YOU HAVE RESTRICTED YOUR OPTION TO A D04* ONLY.

The quicksizer has included allowances for ; checksum ; DDM.

The following is your workload summary. The Key+Think is in seconds and throughput is per hour, except for Spooled Print, which is in Lines Per Minute (LPM). Batch throughput is estimated in disk I/Os per second under the proposed configurations section.

Workload	ID	Users	Key+Think	Disk Growth%	Thruput/hour		
					Trans	Tasks	
Simple (Native RAMP-C)	3	2.0	15.0	38.	20.	450.	450.
Complex (Native)	5	1.5	25.0	38.	20.	186.	186.
Correspondence Center	14	1.5	25.0	38.	20.	196.	163.
Spooled Print Writer	22	2.0			20.	100.	LPM
3270 DE	23	2.0	15.0	0.	20.	450.	450.
5250 DSPT	24	1.0	30.0	0.	20.	116.	116.
IBM Office Benchmark V2	9	0.5	46.0	38.	20.	37.	13.
System Activity	1	0.2	45.0	0.	20.	15.	15.

WARNING!!!! This system workload definition may be incomplete. The following workloads have not been defined, but are typically active in most customer systems:
- Batch

Proposed Configurations

	Inter. Users	CPU Mdl	CPU% Busy	Memory (Mb)	Batch IO/Sec	Res. time	DRIVES! (Not Arms)		
							Disk Drives/Percent Busy		
							6104 or (400Mb)	6103 or (320Mb)	6102
System 1:	8.7	D04*	20	9.0	0.0	1.4	3/11%	3/11%	
OR									
System 2:	8.7	D04*	19	10.5	0.0	1.2	3/ 9%	3/ 9%	

System 2 has 15% more memory, and was analyzed to determine if this additional memory could reduce the cpu model or number of drives required. For the workload you have defined, and because the CPU and Disk %Busy are low, additional memory will not

→ Larger sites

→ Relative performance is equal to 2/2

reduce your CPU or Disk requirements. You should note however, that the additional memory does lower the CPU and Disk %Busy and improves the response time.

System 1 Growth Analysis

The System 1 table assumes a CALCULATED MINIMUM MEMORY REQUIREMENT. DO NOT ROUND DOWN THIS MEMORY AMOUNT. ROUND UP.

Refer to disclaimer.

Elapsed Months	Inter. Users	CPU Mdl	CPU% Busy	Memory (Mb)	Batch IO/Sec	Res. time	DRIVES! (Not Arms)		
							Disk Drives/Percent Busy		
							6104 or (400Mb)	6103 or (320Mb)	6102
0	8.7	D04*	20	9.0	0.0	1.4	3/11%	3/11%	
3	9.1	D04*	21	9.0	0.0	1.4	3/11%	3/12%	
6	9.6	D04*	22	9.0	0.0	1.4	3/12%	3/13%	
9	10.1	D04*	23	9.5	0.0	1.4	3/13%	3/13%	
12	10.6	D04*	25	9.5	0.0	1.5	3/13%	3/14%	
15	11.1	D04*	26	9.5	0.0	1.5	3/14%	3/15%	
18	11.7	D04*	27	9.5	0.0	1.5	3/15%	3/15%	
21	12.2	D04*	28	10.0	0.0	1.5	3/15%	3/16%	
24	12.9	D04*	30	10.0	0.0	1.5	3/16%	3/17%	
27	13.5	D04*	31	10.0	0.0	1.5	3/17%	3/18%	
30	14.2	D04*	33	10.5	0.0	1.5	3/18%	3/19%	
33	14.9	D04*	35	10.5	0.0	1.6	3/19%	3/20%	
36	15.6	D04*	36	10.5	0.0	1.6	3/20%	3/21%	

System 2 Growth Analysis

The System 2 table has 15% more memory than the preceding table. This will provide better response time and lower CPU and Disk %busy. DO NOT ROUND DOWN THIS MEMORY AMOUNT. ROUND UP.

Refer to disclaimer.

Elapsed Months	Inter. Users	CPU Mdl	CPU% Busy	Memory (Mb)	Batch IO/Sec	Res. time	DRIVES! (Not Arms)		
							Disk Drives/Percent Busy		
							6104 or (400Mb)	6103 or (320Mb)	6102
0	8.7	D04*	19	10.5	0.0	1.2	3/ 9%	3/ 9%	
3	9.1	D04*	20	10.5	0.0	1.2	3/ 9%	3/10%	
6	9.6	D04*	21	10.5	0.0	1.2	3/10%	3/10%	
9	10.1	D04*	22	10.5	0.0	1.2	3/10%	3/11%	
12	10.6	D04*	23	11.0	0.0	1.2	3/11%	3/11%	
15	11.1	D04*	24	11.0	0.0	1.2	3/11%	3/12%	
18	11.7	D04*	25	11.0	0.0	1.2	3/12%	3/12%	
21	12.2	D04*	27	11.5	0.0	1.3	3/12%	3/13%	
24	12.9	D04*	28	11.5	0.0	1.3	3/13%	3/14%	
27	13.5	D04*	29	11.5	0.0	1.3	3/14%	3/14%	
30	14.2	D04*	31	12.0	0.0	1.3	3/14%	3/15%	
33	14.9	D04*	32	12.0	0.0	1.3	3/15%	3/16%	
36	15.6	D04*	34	12.5	0.0	1.3	3/16%	3/17%	

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QSIZE400 will not select models marked with '*'.

In the preceding tables, the memory listed is a calculated amount of memory and therefore may not be in the increments offered. Round up to the nearest increment of memory that is available for the listed system unit. DO NOT ROUND DOWN.

NOTE: Disks are specified as drives, with each drive containing the amount of space listed (Mb = megabytes).

Use the configurator to determine how you can mix drive types on each system, as Quicksizer does not provide for that capability. The Disk Drive % should be less than or equal to 40.% (percent busy). For systems requiring only one actuator, the Disk Drive % can be up to 55.%, higher if batch is active. If the Disk Drive % is much less than these guidelines, then more drives were added due to your disk space per user requirements.

The CPU %Busy does NOT include the batch processing. This is because batch is at lower priority than interactives, and batch will most always cause the CPU %Busy to be high (> 70%), which is normal.

The following average response times are provided to give you a rough idea of the response time you could expect. These are not meant to be a guarantee, but are meant to show the range of AVERAGE response times for these benchmarks. Individual response times for a workload may range from very small (0.5 seconds) to large (15 seconds), even though the average for the workload is small (2.0-3.0). The response times listed below are AVERAGES, not the range of individual response times.

The response times shown in the above tables are weighted averages of the individual average workload response times appearing below.

These response times include the cpu, disk, workstation controller, and memory components of response time for this AS/400 system only; remote line and target system components of the response time are not included.

Measured profile response times do NOT include workstation controller time.

Workload	R E S P O N S E T I M E A V E R A G E	
	with the Minimum	with the Minimum
	Calculated Memory+15%	Calculated Memory
Simple (Native RAMP-C)	1.0	1.1
Complex (Native)	2.4	2.9
Correspondence Center	2.2	2.7
3270 DE	0.6	0.7
5250 DSPT	0.4	0.4
IBM Office Benchmark V2	1.7	2.1
System Activity	2.6	3.3

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↳ Smaller sites

Disclaimer
 The performance estimates presented are approximations which are believed to be sound. The degree of success which you may achieve in the use of IBM equipment and programs is dependent upon numerous factors, many of which are not under IBM's control. Thus IBM neither warrants nor guarantees that you can or will achieve similar results. It is your responsibility to validate the estimates furnished and to determine their relevance to your operation.

Refer to MDLSYS to analyze response times and/or workloads that are not supported in this Quick Sizer.

YOU HAVE RESTRICTED YOUR OPTION TO A D04* ONLY.

↳ Relative performance is equal to EØZ

The quicksizer has included allowances for ; checksum ; DDM.

The following is your workload summary. The Key+Think is in seconds and throughput is per hour, except for Spooled Print, which is in Lines Per Minute (LPM). Batch throughput is estimated in disk I/Os per second under the proposed configurations section.

