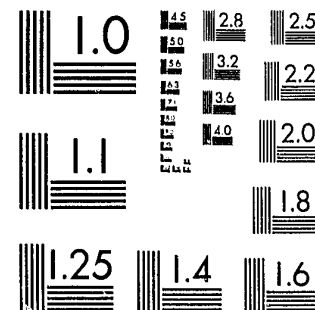National Criminal Justice Reference Service

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STUDY OF POLICE MANAGEMENT INFORMATION SYSTEMS

VOLUME III: POLICE MANAGEMENT INFORMATION SYSTEMS: THE CANADIAN EXPERIENCE

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CHAPTER I

INTRODUCTION

In the spring of 1976, Decision Dynamics Corporation was asked by the Ministry of the Solicitor General to conduct a study of police management information systems for Canadian municipal police forces.

The objective of the project is to develop management information systems specifications that could be used by Canadian police departments to guide future information systems developments. Documents developed through the study represent source books, handbooks or standards which police forces can use to identify, first their own information requirements, and second, the general specifications of information systems required to meet these needs.

This volume is the third of five separate reports which, together, comprise the total documentation arising out of the "Police Management Information Systems" study. They are:

- Volume I: Technological Alternatives and Development Initiatives for Canadian police; in this volume we project current trends in policing for Canadian municipal jurisdictions and their implications on the need for MIS in the future.

- Volume II: Police Management Information Systems Developments in the United States: A Comparative Review; in this report, we review MIS development in American police jurisdictions and extract a number of basic "lessons" for the Canadian audience.

- Volume III: Police Management Information Systems: The Canadian Experience; here we describe MIS initiatives in a number of Canadian police forces and conclude with comments about the development process in the Canadian environment.

- Volume IV: Targeted Information Processing System (TIPS):A Development Program for Police Management Information Systems; this volume contains a conceptual framework for developing a management information system in a Canadian police jurisdiction. The major emphasis is on "why?" and "how?". We view this volume as a "catalogue of procedures" on developing police MIS.

- Volume V: Targeted Information Processing System (TIPS): General Design Specifications; this final volume contains most of the technical design qualities of the TIPS framework presented in the previous Volume IV. Each TIPS component is described by a general flow chart illustrating inputs, output reports and file interactions. The content of each file is described in terms of the various record types and data elements.

These five volumes are "stand-alone" in scope. Each can be read without reference to the others. Each contains a perspective on police MIS at a different level of generalization and detail.

In addition to these five major volumes, we have provided a short monograph entitled, Police Management Information Systems Study: Summary and Conclusions. This is designed for more extensive distribution to a broader audience which may be interested only in the highlights of the project.

A. The Objectives of This Volume

In the previous volume we examined the U.S. police experience with management information systems. In this volume, we turn to the Canadian experience. There are many difficulties associated with "describing" Canadian police MIS experience. We will outline some of these difficulties to provide a general, introductory context for the material that follows.

First, the subject of management information systems is exceedingly broad. There are many different interpretations of MIS. Tracing MIS development processes over the variety of jurisdictions which are contained within Canada is inherently difficult. For example, what may be interpreted as a management information system in one jurisdiction may be described as "simply an indexing system", or a function of Central Records, in another jurisdiction.

Second, as our survey material will illustrate in subsequent chapters of this volume, Canadian police jurisdictions have not, generally (compared to the U.S.), allocated . major portions of their resources to MIS. Police MIS in Canada, with some major exceptions, is still in its infancy. As a result, it is difficult to identify the "basic themes" of the Canadian MIS experience.

Third, partly related to the lack of major funding of MIS in Canada, there is no major, central agency responsible for documenting MIS experiences. All of the material for this volume was collected directly from Canadian police sources. As not all police departments were included, this volume will be characterized by

substantial errors of omission. This study was not
intended to include an exhaustive survey of all MIS
development programs of Canadian police jurisdictions.

Accordingly, we do not intend to develop a
comprehensive reference manual on Canadian police MIS.
Our readers will not be able to use this document to
provide a comprehensive reference for MIS development in
Canadian police forces. Even if this were accomplished,
MIS developments in Canadian police jurisdictions are
taking place so quickly that the document would be
obsolete before it was published.

Our focus then, is on the over-all MIS environment
in Canadian police jurisdictions. We have selected the
information for this volume to illustrate the pattern
of MIS development for Canadian policing. This volume
is ultimately descriptive. Our language and selection
of items for Volume III is conditioned by an interest in
using this volume as a suitable introduction for Volume
IV, where we recommend a particular MIS development
program.

B. The Remainder of This Volume

Chapter II in this volume contains a summary of our
understanding of the current situation in Canadian police
MIS development. The conclusions do not relate to any
particular Canadian jurisdiction. They are based on more
than a year of interviews and discussions with Canadian
police managers. Our conclusions are candid. They
suggest that Canadian police MIS is still in its infancy.
We conclude that, although significant progress has been

made in many individual jurisdictions, the over-all
development initiative for Canadian police MIS is still
a few years away.

The remainder of the volume contains the information,
in more detail, on which conclusions were based. Chapter
III describes the Canadian Police Information Centre
(CPIC). Although the focus of our study is on muni-
cipal police management information systems, we believe
that CPIC has made a vital contribution to the over-all
development of Canadian police MIS. In this chapter we
describe the development background of what we call "the
Canadian police MIS utility", comment on its role in
municipal police MIS, and speculate on its future
development program.

In the following chapter, we report on the results of
a survey conducted of the 26 largest urban police forces
in Canada. This survey was performed to collect information
on the over-all allocation of resources by Canadian
municipal jurisdictions on police management information
systems. In each case, data was collected through the
office of the Chief of Police.

In Chapter V, specific MIS development programs
which are currently taking place in seven Canadian police
forces are described. Only five of the descriptions focus
on municipal jurisdictions; the other two elements of this
chapter describe development programs in an RCMP
detachment in British Columbia and the Ontario Provincial
Police. The major objective of this chapter is to illus-
trate the type and variety of MIS programs in Canada.

An additional objective is related to our interest
in introducing the over-all notion of police MIS. We
have selected these seven development programs accordingly.

CHAPTER II

SUMMARY AND CONLUSIONS: THE STATE OF THE ART IN

CANADIAN POLICE MANAGEMENT INFORMATION SYSTEMS

Our comments in this chapter are general. They will not
apply to all police departments in Canada. One of the most
obvious conclusions about MIS for Canadian police is that
no single critical comment applies to all police MIS
programs. Significant achievements have been made in the
development of police MIS in Canada, but the over-all process
is only in its beginning stages.

A. Canadian Police Are Showing a New Interest in
    Management Information Systems

This is a basic conclusion which can be drawn from
data which we have collected in both our survey of large
municipal police forces and interviews in selected depart-
ments. In particular, many police chiefs have indicated
an interest in moving their departments towards greater
application of computer technology. This interest is
associated with a number of different concerns. In some
cases, the sheer volume of record keeping for urban
policing is creating physical problems with information
handling. In other cases, senior Canadian police managers
have become aware of the computer revolution in other
institutions and intuitively believe that this technology
can be applied to policing.

However, this interest in management information sys-
tems among Canadian police chiefs has not yet crystallized
to a point where a profusion of large-scale MIS develop-
ment programs are in process. Many of the existing

programs are just beginning. Their relative immaturity is indicated by:

- the lack of well-defined organizational responsibility and budget accountability for MIS development in municipal police forces, and,

- the lack of technical, objective criteria for evaluating the need for, and justifying the development of, particular types of MIS in Canadian municipal police forces.

The importance of organizational clarity and budget accountability in the development of MIS programs can best be illustrated with reference to police forces in the United States. As we reported in Volume II, MIS programs in U.S. police departments have matured to a point where they can be evaluated within the police force and resources allocated to development programs in a logical, operational manner. It will be simply a matter of time before we achieve an equivalent decision process surrounding MIS in Canada. In succeeding sections of this chapter, we will illustrate these issues in more detail.

B. Canadian Police MIS Development Focuses on Records

There is a perception among Canadian police managers that the present crisis of policing in Canada is related to volume. That is, immediate police needs for management systems stem from increasing crime rates and, subsequently, an increased demand for service. The information context

of this type of problem is reflected in the volumes of records that are created by police operation personnel that make the administration of Central Records virtually unmanageable.

As a result, many Canadian police MIS programs focus on improving record-keeping efficiency. Beyond this, the MIS is conceived as a device to improve the delivery of specific bits of information to operational personnel. Investigators need more information to support specific investigations. Patrol constables need to be able to have access to files on specific crime occurrences in their patrol sectors. Hazardous address information should be available for dispatch operations. These types of operational concerns are foremost in the Canadian police impression of need for management information systems.

As we emphasize throughout the five volumes of this study, we believe that this orientation towards operations support detracts Canadian police from the management support potential of MIS. Systems that are built primarily to support record keeping do not necessarily generate timely management information, even if this management information could be easily spun off as a natural part of the system.

C. Few Municipal Police Departments are Prepared for MIS Development

Few Canadian municipal police departments that we have visited or contacted during this study are prepared to launch a major MIS development program. This lack of

preparedness is reflected in a number of ways. For example, there is:

- a general lack of appreciation for the value of management information to police operations. Management information must be viewed as a valuable resource, capable of improving police operations and management before significant resource commitments are made to its development.

- insufficient qualified resources within the police complement, capable of managing and directing the MIS development process. We believe that police MIS must be built under police direction. Before sufficient direction and control is forthcoming from trained, sworn officers, police forces must make a significant investment in training their personnel in the areas of management sciences, computer sciences and systems analysis. Few departments have yet made this commitment.

- a reluctance to acquire access to computer technology. Many senior Canadian police still view the computer with suspicion. But MIS is associated with computers and other electronic or mechanical devices designed to handle information effectively and efficiently. There are risks associated with acquiring computers. They are expensive and complex. They must be used intensively before they are cost-effective. Canadian police managers are not yet confident enough in MIS to make bold use of computers.

The lack of preparedness for MIS development amoung Canadian police forces is reflected in the lack of well-defined notions about the organizational process for conceiving and developing MIS in a police force. Our survey has shown that the focus of authority for developing MIS varies amoung police departments. In some police forces, this authority resides with the Central Records Unit. In others, the mandate for MIS development is in branches such as Research and Development, Data Processing and Information Services.

Our view of MIS development is that there must be stability and regularity in the MIS development process. MIS is too complex and expensive to be developed through negotiations with branches and units of a police department that have a number of functional responsibilities. An R & D Unit, by its very nature, is oriented towards strategic planning and performance review. A Central Records Unit is oriented towards the management of paper documentation. MIS conceived in these two different functional areas of police departments would not have similar characteristics.

D. Under{There is Generally Poor Police Control over MIS Development Programs}

A major problem is the lack of clear definition of what a police force will get for a particular dollar investment in MIS resources. There are two consequences, i.e.:

- MIS feasibility studies seriously understate the
  resource implications, both the dollar cost and
  secondary human resource implications of systems;
  and,

- MIS development teams seriously overestimate the
  consequences of MIS or the return that they can
  expect for this investment.

As a result, police MIS development programs in
Canadian municipal jurisdictions tend to be rather indis-
tinct. They tend to be controlled and directed through a
variety of interests which may be manifest in the develop-
ment team. For example, in our field studies we noted
the following types of influences affecting a number of
MIS development programs:

- Seconded data processing personnel from municipal
  common service organizations who are interested in
  creating a demand for their services in the police
  organization.

- Managers of large, municipal, general-purpose com-
  puter facilities who are interested in creating
  police demand for surplus computer time available
  through their under-used machinery.

- Police department civilian personnel with extensive
  experience in computer systems work who wish to
  commit the force to computer hardware, in part
  because they want to satisfy their own career
  expectations in the computer system area.

There is nothing illogical or covert about the three
"influences" on the development of management information
systems. These, and other types of interests, are common
to all MIS development programs in jurisdictions other
than policing. The existence of such personal interests
suggests a major need for strong control over the entire
development process and a need to harness MIS agencies.
We have noted a lack of strong development control in a
number of existing Canadian MIS development programs.

E. Many Police Forces Are Reinventing the Wheel

There is a certain amount of information exchange at
the operational level between police forces in Canada.
The Federal Solicitor General and other government agencies
publish many documents describing development programs
taking place in police forces. One of the objectives of
this study is to foster a form of information exchange on
MIS. The Canadian Association of Chiefs of Police pro-
vides a number of means for contact between police forces.
Its Annual Conference of Chiefs of Police is an opportunity
for information exchange. The work of its Technical
Liaison Committee is also in this mode. There are a
number of regional working groups in areas such as research
and development. Finally, there are numerous contacts
between technical personnel concerned with police develop-
ments.

However, in our field interviews, we have noted a
reluctance to consider the experience of other police
forces in the design of information systems for particular
jurisdictions. We cannot explain this reluctance except
to comment on its existence. There are two characteristics,

i.e., a reluctance to:

- acknowledge problems encountered in development of management information systems; and,

- learn from more advanced development experiences in the United States.

We are not suggesting that one generalized management information system can be created, suitable for transformation into all police jurisdictions in Canada. However, there are fundamental issues of design and development in Canadian police MIS which have been demonstrated in the development of TOPCOPS and CADRE in Ottawa, and PIES in Vancouver. These should be analyzed and understood by all personnel involved in the design and development of police MIS in order to ensure that subsequent design experiences minimize the failures of the past and maximize the successes of the future.

F. **No Major Central Agency in Canada has a Mandate to Evaluate New MIS Technology and Distribute the Results to Police Managers**

This is no fault of the agencies responsible for assisting police departments in Canada. For example, organizations such as the National Research Council are actively involved in programs supporting the development of MIS and other types of new technology for Canadian police forces. However, there is not yet a strong and urgently stated demand for evaluation information to support decision-making in police MIS design. We have a "chicken and egg" problem. Given the limited

budget of agencies such as NCR, and the need for hard science research in areas such as ballistics and forensic science, a limited demand from the field for information on MIS may continue to direct police evaluation and research into other areas.

However, serious problems are beginning to surface. For example, consider the issue of mobile digital terminals. Although MDTs are not strictly MIS devices, since they are generally evaluated in the domain of communications, they do involve computer technology and can provide access to information. Therefore, a decision to acquire (or not acquire) mobile digital terminals must be evaluated within the context of an MIS design.

There are a number of agencies independently evaluating the technical criteria associated with MDTs. They are:

- The RCMP, which is currently involved in a development of a pilot MDT system to interface with CPIC.

- The City of Ottawa Police Force, which is currently involved in the implementation of CADRE (through the Ontario Police Commission) which, in turn, will involve the implementation of MDT technology sometime in the future.

- The City of Edmonton Police Force, which is going through the decision process to determine the need for MDT technology as part of its MIS master plan.

In our police management information system study, we
have either collected information or interviewed members
of the three above-mentioned agencies in an effort to
understand Canadian police need for Mobile Digital
Terminals. At no time were we made aware of the existence
of cost-effectiveness studies which would justify the
expenditure of millions of dollars on MDT technology
for any jurisdiction. Nor, were we informed of any study
which compares the advantages (versus cost) of MDTs
and modified mobile terminals such as the "status box"
devices being used by the Metropolitan Toronto Police
Department. Perhaps such studies exist; but if they do,
we believe that they are not part of the literature or
research base contributing to discussions on the question
of MDTs in Canadian municipal police forces.

In order for police MIS to succeed in Canada, there
must be some institutional focus for the development of
technical performance standards. Some agency must take
the lead in evaluating hardware, considering the cost-
effectiveness questions of different forms of technology,
and developing mundane systems tools such as data element
dictionaries. If this does not happen soon, and indivi-
dual Canadian police forces continue to evaluate tech-
nology independently, we can make some simple and obvious
predictions. There will be:

- a delayed entry into the computer age by many
  Canadian police forces;

- an inefficient allocation of resources to MIS
  development by many police forces that commit them-
  selves to this technology; and,

- many disappointments, through unfulfilled expecta-
  tions, for many police departments that become
  involved in MIS.

We believe that this "institutional focus" for the
development of technical performance standards in police
MIS should be national in scope. Since these standards
are of value for all municipal police MIS programs,
they cannot efficiently be developed at the municipal or
provincial level. The need for such an agency is illus-
trated by the U.S. experience. As we have pointed out
in Volume II, the development of U.S. police technology
in the last decade was largely stimulated by LEAA, a
well-funded national agency.

CHAPTER III

CPIC: THE CANADIAN POLICE INFORMATION RESOURCE *

CPIC is a resource, developed through the National Police Services of the RCMP, which is available to all municipal, regional and provincial police forces in Canada. The successful development of CPIC and its utilization by Canadian police is a vital component of Canadian police MIS.