Workload	ID	Users	Key+Think	Disk Growth%	Trans	Tasks
Simple (Native RAMP-C)	3	1.0	15.0	38.	20.	225.
Complex (Native)	5	1.0	25.0	38.	20.	124.
Correspondence Center	14	1.0	25.0	38.	20.	131.
Spooled Print Writer	22	2.0			20.	75. LPM
3270 DE	23	1.5	15.0	0.	20.	338.
5250 DSPT	24	0.5	30.0	0.	20.	58.
IBM Office Benchmark V2	9	0.3	46.0	38.	20.	22.
System Activity	1	0.2	45.0	0.	20.	15.

WARNING!!!! This system workload definition may be incomplete. The following workloads have not been defined, but are typically active in most customer systems:
 - Batch

Proposed Configurations

	Inter. Users	CPU Mdl	CPU% Busy	Memory (Mb)	Batch IO/Sec	Res. time	DRIVES! (Not Arms)		
							Disk Drives/Percent Busy		
							6104 or (400Mb)	6103 or (320Mb)	6102
System 1:	5.5	D04*	13	8.0	0.0	1.4	3/ 7%	3/ 7%	
OR									
System 2:	5.5	D04*	12	9.5	0.0	1.2	3/ 5%	3/ 6%	

System 2 has 15% more memory, and was analyzed to determine if this additional memory could reduce the cpu model or number of drives required. For the workload you have defined, and because the CPU and Disk %Busy are low, additional memory will not

04-2

reduce your CPU or Disk requirements. You should note however, that the additional memory does lower the CPU and Disk %Busy and improves the response time.

System 1 Growth Analysis

The System 1 table assumes a CALCULATED MINIMUM MEMORY REQUIREMENT. DO NOT ROUND DOWN THIS MEMORY AMOUNT. ROUND UP.

Refer to disclaimer.

Elapsed Months	Inter. Users	CPU Mdl	CPU% Busy	Memory (Mb)	Batch IO/Sec	Res. time	DRIVES! (Not Arms)		
							Disk Drives/Percent Busy		
							6104 or (400Mb)	6103 or (320Mb)	6102
0	5.5	D04*	13	8.0	0.0	1.4	3/ 7%	3/ 7%	
3	5.8	D04*	13	8.5	0.0	1.4	3/ 7%	3/ 8%	
6	6.1	D04*	14	8.5	0.0	1.4	3/ 8%	3/ 8%	
9	6.4	D04*	15	8.5	0.0	1.4	3/ 8%	3/ 8%	
12	6.7	D04*	16	8.5	0.0	1.4	3/ 8%	3/ 9%	
15	7.0	D04*	16	8.5	0.0	1.4	3/ 9%	3/ 9%	
18	7.4	D04*	17	8.5	0.0	1.4	3/ 9%	3/10%	
21	7.7	D04*	18	9.0	0.0	1.4	3/10%	3/10%	
24	8.1	D04*	19	9.0	0.0	1.4	3/10%	3/11%	
27	8.5	D04*	20	9.0	0.0	1.4	3/11%	3/11%	
30	9.0	D04*	21	9.0	0.0	1.4	3/11%	3/12%	
33	9.4	D04*	22	9.5	0.0	1.5	3/12%	3/12%	
36	9.9	D04*	23	9.5	0.0	1.5	3/12%	3/13%	

System 2 Growth Analysis

The System 2 table has 15% more memory than the preceding table. This will provide better response time and lower CPU and Disk %busy. DO NOT ROUND DOWN THIS MEMORY AMOUNT. ROUND UP.

Refer to disclaimer.

Elapsed Months	Inter. Users	CPU Mdl	CPU% Busy	Memory (Mb)	Batch IO/Sec	Res. time	DRIVES! (Not Arms)		
							Disk Drives/Percent Busy		
							6104 or (400Mb)	6103 or (320Mb)	6102
0	5.5	D04*	12	9.5	0.0	1.2	3/ 5%	3/ 6%	
3	5.8	D04*	13	9.5	0.0	1.2	3/ 6%	3/ 6%	
6	6.1	D04*	13	9.5	0.0	1.2	3/ 6%	3/ 6%	
9	6.4	D04*	14	9.5	0.0	1.2	3/ 6%	3/ 7%	
12	6.7	D04*	15	10.0	0.0	1.2	3/ 7%	3/ 7%	
15	7.0	D04*	15	10.0	0.0	1.2	3/ 7%	3/ 7%	
18	7.4	D04*	16	10.0	0.0	1.2	3/ 7%	3/ 8%	
21	7.7	D04*	17	10.0	0.0	1.2	3/ 8%	3/ 8%	
24	8.1	D04*	18	10.0	0.0	1.2	3/ 8%	3/ 9%	
27	8.5	D04*	19	10.5	0.0	1.2	3/ 9%	3/ 9%	
30	9.0	D04*	20	10.5	0.0	1.2	3/ 9%	3/ 9%	
33	9.4	D04*	21	10.5	0.0	1.2	3/ 9%	3/10%	
36	9.9	D04*	22	11.0	0.0	1.2	3/10%	3/10%	

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QSIZE400 will not select models marked with '*'.
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In the preceding tables, the memory listed is a calculated amount of memory and therefore may not be in the increments offered. Round up to the nearest increment of memory that is available for the listed system unit. DO NOT ROUND DOWN.

NOTE: Disks are specified as drives, with each drive containing the amount of space listed (Mb = megabytes).

Use the configurator to determine how you can mix drive types on each system, as Quicksizer does not provide for that capability. The Disk Drive % should be less than or equal to 40.% (percent busy). For systems requiring only one actuator, the Disk Drive % can be up to 55.%, higher if batch is active. If the Disk Drive % is much less than these guidelines, then more drives were added due to your disk space per user requirements.

The CPU %Busy does NOT include the batch processing. This is because batch is at lower priority than interactives, and batch will most always cause the CPU %Busy to be high (> 70%), which is normal.

The following average response times are provided to give you a rough idea of the response time you could expect. These are not meant to be a guarantee, but are meant to show the range of AVERAGE response times for these benchmarks. Individual response times for a workload may range from very small (0.5 seconds) to large (15 seconds), even though the average for the workload is small (2.0-3.0). The response times listed below are AVERAGES, not the range of individual response times.

The response times shown in the above tables are weighted averages of the individual average workload response times appearing below.

These response times include the cpu, disk, workstation controller, and memory components of response time for this AS/400 system only; remote line and target system components of the response time are not included.

Measured profile response times do NOT include workstation controller time.

Workload	R E S P O N S E T I M E A V E R A G E	
	with the Minimum Calculated Memory+15%	with the Minimum Calculated Memory
Simple (Native RAMP-C)	1.0	1.1
Complex (Native)	2.3	2.8
Correspondence Center	2.1	2.5
3270 DE	0.6	0.6
5250 DSPT	0.4	0.4
IBM Office Benchmark V2	1.6	1.9
System Activity	2.5	3.2

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INFORMATION MANAGEMENT STUDY

KANSAS HIGHWAY PATROL

September 15, 1991

INFORMATION MANAGEMENT STUDY

for the

KANSAS HIGHWAY PATROL

INTRODUCTION

The Kansas Highway Patrol began the process of automating several applications approximately 5 years ago. While there had been attempts by the Department of Transportation (DOT) to implement several small systems for the Patrol before this time, most of these efforts were limited. These efforts consisted of small programs written on the State mainframe at the Division of Information Systems and Communication (DISC) and supported almost entirely by DOT staff. During the past 5 years, the Patrol has made considerable progress automating several systems. This effort was successful in accomplishing the immediate needs of the Patrol, however, it did leave the Patrol with several fragmented systems scattered across multiple platforms, making it difficult for the Data Processing department to support these applications. This is complicated by the inability to interface these systems with one another in order to correlate appropriate data. This report will discuss the Highway Patrols' current and proposed applications, how these systems are presently implemented and supported, the problems encountered by the Patrol with these applications, and several possible solutions that would allow the Patrol to continue its' attempts to automate.