In this chapter, we focus on the development of CPIC, some of its operating characteristics and the future of the CPIC service as interpreted by senior personnel responsible for the system. CPIC is important for two reasons:

- the information files maintained through the CPIC facility are fundamental to police MIS. The success of CPIC is, to a large extent, dependent on cooperation between police forces in Canada, and will influence the course of MIS development in municipal forces.

- the successful development process for CPIC, based on Advisory Committees and open communications channels between participants, is a model for all police MIS programs to follow.

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*The authors are indebted to Mr. Jack Hopkins of the Canadian Police Information Centre for his contribution of much of the substantive material in this chapter.

Finally, future development programs, sponsored by CPIC (e.g., Mobile Digital Terminals, etc.) will influence the environmental conditions for MIS in municipal police forces. Police managers of MIS porgrams must be aware of these programs. Some of them are described in this chapter.

A. The CPIC Development Program

1. Historical Background

The need for automation within the police environment was first recognized early in the 1960s. There was a rapid increase in the crime rate combined with a smaller increase in the number of operating police officers. It was apparent that, if the trend continued, the ability of police forces to cope with the rapidly changing environment would become more difficult. The mobility and speed that could be obtained during the commission of crime and the increased capability of criminals to move across the country increased the importance of information to police. Also, the sharing of information between police departments increased, both in terms of quantity of information shared and its accessibility by police forces.

In 1966, at a Federal/Provincial Conference on crime, the Federal Government committed itself to funding, operating and maintaining a central computer system containing operational police data for use by all Canadian Police Forces as a part of its National Police Services. Such a system was to be controlled through the RCMP. The RCMP recognized that the

existing organization did not contain the expertise required to develop such a system. Accordingly, it was decided that to achieve this goal it would be necessary to hire computer specialists from outside the police community.

Early in 1968, a concerted effort was undertaken by the RCMP to recruit such a staff. The purpose of this specialized team would be to determine the cost, the computer network and the systems that should be developed for Canadian police forces. Also, to ensure that police needs were represented, police officers would be trained as computer specialists and contribute to the computer systems development. This signalled the beginning of full-scale development of the Canadian Police Information Centre.

It became clear early in the development stage that, if the Canadian Police Information Centre as envisaged was to be available to all Canadian police forces, a means must be found to ensure that their requirements be recognized by the development team. As a consequence, the RCMP, in a submission to Treasury Board, requested that the Federal Government subsidize the creation of an Advisory Committee for the CPIC development effort. The Federal Government agreed to this proposal and funded the first Advisory Committee meeting held in November, 1969.

At the initial meeting, representatives from twelve major police forces across the country and two representatives from the RCMP met in Ottawa. The mix of officers guaranteed representation from a broad

spectrum of police environments. From the beginning, the Advisory Committee has played a leading role in ensuring that the system would reflect the requirements of the Canadian Police Community.

Following the initial design presentations made by CPIC developments staff, the Advisory Committee members insisted on significant changes, specifically in the area of what consituted a wanted person. The original concept presumed that only records of individuals wanted on warrants for Criminal Code offences should be maintained centrally. Under strong pressure from Advisory Committee members this was changed to include any individual wanted under any statute. Major changes resulted, both in the quantity and quality of hardware that had to be obtained and in the complexity of the programs required to run on that hardware.

From a police operations point of view, however, it was obvious that the broader definition was necessary, if time savings or information advantages were to be gained. If records of all Wants were not maintained centrally, officers would still have to search more than one index in order to get complete response: one index would provide a rapid response, and the other, a slower response as dictated by the manual methods in use. There would be no net advantage to police.

The Advisory Committee imposed a number of other goals on systems development to achieve the maximum effectiveness for the police community:

- A response to any query could not take longer
  than three minutes from patrol car to communi-
  cations centre to the central system and back
  to patrol car. This meant (given the overloaded
  radio communications facility of 1972) that
  within the computer system itself, no more than
  30 seconds could be taken to respond to a query
  during peak load periods.

- A single query should, within reason, allow the
  user to have access to all pertinent information
  held in the central system, i.e., a vehicle
  query could return messages pertaining to a
  wanted person if such a relationship existed. It
  was felt that a large computer centre should
  not impose a restriction on the users, forcing
  them to make two queries when the information
  could be made available with one. This in-
  creased the complexity of the system but
  resulted in a more efficient system.

- A further restriction was cost. CPIC is funded
  by the Federal Government; it operates under
  government policies, procedures and budget res-
  traints. In the original concept, none of the
  costs were to be borne by any of the other police
  departments and, as the cost grew, CPIC maintained
  the stance that the centre should be funded by the
  Federal Government as a National Police Service.

To adequately determine the requirements of the
various police departments, development teams were
set up in four major areas: Vehicle system, Wanted Person

system, Criminal Name Index and the Criminal Records
system. These teams were to analyze the requirements
of the police community and to design, develop and
implement operational systems. Relationships existing
between the various systems had to be developed and
the design had to contain sufficient safeguards to
ensure confidentiality. Each of these teams made
extensive tours of a number of Canadian police departments
to discuss the problems with them, and to determine
their objectives for a national system. Each design area
was discussed and approved by the Advisory Committee.
Many suggestions were made at this level and subsequently
affected the ultimate design of CPIC.

CPIC successfully went operational with the
Vehicle file on July 1, 1972. During the initial
months of operation, considerable effort was spent
on improving and refining the quality of service.
Implementation of further systems was delayed until
CPIC was sure that the quality of service being
supplied was sufficient to warrant an additional
capability. In November 1972, the Wanted Persons
system was made available to terminal users.

The remaining two systems approved by the Advisory
Committee in 1969, i.e., the Criminal Name Index and
Criminal Record system, involved considerably more
effort and cost than the first two. In 1970, the
Criminal Records (or Confidential Records) maintained
and stored by the Identification Services of the RCMP
consisted of more than one million paper files. They
covered a time period from 1911 to 1970. During that
60-year period more than one and one-half million files

had been opened, of which 1.1 million remained open.

In November 1973, the files were made accessible
to the Identification Services of the RCMP to confirm
that the system was working properly and that the files,
being as large as they were, could adequately be processed
by the system before being released to the field.

In June 1974, these two files were put into use.
Also in 1974, a Stolen Property system was made avail-
able to users.

2. Current CPIC Management Structure

CPIC is part of the National Police Services of
the RCMP and falls within the jurisdiction of the
Deputy Commissioner, National Police Services. CPIC
is thus in the same category as the Identification
Services, the Crime Laboratories and the Canadian
Police College, as a service supplied by the RCMP for
use by all Canadian police forces.

Within CPIC the various technical areas of the
computer complex come under an Assistant Director of
Technical Services, who is responsible for ensuring
that all technical changes are coordinated and well-
planned. No changes of a technical nature are made
to the system without approval of a management committee.

Any changes that affect the users, either in their
operation, or in the information that they will have
to supply to or receive from the computer centre, must

have prior approval of the Advisory Committee before
implementation. The Advisory Committee is chaired by
the Director of CPIC, thus ensuring that both the
user requirements and technical problems are well
considered before any changes are made. All this is
to ensure that the service of CPIC is maintained
at an extremely high level and that Canadian police
forces can depend on its availability and its accuracy.

B. CPIC 1977

The CPIC Computer System and its files, in 1977,
consisted of information in the following areas: Vehicles,
Persons, Criminal Name Index, Criminal Records and
Stolen Property.

1. The Vehicle File

The Vehicle file was designed to contain informa-
tion primarily on Stolen Vehicles. However, it also
contains data on categories such as Abandoned Vehicles,
Crime Vehicles, (i.e., those vehicles which have been
used in the commission of a crime) and Pointer Vehicles
(which may be used as a point of reference to other
records on the system). A vehicle, in spite of legal
definitions, is defined as: automobile, truck, snow-
mobile, boat, aircraft, etc. Access to the system is
through either a licence number, a VIN number, part
number, or in the case of water craft, the Hull Iden-
tification Number.

Searches may be made on partial information such
as incomplete licence or VIN, depending on information

known to the inquirer. Response time from the system, because it is based upon an alphanumeric sequence, is rapid.

Records on the system may be associated to each other or to records in another system. Queries, for which a negative response has been given, are checked against subsequent additions to the file for the next 72 hours. This feature is useful to determine the route and possible whereabouts of vehicles which may have been checked prior to a theft report. Significant results have been obtained because of this feature.

2. Persons File

In addition to wants under the Criminal Code, the Persons system permits entry of warrants under other Federal Statutes and Provincial Statutes, including Highway Traffic Acts. The latter have a major impact on the efficiency of police departments. As clearance rates on traffic warrants increase, because of the increased possibility of apprehension, a reduction occurs in the volume of paper being handled, stored, and maintained by police departments.

Other categories of information such as parolees and individuals who are prohibited from possessing firearms are accepted. The prohibited group was extended in 1973 to include those who have been prohibited by a court from driving. Provision was also made for the acceptance of Missing Persons information.

We should note that the purpose of this system is not as a record keeping function for police departments, but rather it is a means of exchanging information quickly from department to department.

The development team and the Advisory Committee believed that certain facilities should be available in connection with Criminal Code warrants, which departed from normal practice existing in police departments at that time. It was decided that although the radius of return for the warrant was limited in nature, information indicating that the individual was wanted would be of value to other police departments. As a consequence, records pertaining to wanted persons indicate both the radius of return as well as the area of distribution of the information. Generally, Criminal Code offences are nationally distributed while warrants under other statutes remain within a province. Municipalities bordering on another province are treated as exceptions to this general rule.

3. The Criminal Name Index System

In 1969, it was evident that a major design and development focus of CPIC would have to be a system which would permit the searching of names on a computer. Unlike a Vehicle system, where a match either does or does not exist between one alphanumeric sequence and another, names have to be examined on their closeness to the original request. Name inquiries have to be searched against all reasonable spellings, using other

descriptive information to assist in an elimination process.

The systems design must solve two conflicting problems: how to give police all possible and reasonable information pertaining to a query, yet ensure that the amount of information being given was not excessive. The result was development of the FIND (Phonetically Indexed Name Directory) and its corresponding matching techniques. The FIND Code is far superior to any other name searching technique developed in North America or Europe. Basically, the FIND Code is a method whereby any name entered on the system is coded according to its apparent phonetic possibilities. Its development had to be consistent with the multi-linguistic nature of Canada. Other name searching techniques had been developed in conjunction with one ethnic group, usually English.

Allowance also had to be made for the possibility of different pronunciations existing in the various regions of the country. For example, the same name could have a different pronunciation in a French environment than in an English environment. In addition, studies were undertaken to ensure that the distribution of names present in the Criminal Record and Criminal Name Index systems truly matched the distribution of names that could be expected in an large volume of queries. Checks were made to ensure that post war immigration had not resulted in a significant switch in the distributions of names within the Canadian mosaic. Names with Van, Mac, De, Le, etc., have to be accommodated and assurances made that the name would be found and the record obtained.

Other descriptors such as Date-of-Birth, Height, Weight, Eye Colour, Given Names, etc., can be considered.

Studies examined the existing Name Index file to determine the value of such features as descriptive information in a search. Date-of-Birth is a useful descriptor, but it may be recorded incorrectly. It was necessary to permit some deviation in descriptors to ensure hits given, where reasonable.

Given names were studied in great detail as to their frequency, etc., and attempts were made to match christian names and common nicknames (both in the male and female categories); for example, John and Jack, Robert and Bob, etc. The Criminal Record, Criminal Name Index systems contain more than 400 John Smiths. There are more than 4,000 individuals with the surname "Smith" and in excess of 14,000 individuals that have surnames that are similar to Smith, such as "Smythe, Smits", etc.

The studies indicated that certain commonly present descriptors were not as useful for a large file as they would be on a smaller sub-set of the file, notably scars and tattoos. It was found that close to 80 per cent of the existing records contained a reference to tattoos or scars. This does not mean that they are not of value in a smaller sub-set of the file that might pertain to those individuals with the most active criminal histories.

The result of the studies was a weighting and matching technique applied to each record within a

name group to check its possibilities as a respondent.
A difference in descriptors may or may not result in
the record being given as a possible response to the
query.

4. Criminal Record Synopsis

In 1970 there were over one million records held by
the Identification Services of the RCMP. These
described individuals who had records opened since 1911.
The majority of this information was supported by
fingerprints and, it was felt that in order to further
ensure the integrity and accuracy of the information
system, only Identification Services would be permitted
to add, modify or delete a record. Therefore, users
could ensure that their information was supported by
fingerprint submissions and was therefore accurate.

In order to supply this information in an automated
manner, CPIC had to launch a large conversion effort
to examine each file, code the information and prepare
it for the computer system. Studies were conducted to
determine how many characters would be involved in the
conversion process, the panpower requirements and what
information should be automated. The result was a 75
man-year effort costing about $1 million.

With the concurrence of the Advisory Committee it
was decided that the full confidential record should
not be automated at the beginning; the primary need
was a synopsis of an individual's involvement with
police forces. It was determined that 13 categories

of information would be sufficient to describe the
major offence types with regard to Criminal Code and
other Federal Statute offences.

In addition to information concerning the crime
categories, the synopsis supplies the last recorded
descriptive data and gives an indication of the indi-
vidual's current status with respect to the Criminal
Justice procedure; i.e., is he still in prison, on
parole or free of any restraints.

C. The Hardware

The computer complex housed at RCMP Headquarters
in Ottawa is one of the largest computer installations in
the country. It consists of two large-scale IBM computers
and two smaller computers which handle the communication
lines to and from Ottawa. Further, in the major regions
of the country there are additional small computers to
concentrate traffic from their terminals for transmission
to Ottawa. In this way, costs are minimized and speed is
maximized in gaining access to the central system.

All hardware on the main system is duplicated so that
in case of failure of any component on the system, service
to the users is affected minimally. Of the two large
computers, one is always available for on-line access with
the other available both for testing of changes to the on-
line system and as backup. In case of hardware failure,
service may be restored on the alternate equipment in a
matter of minutes. It is for this reason that CPIC, is
able to provide service to the users more than 99 per
cent of the time. All communication lines to and from

the computer centre are dedicated lines so that service
is available instantaneously for any terminal on the
system. In addition, dedicated lines reduce the chance
of any covert attempt to gain illegal access. Much effort,
time and money has been spent in ensuring that service
to the users can be maintained at as high a level as
possible and with a minimum risk of any unwanted
intrusion.

The increase in traffic through CPIC's system over
the years has been quite intensive. As of February 1977,
traffic to the system on a weekly basis has exceeded
700,000 messages or over 38,000,000 messages per year.
An examination of the traffic pattern show that vehicle
queries are running at over eight million per year and
name checks, both Persons and Criminal Name Index, at
over 16 million.

The limiting factor on traffic seems to be the capacity
of communication channels between patrol cars and communi-
cations centres. As this capacity is improved, and other
devices such as mobile terminals are instituted, CPIC
will be required to handle larger increases in traffic.
The number of records being held by CPIC has also
increased at an extremely rapid rate. The number of
vehicles on the Vehicle file is now in excess of 100,000
and on the Persons file over 600,000 records across all
categories. This compares to the NCIC figures of 240,000
vehicles and one million persons from a population ten
times as large. The difference stems from the fact that
there is only one system handling these aspects of polic-
ing in Canada, whereas in the U.S. there are many separate
state systems which handle much of the traffic.

Within CPIC, there is one section which is entirely
devoted to studies of the existing traffic load on the
system and its effect on the computer hardware and
programs. They determine where bottlenecks are developing.
With early identification of problem areas, sufficient
time is available to solve these problems before they
become critical and affect users. The studies indicate
that the present hardware configuration is more than
adequate to handle today's traffic. In the peak hour,
when the load is at present approximately 7,400 messages,
the analysis indicates that no query to the system remains
unattended for more than 1.4 seconds. A vehicle query
will be responded to in less than two seconds after the
end of the message key is struck during peak-hour condi-
tions.

Predicted growth patterns in queries and file size
indicate that the current hardware and software system
will have to be upgraded by 1981. The existing configu-
ration will adequately handle a peak load of about 20,000
transactions per hour. Beyond that figure, service to
the users will begin to degrade and response time move
to unacceptable levels. CPIC will have to change
computer hardware and software before the situation becomes
critical. Plans for the necessary change-over have
already begun owing to the long lead time involved in
tendering for new equipment, evaluating it and ensuring
it functions properly before it is made available to the
users. Again, great efforts will be made to minimize the
effect of such a change on the user community.

D. New Interfaces

Under current technological conditions, the major limitation to virtually instantaneous response time for CPIC queries is in communications channels - that is, the interface between patrol unit, communications centre and the necessary manual interface between communications centres and CPIC. Two major developments are underway in CPIC which address this area. These are described below.

1. Mobile Terminals

In conjunction with the Federal Ministry of Communications, CPIC is proceeding with the design and development of a prototype mobile terminal for use within patrol cars. It is the hope of CPIC and the Ministry of Communications that a standard will be developed to assist other police departments in the evaluation and acquisition of such equipment. This standard will indicate what performance levels are required and what the specifications for interfacing with the CPIC computer network should be.

CPIC will not attempt to identify which manufacturers' equipment must be used. This choice must be based on the technical staff and budgetary restraints of individual police departments. The acquisition of such equipment should increase the traffic to CPIC significantly. If direct access from a patrol car to the computer centre at Ottawa is available, then considerably more checks can be made as mobile terminals will bypass heavily-used police communication channels.

2. New Terminals

The other area being addressed by CPIC's technical staff is the terminals themselves. The terminals currently in use (Texas Instrument 720) are adequate for their original purposes. Unfortunately, this terminal is no longer in production and it is anticipated that maintenance will become increasingly difficult. Further, in heavy traffic areas it is becoming a limiting factor. As a consequence, new terminals are being tested by CPIC and installation of these terminals in large record and communications centres has begun. The new terminals will consist of both a cathode ray tube screen and a low-speed printer for hard copy output where required. The advantages of the new terminal fall primarily in the following areas:

- Preformatting of messages is possible so that it will no longer be necessary for the typist to key the keywords that are necessary for use with the Texas Instrument terminals.

- Receipt and transmission of messages can be simultaneous. This will permit an increase in the traffic at heavier-loaded centres without resulting in an increase in manpower requirements.

Concurrent with the development and acquisition of new terminals, the communications aspects of the CPIC network are being redesigned. Demands are being placed on CPIC to connect with other police computers and with non-police agencies. For example, a computer to computer interface with NCIC in Washington is now

being designed, and interfaces with some provincial
motor vehicle branches are in place or planned for
access to registered-owner and driver-licence infor-
mation. In addition, the increased narrative traffic
requirements necessitate the development of a more
efficient message switching capability.

E. The Future

As well as expending considerable effort in ensuring
adequate service levels to users, CPIC is actively
engaged in new efforts, two of which are reviewed at this
time:

1. Redesign and Re-implementation of the Persons System

Because of the number of changes to the system and
the rapid growth rate over the years, this system must
be redesigned to ensure that it can continue to fulfill
the requirements of its users.

At the same time, one significant new feature -
dental identification - will be added. This feature
should be an aid in identifying bodies through compari-
son of ante- with post-mortem dental chart data. The
proposed system will eliminate impossible matches and
list possible matches in sequence in order to assist
qualified dentists in making identifications.

The structure of the system will involve a separate
sub-file of the Persons file with access via dental
chart keywords. Post-mortem dental records for uniden-
tified bodies and dental records for missing persons

will be stored on the same file. The addition of a
post-mortem dental record will generate a search to
compare with all ante-mortem records on file. Simi-
larly, an addition of an ante-mortem record will
generate a search to compare with all post-mortem
records. A query will search the type specified by
the user.

2. National Automated Criminal Index System

The second major area being examined by CPIC
is the National Automated Criminal Index System. The
analysis of the requirements for this system has been
completed and is under review by the Advisory Committee
at this time. If approval is granted by the Advisory
Committee, implementation in a first region is antici-
pated in 1978.

The NACI System is:

- a crime information system that will provide for
  the analysis of operational police data on a
  local, metropolitan, provincial, regional and
  national basis, if required.

- a tool to assist investigators and management
  with their functional responsibilities.

- a device to assist the standardization and index-
  ing of a common core of crime information.

- not a "Modus Operandi" system per se, but rather

a system for consolidating major crime information for analysis.

- not intended to replace current or proposed occurrence type systems, but will augment them.

- expected to be a sub-component of any existing or proposed police information system (CADRE, PIES, TOPCOPS, etc.) so that these systems can be interfaced.

F. The Role of CPIC in Municipal Police Management Information Systems

CPIC has made a vital contribution to the development of a management information system capability for Canadian municipal police forces. Unlike NCIC in the United States, CPIC is capable of storing all information on wanted persons, stolen vehicles, etc., for field support purposes for all Canadian police forces. The existence of CPIC makes it unnecessary for local police forces (or law enforcement agencies at the provincial level) to develop their own files in these crucial areas of policing.

The ability of CPIC to provide such an all-encompassing "utility service" depends on a number of factors, i.e.,

- the maintenance of current levels of crime and CPIC usage, within an order of magnitude of the current situation; for example, in the United States we

suspect that the combination of field support systems similar to CPIC (e.g. NCIC, CLETS, FCIC, etc.) contain 15 or 20 times as many records as CPIC. One centralized, national utility such as CPIC may be physically impossible in the United States.

- the cooperation of Canadian police forces in the Maintenance of CPIC; the national utility can only operate in Canada if virtually every police force in every provincial jurisdiction effectively makes use of CPIC. All participating police forces are responsible for entering the relevant data from their own jurisdictions. The complexity of data entry procedures and their dependence on hundreds of individual, independent agencies makes the success of CPIC highly dependent on cooperative police interaction.

Over and beyond the technical capacity of this highly complex system, the success of CPIC depends on the ability of its managers to maintain the confidence and active participation of municipal police users of CPIC. Historically, this relationship has been maintained through:

- the prominence of the Advisory Committee in both the original development of the CPIC design and its ongoing activity as the "representative" of municipal police interests.

- the CPIC investment in user training programs, which ensures that municipal users are continuously informed of new developments and their applications to municipal policing.

The experience of CPIC is an important lesson for individual municipal police forces involved in MIS development. Interaction with user groups is a fundamental element of success. MIS cannot be built in a vacuum. Users must be given an opportunity to determine the scope, structure and application of a management system. They must play a prominent role in MIS design. CPIC has shown that users and designers must work together. We confirm our belief in this principle by our development of TIPS specifications, wherein information systems target information to user needs.

CPIC has provided Canadian police MIS development with another, as yet unstated, development lesson. The lead time for the CPIC development, or the time elapsed between the original CPIC concept and its actual implementation, was approximately five years. This length of time is a measure of both the complexity of CPIC and the need to establish careful, consistent procedural control in systems development. In our field studies among Canadian police forces, we have noted a somewhat naive optimism about the speed at which MIS can be built. The CPIC experience suggests that the lead time is a lengthy one. We have built this into the TIPS design; we suggest that it takes approximately seven years to implement a comprehensive information system for a medium-sized municipal police force.

What direct role does CPIC play for an information system in a municipal police force? We believe that municipal police MIS design should consider two CPIC - derived issues, i.e.,

- <u>procedures for entering data on CPIC</u>; a municipal police management information system involves major restructuring of procedures for all information handling in the agency. Most police forces devote a significant proportion of their data handling capacity to maintenance of CPIC files. Development of a more advanced information system would require modification to current CPIC procedures.

- <u>new interface device developments</u>; in Section D of this chapter we described developments in mobile digital terminals and new communications terminals. Development programs in these two areas will profoundly affect the MIS design for municipal forces.

In both of the above-mentioned areas, municipal police MIS will have to keep pace with CPIC developments. CPIC maintains an active advisory capacity, constantly available to assist municipal forces with MIS programs. Municipal police MIS designers should make use of that capacity.

CHAPTER IV

SURVEY OF CANADIAN POLICE MANAGEMENT INFORMATION SYSTEMS

As part of the field study which contributed to this report, we visited many Canadian police departments and conducted interviews at all levels of command. We developed clear impressions of Canadian police MIS development initiatives. However, we wished to avoid making general, inferential statements about MIS in Canadian police forces from a small sample of observations. Therefore, we decided to launch a small-scale survey to collect primary data from a larger sample of police forces in Canada. This was carried out in the Spring of 1977. We took the following approach:

- We selected the 26 largest municipal police forces in Canada. Only large police forces were selected on our certain knowledge that very few smaller departments are currently involved with MIS.

- We constructed a questionnaire (a copy is contained in an appendix to this volume) and sent it directly to the chiefs of the 26 selected departments. A covering letter was included, explaining the over-all objectives of our study.

- Finally, we telephoned each of the 26 police departments and took all of the information over the telephone.

All 26 police forces responded to the questionnaire. The information collected confirmed many of our earlier convictions about police MIS in Canada and helped us to establish new insights into current applications and future development

programs. We report on this survey in this chapter in Section A.

A. General Characteristics of Police Departments in the Survey

Table IV-1 provides summary statistics on police forces covered by our telephone survey. The jurisdictions represented in the survey include municipal police forces from nine of the 10 Canadian provinces. They range in size from the Metropolitan Montreal Police Force with 5,200 sworn officers, to the police force in Sherbrooke, Quebec, with only 137 sworn officers. The municipal jurisdictions contain populations of between 2,158,000 and 100,000. In total, almost half of the total population in Canada is covered by these 26 municipal police jurisdictions.

We have displayed two types of statistics which describe these 26 police forces, i.e.,

- the ration of sworn to civilian personnel; and,

- the ratio of population in the municipal jurisdiction to police personnel.

The sworn/civilian ratio is a statistic which, to some degree, represents the extent to which the police force is moving towards traditionally non-police functions. MIS is an example of one of these functions. We believe that as MIS becomes more important to Canadian police, the sworn/civilian ratio will begin to decrease and approach the American norm or become approximately 3:1. Our data

on the 26 police forces indicate that there is a major
variation in sworn/civilian personnel ratios among Canadian
police departments. Only one police force reported a
ratio which approaches American levels - this is London,
Ontario, with 2.5:1. Other police forces such as Toronto
and Ottawa also have relatively low sworn/civilian ratios,
at 4.0:1 and 3.5:1 respectively. Other police forces,
such as Montreal, Halifax, Windsor, St. John's, and
Sherbrooke have exceedingly high sworn/civilian ratios.

We also looked at the ratios between population served
and police personnel for each of the 26 police jurisdic-
tions. There are major variations in this statistic. The
data show that Halifax, Waterloo Region, Niagara Region,
Hamilton-Wentworth Region, Halton Region, Durham Region,
and Sherbrooke all have low ratios of police officers and
other personnel to population.

Our data show that there are major differences in the
way that police resources are committed in the 26 major
cities of Canada. This, in turn, infers that there are
major differences in the law enforcement environment (e.g.,
conditions of crime, the politics of resource allocation
within municipal institutions, and the ralationship between
municipal and either regional or national police forces,
etc.) in these cities.

We cannot comment on all aspects of the "law enforce-
ment environment" in the 26 cities in this report. However,
we can quote some statistics which confirm that crime
conditions differ among some of the 26 cities in this
sample. We were fortunate to have access to munici-
pal crime data which was collected by Staff Sergeant Robert

Claney, OIC Planning Section, the City of Edmonton Police
Department. This information came directly from municipal
police departments. The data are shown on Table IV-2.

The table compares three types of reported crimes per
100,00 population - Crimes of Violence, Crimes Against
Property and Other Criminal Code Crimes - for 11 of the
26 police forces described in our survey. There are large
variations between the jurisdictions. For example, for
Crimes of Violence, the rate varied between 413 in
Winnipeg and 1,310 in Edmonton; Edmonton experiences 217
per cent more violent crime per capita than does Winnipeg.
There is much less, though significant, variation in Crimes
Against Property. These vary between 8,533 in Vancouver
and 4,516 in Metropolitan Toronto. There is only an 89
per cent difference between the highest and lowest munici-
pal jurisdictions in this category.

We caution the reader that the data on Table IV-2 are
subject to distortions because of variations in reporting
conventions on crime information among Canadian police
forces. Nevertheless, there is sufficient substance in
the data to confirm the notion that there are major
variations in the incidence of different types of crimes
among the major cities of Canada. We also believe that a
thorough study of other environmental conditions affecting
policing in the 11 jurisdictions would show similar
variation. Therefore, we can conclude that the need for
police technology, such as Management Information Systems,
varies significantly in the major urban jurisdictions in
Canada.

B. Existing Management Information System Facilities

Our primary interest in this survey was to establish the degree to which police departments were making use of "modern information technology". However, in our survey we had to overcome a major semantical problem - how do we define "modern information technology", and how do we identify it through a telephone survey? Hence, we inquired about the use of "computerized systems", as opposed to "Management Information Systems"; the latter term has a more oblique and vague meaning in the police environment.

Table IV-3 summarizes the use of "computerized systems" in the 26 police forces which responded to our survey. Twenty-two of the 26 departments (85 per cent) reported that they had "some computer applications". We itemized these applications in the study. The list of application areas currently computerized is also shown on the table. Seventeen areas were covered by the survey. Among the 21 police departments which use computerized techniques, we could enumerate 102 separate applications.

The total of 102 computerized applications in 22 police forces overstates the degree to which the sampled depart-ments have moved towards computerized MIS. At least five of the 17 application areas which were defined are often managed by municipal agencies outside of the police domain. These are: traffic accident reporting, vehicle maintenance, accounting, payroll, and budget control. If we assume that all of these application areas have been designed, and are being managed within the municipal common service area, then 49 of the 102 application areas reported are "outside" of the police environment.

Table IV-4 describes the distribution of computerized applications among the 26 sample police forces, by size of jurisdiction. The table shows that 13 of the 26 police forces serve a population of between 100 and 250,000 people.

Six police forces in this population range reported between one and three computerized applications. For all of the police forces reporting to the survey, four had no applications, 12 had between one and three applications, two had between seven and nine applications and the remain-ing three had ten or more applications.

To determine the over-all commitment to Management Information Systems by the sampled police forces, we needed additional data: the number of police officers and civilians assigned to MIS purposes; the total budgetary commitment and the locus of authority for development and maintenance of MIS in the police forces.

First of all, in the survey we asked whether the police forces had established a "section" which is responsible for the development and maintenance of management systems. Fourteen of the 26 police forces had established such a group. On average, there were six full-time staff allo-cated in each of the departments; approximately half of these were police officers and the remainder were full-time civilians.

There were no consistent loci of authority for MIS development among the 14 police forces. For example, in five of the departments, responsiblity for MIS rested with Planning and Research sections. In the remainder of

the police forces surveyed, responsibility for information
systems was allocated to sections such as the "Data Proces-
ing Unit" of the "Computer Services Section".

Only seven of the police forces had annual operating
budgets for MIS and data processing services which
exceeded $50,000 per year. Three of these forces are cur-
rently involved in a major MIS development program.
Also, two police forces in this group spent a large propor-
tion of their operating budget on data processing services,
for the use of "city hall computer facilities"; this amounts
to a major subsidy of the municipal computing facility.

On Table IV-5 we summarize the 1977 operating cost data
for data processing for the sampled police forces. The
data indicates that three of the forces located in smaller
jurisdictions had no budget for management information
services. Each of these three forces reported that they
were receiving "some services" from city facilities. In
seven of the responding forces, there were no expenditures
on data processing services. The remaining forces reported
modest expenditures.

We believe that the development of a Research and
Development section in a police force can create a major
incentive for management information systems. An R & D
section is capable of both creating a "demand for infor-
mation", through investigating future-oriented research
issues, and raising questions for senior management that
require information. Therefore, our survey inquired
about the existence of Research and Development (or
Planning and Research) sections in the police forces.
Eighteen of the 26 police forces reported the existence

of such a unit. Eight of the police forces surveyed
did not have such a section. In most of the police
forces where R & D was currently being carried out, the
section contained no more than three or four full-time
staff.

C. Planned Management Information System Development

We gathered information on the plans for future MIS
development in the sampled police departments. Table
IV-6 summarizes this information.

Eighteen of the 26 police departments reported that
they were planning to build new computerized applications
in the immediate future. The 18 departments tended to
be those that had already initiated some form of MIS,
while those departments which had no plans in this area
typically had not yet made formal plans for any segment
of an MIS.

We asked each department to indicate the nature of
planned applications using our original list of
"computerized applications". The 26 police forces,
collectively, are planning to develop 140 types of MIS
applications. The major activity is among police
departments serving between 100,000 and 500,000 populations.
Fifteen of the 18 departments reporting MIS plans fall
into this range. The distribution of planned MIS
development among the 18 different application areas
is evenly spread. The most prominent application areas
are: Summons and Traffic Ticket Control, Computer Assisted
Disptach, Statistical Reporting, and Personnel Management.