PRESENT SYSTEMS

Law Enforcement Telecommunications Network

The Highway Patrol presently has a network of terminals that exist throughout the state. These terminals are used by Communication Officers at each troop headquarters to check the Department of Revenue's drivers license and vehicle files or the FBI's wanted person and stolen vehicle files whenever a trooper makes a "Stop". A Tandem processor is used to operate this network which resides at DISC and is controlled by a committee know as the ASTRA board. The board consists of three individuals. One member chairs the board and represents DISC, another member represents the KBI and the final member represents the Highway Patrol. This board holds quarterly meetings to solicit ideas from local Sheriffs and Police departments who utilize the network.

Notice-to-Appear

The Notice-To-Appear (NTA) ticket system is used to track and confirm the disposition of tickets written by the Patrol and to produce statistical information regarding the number and type of NTA's written. The present system resides on the Patrol's IBM System/36 processor and is accessible by appropriate headquarters staff. The system contains the present year information plus the previous 4 years as required by law. This system can be queried via a program to produce a computer generated copy of the NTA or through a system utility for statistical information. At this time, Troop Captains rely primarily on the information that is generated by batch reports and mailed to them. Current central computer requirements: 12 Physical Files, 6 Alternate Access Paths, 72 Programs.

Data storage needs - 87,013 Blocks

Motor Carrier Inspection Notice to Appear

This application is essentially identical to the NTA application but contains data exclusive to the Motor Carrier Inspection (MCI) violations. An activity report by scale type is used for reports necessary for Federal grant compliance. Computer generated NTA copies can be created by the same query program used for KHP NTA's. Current central computer requirements: 10 physical files, 1 alternate access path, 10 programs.

Data storage needs - 5055 Blocks

Motor Carrier Safety Assistance Program

The Motor Carrier Safety Assistance Program (MCSAP) inspection forms are entered and stored on a stand-alone personal computer using an RBASE program. This data is only accessible by MCSAP staff. Information produced from the system is used to satisfy federal grant reporting requirements. Personal computer requirements: 2 physical files(per year), Multiple access paths, several report generation programs.

Data storage needs - programs 800 blocks
data 6,000 blocks annually

Time and Activity/Leave

The Time and Activity system and Leave Balance system are the facilities used by the Patrol to track the duties performed by field troops and the leave balances of individual officers. The Time and Activity system and Leave Balance system is a combination of personal computer applications utilizing PC FOCUS and System/36 file serving features. In this system, troop clerical personnel enter information from forms filled out by uniformed personnel. This information includes time, activity and leave data and is entered into a PC FOCUS database. Part of this information is then extracted into a personal computer file which is sent to headquarters and placed onto the System/36 via the 'Connect/36' procedures. These files are then downloaded to a personal computer in the Data Center at Headquarters for processing and printing of all reports. No reports are generated from the System/36 since it simply acts a file server. Information from one of the leave reports is used by our personnel section to enter the appropriate data into the KIPPS system on a monthly basis. Current central computer requirements: 17 Physical Files. Personal computer requirements: multiple programs and data files at 10 separate locations.

Data storage needs - central site - 104 Blocks
remote site - 28,000 Blocks(2,800 * 10 sites)

Office Systems

The Patrol has a rather diverse approach to word processing and office functions throughout the organization. Many Headquarters staff members utilize the Displaywrite word processing and office functions available on the Patrol's System/36. Most others, including some members at General Headquarters and all Troop Headquarters throughout the state utilize personal computers with Displaywrite III or Displaywrite IV to achieve their word processing needs. However, there is very little coordination and virtually no ability to use mail, calendaring or messaging among the users even though this is a strong need of the Highway Patrol. Current central computer requirements: Office software and multiple folders. Personal computer requirements: Since the use and management of word processing on personal computers is left to the users or the troops discretion, the total resources used is unknown.

Data storage needs - 15,234 Blocks (central site)
unknown (remote site)

Personnel System

A recent addition to the applications in place at the agency is a personnel system. This system allows the Patrol to maintain a database of employees working for the Patrol and can also be used to track retirees. The system features information about employees, their position and pay status. This system allows users to query the files to retrieve information to facilitate completion of EEO reports, manpower allocation models, and budgetary information for payroll. The Highway Patrol foresees this system becoming an integral part of many other applications, both in place and planned for the agency. With proper implementation, the personnel database would be accessible by many other databases at the Highway Patrol. Current central computer requirements: 12 Physical Files, 90 Programs.

Data storage needs - 242 Blocks

Vehicle Expense

The vehicle expense application utilizes data entry at General Headquarters to input data from vehicle expense sheets submitted monthly by operators of patrol vehicles into a data file. Information from this file is then used to produce reports for the Logistics section regarding fleet costs and possible problems areas. The scope of the present system is very limited and the legislature has appropriated approximately \$27,000 for hardware and software costs that would be used to replace the present system in FY1991. Current central computer requirements: 1 Physical File, 1 Program.

Data storage needs - 34 Blocks

Personal Inventories

This is a stand alone system developed with FOCUS and executing on the Logistics section personal computer. The purpose of this system is to account for all property acquired by the agency. Said property is assigned to an individual when it is issued, personnel changes are made (i.e. promotions), or it is transferred from one location to another for better utilization. Annually, files from the personal computer application are transferred to the System/36, where reports are produced to verify individual inventory and for the Highway Patrol to report agency inventory to the Division of Accounts and Reports. Current central computer requirements: 6 physical files, 56 programs. Personal computer requirements: 2 files, 1 program.

Data storage needs - 4,000 Blocks

Professional Standards Case Tracking

A newly formed section, Professional Standards, uses a S/36 application to track citizen complaints about Patrol members. Information regarding these complaints, whether phoned or written, are entered into the system so that their status can be ascertained at any point in the process. Information can be retrieved by name of complainant, Trooper name, and other relevant search fields. Current central computer requirements: 1 Physical File, 9 Programs.

Data storage needs - 93 Blocks.

Seizure Reports

This is a recent addition to the Patrol's applications. This system utilizes PC-FOCUS on individual Troop microcomputers and captures data resulting from the seizure of property during an arrest (usually involving drugs or stolen vehicles). All data is transferred once per month to a standalone file on the System/36. This way, the information can be accessed by GHQ management and staff for inventory control issues and planning. Current central processor requirements: 7 Physical Files, 3 Programs. Personal computer requirements: multiple programs and data files at 10 locations.

Data storage needs - central site - 143 Blocks.
remote site - 500 Blocks(50 * 10 sites)

Warnings/Tickets Issued by CAPS

This is a standalone application written in RBASE and operating on a personal computer at Capitol Area Security Patrol (CASP). The information contained in this application is currently unavailable via electronic means to anyone outside of CASP. Personal computer requirements : 1 program, 1 file.

Data storage needs - 800 Blocks

PROBLEMS

While the Highway Patrol has made considerable strides in their efforts to automate many of the manual systems, there still remains a host of problems which will continue to hinder their efforts unless they are corrected. Many of the systems are implemented on stand-alone personal computers which do not allow access by more than one individual at a time. These systems are difficult to support by central site staff as they are distributed across the entire state and do require travel periodically to update software or to fix problems. Other systems are currently being processed by the central site IBM System/36 but do not allow access to field personnel other than to dial-in and upload data. Finally, the Patrol is still using several applications that were written years ago which are being processed on the large mainframes at DISC. The Highway Patrol is now relying on DISC for some support of these applications as the only programmer who had knowledge of mainframe programming recently resigned.

One system that will need immediate consideration is the **Law Enforcement Communications Network**. The Patrol acquired terminal and printer devices over 6 years ago to be used on this network. While this equipment is still operational, it is extremely susceptible to failure. The Telex Corporation who maintains the equipment has realized this and has begun charging appropriate service fees to keep it operational. At present, the Patrol spends over \$17,000 per year to maintain this equipment and FY1992 costs are anticipated to exceed \$18,000. At this rate of expenditure, the Patrol could replace all the equipment on the network with brand new equipment and see a return on their investment within 5 years. However, the Patrol would also like to investigate the possibility of alternate equipment that would not only provide the same capabilities as the old equipment, but would also provide new capabilities to the Troop commanders and communications personnel. This new enhanced equipment would, however, cost considerably more than the \$18,000 annual outlay.