D. A Comparison of Management Information Systems in
    Canada and the United States

In the original design of this study, we had hoped to
construct a format for comparing the commitment to MIS
in Canadian and U.S. jurisdictions. We were able to
collect appropriate statistical information, through LEAA
sources, for a large sample of U.S. police forces. Using
this, we had hoped that our combination mail/telephone
information collection process for the 26 largest Canadian
municipal police forces would generate comparable data.
Our expectations were unfulfilled.

First of all, we were unable to collect any information
on the development costs associated with Canadian police
MIS. There are a number of reasons for this problem,
i.e.,

- Many of the elements of MIS development in
  Canadian municipal police jurisdictions have been
  created through agreements between police and muni-
  cipal agencies (e.g., data processing centres,
  management services groups, etc.). These arrange-
  ments were not based on formalized systems develop-
  ment plans or any form of master plan document which
  contains development cost estimates.

- Only a very small number of the Canadian police
  forces surveyed had any notion of comprehensive
  management information systems. Instead, individual
  components of management systems, such as personnel
  management systems or payroll systems, have been
  built for particular functional needs. Costs tend

to be folded into the broader operating budget of
the police force.

- Finally, the state of municipal budgeting in
  general and police force budgeting in particular,
  is much more rudimentary in Canada than in the
  United States. Many of the police forces we
  surveyed would have difficulty performing a
  budget or expenditure analysis of police program
  areas such as "patrol" or "investigations".
  Accordingly, it is unrealistic to expect that they
  can provide estimates of expenditures in data
  processing and management information system
  services.

One obvious conclusion emerges from a comparison of
U.S. and Canadian MIS resources. Canadian municipal
police forces are, with some exceptions, investing a
much smaller proportion of their resources in management
information system tools. American municipal police
forces are, at least, a decade ahead of their Canadian
counterparts in the development of MIS.

E. Some General Observations about the MIS Development
    Process in Canada

Although limited in scope, our survey of large
municipal police forces in Canada has provided us with
some insight into the MIS development process. The
major conclusions which we can derive from this survey
are as follows:

- There is some interest in management information
  systems among Canadian police personnel. This
  interest has developed recently.

- There is little understanding of MIS as a
  comprehensive tool for police management.
  Canadian police have not yet decided on the
  importance and value of management information
  as a police "resource". Except on rare occasions,
  MIS is not being built in Canadian police depart-
  ments in accordance with an over-all Master plan
  which describes how the total framework of the
  information system will be constructed over a
  five-to ten-year period. As a result, the
  information systems which exist in police depart-
  ments today tend to be "fragmented"; they are a
  collection of data processing applications, each
  designed to satisfy a particular function unrelated
  to other potential uses in policing.

- Large commitments of resources are not being made
  to the development of MIS in Canadian police forces.
  Few dollars are being allocated and few senior
  level police managers work full-time on the
  application of management systems in policing.
  In many circumstances, the development of management
  information systems are the responsibility of
  either the Planning and Research section, or some
  other similar type of unit for whom MIS is
  a low priority.

- There is a loose relationship between municipal
  "common service" and police agencies in the
  development of MIS. This tends to contribute to
  poor development control. It leads to the
  understatement of cost estimates. Also, it leads

to the development of fragmented systems. MIS
components which satisfy the common interests of
the two agencies (e.g., payroll systems) receive
top priority.

Given the newness of MIS development interest in
Canadian police forces, none of these observations should
surprise the reader. Police management science is a
complex discipline; MIS, with its dependence on
computers and systems analysis, represents the intrusion
of a new, highly technical discipline. The new
discipline has not yet made a major impact on police
management science. It will take a number of years
before there is an accepted and effective interface
between police management science and management
information system science. Until that happens, it will
be difficult to establish a fertile environment for
the implementation of management information systems in
Canadian municipal police forces.

CHAPTER V

SOME MANAGEMENT INFORMATION SYSTEM PROGRAMS IN
CANADIAN MUNICIPAL POLICE FORCES

In Chapter IV of this volume, we provided a macroscopic perspective on management information system programs in Canadian municipal police forces. Our analysis was based on a survey which had been administered to the 26 largest municipal police forces in Canada. In this chapter we focus on the MIS development programs in specific police forces.

It is not the objective of this chapter to provide a detailed descriptive commentary on either the type of information systems being developed or the over-all development philosophy in a number of Canadian police departments. Rather, this chapter is intended to:

- provide a set of national reference points for Canadian police managers interested in management information systems; and,

- use general description of MIS developments in specific police forces to help illustrate some of the fundamental concepts of MIS.

We do not pretent that the following descriptions of seven Canadian police forces and their MIS programs constitute an exhaustive commentary on the "MIS state-of-the art" in Canada. All of the forces involved with MIS are not reviewed. Nor have we attempted to provide complete descriptions of the seven forces selected. Rather, this chapter is intended to describe and illustrate, and as such,

complement the more general descriptions in Chapter IV.

We have selected MIS development programs in seven Canadian police forces for this chapter. They are in the following jurisdictions:

- the City of Ottawa, Ontario.

- the Ontario Police Commission, which has developed a police management information system design to be implemented in a number of Ontario jurisdictions.

- Surrey, British Columbia, which is policed by an RCMP detachment.

- the City of Edmonton, Alberta.

- the City of Vancouver, British Columbia.

- the Ontario Provincial Police Force.

- Metropolitan Toronto, Ontario.

A. City of Ottawa: TOPCOPS - The Ottawa Police
   Computerized On-Line Processing System

With the development of TOPCOPS early in 1975, the City of Ottawa Police Force became the first medium-sized municipal police department in Canada to have a totally computerized occurrence reporting system. TOPCOPS has been operating successfully but, recently, a decision was made to replace it with a more sophisticated,

more comprehensive management information system. The
new system is being developed for the OPF by the Ontario
Police Commission. We will describe the new system,
called CADRE, in section B. In this section, we describe
TOPCOPS.

1. Background

Early in 1974, it became evident to senior manage-
ment of the Ottawa Police Force that the occurrence
reporting system then in operation was inadequate. Up
to that time, field officers investigating a call for
service filed an occurrence report consisting mainly
of free-form narrative information. These reports
were dictated by field officers and were subsequently
transcribed, distributed and filed on 3" x 5" index
cards by clerical staff.

These procedures caused two major problems which
seemed to seriously inhibit police efficiency, i.e.,

- it was difficult to develop adequate guidelines
  describing the type of information required in
  the narrative report. Field staff tended to
  say a great deal without necessarily providing
  required information for either follow-up inves-
  tigation or records purposes. The reports
  tended to be both inaccurate and incomplete.
  At very least, the occurrence reports varied in
  quality.

- clerical staff responsible for transcribing
  occurrence report tapes were unable to keep up
  with the work-load. During peak periods, there
  was a 30-day delay on information essential
  for investigation or street patrol.

Also, it was difficult to manually extract accurate
statistics on field occurrences for occurrence reports
based on narrative information. Not only were patrol
and investigative personnel unable to acquire the
necessary information for their work, but police
planners were having difficulty constructing statis-
tical data required to effectively deploy personnel
resources.

At this point a Task Force was established to
determine the most effective method of processing
occurrence reports in the Ottawa Police Force. The
Task Force included two senior officers, a civilian
employee of the force, and a number of personnel from
the City of Ottawa data processing division.

The Task Force drew up a list of recommendations
which were subsequently accepted by the Chief of
Police. These were:

- That an on-line computer processing system with
  a file capacity of 150,000 occurrence reports be
  installed. This matched the estimated through-
  put of occurrence reports for the OPF over a
  three-year interval.

- That this system be installed at the central

police station in order to maintain the confiden-
tiality of information on file and to ensure
the security of the system. TOPCOPS is a closed
system. It is not shared with other government
agencies. In any case, since the city computer
operated only 18 hours a day and five days a
week, its usefulness to the police was severely
limited.

- a multi-copy occurrence and investigation form
  should be designed and implemented to allow
  officers to record pertinent information at the
  time of occurrence. The format of the report
  had to be designed so that information could be
  conveniently and directly entered onto the
  computer.

2, The Development Program

Soon after the Task Force began its work, a forms
design and manufacturing firm was hired to develop
a multi-copy, snapout occurrence report form. This
was to become the basis of TOPCOPS. In April 1974,
R.L. Crain Limited was given a contract to develop
these forms. It was agreed that no payment would be
made for the design of the forms if the Ottawa Police
Force agreed to use them for at least one year.

Following a "needs" analysis conducted by the force,
occurrence and investigation report forms were drawn
up and distributed to a representative group of field
personnel for their comment and approval. Suggestions

were taken into consideration and a number of revisions
were made before the final draft was completed and
operationalized.

In July 1974, the recommendations of the Task
Force were accepted by the Chief of Police. Following
that, the City of Ottawa Data Processing Division drew
up a list of functional and program specifications for
the proposed TOPCOPS system. These specifications
were distributed to a number of large computer sup-
pliers who were invited to submit proposals. Because
the Task Force was able to clearly define the proposed
occurrence reporting system, it was able to develop a
systems evaluation procedure based on well-defined,
objective criteria. Each of the six proposals sub-
mitted was scored according to factors such as: price,
suggested hardware and software, possibility of data
loss through malfunction, maintenance time required,
disk capacity, potential for disk capacity expansion,
training necessary for programmers, data entry clerks
and users of the system, and response times for
requests for information.

After an extensive evaluation of the six proposals,
a contract was awarded to Sperry Univac. It was a
five-year rental agreement for the hardware and soft-
ware required to maintain TOPCOPS. The Sperry Univac
proposal was successful for two reasons. First, the
firm was able to show that it had experience in the
design and implementation of police systems in both
the United States and Europe. Second, its proposal
for the development of TOPCOPS satisfied the objective
criteria in the tender specifications better than the

other five bidders.

The rental cost of Sperry Univac equipment and software for TOPCOPS was estimated at $5,000 per month. Installation of the system took approximately six months and was largely carried out by Univac personnel. Before TOPCOPS became fully operational in January 1975, there was a 30-day period during which TOPCOPS and the old system were used concurrently. During this interval, problems in TOPCOPS were corrected and equipment checked while a back-up system was maintained.

3. The System

The TOPCOPS system is a total procedure for managing the occurrence reporting process in the Ottawa Police Force. That is, TOPCOPS contains procedures for completing information required on occurrence reports, entering this information on computer files, verifying its accuracy, modifying the data when required for administrative or investigative purposes. So, although TOPCOPS is often referred to as "a computer system", we should be aware that the major component of the development process is related to the installation of procedures to manage data.

The hardware systems involved in the TOPCOPS include:

- a UNIVAC 9214-B central processor;

- a card reader;

- a line printer;

- three UNIVAC 8414 disk storage units to contain all necessary data, index and program files of the system;

- a standard card punch;

- three UNISCOPE-100 cathode ray tube terminals for data entry, verification and inquiries;

- a UNIVAC 8514 communication output printer which provides copies of display replies.

This equipment is located on-site, in the Ottawa Police Force headquarters building.

An atom mapping system was developed for the OPF by Dr. Fred Lipsett of the National Research Council and added to TOPCOPS early in the project. The atom mapping system divides the city into "grids" and allows statistical analysis of occurrences in small geographical areas. Currently, the atom mapping classification system is being used to develop incident maps to be given to field officers for use in preventative patrol. Statistics are available from TOPCOPS on a 24-hour basis and the force believes that this system can be expanded and actively used by field personnel in the future.

The data entry component of TOPCOPS captures information directly from the occurrence and investigation reports submitted by field officers. These reports

are brought to the Records Section of the Staff Services Division by field officers or their supervisors following tours of duty.

Occurrence reports are normally checked by platoon sergeants and commanders before submission to the Records Section. In the Records Section, four individuals are employed as "readers" to check reports for accuracy and completeness. If any problems arise, reports are returned to the officer involved in the case. Also, a random audit is done on approximately ten per cent of all the occurrence reports submitted by the computer staff section of the department.

The report reader adds a classification code to the form. All types of offences are classified according to a five digit code. The first three digits match the classification codes of Statistics Canada; the last two digits allow expansion of the codes into more specific detail (e.g., type of weapons used in homicides).

After the occurrence reports have been checked and classified, data entry operators in the Records Section enter the information directly from occurrence reports, through Cathode Ray Tube terminals (CRTs), into TOPCOPS data files. Special codes are used to ensure that only authorized personnel can enter information. Preformatted "screens" minimize both the time required for entering new information and the possibility of errors.

Data verification procedures have been developed to ensure the accuracy of information before it is actually entered in the data file. The CRT terminal has been programmed to check each item of data, in each data field, to ensure that it falls within a prescribed range. For example, if by mistake the number 2 is entered in the field designated for "age of offender", and error flag will flash and the record will be stored in a special file for subsequent verification. The data verification operator must check each piece of entered data and "key over" any incorrect entries.

Corrected data is transmitted to the computer where en edit is again performed by the computer to ensure that any changes made are valid. Following final verification, the original reports are stamped as "entered" and are filed in case folders in the hard-copy master record file. These hard-copies are kept for five years. Simultaneously, the computerized records are actually entered in the TOPCOPS data file. Three types of records can be accepted by the system: occurrence, persons and vehicles. Each contains information on its type, its status, its specifics and any error flags which have been activated during the edit process.

The data entry files feed information into the Case Master File which contains all information relating directly to cases, including: case number, division assigned, atoms, occurrence, classification codes, status of case and charges laid. Records are stored in sequence, by case numbers.

An additional file in TOPCOPS, the Persons File, contains information relating to all persons involved in cases, including: victims, accused, witnesses and complainants. There are in addition, two minor types of files: The Atom Index and the Classification Index File, which are used to locate a record identified initially by either of these two codes.

After information from occurrence reports becomes part of the TOPCOPS data base, it may still be necessary to alter, modify, delete or add to the data on an occurrence. Data base modification procedures are an important component of the entire system. In TOPCOPS, separate programs and procedures have been developed for modifying each of the three main files - Vehicles, Persons and Case Master Files. The use of these programs is restricted to Records personnel trained in the operation of the computer system.

For example, if the status on a particular case changes from "unverified" to "verified", the Case Master Files must be changed appropriately. The procedure begins with the location of the existing record. It is called from the system and displayed, via the preformatted screen, on a CRT terminal. The operator, using a cursor/locator, can change an individual data element on the screen. A "change action" is performed and the new record replaces the old record in the Case Master File.

The data retrieval function is the crucial element of any information system. Since the major purpose of TOPCOPS is to provide rapid response to requests for information by police personnel, data retrieval

and procedures associated with it are key elements of the system. There are several different types of "request for search" procedures in TOPCOPS. These include: request for information in the Case Master File; request for information regarding persons involved in cases (person details); requests regarding vehicles involved in cases (vehicle details); request for standard statistics or information on particular cases. A CRT terminal must be used to initiate any of the available search programs in TOPCOPS.

Requests for information regarding the Case Master File are initiated by entering a code for this particular program. The user is presented with a blank Occurrence Search Request screen and decides how the reply information is to be presented. The system is designed to "prompt" the user on the parameters of their requests. For example, if the user requests information on "all cases" satisfying certain criteria, the number of records is indicated. It may be impossible to scan all of the records in a reasonable time interval through the CRT mechanism. The user may then route the information through a line printer located in the computer room.

The user supplies known parameters about a request only if these will facilitate the search process. Some fields may be left blank if unknown or inapplicable. Some matches will be exact while others may fit into ranges of information provided in the various fields of the search request. For example, a user may wish information on case number 1234, occurring 12.05.75, at a particular street address. If the case number is

known, only that information has to be entered as a
search guideline. On the other hand, if the user
knows only the date and some general characteristics
of the case, the system will display all cases satis-
fying those criteria.

Requests for information about a specific person
or persons involved in any case are handled in the same
way. The user enters the code which activates the
Person Search Request Program and is presented with a
blank persons search request screen. Again, only
information necessary to facilitate the research needs
to be provided by the user. If the search was for a
particular individual's record, personal data is
required. In addition, data may be entered describing
the person's involvement in a particular case, ensuring
not only a search of the Person File but of matching
case records as well.

The same procedure applies on request for data in
the Vehicle File. However, if the licence information
is given, the reply will be immediately displayed. If
this piece of information is unavailable, the reply
may take longer and may be printed on the on-line
printer.

The request for standard statistics provides a
variety of data, usually grouped around particular
time periods. When the appropriate code is entered,
the user is presented with a blank request for stan-
dard statistics screen. Figures are retained in the
file on a month-to-month basis for all classification
codes. Replies are displayed on the CRT immediately;

no print option is available. Monthly figures are
available by code; yearly information could also be
obtained by leaving blank the month information space
on the screen. This allows the user to observe the
trends in any "crime category".