PROBLEMS CONTINUED

The next system that will need attention soon is the **Motor Vehicle Inspection (MVI) Program**. The Patrol received a less than complimentary review by Legislative Post Audit when they examined this system. They indicated the Patrol should seek alternatives to the present manual system, which is less than adequate, and present these ideas to the 1991 legislature. The primary problem with the present system is matching the first copy of the MVI form, obtained from the party doing inspection, with the second copy, received from Department of Revenue after it is surrendered by the citizen who is trying obtain a title. It is important that these forms be matched in a reasonable time frame, for if a form is received from the Department of Revenue with no matching copy on file from the individual performing the inspection, it would indicate that the individual performing the inspection is not remitting the proper funds back to the state. The Patrol processes approximately 160,000 duplicate forms a years and is currently about 5 months behind, which translates into about 65,000 to 70,000 forms. Because manpower at the Patrol is already strained for other projects, it would appear that a solution would entail a system that requires very little manual intervention. The Patrol hopes to obtain a scanner which can read the forms, determine if the form being scanned has an accompanying report already loaded in the system, and store the form, perhaps on optical disk, the necessary 5 years as required by law. This approach would avert hiring additional personnel, and would allow the system to provide the necessary controls to adequately audit the MVI system.

The **Fleet Management System** that the Patrol will be enhancing in FY1991 had been planned for implementation on a Personal computer. The system would provide additional capabilities regarding tracking and projecting costs and problems related to the fleet. It is becoming increasingly obvious, however, that if the patrol wishes to implement a solution that will allow field and shop personnel to enter data relating to mileage and costs for the vehicle and also have the ability for Headquarters to review and track this information, a personal computer will not be adequate for this application. It would appear that if the application could run from a central platform that all parties have access to, it would be easier and simpler to implement and maintain the system.

PROBLEMS CONTINUED

Two other systems which have begun to show signs of problems are the Time and Activity system and the Leave Balance system. Both these systems utilize personal computers at the Troop locations to capture the data and produce local reports for the commanders. Select information is then extracted and a dial-in program allows the information to be uploaded to the Patrol's central site System/36. Here the data is once again downloaded to a personal computer at Headquarters so that the appropriate reports can be generated. Information from these reports include state wide totals and leave information which can be loaded into the State of Kansas Integrated Personnel and Payroll System (KIPPS). The personal computers in use at Troop Headquarters are quite old and are beginning to break down frequently. Because of the old architecture, these machines are relatively slow as compared to today's processors, and each successive update to the software causes delays in the program execution times. All of the personal computers involved utilize PC-FOCUS for capturing and storing of data and producing the reports. The software and processes as described above for these systems are rather confusing and cumbersome for field personnel. This translates into the need for additional support by central site staff. New releases of software or modifications to application programs on these personal computers generally result in a member of the Data Processing staff driving statewide to the various Troop locations. Once again, the only knowledgeable FOCUS programmer recently left the Patrol (this is the same individual who maintained their mainframe applications), and the Patrol is simply trying to keep these systems operational. The Patrol could, at a minimum, simply replace the personal computers with newer, more reliable, and faster models. However, it is apparent that continuing to support isolated systems statewide will only result in continued operational problems, difficulty for the Patrol to ensure that information is available to those who need it, and increased long term costs to the State of Kansas.

The Highway Patrols Word Processing and Office Automation systems are running on the IBM System/36 and several types of personal computers with different levels of operating systems, utilizing both Displaywrite III and Displaywrite IV. As a result, while there has been an attempt at standardization, the Patrol still cannot make use of office functions such as electronic mail, calendars, etc. because of the diversity of hardware and software. Also, the personal computers being used at the Troops to support word processing are the same processors used to handle the Time and Activity and the Leave Balance systems and are due to be replaced soon.

PROBLEMS CONTINUED

In addition to the problems outlined above, and far more global in impact to the Highway Patrol, is the overall **Organization of the Information Resource**. The Highway Patrol has a number of systems implemented on different processors with no easy method in place to access the information. A quick glance at Appendix A will give you an indication of the number of applications in place at the Highway Patrol and the lack of integration of these systems. With the diversity of systems scattered around the state and no effective way to coordinate the information on any of these systems, it is becoming increasingly difficult to maintain these applications. This situation began to manifest itself within the Time and Activity system and Leave Balance system and became noticeably apparent when the Highway Patrol began efforts to implement a Fleet Management system. As the Patrol continues to implement new solutions, a separate and isolated approach to each system will only add to these problems. If the Patrol is going to provide support for the diverse applications throughout the state and continue to build new systems to meet future demands, there must be some effort to coordinate these systems today.

PROPOSED SYSTEMS AND MAJOR MODIFICATIONS

Arguably the most critical activity in the long term development of the Highway Patrol's Information System is the introduction of an **Integrated Support System**. This system would most likely make use of several key databases (e.g. personnel files) as its foundation, and allow access by all other major systems at the Highway Patrol. Because the Time and Activity system and a Leave Balance system show signs of needing major modification, and the Patrol is in the process of implementing a Fleet Management system, the time is right to implement an overall strategy that allows these systems to be effectively coordinated with other systems, both within the Highway Patrol and within the State. Appendix B graphically represents the proposed plan for logically reorganizing the information maintained by the Patrol and their various interrelationships. Setting this foundation today is going to be critical to delivering all new applications discussed later in this document and managing the information resource in coming years. If implemented properly, the following described applications will not only be easier for the data processing staff to build and maintain (or purchase and integrate), but will be accessible by all relevant personnel.

Motor Vehicle Inspection

The Motor Vehicle Inspection (MVI) system is presently a manual process which consists of receiving two copies of an inspection form, matching the form numbers to determine that we have received both copies and storing these forms for 5 years. At present the Patrol is months behind in this effort which translates into tens of thousands of forms. There is no automation involved at this time and a recent Legislative Post Audit report was critical of the process for not providing the controls necessary to adequately oversee the proper operation of the project. The Patrol is pursuing the possibility of utilizing a scanner to read the forms, capturing the form number and comparing it to a corresponding form number if it exists in the system. The system would then store the form in an optical media format for the necessary 5 years. Estimated storage requirements: 2 physical files, 1 alternate access path, 10 programs.

Data storage needs - 5,600 Blocks

Fleet Management

The present Fleet Management system is very limited in both scope and ability. Not all necessary information is being captured and therefore, it is difficult to track and project the present fleet status. With the Patrol possibly opening additional repair facilities in strategic locations, it will become critical to effectively manage the operations of these facilities including repair parts inventory, mechanic activity, etc. Also, there is no automated method to schedule preventative maintenance on a consistent basis. As mentioned earlier, the Highway Patrol was allocated approximately \$27,000 to rebuild or replace it's present fleet system. There is a multitude of packages on the market that can be used to monitor fleet activity. The Patrol is particularly interested in obtaining a package that can be implemented in a manner that allows the Logistics section at Headquarters to monitor the fleet, allows shop personnel immediate entry and recall of service information and the ability for Troop Personnel to enter data and recall select information. While the Highway Patrol could most certainly implement a solution on the present System/36 or on a number of personal computers, an approach consistent with the discussion regarding an integrated information solution would appear much more viable in the long run. Estimated storage requirements: 27 physical files, 45 alternate access paths, 200 programs.

Data storage needs - 39,000 Blocks

Time/Activity and Leave Balance

The current Time/Activity and Leave Balance systems have provided the Highway Patrol with valuable information over the past 5 years. However, as indicated earlier, problems are beginning to occur which will need some attention if these systems are going to continue to function for the Highway Patrol. The original plan for these systems included implementation on personal computers in the field until such time as growth and access needs warranted moving these applications to a different platform. Hence the reason these system were implemented utilizing PC-FOCUS, thereby allowing for a natural evolution to an upgraded platform. It would appear that the time for the migration of these systems to a more powerful and accessible system is growing near. If implemented in conjunction with with other systems at the Patrol using DISC's approach to organizing information resources, these systems can become even more valuable to the Highway Patrol in future years. Additional storage requirements: 2 alternate access paths, 5 programs.

Data storage needs - 3,200 Blocks

Logistics Supply and Inventory

Corresponding to the logistics that are necessary to maintaining a fleet system are the supply and inventory components that are essential to maintaining an organization that is distributed over the entire state. This is accomplished at present with an extensive manual system which allows headquarters personnel to monitor usage of components and reorder before these items fall below an unacceptable level. This application would appear to be a good fit for automation as well, especially if bar code labels might be used to track and dispense items from the stock room. This system would also benefit from the advantage of an integrated support system to coordinate the availability of repair parts with the Fleet Management System. Estimated Storage requirements: 2 physical files, 3 alternate access paths, 50 programs.

Data storage needs - 6,250 Blocks

Accident Reports

Accident reports are completed for any accident that is worked by a trooper throughout the State. Upon completion of the investigation, these reports are forwarded to Headquarters and assigned a number to allow for indexing. At present, these reports are indexed manually on 3x5 cards. Because of the time involved to forward reports to Headquarters and the hand searching which occurs with the index files, it is difficult to respond to inquiries in a timely manner. The Patrol would like to implement a solution that allows this information to be stored on-line on a computer system with access by both headquarters personnel and field personnel at the Troop level. Estimated storage requirements: 5 physical files, 22 alternate access paths, 30 programs.

Data storage needs - 152,700 Blocks

Incident/Arrest/Case Management Systems

The Highway Patrol has a multitude of other manual record systems presently in place at Headquarters which could be automated. These include arrest and investigation reports, DUI reports, Vehicle Tow/Storage reports, Court orders, and Subpoenas to name a few. At present, Patrol staff is reviewing the possibility of combining several of these forms into a consolidated form useful for the majority of cases. Once again, if this form is implemented, it would appear that several of these systems could be combined and automated in fashion similar to the accident reporting system to facilitate better record keeping and faster access time. Estimated storage requirements: 7 physical files, 30 alternate access paths, 45 programs.

Data storage needs - 384,000 Blocks

Patrol Accident History System

One small system that could actually be part of the Fleet Management System (dependent on the vendor package ultimately selected) is a Patrol Accident Reporting System. This system would be incorporated in a manner that would allow information to be shared with the fleet management repair and vehicle data. It would allow the Highway Patrol to track accidents involving Patrol vehicles similar to the method in which the fleet management system would track other service records. It would also need to retain such information as location of accident, cause, other drivers (if any), etc. If this system is not delivered as part of the fleet management package selected, the Patrol will develop their own system when resources and priorities afford the opportunity.

Computer Aided Dispatch (CAD)

Currently, as Kansas Highway Patrol troopers are on the road covering the State, they maintain contact with their communications center via two-way radio. Communications operators receive and transmit calls to and from the various troopers throughout each day. As a trooper works through his day, his activity and location are continually recorded by these operators on a "radio card". This manually kept card is a log of each significant call made to or received from an individual trooper. Computer Aided Dispatch (CAD) is a rapidly increasing trend among all types of public safety organizations to more effectively monitor an officer's whereabouts, thereby providing better protection to the Troopers while on the job. A CAD system would replace these radio cards with a more automated method for tracking and recording a troopers location/activity. Also, this information could serve as a valuable management tool to develop troop specific or patrol wide statistics and reports. With proper implementation, this system might be able to replace part or all of the manual process currently being performed by the trooper to fulfill the time and activity system requirements. Additionally, CAD systems often become the primary input for incident or accident reporting systems.

Accounting/Budgeting

The Patrol does not have an Accounting or Budget application at present. The Patrol does have a small program that tracks some vehicle expenses and a small personnel computer system that can be useful in projecting salary figures for Budget reasons. However, the remaining Accounting or Budget tasks are performed either in a manual fashion using ledgers, journals, etc. or via the new Statewide Accounting and Reporting System. (STARS). Unlike many other state agencies which utilize some computer resources to maintain transaction files, vendor files, and running balances that can be used to reconcile with STARS, the Patrol depends on a manual system to perform this function. Likewise, the budget process is a very time consuming and laborious process with little effort to utilize automation beyond simple spreadsheet programs.

It is the Patrol's desire to automate its manual accounting system, resulting a fairly simplistic system that would replace much of the present paperwork (i.e. ledgers, etc.). A system similar to those used by other agencies could be used to balance to the STARS database periodically, and would contain much of the information needed for projecting figures at budget time. Additionally, the Patrol accounting and management staff would have access to up-to-date information almost immediately. Data storage requirements: 5 physical files, 3 alternate access paths, 25 programs.

Data storage needs - 19,500 Blocks

SUMMARY OF ISSUES

As evidenced by the previous documentation, there is a large number of issues facing the Kansas Highway Patrol to support their operations in the coming years. Unfortunately, there are limited resources and all issues may not be able to be addressed in FY1992. The Patrol has taken these issues and prioritized them based on the following criterion, in order of importance:

- A. Impact on the safety of a trooper performing their job.
- B. Impact on the ability of the Kansas Highway Patrol to carry out their primary missions as dictated by the Kansas Statutes, the Legislature, and the Governor.
- C. Impact on the ability to provide Patrol management the information necessary to make the operational decisions affecting criteria #1 and #2.
- D. Impact on the short- and long-term operating expenses of the Highway Patrol.
- E. Maximizing the productivity of the support staffs at each Troop location and General Headquarters (GHQ).
- F. Impact on the information sharing capabilities between the Patrol and other State and Federal organizations.

With these criteria directing the decisions, the following represents the priorities of the Patrol regarding these issues:

1. Law Enforcement Network - this is informationally the single most important resource to protect a trooper's safety in the field. Communication operators MUST have access to this critical information at all times to appropriately advise troopers in their activities.

2. Motor Vehicle Inspection Automation - while this system, or actually the lack of an automated system, was singled out by the most recent Legislative Post Audit, it has less impact on the first three criteria used in evaluating these issues than the previous one. It is an activity currently being accomplished, albeit in a time consuming and costly manner. Investigation by the Patrol's GHQ staff has determined that automating this one application alone will cost in the range of \$115,000 - \$150,000 if implemented in a standalone manner. This cost, coupled with the Patrol's desire to avoid separate standalone systems (especially since an image-based solution could have other significant uses for the Patrol), makes it difficult for the Highway Patrol to approach the Division of Budget or the Legislature for the necessary resources to accomplish this one activity only.
3. Fleet Maintenance - because of the sheer number of vehicles necessary to support the operations of the Patrol, the impact these vehicles have on the ability of the Patrol to perform their mission on a statewide basis, and the importance of the vehicle to the trooper, it is imperative that this fleet is managed effectively. Out of service conditions must be minimized. Additionally, since vehicles represent the single largest capital expenditure by the Patrol year-in and year-out, it is important to ensure that the State of Kansas is getting the most for their investment in these vehicles.
4. Integrated Patrol Support System - with the Highway Patrol's increasing dependency on accurate, up-to-date information to allow management and troopers the ability to effectively carry out their missions, this activity needs to be accomplished now. If the development and proliferation of disjointed application solutions is allowed to continue, both the cost of this continued operation and support, as well as the cost for ultimately fixing the problem is going to dramatically increase. However, the cost for fully implementing this strategy is still costly and will show little direct return in FY1992, but strides can be made toward this goal even with minimal funding.