Finally, TOPCOPS regularly generates reports
required for Statistics Canada reporting purposes.
These reports are generated in a "batch mode". The
activity takes only a few moments with TOPCOPS,
whereas the previous manual system took several man-
days to complete.

4. Significance of TOPCOPS to Canadian Municipal Police
Forces

To the best of our knowledge, the design and imple-
mentation of TOPCOPS represents the first major appli-
cation of automated information systems by any medium-
sized Canadian municipal police force. TOPCOPS
represents a valuable systems experience for other
police forces contemplating similar types of develop-
ment programs.

There are three positive demonstration qualities
of the TOPCOPS program. They are:

- TOPCOPS represents an automated solution to a
  fairly well-defined information handling prob-
  lem. The problem was perceived by senior
  management in the police force and analyzed in
  a systematic fashion. The subsequent design

and development experience is of value to
Canadian police forces. A Task Force composed
of civilian and sworn members of the police
force and representatives of the city adminis-
tration was given the responsibility of making
recommendations. It was able to outline a
comprehensive set of solutions to the prevailing
information handling problems. This type of
inter-agency and interdisciplinary Task Force
approach is a sound way to initiate an informa-
tion system development program.

- The actual hardware and software components of
TOPCOPS were leased from external agencies.
The tendering process adopted by the OPF for
soliciting proposals and evaluating tenders was a
highly scientific procedure. We were impressed
by the degree to which the OPF Task Force was
able to apply objective criteria to the selection
of hardware and software suppliers. Other
Canadian police forces, going through the same
process, can learn valuable lessons from Ottawa's
tendering procedures.

- TOPCOPS proves that an automated occurrence
reporting system can be developed and implemented
by a medium-sized Canadian police force at a
modest cost. For approximately $5,000 per month,
Ottawa has acquired a reasonably sophisticated
configuration of computer hardware and software
and has moved into automation without serious
financial risk.

On the other hand, TOPCOPS was a qualified success
for the Ottawa Police Force. Difficulties were ex-
perienced in designing a system which was capable of
providing a consistent set of crime statistics. By
nature, police information is continuously being
altered: new data is added through investigation;
arrests are made; cases are cleared when charges are
dropped. A problem arises when one attempts to provide
a summation of data (statistics), by type of case.
While a case may be initially classified as rape,
further investigation may change that charge to
"sexual intercourse with a female under 14 years".
Or the cause of death may be reclassified as suicide
as new data is introduced as a result of investigation.

Therefore, because the data base is constantly
being modified in light of new information, it may
be impossible to reconcile monthly crime statistics
with yearly totals. All police forces must cope with
some variation on this problem, if only through infor-
mation which they submit to Statistics Canada. TOPCOPS,
or any automated facility which is capable of generating
a host of statistics instantaneously, must face the
problem of deriving statistics which only approximate
reality in a dynamic law enforcement environment.

TOPCOPS was also beset by a number of other prob-
lems. The hardware configuration selected for the
information systems was soon found to contain insuf-
ficient capacity for the actual volume of information
throughput. There was a large, unanticipated volume
of occurrence information entered on the system, and
a large variety of usages related to this information.

When the system began to operate, users complained of slow turn around times on queries. Investigators became reluctant to use the system because of the frustration associated with turn around time.

Recently, the Ottawa Police Force made a decision to phase out TOPCOPS as their major occurrence reporting system and move into a more sophisticated information system called CADRE. At the present time, this system is being implemented by the Ontario Police Commission (OPC) on behalf of the OPF.

B. CADRE: The Development of an Information System Utility for Ottawa Municipal Police

CADRE (Computer-Aided Dispatch and Record Entry) has been designed by the Ontario Police Commission. Its implementation in Ottawa, scheduled for completion late in 1977, is a demonstration project. If CADRE is successful in Ottawa, the OPC intends to make it available to all other Ontario police forces. CADRE may become one of the most significant police information systems projects in Canada; certainly it will be one of the most comprehensive systems available in Canada. CADRE consists of three major components, including:

- a computerized records entry and file management facility for processing local information requirements;

- a computer-aided dispatch capability for supporting the communication function; and,

- a field support component consisting of Mobile Digital Terminals (MDT) in patrol units. The MDT technology gives officers in the field direct query access to local and CPIC files.

These components and the background related to the development of CADRE are described below in more detail.

1. Systems Development Background

In early 1975, the Ontario Police Commission established a project to study and define the information processing requirements of medium-sized to large police departments in Ontario. Twelve police departments were considered as prime candidates for CADRE system implementation.

The CADRE project team consisted of six representatives from Ontario police departments and OPC specialists in data processing and communications technology. Members of the team visited a number of police departments in Canada and the United States to review information systems developments in a variety of settings.

The first phase of the project involved the definition of functional specifications for the CADRE system. It was completed in the first quarter of 1976. The descriptions of CADRE presented below are based on an OPC document published in April 1976 describing those functional specifications. CADRE was not operational when this report was written.

As it was originally conceived, CADRE is a standard system capable of satisfying the information processing needs of a number of different police departments in Ontario. The OPC is developing the CADRE system software and will provide all on-going system support required to maintain the CADRE software and procedures. Each participating department will acquire its own computer hardware. OPC technical staff will provide the system software and assist with the initial implementation.

2. The CADRE System

CADRE has three major components: Records Entry, Computer Aided Dispatch, and Field Support. These components interface with 18 local files, generate more than 25 different hard-copy reports, and provide on-line query capabilities to both local and CPIC files.

(a) Local Files

The files contained within the CADRE system framework are classified as follows:

- operational,
- administrative, and,
- index.

The operational files include:

- Incident File; contains record abstracts of information gathered for each call-for-service.

- Occurrence File; contains record abstracts of information contained in the various types of occurrence reports.

- Motor Vehicle Collision File; contains record abstracts of information contained in the standard Ontario Motor Vehicle Collision Reports.

- Criminal Records File; contains brief summaries of criminal history data on local criminals.

- Firearms Registration File; contains records for each firearm registered by the police department.

- Summons/S.C.T. File; contains records of each Summons and Summary Conviction Ticket issued for offences falling under the Summary Convictions Act, provincial statutes and municipal by-laws.

- Night Listing File; contains records for each business registered with the police department for the purpose of providing the name and telephone number of key holders in the event of a security problem after closing hours.

- Observation File; contains record abstracts of information collected from field observation reports involving suspicious persons and vehicles.

- Bicycle Registration File; contains records of the owners of each bicycle registered with the police department.

- <u>BOLO File</u> (<u>Be On</u> the <u>Look Out</u>); contains records
  describing the contents of the daily bulletin.

- <u>Street File</u>; contains records which cross-
  reference street addresses to the grid or atom
  map and codes.

- <u>Hazardous Address File</u>; contains records for
  each location considered to be hazardous.

The administrative files include the following:

- <u>Personnel/Equipment Issued File</u>; records des-
  cribing the vital statistics, skills, promo-
  tional history and equipment issued for each
  officer.

- <u>Vehicle Maintenance File</u>; records of the complete
  service mileage, repair history and purchase price
  of each police vehicle.

- <u>Duty Roster File</u>; records describing individual
  shift assignments, hours worked, sick time,
  vacation, etc.

The index files include the following:

- <u>Name Index File</u>; entries for each name encountered
  in the following files:

  . Occurrence File
  . Incident File
  . Criminal Records File

  . Firearms Registration File
  . Observation File
  . Motor Vehicle Collision File

- <u>Address Index File</u>; entries for each address
  encountered in the following files:

  . Occurrence File
  . Incident File
  . Motor Venicle Collision File
  . Criminal Records File
  . Firearms Registration File
  . Night Listing File
  . Observation File

- <u>Vehicle Licence Index File</u>; entries for each
  vehicle encountered in the following files:

  . Occurrence File
  . Motor Vehicle Collision File
  . Criminal Record File
  . Observation File

(b) <u>Records Entry</u>

The Records Entry component of CADRE captures data
from existing departmental reporting procedures, to
classify and store these data for easy and quick
retrieval, and finally, to generate a number of statis-
tical and management reports. The files accessible and
updated by this component of CADRE do not completely
replace the manual filing system prevalent in most
police departments. Manual files must be maintained

to contain narrative information not entered into the computerized files.

Data are abstracted and entered into the system from a number of different source documents. They include:

- General Occurrence Report
- Follow-Up Report
- Continuation Report
- Property Occurences
- Missing Person Report
- Accident Report
- Juvenile Follow-Up Report
- Arrest Notice
- Fraudulent Cheque Report
- Sudden and Violent Death Report
- Stolen Automobile Occurrence Report
- Impounded Vehicle Report
- Bicycle Occurrence Report
- Motor Vehicle Collision Report
- Fingerprint Forms
- Criminal Records Sheets
- Crown Sheet
- Gun Registration Permits
- Information and Summons
- Appearance Notice
- Summary Conviction Ticket
- Night Listing Form
- Field Observation Report
- Bicycle Registration Form
- Complaint Card
- Special Duty Report
- Juvenile Detention Report

- Liquor Seizure and Disposal Report

A number of operational and management reports are generated as listed below:

- Occurrence/MVC Chaser
- Incident Chaser
- BOLO Report
- Traffic Charge Chaser
- Repetitious Caller Report
- Statistics Canada
- Crime Statistics - Monthly Summary
- Crime Statistics - Summary by Day of Week
- Crime Statistics - Summary by Hour of Day
- MVC Monthly Analysis by Grid/Atom
- Monthly Traffic Charge Analysis
- Summary of Attendance Report
- Office Activity Report
- Personnel File Reports
- Vehicle Maintenance Report
- Vehicle Maintenance Schedule
- Street File Exceptions
- Crime Activity by Grid

In addition to the hard copy reports outlined above, the Records Entry component of CADRE is designed to have an extensive on-line query capability for accessing the various CADRE files via keyboard terminals located throughout user areas within the police department. The types of on-line queries include:

- name checks
- address checks
- vehicle checks

- crime analysis reports by atom/grid
- personnel history
- vehicle maintenance summary
- duty roster summary

(c) Computer-Aided Dispatch

The CAD component of CADRE consists of computer hardware and software facilities which directly support the communications functions performed by complaint operators and dispatchers. As calls-for-service are received, the appropriate complaint data (such as complainant's name, location of incident, nature of complaint and priority) are entered into the system by complaint operators via on-line keyboard terminals. The system has access to the local CADRE files to check for hazardous addresses, and assigns the appropriate patrol beat and atom code. A record is created for each call-for-service and deposited in the Incident File. At this point, the incident data are transferred to the appropriate dispatchers. Through the use of on-line keyboard terminals, each dispatcher is provided with a continuously updated display of patrol unit status. As units are dispatched and cleared, the status of units and the calls-for-service queue are modified accordingly. Each dispatcher can also search most local CADRE files to respond to specific queries from the field.

(d) Field Support

The Field Support component of CADRE uses Mobile

Digital Terminal (MDT) technology to provide on-line, remote, read-only access to most local and CPIC files by units deployed in field operations. This component is the most technically advanced part of the over-all CADRE system and directly complements the CAD component.

The field units can use their MDT devices for the following types of transactions:

- status changes including assigned, in-service, busy, out-of-service, emergency and signed-off.

- narrative type messages which are displayed on the dispatcher's terminal.

- dispatch information received in a digital communications format displayed on the MDT screen.

- person, vehicle, address, night listing and BOLO file queries.

3. Significance of CADRE for Canadian Municipal Police Forces

The CADRE development program is a bold and exciting attempt on the part of the senior law enforcement agency in the Province of Ontario to create an information processing "asset" for the police forces within its jurisdiction. We are enthusiastic about the potential value of this asset to police forces throughout Canada. CADRE has been designed to satisfy virtually every type of information handling process

for a police force. And, it was designed through active cooperation between police forces and civilian experts, representing the best combination of knowledge on police procedures and information technology.

If CADRE is successfully implemented in Ottawa, we expect that the demonstration effect of CADRE in this police department will soon spread to other police forces in Ontario and throughout Canada. Like all other technological experiences involving a major innovation, the success of the innovator will determine the value of the innovation to other police departments.

Even if CADRE is successful in Ottawa, however, its existence will not guarantee that Canadian police forces will adopt more efficient and effective information handling procedures. Police forces evaluating CADRE for possible application in their own jurisdiction should be concerned with some of the more general aspects of adopting new information technology.

First, CADRE is a "package solution" to police information processing. That is, it is a management information system designed to satisfy the maximum number of information requirements for the broadest range of types of police forces. The designers of CADRE have to their credit designed the system to provide optimum flexibility within the generalized framework of CADRE. The system is modular. It can be implemented component by component and will allow major design changes in subsequent implementations of CADRE. However, police departments subsequently carrying out an implementation of CADRE must make use

of this modularity and flexibility in the CADRE design and accept and implement the entire "package" only if it clearly satisfies their need for information. The existence of the CADRE "package" should not deflect MIS implementation away from the required analysis of information needs (see Chapters III and IV in Volume IV of this study) which should be the preliminary phase of any MIS implementation.

Second, the existence of a packaged solution such as CADRE should not convince police managers that management information systems can be quickly and easily implemented. One of the most precious resources for the implementation of MIS is time. The years of development, training and sensitization required to orient people towards management information systems cannot be replaced by technology in itself.

Ottawa's experience with TOPCOPS may help compress the time required to implement CADRE. However, we suspect that the Ottawa Police Force and the Ontario Police Commission have collectively underestimated the time required to implement CADRE. We were told that the development and implementation in Ottawa would require between 18 and 24 months for completion. We suspect that five of six years is a more accurate estimate. In the TIPS development program, outlined in Chapter V of Volume IV, we estimate a six-to seven-year time frame for the implementation of a total information system.

Third, CADRE is a highly sophisticated piece of new technology. A police force should seriously

consider the impact of this technology on the police organization. For example, the immediate introduction of digital communication and mobile terminals will place a major strain on the communications functions of the police force. There is a whole set of "human factors" involved in having patrol officers read instructions from a CRT terminal, placed in a car, which are not clearly understood. There is a danger that users of the system will feel alienated by this radically new technology. This technology not only involves computers but also remote on-line data entry through mobile terminals in cars. There are staggering implications for the way people will do their jobs.

From our field visits to police departments throughout North America, we learned that most police departments manage to process an extremely high volume of transactions through information handling procedures that are poorly defined and rather inefficient. Nevertheless, these systems seem to work. A major reason for their success, despite the application of obsolete technology, is that people feel comfortable with current systems and redouble efforts to make them work. This psychology is a familiar one to police forces.

But, the same psychology poses a threat to new technology which moves standard work procedures into a new dimension of operation. In-car remote entry terminals represent that kind of new technology. Its cost-effectiveness should be studied carefully and if implementation is recommended, it should be phased in carefully to avoid "future shock" which would de-stabilize

the smooth, calm, working relationships which tend to characterize information handling in police forces.

Fourth, the CADRE system will be expensive. In our estimate of costs for the development and maintenance of a major police management information system, we estimated a six-year cost of approximately $3 million. The equivalent estimates that we have seen for the Ottawa implementation of CADRE are much lower. If actual expenditures far exceed original estimates, we believe that the credibility of the system and its design may suffer.

Despite all of these caveats, we believe that the CADRE demonstration implementation in Ottawa is one of the most exciting potential implementations of MIS in Canada. It warrants thorough examination and interest from police forces throughout the country.

C. Surrey RCMP Detachment, British Columbia: A New Management Style to Target Information Requirements

The first work in MIS is management. The success of an information system depends on the degree to which it targets information to management needs, and management needs must be articulated by managers. Stated differently, information can help managers make decisions if there is a coherent management structure. People have to know who is responsible for what decisions.

There are many different styles of management in police departments, ranging from the authoritarian, "military discipline" management style to the less disciplined, "open"

participatory decision-making mode. Our visit with the
Surrey RCMP Detachment revealed a participatory style
of management which we believe is rare among Canadian
police jurisdictions. Decision-making responsibilities
are decentralized and distributed among ranks and levels
of authority.

Surrey police management rejects the notion that police
management is absolutely unique and police management
"science" has no parallel in other jurisdictions. The
operating style of this RCMP Detachment is, in many
ways, similar to that of a "progressive" educational
institution, government department or private corporation.