5. Time/Activity and Leave Balance Systems - this problem is vitally important to address for three basic reasons. One, it is the primary vehicle by which a trooper is authorized to receive payment for a given pay period. Two, the summary information is a tool used by management to ensure the Patrol is effectively using their trooper's statewide. Three, the current system is old, becoming very unreliable, and is costly to operate and maintain.
6. Logistics Supply and Inventory - this activity needs attention to ensure that the Patrol, while always maximizing cost effectiveness, can provide the necessary equipment and supplies to the right locations statewide to support operations.
7. Accounting/Budgeting - management and support staff, especially at GHQ, spend far too much time on manually addressing these issues (which, in turn, takes them away from other operational issues). Also, the State is driving more and more to automating these functions and the Patrol needs to be in a position to fully participate.
8. Case Management System/Incident Based Reporting System - these two systems, which are closely related, will have a strong impact on the ability to monitor the activities of the trooper and to ensure those citizens which are impacted by the trooper's activities have been afforded their rights under due process. These systems will aid management in effectively utilizing these troopers statewide. Finally, these systems will aid GHQ staff by automating several current manual systems.
9. Word Processing and Office Automation - due to the statewide nature of the operations of the Highway Patrol, steps need to be taken to facilitate communications. Documents must be shared, meetings scheduled, and messages delivered without the frustrations of mail delays and 'telephone tag'. Also, it is becoming necessary to be able to address these same issues with other relevant State organizations such as KBI, DISC, Revenue, etc.

10. Computer Aided Dispatch (CAD) - based on the criteria being used to prioritize these issues, it would appear that CAD should be much higher on this list. Granted, it is an activity which will improve the ability to track an active trooper's whereabouts, thereby improving that trooper's safety. However, the degree of improvement over the current 'radio cards' has not been identified or estimated. Also, CAD's use as a management tool is highly dependent on some of the other activities on this list being accomplished such as the Integrated Support System, Time/Activity System, and the Incident Based Reporting System. Lastly, CAD is a major initiative industry-wide in public safety currently and it would probably be in the Patrol's best long-term interest to let some of the dust settle.
11. Accident Reporting System - this application would improve the productivity of personnel and afford information to be available in a more timely manner. Since image technology may be a logical fit for some parts of this system, it also appears the MVI system needs to be addressed first and in such a manner that allows this system to become a natural extension.
12. Patrol Accident History System - this system will have similar components to No. 11 above, but must be able to work with the Fleet Maintenance System. This system, once implemented will have a benefit to management for decision making with regard to troops and the location of vehicles.

POSSIBLE SOLUTIONS

Several possibilities exist that will allow the Highway Patrol to address the problems that confront the agency. The following two alternatives represent what the Patrol views as the most viable based on the activities that must or should be performed and to provide the Patrol with the greatest amount of flexibility for the future. Either alternative will allow the Patrol to fully address the three most pressing priorities and in a manner consistent with the generation of an Integrated Support System. The key difference between the two alternatives is the manner in which equipment is implemented directly in the remote Troop locations across the State. Funding for both options will be provided through the fees collected from the Motor Vehicle Inspection (MVI) program.

Alternative I

Alternative I will allow for the direct exchange of equipment on the Law Enforcement Network for new 327X-type equipment and personal computers from State Contract. While this would provide for noticeably more reliable equipment to support the Troops, it will have marginal impact on providing new or enhanced functions. To fully address such functions as Computer Aided Dispatch (CAD) this equipment would, most likely, be replaced at a later date. This means that this alternative must be evaluated against whether there would be any reasonable opportunity to accomplish a preferred long term solution within three years. However, to simply continue spending the present amount of money to repair old old equipment when the State could conceivably realize a return on this money in roughly three to five years by simply buying new equipment seems foolhardy. The Patrol would need to shift approximately \$18,000 annually from Repairing and Servicing (Object Code 240) to Capital Outlay (Object Code 400). The new equipment could be obtained using certificates of participation with a combination of one- and three-year warranties.

Another key component of this alternative would be the implementation of an IBM AS/400, also off of State Contract. The AS/400 would be utilized initially for addressing the MVI image system requirements and for Fleet Management. The AS/400 has very strong capabilities for functioning as an image application server. This would allow for the MVI image system to be implemented in a manner consistent with the Patrol's desire for an Integrated Support System since the image-based technology could eventually be spread to such applications as Accident Reporting.

Alternative I Continued

The choice of the AS/400 is very logical for the Patrol based on its investment and experience with the System/36. Since maintenance costs and reliability concerns will eventually drive the Patrol to migrate from the S/36, it is appropriate for the Patrol to make that move today. The AS/400 system has several distinct qualities that sets it apart from the System/36, most notably its advanced database capabilities. Exploiting this relational database approach would allow for the capable implementation of the integrated support system as outlined in Appendix B, which could not be accomplished with a System/36. Likewise, the advanced communications capabilities and software availability will be useful to the Patrol for many years to come. The Fleet Management software which has already been awarded the Patrol's RFO, could now be implemented initially on the AS/400 which would save time and money with migrating at a later date. Also, the AS/400 could operate all of the current applications running on the System/36 with minimal modification, if any. This will allow the development of a total Integrated Support System to slowly begin as these systems are changed to meet the growing needs of the Patrol.

Another disadvantage to this alternative is the continued reliance on personal computers running Troop specific applications, such as word processing. This alternative provides limited ability for data processing equipment to communicate between headquarters and remote sites, and therefore, no capability to effectively correlate correspondence or data between various application software on the different systems.

Alternative II

The major difference between this approach and the previous alternative would be the placement of new processors at each of the field Troops (in addition to the new main processor at the central site). The smallest member of the AS/400 family (Model D02) appears to be the best option, based on the requirements of DISC's new proposed network, to meet all of the functional requirements which this document discusses. Associated with these new processors would be the replacement of the worn-out law enforcement terminal equipment with new equipment. This new configuration would not simply replace the present law enforcement terminals but also provide a platform to build a CAD system for the dispatch personnel. By utilizing a communications connection consistent with DISC's new network, this alternative could have a line used for law enforcement communications and also utilize the line directly back to GHQ to provide a fault tolerant communications link as a backup for the critical law enforcement network.

This alternative provides for the delivery of a true integrated support system for all information resources within the Highway Patrol over the next 3 to 4 years. By accomplishing this, the Patrol not only provides access between all functioning systems and data files within the agency, it also allows access by other systems or agencies connected to DISC. This is directly in line with the long range plans as outlined by DISC in the State of Kansas Information Resource Technology Plan.

Next, this equipment would also replace the word processing and office automation equipment that is experiencing problems. As discussed earlier, this equipment is wearing out and will need to be replaced within a few years. This new equipment would supersede the old personal computers and standardize the Patrol's word processing and office software, thereby providing the ability to send documents between offices via electronic mail.

This solution also provides access by the Troops to the other applications which could reside on the central site processor. This allows applications such as Fleet Management or Notice-to-Appear to be accessed by Patrol staff across the state permitting immediate update and recall of information on any database where ever it resides within the Highway Patrol.

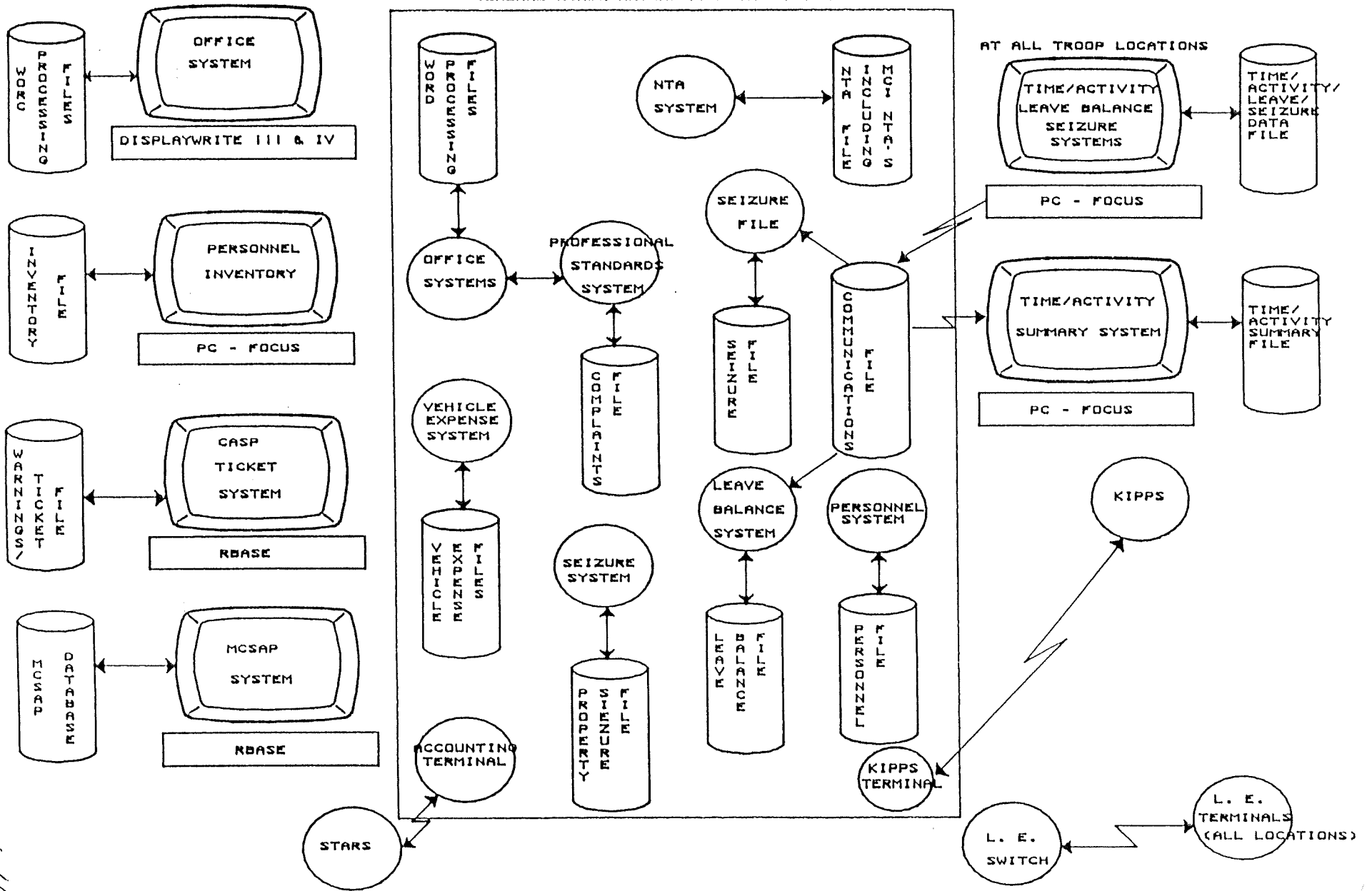
RECOMMENDATIONS

Based on the advantages and disadvantages of the two alternatives discussed above, it is the Highway Patrol's recommendation to proceed with Alternative II if at all possible. The Highway Patrol understands that the State of Kansas has insufficient funds to proceed with many projects this fiscal year, but would encourage an implementation utilizing the MVI funding source that appears might be available to the agency. Investment in Alternatives I will not fully achieve the goals set forth by the Highway Patrol or the State of Kansas as outlined by DISC in the Information Technology Plan. While Alternatives I is less expensive initially, the costs to support these alternatives in manpower and other resources, as well as the costs to swap this equipment out later, could impede progress within the Highway Patrol in future years.