Why do we include this chapter on the Surrey RCMP
Detachment in a study of information systems? First, we
believe that the Surrey experience allows us to trace the
relationship between management or operating style and
information systems. Secondly, the Surrey style is heavily
dependent on information systems for its success. Finally,
we suspect that this style of management will be emulated
by many urban police departments throughout Canada over
the coming decades.

1. The Management Style

The management program in Surrey was initiated by
Superintendent R.N. Heywood, Officer In Charge of
the Surrey Detachment. A member of the Decision
Dynamics Corporation Study Team visited the Surrey
Detachment in January 1977. At that time, the Surrey
Detachment had gone through more than a year of
preparatory work for their "Zone Policing System".

The program had just become fully operational.

(a) Philosophy

The Surrey management philosophy rejects much of
what may be known as "conventional wisdom" in current
police management philosophy. It assumes that the
major trends in policing over the past two decades
have been counter-productive, in that they have served
to decrease police effectiveness.

In the complex regulatory environment characterized
by more crime and more enforcement, police management
has become oriented towards rules and procedures.
Middle management in a police department, the tradi-
tional supervisory level, focuses its relationship
with the field force on rules and procedures. Compe-
tence is defined as allegiance to these regulations.
The relationship of the police with the community is
mainly through evidence-taking and other formal
contacts, "after the fact", when a crime or regulatory
transgression has occurred.

The basic element of the "surrey view" of police
management is "accountability". In the current manage-
ment style, accountability for most police officers is
a technical abstraction. Very few police officers
are actually accountable for the outcome of police
discretion in the field. The focus is on accountability
through formal documentation of events and response to
arbitrary rules and procedures. The "Surrey style"
suggests that accountability would be better placed

if a larger proportion of a police force was made
accountable for police/community activities. Police
work could then be defined as tasks that contribute
to a reduction of crime in the community.

(b) Structure

Surrey RCMP officers call their management
style "Zone Policing". Their comprehensive management
approach has been named after only one of its many
elements. Zone Policing suggests only a geographic
deployment of manpower.

The basic elements of the Zone Policing system in
the Surrey RCMP Detachment are:

- a two-tiered operational command structure; the
  bottom tier contains the entire field complement
  of the Detachment. The top tier has both a
  command and staff consulting function.

- police activities centered on three basic programs;
  They are Investigation, Enforcement and
  Prevention. Each of these has a specific command
  focus within the top tier.

- "generalist" field constables; they handle all
  types of primary and follow-up investigations.

- community "involvement"; it is a primary component
  of a constable's job.

- field forces deployed in to five geographic zones;
  most of the resource deployment decisions are
  taken at the zone level, in consultation with
  program specialists at the senior command level.
  For this reason, the Surrey management system may
  be called Team Policing or Community Policing.

- decision-making and decision accountability
  organized around a formal Management by Objectives
  procedure; this is probably the unique and most
  exciting element of the Surrey management style.

Figure IV-1 illustrates the major features of the
zone policing organizational structure. Senior command
in the Surrey RCMP Detachment believes that this
system has a number of clearly-defined benefits to
police effectiveness. These benefits are:

- clear accountability, defined for lower levels
  of command, specified in terms of police objectives.

- decision-making involvement for all levels of
  command in the development of objectives and
  performance targets.

- inherent flexibility of staff deployment, mini-
  mizing resource allocation to "non-productive"
  shifts and maximizing personnel satisfaction
  arising from doing productive work.

- clear incentives for community involvement on
  behalf of all responsible field officers.

- varied and comprehensive activities for field
  officers, enriching job situations and enhancing
  career development paths for field officers.

The fundamental key to the success or failure of
the Surrey Zone Policing system is accountability!

There are three basic elements in establishing a
system for police accountability. They are:

- constructing an "organizational dynamic" wherein
  members representing all levels of command can
  interrelate towards the establishment of
  realistic police targets.

- the forms and procedures for collecting infor-
  mation on areas of police performance and moni-
  toring successful or unseccessful achievement.

- information sources which can generate performance
  information, cost effectively.

Our comments on the Zone Policing systems will
focus on information requirements and their correla-
tions in management information systems.

(c) Information Requirements

The Zone Policing process is centered on a Manage-
ment By Objectives (MBO) procedure. This procedure
is based on an MBO "statement" prepared for each zone
by a zone "committee" involving virtually every member

of the team. Program specialists advise and assist
in the development of the statement. The statement is
essentially a set of police targets for performance
over a six-month interval.

The MBO statement contains three elements, i.e.,

- a statement of objectives; for example, "we will
  reduce the number of Break & Enter and Thefts in
  Zone 1 by 10 per cent over the next six months".

- a statement of goals associated with the objectives;
  for example, "we will contact all pawn shops by
  a certain date to expand information sources in
  relation to Break & Enter and Thefts".

- a breakdown of activity and task allocations
  which relate to the stated goals; for example,
  "a certain constable is responsible for develop-
  ing a program to improve the quality of Break &
  Enter and Theft reports and investigation proce-
  dures by a particular date".

The MBO system, as defined above, is highly
dependent on information. At present, there are two
major organizational vehicles for implementing and
monitoring the associated procedures. First, the MBO
statements are constructed through a complex inter-
action between program personnel and zone personnel.
Second, every six weeks each zone is taken out of
rotation and all members of the zone team review the
previous six weeks of activity relative to their zone
targets.

CONTINUED

1 OF 2

Two types of information are required for the system to work. They are:

- activity information; describing the achievements in particular activities and tasks allocated to particular members of the zone team.

- crime and occurrence information; describing performance in each zone relative to target goals and objectives. For example, this information must be capable of answering questions such as: Have we reduced BE & T's by 10 per cent? If not, in what particular locations within the zone, or subtypes of this crime have we succeeded or failed?

When we visited the Surrey Detachment, the Zone Policing system was in the first stages of its operation. MBO statements had been developed for each of the five zones. Zone management had not yet come to a point where statistical monitoring information was necessary for the operation of the program. There seemed to be an expectation that manual or clerical derivation of required data could satisfy the demand. We suspect that the manual processes will fall short of requirements. The Surrey Detachment is a relatively large police force of over 180 sworn officers. Its environmental setting is ex-urban. The community is fairly differentiated. As a result, crime and other occurrences are subject to major time and location shifts. There is a great need for timely data to monitor these changes and manual information procedures may prove inadequate.

Concurrent with the development of the new management system at Surrey, there is a broader management information system development program taking place in the Lower Mainland Division RCMP Detachments. This Computer-Aided Dispatch (CAD) system may provide much of the data required for the Zone Policing system.

2. The Broader Information System Development Program

We review the CAD development in the Lower Mainland Division for the RCMP within the context of information requirements identified for Zone Policing. However, it is a "broader" information system development program designed to serve five other RCMP detachments in the Vancouver area.

(a) Background

The Lower Mainland Division (LMD) includes the RCMP detachments of Surrey, Richmond, North Vancouver, Coquitlam, Burnaby and the Vancouver Sub-Division. Collectively, they police more than one-half of the 1.1 million population in the Greater Vancouver area. In total, the six detachments receive an estimated 120,000 calls-for-service per annum.

When the CAD program began approximately three years ago, it focused on hardware questions associated with radio communications. New radio equipment was purchased and installed in March 1976.

The CAD development program has been carried out through a steering committee containing one representative from each of the participating detachments, a number of individuals from CPIC headquarters in Ottawa, and both hardware and software vendors. The civilian project manager is a member of CPIC/Ottawa.

The total cost of the program is estimated at approximately 3 million dollars. This is the total development cost and includes both consulting services, software development costs and hardware costs exclusive of computers.

The first terminal equipment arrived at the six detachments in May 1976. The program is schedule for phased implementation beginning in February 1977. Total implementation is estimated at July 1977.

(b) The System

Each detachment will be responsible for interface with the public for both complaint-taking and routing calls for service to patrol and other resources.

The operating characteristics of the CAD are quite simple. The complaint operator will receive calls-for-service and type in the address on a typewriter-CRT console. The computer will carry out an automatic address check to establish whether the call has come from the proper jurisdiction and determine the patrol zone for each call. There is sufficient file space and room on the CRT display unit for complaint operator

comments about each call as it is taken.

As soon as all of the information has been taken by the complaint operator, a function key is pressed and the entire complaint message is electronically switched to the dispatch screen. Control over the call is put in the hands of the dispatcher. In computer terms, the file has been placed in an "unassigned incident queue".

A number of other information items are automatically generated by the computer. They are:

- occurrence number
- date
- time
- agency received
- complaint operate code number.

The dispatcher receives up-to-date computerized information on unassigned patrol units. The assignment control information is automatically transmitted through the computer via in-car "status box". Status boxes can transmit nine different messages.

There are a number of other automated features of the system. Its dictionary of street addresses and other geographic information contains a cross-street index. Its file structure enables it to automatically purge or flag repeat incidents during investigations. Finally, it has the usual facility for filing information on hazardous addresses and other relevant address information for display during calls-for-service.

When the dispatcher assigns the car, the status box is used to activate a record of "time assigned". When the unit arrives at the scene, the dispatcher is notified through this automatic process. When the call is completed, a different dispatch function clears, or the patrol unit may clear directly through the dispatcher via radio communications.

In its present state, the CAD system automatically generates six reports. They are:

- a hard copy report containing all information collected on the complaint and units assigned. This report is used as an occurrence report. Additional information is taken via dictation equipment and is entered directly into the CAD mask.

- a complaint log.

- an edited complaint summary.

- a log of all messages relating to specific occurrence reports.

- a list of unit dispatched and subsequent loading statistics.

- a list of complaints dispatched.

Currently, each complaint is routed through the relevant detachment headquarters communication system. However, the system is designed to handle decentralized automatic 911 routing, if deemed necessary in

the future.

(c) The Future

The CAD system described above is currently in the implementation stage and will take four to five months to complete. Therefore, our comments on "the future" will focus on: What changes should be made to the CAD system to maximize its value for the Zone Policing?

The LMD Computer-Aided Dispatch system is currently heavily oriented towards field support. Its major objectives support improved response time for field units to calls-for-service. It will help make dispatchers and complaint operators more effective in routing calls-for-service and supply more relevant operational information to field officers. But, it has a capacity to supply higher level (statistical) information for management use.

The CAD system automatically stores information on all calls-for-service. This information is valuable and must be delivered to management in a timely and usable fashion, to help effect management decisions. Let us illustrate this notion with reference to the Zone Policing management style. Statistical reports such as the following will complement Zone Policing:

- crime analysis; by geographic area (atoms), type, and time of occurrence.

- response time; by all of the above categories and field units.

- service time: by all of the above categories.

- manpower loading analysis: by different times of
  day, days of week and weeks of year, to provide
  information for flexible manpower scheduling.

From these four categories of information, we
could describe at least 20 different reports that would
be valuable for the Zone Policing system. For example,
a particular Crime Analysis report, by zone, by month,
compared to previous years data, would indicate the
success or failure of the MBO system. A Manpower
Loading report would assist zone personnel in their
work-load scheduling for allocation of time to commu-
nity relations programs.

Much of the required data can be developed manually.
However, even for a medium-sized police force such as
Surrey, the work is laborious and cannot easily or
readily be completed. Information on CAD computer
file will be easily accessible through simple computer
programs.

We suspect that, once the CAD system for the LMD
is operating, the Surrey Detachment will make use of
the data for the purposes described above and that
this will be an essential ingredient in the success
of Zone Policing in Surrey.

D. Edmonton: MIS is Part of the Over-all Development
    Plan for the Police Department

Early in 1975, the City of Edmonton Police Department

began a process unique to Canadian policing. Under newly-
appointed Chief of Police, Robert Lunney, the police
department initiated a long-range program of "moderniza-
tion". Although MIS is only a segment of the compre-
hensive program, the EDMONTON POLICE HEADQUARTERS PROJECT
has important demonstration effects for both Canadian
policing in general, and the process of MIS develop-
ment specifically.

1. Background to the Project

Like other urban police jurisdictions, Edmonton
was affected by major social, economic, and demo-
graphic changes during the last decade. In Edmonton,
the effects of national social and economic trends
have been enhanced by the Province of Alberta's posi-
tion as   the boom centre of the petroleum industry.
By the mid-1970s Edmonton was one of the fastest-
growing cities in Canada.

The law enforcement environment in Edmonton was
characterized by:

- a rapidly-growing population with a large
  proportion of newly-arrived migrants.

- a rapidly-growing police department whose
  composition quickly changed to one dominated
  by a youthful, new recruit echelon.

- a precipitous increase in crime, particularly
  crimes of violence.

Chief Lunney recognized the strong need for a new type of police force, one which could adapt rapidly to the changing conditions of law enforcement. Greater use of technology and other innovative procedures must be made in law enforcement. At the same time, both police and civic management knew that the police department would require new physical facilities. The existing police headquarters building had exceeded its physical capacities; a number of police functions could not be serviced from the facility and available office space had been exhausted. Sections of the Central Library and other municipal facilities had been converted for use by police personnel. This was beginning to take a toll on managerial effectiveness in the police department.

As a result, the concept of the Police Headquarters Project was developed. It was based on the premise that the police department should consider its need for both physical space and police technology in the same context. Both should be based on an assessment of the future environment for law enforcement in the jurisdiction. This premise is the most important element in the significance of the Edmonton police headquarters project to Canadian policing. It suggests:

- Technological change for policing should be consciously managed by police officers. It should begin with an analysis of future social and economic trends so that police technology and facilities are being built to match future needs, not past conditions that may not be relevant to the future.

- Management information systems, like any other form of new police technology, should be formulated within the context of an over-all master plan for the police department. This ensures consistency between the perception of the future and the development of police technology.

Chief Lunney believed that a major effort was required to orient his police department towards the needs of the future. The need for a headquarters facility provided an opportunity to take a comprehensive look at future requirements. Two further conditions were recognized, i.e.,

- A great deal of time was required to carry out the reorientation.

- The force must depend on external consultants to carry out a large portion of the planning and research required for the programs. Few Canadian police departments have sufficient internal human resources to carry out a development program of the magnitude contemplated for the Edmonton Police Department.

After examining the available consultants in both Canada and the United States, Edmonton entered in contract with Stanford Research Institute (SRI). SRI had recently carried out a similar type of project for the City of Miami Police Department (see Volume II, Chapter IV for a description of the City of Miami program).

Finally, both the Edmonton Police Department and

the Federal Ministry of the Solicitor General (which
was consulted about the project) believed that the
valuable demonstration effects of the SRI headquarters
project should be preserved for possible application
in other police departments in Canada. As a result,
Decision Dynamics Corporation was asked to attend
all major meetings of the Edmonton project in a
"watching brief" capacity to ensure that this new
Canadian expertise would be included in our report.

When this chapter was written for the police
management information systems report, the Edmonton
project had not yet been completed. Accordingly, in
this descriptive section, we focus on the objectives
of the project and the procedures established for
carrying out the study. The significance of this
project will probably not be accurately realized for
at least two or three years.

2.   The Development Program

The philosophy of the Headquarters Project is
illustrated in a statement made as part of the police
department's application for funding, i.e.,

> "For too many years, the police service
> in this country has been governed and
> often misguided by tradition rather
> than visions in their policing methods
> and styles - the Headquarters Project
> can illustrate to community and Police

officials that significant and meaning-
ful changes in police service are
possible." (The City of Edmonton Police
Department; Police Headquarters Project:
An Application of Systems and Space
Design to a Canadian Policing Agency,
1975)

Other comments in the same document pertaining to
the specific project objectives place the headquarters
facility in a broader context, i.e.,

> "The problems that the Headquarters
> Project is directed at resolving is
> not just the design of a new
> Headquarters Building alone. In-
> stead, the building is only part
> of the total program intended to:
>
> (a)   substantially enhance organiza-
>   tional and administrative effec-
>   tiveness;
>
> (b)   develop viable internal and
>   external communications systems
>   that will:
>   . reduce delay in police re-
>   sponse to calls-for-service,
>   . facilitate the flow of
>   information out to "street"
>   personnel,
>   . reduce the time-lag between
>   changes in social patterns

and corresponding responses
by the police,

(c) develop efficient information systems
for:
. managerial purposes in terms of
fiscal planning, cost control,
manpower and resource allocation,
etc.,
. keeping "street" and command
personnel abreast of constantly
fluctuating conditions and
criminal occurrences,
. reducing police reaction and
response time and thereby
increasing the rate of "crimes
solved".

(d) improve inter- and intra-governmental
agency relations by expanding chan-
nels of information and interaction,

(e) enhance the ability of the Force to
become more involved with the
average citizen in "non-hostile" or
"non-criminal" situations by deter-
mining ways that public education
programs can be made more effective,

(f) develop a more realistic and com-
prehensive internal training
program to increase the level of
individual competence and job
skill,

(g) design a physical plant around
the various sub-systems that are
established, to serve the needs
of the Force and the community
into the 21st century".

The SRI Study Team spent approximately one year in
Edmonton. It was composed of experts in areas such as
police communications, information systems and facili-
ties design, who were asked to work closely with police
and civil personnel responsible for those functional
areas. Thus, the Headquarters Project avoided one of
the most serious problems associated with the use of
external expertise. The consultants had to work
closely with in-house personnel, merge the various
talents available and create a consistent set of
perceptions about the future needs of the Edmonton
Police Department. This "integration" of consultant
and in-house personnel is an important element in
projects of this sort.

Another basic characteristic of the Headquarters
Project is the use of a senior level Steering Committee.
This committee was given a mandate to act as the execu-
tive body responsible for the management of the
Headquarters Project. It was formed when the original
contract was signed with SRI and met crucial junc-
tures during the project to review its progress and to
make decisions necessary to allow the project to pro-
gress. The committee was composed of representatives
from: police departments, SRI, city administration,
the provincial Solicitor General's department, the
provincial department responsible for housing and

public works, the federal Solicitor's General's ministry, and a provincial task force investigating the need for new management tools in the administration of criminal justice institutions.

The Headquarters Project was designed to be accomplished over three phases. The general objectives of these phases are as follows:

- Phase I; the conceptual phase. It is scheduled for completion in September 1977. The major outcome of this phase of the study is a Master Plan which describes how the police department will be affected by the future environmental conditions and makes recommendations on technological responses. At the conclusion of this phase, the police department will have a blueprint for its future development.

- Phase II; once recommendations from the earlier phase have been accepted, this phase will begin with the translation of conceptual findings into technical procurement specifications and the development of greater in-house capabilities for the implementation of the technological blueprint.

- Phase III; the implementation of the Headquarters Project. Parts of the project are not expected to be completed until 1981.

The format for carrying out Phase I of the Edmonton Headquarters Project represents a sensible approach to the development of a Master Plan for technology in

a police force. We will describe it in some detail below. There are six tasks associated with Phase I. They are:

- Task I: An analysis of current operations; the purpose of this task is to document the situation in Edmonton for systems planning. The work is divided into four sub-tasks.

    . police department mission, organization and functions,
    . communications,
    . information systems, and,
    . space utilization and physical facilities.

- Task II: The environment and its implications; in this task the study team assesses the over-all environment, including: the plans of the City of Edmonton, the socio-economic, political and demographic trends in the Edmonton region, and the legal and regulatory constraints imposed by building codes, CPIC procedures, spectrum utilization policy, and Canadian legislation on security and privacy.

- Task III: Determination of user needs; the purpose of this task is to assess need for services and facilities as understood by police department users of these services. Two working groups have been established to help determine user needs: one group focuses on the operational and transactional communications and information needs of the department, and the other on the management

and administrative communications and information needs.

- Task IV: Functional requirements; the purpose of this task is to determine the over-all space needs of the department, as well as the major alternatives from which the department can choose in developing and implementing modern integrated information and communications systems. The three functional areas are:

  . communications; i.e., departmental administrative telephone service, 911 telephone systems, emergency telephone answering and the requirements for an advanced radio system;
  . information systems;
  . headquarters building and other physical facilities.

- Task V: Development of alternative concepts/design; at this point, the study team completes the requirements study to include quantitative determination of the numbers and types of equipment, radio channels, and floor space required. Again, the focus is on communications, information systems and facilities.

- Task VI: Formulation of recommendations; this last major task involved completion of the over-all system concepts for the departmental program. Emphasis is placed on the preparation of an integrated schedule for the design and implementation phases. The cost implications of recommendations are also refined in this task. Finally,

the study team will define its recommendations regarding the appropriate inter-departmental relationships and responsibilities for the system development and operation.

In our report, we will focus on the recommendations regarding information systems. To begin the analysis of information systems, the study presented statistics on the conditions affecting information for the police department and created a status report on the current information systems. The conclusions may describe the majority of information systems in Canadian municipal police departments. The descriptions included the following critical comments:

- there is no unique identification number system.

- the system is highly paper oriented; it is inundated by over four million paper handlings per year.

- there is a duplication of data entries.

- data entry is error prone.

- there is slow inquiry response time.

- basic information is difficult to retrieve.

- information access for analysis and planning is difficult.

- there are large file storage space requirements.

The study team provided a conceptual design of an integrated information system which was meant to overcome these liabilities. The preliminary design of the information system drew heavily on determination of user needs. In fact, this study of user needs for information followed an approach similar to the one which we recommend for TIPS (see Volume IV). In this approach, the study team derived information requirements from an analysis of "organizational functions" in the Edmonton Police Department and related these to both existing and planned information systems. SRI carried out a study which resembles our notion of the "demand and supply" of information in the police department.

Five separate organizational functions were defined. For each, a set of functional requirements were specified. The major organizational functions and some of their associated functional requirements are as follows:

- operational management; these functional requirements include: dispatch, personnel allocation, equipment allocation, situation analysis, crisis response, etc.

- operational analysis and planning; some functional requirements are: development of evaluation techniques, expenditure analysis, training, operational procedures analysis, etc.

- strategic analysis and planning; some functional requirements include: development of planning techniques, trends of offences and offenders, resource trends, demographic trends, etc.

- intelligence analysis and planning; some functional requirements include: assessing new law enforcement techniques, development of information correlation techniques, technology trends related to law violations, etc.

- management support; some functional requirements include: performance evaluation, budget preparation, public services, professional development, payroll, program budgeting systems support, etc.

The study team showed that these functional requirements are satisfied by a number of information subsystems. These include:

- central records; which contains master index name facilities, occurrence summaries and field reports.

- dispatch; which contains information on resource allocation, vehicle location and communications control.

- field support; which contains information on wants/warrants, motor vehicles, courts, property, etc.

- analysis and planning; which contains information on personnel, evaluation models and physical assets.

- system development support; which contains information on systems software, application software and operations procedures.

Some of these information sub-systems were in the Edmonton City Police Department, while others were managed by agencies such as CPIC, the Province of Alberta, the City of Edmonton and other sources. From this type of analysis, the study team was able to outline a set of priorities for the development of particular types of information systems in the Edmonton Police Department. A cost and effectiveness analysis was performed to show that the new information systems recommended for the Edmonton Police Department would reduce operating costs associated with information handling.

When this volume was being written, SRI had submitted their recommendations to the Steering Committee and decisions on final approval and associated appropriations were pending.

3. The Significance of the Edmonton Police Headquarters Project for Canadian Municipal Police

New technology, such as Management Information Systems, cannot be installed in a police department in a vacuum. We strongly recommend the need for a Master Plan in Volume IV and for a great deal of preliminary analysis in the form of feasibility studies and studies of policies and procedures in the police department. The Edmonton Headquarters project offers an excellent example of a police department which is going through the entire development process that we believe is a necessary condition for the application of new technology.

The Edmonton project is an example of "engineered" change in police technology. Senior management in the police department is being deliberate and proactive in its development of technological plans for the future. It is taking the required time, spending the "front end" resources needed to ensure that technological change is not misplaced or misdirected in its application.

E. City of Vancouver, British Columbia

In 1972 and 1973, the Vancouver Police Department, with the cooperation of other police departments, performed an extensive study of its operational needs. The study focused mainly on information requirements for patrol. A detailed survey of all sources of information within the department was carried out and an idealized view of the information systems required was developed.

The study led senior management of the VPD to conclude that the cost of developing the required systems was beyond the financial scope of the department. Further, the study suggested that information system problems which existed in the VPD were common to many police agencies in the province.

Accordingly, the Department approached the British Columbia Police Commission for support. The Commission turned to the Justice Development Commission which approved a feasibility study to examine the problem. The feasibility study was carried out by the Justice Information Systems group of the provincial Department of the Attorney

General. It was completed in May 1976; early in 1977 a
decision was made to implement the Police Index Inquiry
System (PIES). The implementation is currently taking
place.

The Decision Dynamics Corporation study team visited
Vancouver two times at the conclusion of the first set of
studies and after completion of the feasibility study for
PIES. We met and spoke with many officers and civilians
involved in the MIS development process and collected
a large number of documents representing the output of
both the first and second study phases. In this section
we briefly describe the early studies conducted by the
VPD and the feasibility study which recommended the develop-
ment of PIES. We also comment on the significance of the
information system development program for the VPD and for
other Canadian police departments.

1. The Early Study

The first set of studies on the information system
processes in the Vancouver Police Department focus
on the Patrol Division. The study was carried out
under the direction of Inspector I.B. Bailey, who
acted as Project Manager on behalf of the police depart-
ment. However, a large portion of the work was con-
ducted by team members who were borrowed from other
city departments such as the Social Planning Branch
of the City Administration.

Three separate reports were submitted to the Project
Manager who integrated them into a composite report in

which many of the recommendations were extracted and
focused the decisions necessary for developing and
information system. The three reports were:

- an analysis of the existing information systems
  in the VPD,

- a functional analysis of the Patrol Division
  including indicators of performance and infor-
  mation requirements for the new system, and,

- an initial information system design specifica-
  tion including recommendations for future develop-
  ment.

The report on the existing systems in the VPD was
detailed and comprehensive. The major conclusions,
defining the characteristics of the VPD information
systems in the early 1970s could describe many police
information systems today. They describe existing
VPD systems as:

- non-systems; that is, individual components of
  the over-all information process bear no relation
  to each other, nor has the design taken into
  account any of the objectives of the force or
  the constraints which affect its operation.

- designed on a one direction (input) basis only;
  the major thrust is directed to getting infor-
  mation from the field into case files, card
  indexes, etc. Information is used mainly for
  the solution of individual cases and the inves-
  tigation of specific persons, places or things.

In short, the information system is "fragmented".

- highly personalized; many files are designed and operated on the basis of the convenience of the particular custodian without regard for the needs of others. Thus, as supervisors rotate, the existing system is affected by either "the new broom" approach, or the "we've always done it this way" outlook.

- lacking summarization procedures; statistics are not being generated from the system which can be used for either performance review or general management purposes.

- lacking an audit of the system; the records have to be taken at face value in terms of completeness, relevance and accuracy. There is no mechanism for reviewing the thoroughness with which required procedures were carried out or whether they were performed or not.

- over-centralized, over-simplified, and under-automated; centralized systems only make sense when a high degree of automation exists so that information can be easily reached by users.

The remainder of the review of existing systems at the VPD focuses on the development of comprehensive flow charts which define the information flow process in the patrol function of the police force. These flow charts are comprehensive and represent the first attempt by a police department to develop a routine,

systematic view of its procedures with respect to information processes.

The second study analyzed performance indicators and information requirements for the Patrol Division and its management information systems study. This study attempts to relate information requirements with two dimensions of need: (a) the operational functions of the entire patrol division, and (b) the role of each level of command in this division in the execution of each function. Thus, the study authors logically perceive that information requirements are related to both what jobs people do and what level of authority they command over these job functions. In addition, the study addresses the need for performance indicators to focus management information systems on management information.

Finally, the third study provided a conceptual design of the information system recommended for the VPD Patrol Division. The earlier two studies contributed to this ultimate conceptual design. Detailed recommendations were included in this study, ranging from the need to develop a "resource allocation model" within the Planning and Research Branch to the need for a centralized records and information centre in the VPD. Unfortunately, the third study did not contain a detailed master plan for information systems which described both the time and resource commitment required for the implementation of the over-all information system program.

Although the three studies which we have described

above did not lead immediately and directly to the development of a particular information system at the VPD, they contained a great deal of insight on the nature of police MIS. We were indebted to the authors of these reports for their contribution to the development of our own understanding of police MIS. Our Volume IV, in particular, has been greatly influenced by the notion of command and functional requirements for information in a police department. As a result of these three studies, we believe that the VPD has played a major role as a "pioneer" in the development of police management information systems concepts in Canada.

2. PIES: The Current MIS Development Program in the Vancouver Police Department

Although the VPD began its information system development program with a broadly based set of analyses of information requirements in the police department, the ultimate development program, called PIES, is more limited than a "total police information system". In general, PIES is an indexing and cross-referencing system for operational police information concerning persons, events, locations and property (including vehicles). It is intended to aid in storing and retrieving large volumes of routine reports. It is designed to provide quick and automatic access to key details relating to any person, event, location and/or property which has been highlighted in a report, by providing a list of logically-related subjects and a precise reference to the physical storage location of

the original document or microfilm and any related documentation.

Conceptually then, PIES resembles the TOPCOPS system developed by the Ottawa Police Force (Section A). It has an operational focus and is oriented towards records management. It has the additional capacity of generating statistics which support the development of UCR reports, crime analysis and police deployment management.

PIES is designed to accept, edit, store and cross-index data related to the four major files (persons, events, location and property) from the following report forms which are currently being used by the VPD, i.e.,

- case reports (occurrence and follow-up reports),
- check cards,
- booking sheets (two different types), and,
- traffic accident reports.

Like TOPCOPS, PIES is designed to store data abstracted from these reports - the data is rendered into computer processable form through CRT terminals after they have passed through a quality control check within the department - and make this data available for operations and planning in the police dpeartment. Users, through CRT devices, can retrieve this data to either carry out on-line analysis or help reference the location of particular documentation related to cases through index keys such as names, events, etc.

The original cost estimate of PIES, submitted in
the 1976 feasibility study, suggests that the total
development cost of PIES will approximate $250,000.
Of this sum, approximately $100,00 is allocated for
the development of forms, procedures and a training
package for its implementation in police departments.
In addition, the equipment lease cost of mini-computers
required for the PIES configuration will range between
$2,000 and $2,500 per month.

Although an implementation team, working through
the British Columbia Attorney General's Department in
the Systems and Procedures Divisions, is currently
developing PIES, they are considering other aspects
of information systems for both the VPD and other munici-
pal police forces in British Columbia. For example,
documents which we received in the summer of 1977
suggest that the PIES implementation team is consider-
ing geo-coding, intelligence data modules, manpower and
equipment inventory modules and Mobile Digital Terminals
for future extensions to the VPD information systems.

F.   Ontario Provincial Police: Manpower Inventory and
      Forecasting System

During our visits with the Staff Development Division
of the Ontario Provincial Police, we discovered some fresh
approaches to manpower planning and development. Our
descriptions of the OPP information systems are restricted
to the Manpower Inventory and Forecasting System. The
Ontario Provincial Police are involved in other computer-
based systems. However, a description of the background

issues which led to the development of the Manpower
Inventory and Forecasting System will serve to illustrate
some important lessons for other Canadian municipal police
departments.

The OPP is a Crown Agency within the Ministry of the
Solicitor General of Ontario. The force is made up of
4,100 uniformed officers and 1,200 civilian employees.
In 1975, there was an annual operating budget of more
than $84 million. The OPP serves, primarily, the non-
urban areas of Ontario, covering 387,874 square miles of
territory. The force is divided into 17 districts which
are further subdivided into a total of more than 185
detachments.

The development of a Manpower Inventory and Forecasting
System can be attributed to three specific factors. First,
there is within the OPP management structure a genuine
understanding of the need to develop the most vital
resource used by a police department - its people. Second,
there was a need for significant change, brought about by
the introduction of a specific piece of provincial legis-
lation. These created extraordinary pressures on the
force to accelerate the development of senior management
talent. Third, there was a clear recognition of the need
to support this management development with the appropriate
information processing tools.

1.   Background to Systems Development

Over the past few years, the Ontario Provincial
Police have paid a great deal of attention to the

process of developing managerial skills within the
force. Impetus was given to this area as a result
of the introduction of Bill 77 in the Ontario Provin-
cial Legislature in 1974. (The enactment of Bill 77
allowed Ontario civil servants to add their years of
war-time service in the Armed Forces to their years
of service with the Government of Ontario). It was
recognized that key senior management positions would
be vacated earlier than expected because of the earlier
retirements made possible by enactment of Bill 77.

Recognition of this situation led to the formation
of a Management Development Study Group to assess the
force's ongoing management needs. The study group
recommended an expanded approach to the whole area of
management development, and the formation of a two-
phased Management Development Program.

The first phase was concerned with the immediate
management needs of the force, related to the direct
impacts created by the enactment of Bill 77.

The second phase was concerned with the long-term
implementation of an ongoing structured program for
management development. There were two main components
of this program. First, there was an educational
component which consisted of a series of classroom
courses and seminars concerning a wide range of topics
related to the various branches of social and manage-
ment sciences. Second, an on-the-job component was
developed to apply newly-acquired knowledge to specific
field-related tasks and responsibilities.