APPENDIX A

KANSAS HIGHWAY PATROL CURRENT INFORMATION RESOURCE ORGANIZATION

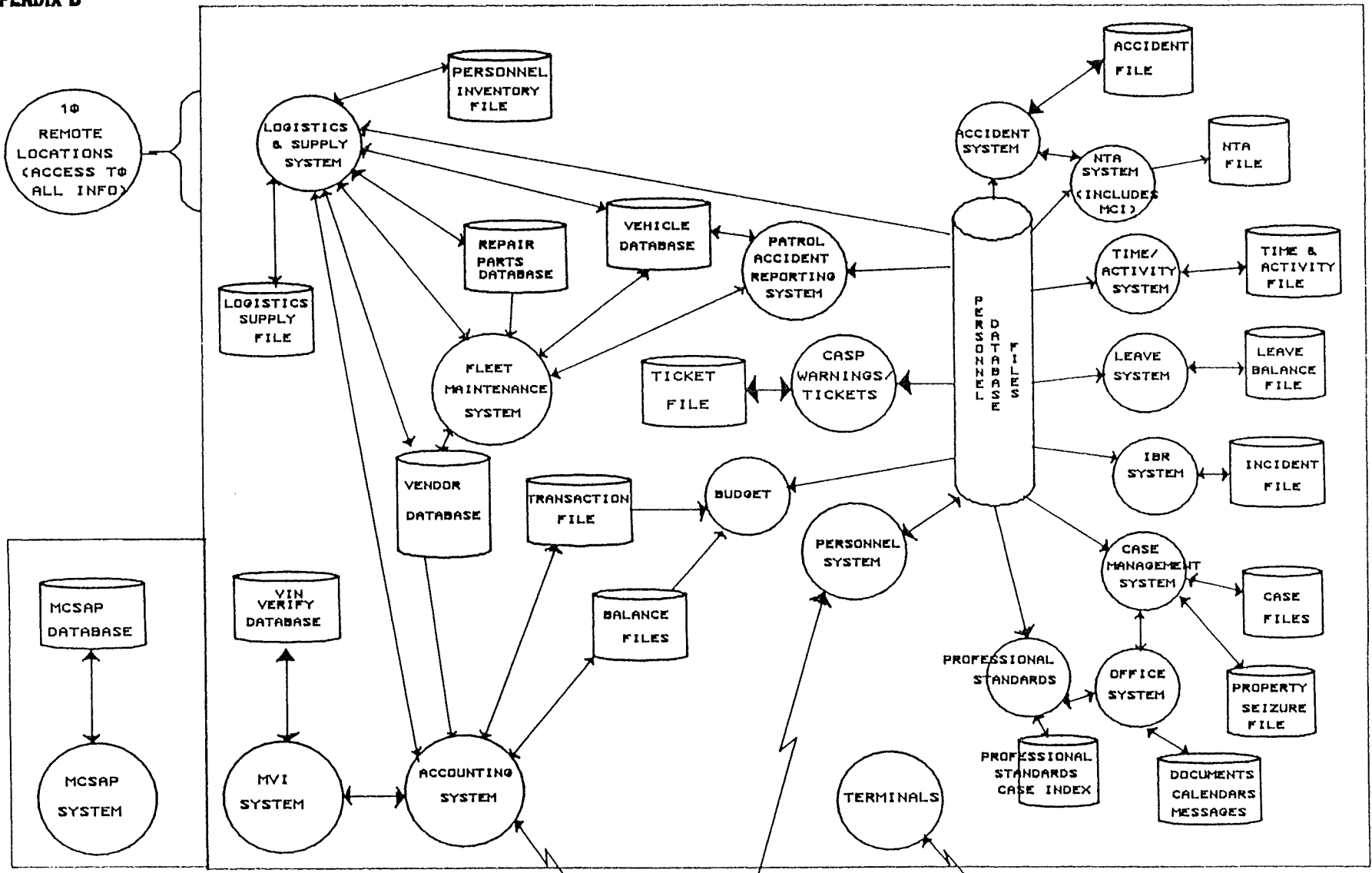
GENERAL HEADQUARTERS PRESENT SYSTEM/36



99-8

APPENDIX B

GENERAL HEADQUARTERS AS/400 SYSTEM



**KANSAS HIGHWAY PATROL
PROPOSED
INFORMATION RESOURCE ORGANIZATION**

2-67

Appendix C

Comparison of Alternatives

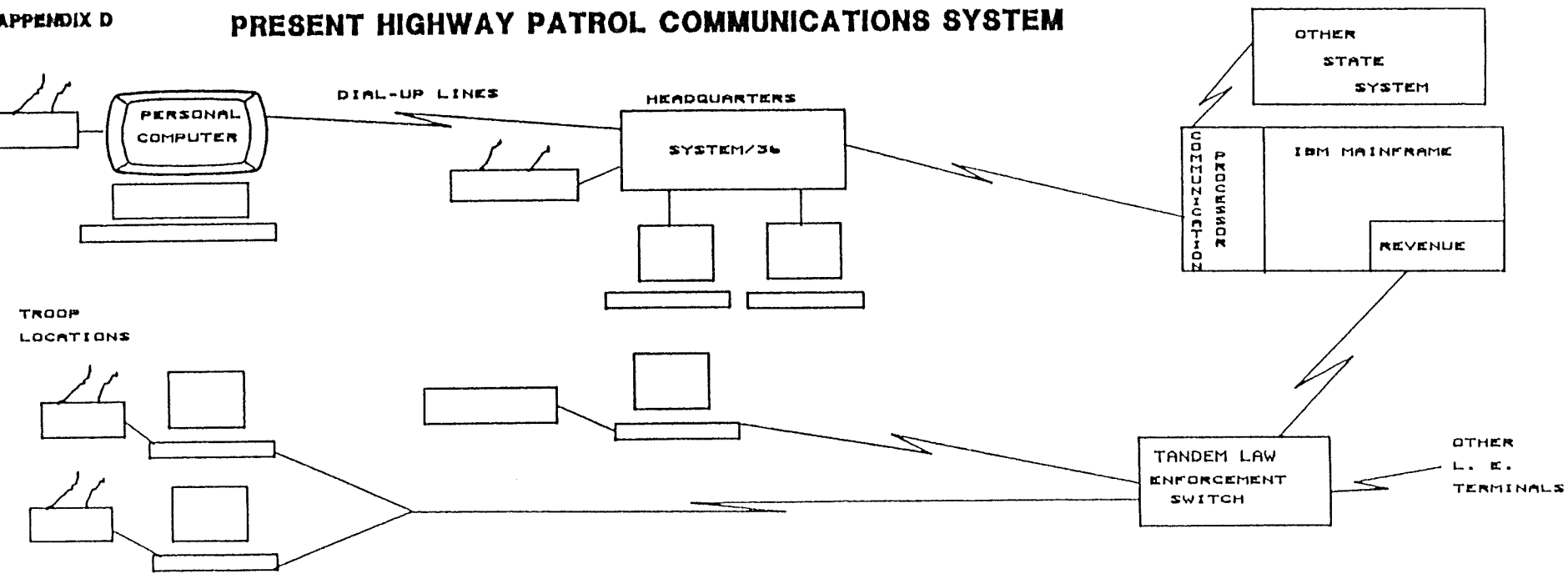
	Alt. 1	Alt. 2
<u>Problems to be fixed</u>		
Replace equipment on L.E. Network	X	X
MVI - VIN inspection paperwork	X	X
Fleet Maintenance	X	X
Multitude of standalone applications	/	X
Time/Activity and Leave Balance	X	X
Lack of Statewide Office Support		X
<u>New Activities</u>		
Integrated Patrol Support System	X	X
Inventory/Logistics	X	X
Accounting/Budgeting	X	X
Case Management System and Incident Based Reporting System	X	X
Computer Aided Dispatch (CAD)		*
Accident Reporting System	X	X
Patrol Accident History	X	X

Legend:

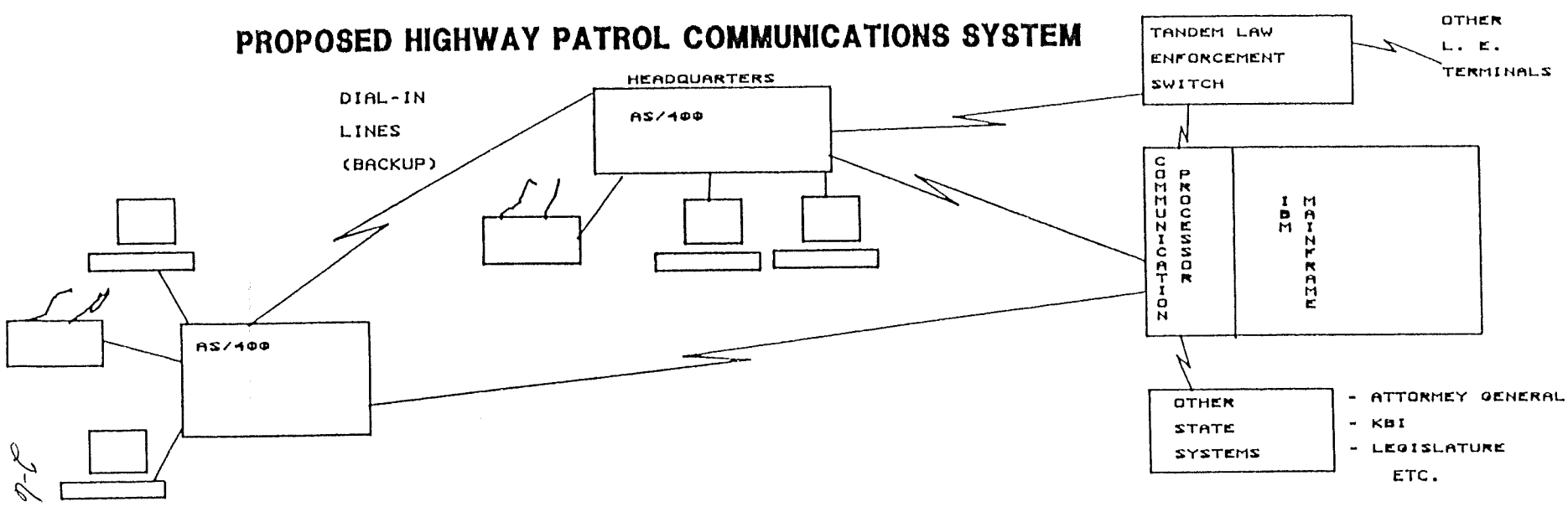
/ - indicates that a system (or some portion of a system) could be completed, although not in the fashion that would represent the best long term interests of the Highway Patrol.

* - indicates that the correct equipment is in place to implement this solution, but funding was not included to install this application.

PRESENT HIGHWAY PATROL COMMUNICATIONS SYSTEM



PROPOSED HIGHWAY PATROL COMMUNICATIONS SYSTEM



69-8

FINANCIAL ANALYSIS

FIVE YEAR COST SUMMARY

	<u>Alternative I</u>	<u>Alternative II</u>
Upgrade Central Processor		
AS/400 D35 Hardware(48MB/4.1GB)	\$ 145,367	\$ 145,367
AS/400 D35 Software	57,183	57,183
5-year Extended Warranty	30,000(estim.)	30,000(estim.)
Troop Terminal Equipment		
13 Control Units	143,743	
47 Terminals		
45 Printers		
12 Personal Computers		
7 AS/400 D02s		208,998
Hardware/Software/5-year Extended Warranty		
6 Controllers		
56 Terminals		
45 Printers		
MVI Image System		
1 Scanner w/ Auto Feed	119,000	119,000
AS/400 Software		
Optical Library Server		
SUB-TOTAL	<u>\$ 495,293</u>	<u>\$ 560,548</u>

FINANCIAL ANALYSIS

FIVE YEAR COST SUMMARY

	<u>Alternative I</u>	<u>Alternative II</u>
Amount to be Financed	\$ 495,293	\$ 560,548
Three-Year Financing		
8.0% Annual Interest Annual Payment	\$ 177,954	\$ 201,399
Total of Three Payments	\$ 533,862	\$ 604,197
Other Equipment Maintenance(3 yrs)	38,232	26,582
Minus Current Maintenance(3 yrs)		
Terminal Maintenance	(54,978)	(54,978)
System/36 Maintenance	<u>(6,574)</u>	<u>(6,574)</u>
Three-Year Total Outlay	\$ 510,542	\$ 569,227
Divide by 3	x 1/3	x 1/3
Annualized Outlays	\$ 170,181	\$ 189,742