The basic philosophy of this Management Development
Program involves the notion that Management Development
is a process. It is not just education, nor just
training or merit rating. The Management Development
Process is defined by a system framework which includes
the following basic components:

- development of a system for defining and modifying
  positions as required,

- development of a career guidance capability,

- development of educational programs designed to
  provide classroom instruction and on-the-job
  application,

- development of a progress monitoring system,

- development of a manpower forecasting system, and,

- development of a manpower inventory system.

2. Manpower Inventory and Forecasting System

The Manpower Inventory and Forecasting System was
constructed to support the management development
process within the OPP. It was developed on computer
facilities maintained by the Ontario Ministry of
Government Services in 1977 by a Canadian consulting
firm called System House. The system provides facili-
ties for on-line data entry and retrieval via keyboard
terminals which interface directly to the Ministry

systems. These terminals are located at OPP Head-
quarters in Toronto. Due to the sensitive nature of
the information being collected, it was felt that
access to the files should be centrally monitored and
controlled. When we visited the OPP early in 1977,
the system had not yet been fully tested and was not
available for demonstration purposes.

The types of data input into the system are
broadly defined by the following categories:

- biographical (sex, date of birth, address, etc.)
- performance review
- promotional process
- educational and training
- position descriptions.

A variety of output reports are generated by the
system. These include:

- skills inventory
- position inventory
- manpower forecasts
- position forecasts
- recruitment forecasts

These reports, as well as statistical summaries
from other information systems at the OPP (such as
the activity reporting system), improve the manage-
ment capability of the OPP to develop the human
resources of the force.

3. Significance

The systems being developed by the OPP are highly
significant for Canadian policing, notwithstanding
their untested operating performance. The OPP Manpower
Inventory and forecasting systems represent an excep-
tional and overriding interest in human resources -
perhaps unique in Canadian policing.

This concern for human resources at the OPP is
reinforced by other management initiatives. For
example, a Management By Results (MBR) program has
been developed and implemented at the field level to
provide a professional environment for monitoring the
achievements of officers within an "objectives"
framework. Other information systems are being
designed to complement this effort.

The OPP is not alone among Canadian police forces
in developing programs to improve human resources;
rather, the OPP had made this in to a high priority
concern. Other Canadian police forces can learn from
the OPP in this regard.

G. The Metropolitan Toronto Police: A Long-Standing Commitment to Management Information Systems

We visited the Metropolitan Toronto Police (MTP) at a
late stage in our project. From our over-all understanding
of Canadian police MIS, we knew that MTP had been involved
in MIS longer than any other Canadian force. We also knew
that the development program was thorough, well planned and

well funded and were not surprised to find a well developed
MIS.

The MTP began using data processing technology in 1948.
Today they have developed a computerized information sys-
tem that forms an integral, and essential, part of their
operation and management system. MIS is used through-
out the force in administration, staff support and opera-
tions. The MTP provides an illustration of the effective
use of MIS within the police environment.

Since the MTP management information systems are very
mature and extensive, we describe the systems only briefly
and focus our efforts on the background of systems develop-
ment in this large urban force. Also, we are interested in
illustrating the strategies adopted to ensure user inter-
face and the acceptance of MIS in Metro Toronto.

1. Systems Development: Technology

There are two major computer-based information
systems within the MTP: a communications system and
a broader MIS system. We will only consider the
development of this latter, more general system.

(a) Background

The Metropolitan Toronto Police have been involved
with the various forms of mechanized data processing
technology for almost three decades. The changes that
have occurred have been gradual. The various user
applications have _evolved_ over time.

MTP's MIS development to date can be divided
into two historical periods:

(i) Unit Record: 1948-1968

In 1948 Unit Record equipment was installed to
facilitate the processing of accident and occurrence
reports. The major development during this initial
20-year period was the decentralization of this infor-
mation into the various police districts.

(ii) Computers: 1968 - Present

In 1968, it was decided to consolidate all Unit
Record equipment, and as a result, MTP's first computer
was installed. This machine was a card-oriented IBM
360 Model 20. Initially, the accident and occurrence
reporting system were converted from the Unit Record
system to run on the new system.

The next move was the acquisition of a new computer
in 1969 which incorporated disk storage technology. A
number of system applications beyond the scope of the
original Unit Record equipment applications were then
made possible. This basic computer configuration
went through two more upgrades because of increased
processing loads:

- in 1971, and IBM 360 Model 25 was installed, and,
- in 1973, the system was upgraded to an IBM 370
  Model 135.

In early 1975, a major change was made to the

computer hardware processing capabilities when the
Burrough's B6700 was installed. This system provides
MTP with on-line data processing capabilities whereby
users can enter their data into the systems via key-
board terminals and can reach data contained in
several major system files from these terminals.

2. The Systems

The MTP data processing applications comprise five
on-line systems and 14 batch processing systems.

(a) On-Line Systems

The on-line systems include the following:

- Fingerprint System; this consists of a file
  containing a record describing all persons who
  have been fingerprinted by the Identification
  Bureau. The system is used to check unknown
  fingerprints against those contained on the
  files.

- Accident Index Search System; this provides an
  on-line index to all accident reports which are
  microfilmed. Each report is indexed according
  to the following:

  . names
  . location of accident
  . date

  . officer badge number
  . accident report number

All accident reports are entered into the system
by operators using on-line keyboard terminals
located in the Records Bureau. Requests for
information about specific accidents are also
handled by these operators.

- Property Inventory System; this provides a record
  for each item of property recovered by the police,
  as one of the following:

  . evidence
  . found articles
  . deceased person's property

Regular weekly reports are generated to inform
the various property units of what articles they
are holding and what articles should be disposed
of.

- Identification Number Conversion System; this
  facility converts RCMP Fingerprint Service
  numbers to internal Metropolitan Toronto Police
  numbers.

- Complainant System; this latest on-line applica-
  tion extracts pertiment data from Occurrence
  Reports and creates a number of index file
  entries which are used to cross-reference all
  occurrences. The data entry and retrieval
  functions are performed by operators located in

the Records Bureau, using on-line CRT terminals.

(b) Batch Systems

The batch processing systems are divided into two broad categories: direct police services and administrative support.

(i) Direct Police Services

The batch systems developed to serve the needs of direct police services are:

- Crime Reporting; three different types of reports are generated by this system:

  . a weekly report of selected crime categories which compares this week to last week, total to date this year, total to date last year and percentage changes. This report provides statistical breakdowns by patrol areas and districts;
  . a 28- day statistical report on index crimes for Metropolitan Toronto;
  . special requests by specific crime types.

- Officer Performance Reporting; this system generates a monthly list of personnel who are due for performance review. The Officer's Performance Report includes a listing of the following types of data:

  . type of duty
  . overtime
  . court appearance
  . sick time.

- High Accident Locations; this report is produced every four weeks and provides a detailed review of the 20 locations in each of the five police districts with the largest number of accidents during that period. The following types of data are reported:

  . number of accidents
  . weather conditions
  . number of charges
  . road conditions.

The MTP Traffic Units and the Metropolitan Toronto Roads Department use this report to analyze dangerous traffic situations and to allocate patrol units to these locations.

- Parade Sheet; this report lists all staff and their duties as assigned by the Sergeants in charge of platoons.

- Street Index; a microfiche is generated with a complete street index of all major locations within the Metropolitan Toronto area. The street index is used by the complaint operators in the Communications Bureau when assigning vehicles and police personnel to specific calls-for-service.

- Court Notification; this system generates a
  report which notifies officers when they are to
  appear in court. These Court Notifications are
  generated from information contained on a mag-
  netic tape file which is delivered to MTP daily
  from the local court system.

(ii) Administrative Support

In addition to the police service applications
listed above, there are six different administrative
applications.

- Accounting and Budget Control; the entire budget
  preparation cycle has been automated. A complete
  set of accounting and budgeting reports are
  generated by the system.

- Payroll; all payroll functions involving the
  following documents have been automated:

  . payroll
  . pay cheques
  . bank reconciliations
  . employee salary withholding information
  . etc.

- Inventory Control; this system has been fully
  implemented in the vehicle maintenance area. A
  similar application is being considered for the
  general stores section.

- Sick Bank System; this system provides a record
  of each MTP staff member's sick bank entitlement.

In addition, this system is used by the Chief
Medical Officer to assist with the scheduling
of appointments.

- Vehicle Maintenance; this system records the
  allocation of operating costs to each vehicle
  in the fleet. Operating statistics on gas and
  oil consumption are included.

- Key Work in Context (KWIC); the KWIC software is
  used to index all policy order and procedures
  for future reference by subject matter.

3.   System Development: Departmental Acceptance

The MTP development of MIS has emphasized user
commitment. This commitment has been responsible
for the widespread use and acceptance of the systems
that have been introduced to date.

How this commitment and acceptance has been
achieved can be illustrated by reviewing the develop-
ment of both the general systems just described and
the dispatch and radio communications system.

(a) Dispatch and Radio Communication

The most striking fact about the development of
these systems is the operational emphasis and the
thorough needs analysis that was undertaken prior to
the development of the present system. Before any

decision was made on components of the system, it had
to be supported by a careful analysis of the routine
operational demands and the range of potential demands
on the system. This needs analysis provided the
basis for the system specifications.

The system is composed of a variety of different
technologies which range from the most sophisticated
electronic developments to a standard mechanical
conveyor belt for passing information. This juxta-
position of the old and the new is evidence of the
user emphasis in the system development. The selec-
tion of each component was based on analysis of police
requirements, not just technical sophistication.

(b)   Methods of Operations Units

Throughout the development of MIS systems within
the MTP, this unit has emphasized user requirements.
It is staffed by over 30 civilians who work closely
with police officers at all levels of the department
in both developing and operating the information system.
This cooperation and close liaison with working police-
men is the key to the unit's success.

(c)   Liaison With Senior Management

The head of the Methods and Operations Unit reports
to an EDP Steering Committee composed of the Chief of
Police and the Deputy Chief. This membership ensures
that the senior management of the force is kept in-
formed of the work of the unit through participation

in monthly meetings. As the EDP Steering Committee
sets priorities and approves all projects, all new
systems introduced by the Methods and Operations Unit
are backed by the Chief and his Deputies.

(d)   Liaison With Users

When a new system is being developed, a project
leader from the field area in question is selected to
head the project team. He is supported by personnel
from the Methods and Operations Unit. The project
leader is responsible for:

   - ensuring that the system meets the operational
     needs of the users, and,

   - presenting the system to the EDP Steering
     Committee for approval.

This Project Leader "approach" ensures that the
users are actively involved in the development of the
system and places responsibility for the user specifi-
cations with users. Under this system the users share
with the Methods and Operations Unit both the credit and
blame for all new systems.

(e)   Planning and Future Development

Early in the development of the present computer-
based information system, the Methods and Operations
Unit developed a master plan for future MIS system

development, which was endorsed by the EDP Steering
Committee. In developing this plan, the Methods and
Operations Unit took the initiative in developing a
number of high "pay off" systems designed to make
clear that computers and the information systems they
facilitated would be useful. As systems became opera-
tional, the Unit considered the responses of users
and employed the blueprint as a guide. Thus, the
order of development of systems noted in the master
plan was tied to the demands of users. This trategy
allowed for orderly planned development while placing
initiative where it belongs, namely, with the users.

At present, the system development anticipated by
the master plan is nearly complete. The two remaining
planned on-line systems foreseen in the master plan
are now in the development phase. These are:

- Fraud Squad Index; this system will be inter-
  faced with Complainant System and basically
  represents an extension of the index file. This
  expanded index file will permit the Fraud Squad
  to index the fraud occurrences to match their
  specific requirements.

- Intelligence Information; this system will pro-
  vide the Intelligence section with on-line
  access to a number of MTP local files including:

  . complainants
  . fraud
  . FPS/MTP cross-reference.

The Methods and Operations Unit is now on the verge
of developing a second master plan which will anticipate
developments for the next five years. It is expected
that developments during this five-year period will
concentrate on:

- a review and update of existing systems,

- the expansion of the on-line capacity to include
  some of the present batch systems,

- decentralization of the data entry and retrieval
  systems, and,

- greater coordination between the Communications
  and the Methods and Operations facilities.

4. Significance

Much can be learned from the development of infor-
mation systems at MTP. Over a ten-year period this
department has been extraordinarily successful in
building a management information system that meets
the major operational administrative and management
demands for information of users at all levels in the
organization. These lessons can be summarized as
follows:

- in developing systems, concentrate on operational
  requirements and a thorough needs analysis.

- ensure the commitment of senior management to
  MIS.

- involve users in systems developments and ensure
  that they share responsibility for new systems.

- develop, within the police department, and MIS
  unit staffed by professionals.

- implement high visibility and high pay off
  "bread and butter" systems first.

- allow initiative for new systems to come from
  users as their confidence in MIS grows.

- plan initially to develop a full repertory of
  operating systems before moving to sophisticated
  on-line data entry and retrieval systems.

- similarly, allow users to become familiar with
  the products of MIS before attempting to
  drastically change data recording and storage
  methods by, for example, doing away with documents
  in favour of a direct computer/policeman interface.

- consolidate successes before moving ahead to new
  system development.

- in everything, put users first.

The MTP has had more experience in developing com-
puterized MIS than any other municipal police force
in Canada. Other police jurisdictions becoming in-
volved with MIS can benefit from the Toronto experience
and should visit this jurisdiction.

H.   Conclusions

The preceding sections of this chapter have provided
a number of general sketches describing the management
systems development programs in a number of Canadian police
forces. Although the over-all emphasis of this study is on
municipal police forces, we have also described MIS
development in one provincial police force and one RCMP
detachment. These deviations from the municipal scope of
the study are deliberate. In this volume, it is our inten-
tion to provide the reader with a general view of police
MIS philosophy in Canada, rather than a detailed description
of any particular police MIS development program.

We have made no attempt to describe all MIS develop-
ment programs in Canadian police forces. For example, we
did not describe the development programs in the following
police forces:

- the City of Calgary, Alberta; the Calgary Police
  Department has been developing an information system
  based on occurrence reporting for almost two years,
  the system is being designed and developed in consul-
  tation with city data processing personnel. It is
  scheduled for completion in the summer of 1977.

- the Hamilton-Wentworth Regional Police Force, Ontario;
  although this police force is not currently involved
  in an MIS development program, its senior manage-
  ment in interested in MIS and is currently examining
  the need for a major development program. Part of our
  police management information system study was devoted
  to a review of the current systems at HWRPF and a

specific analysis of the need for new systems. Our
own formulations of TIPS, described in detail in
Volumes IV and V, drew heavily on our experiences in
Hamilton.

- Quebec City, P.Q.; the Quebec City Police Force has
been gradually updating their information processes,
first through improved manual procedures, then
through a proposed computerized system. Part of our
study was devoted to an analysis of the need for
ATOM mapping and the developing of new patrol zones
in the Quebec City jurisdiction. We gained valuable
insights through our work with the Quebec City Police
Force.

- the Royal Canadian Mounted Police; in addition to
CPIC and CPIC-related developments (see Chapter III)
the RCMP is conducting an analysis of their own infor-
mation processing requirements. This study is
called IMS, for Information Management Study. It
focuses on the development of improved administrative
and operational management systems between detach-
ments and centralized administrative processes
of the RCMP.

Readers will note that most of the information systems
development programs we have described in the preceding
sections are in process. MIS is a relatively new science
for Canadian police. Accordingly, much of what we have
described will be out of date by the time this volume is
published. This is one of our major reasons for emphasizing
philosophic profiles of MIS, which tend to remain stable over
time, as opposed to detailed specifications, which tend to

change during the course of a development program.

GLOSSARY OF TECHNICAL TERMS

ADMINISTRATION OF CRIMINAL JUSTICE (System of Criminal Justice):
The inter-organizational relationships that exist between
law enforcement, prosecution, adjudication, probation,
corrections, and parole.

AUTOMATIC DATA PROCESSING (ADP): Denotes both electronic
data processing (EDP) and electric accounting machinery
(EAM).

BATCH INFORMATION PROCESSING: The function of providing data
within some reasonable time, but not simultaneously with
operations. This type of processing is frequently accom-
plished in an off-line mode. Off-line pertains to opera-
ting devices not under the direct control of the central
processing unit. Batch processing can also operate in an
on-line mode.

CATHODE RAY TUBE (CRT): A CRT is a visual display terminal
used for inquiry into the memory of a computer system.
The terminal consists of a keyboard, a signal generator-
interpreter, a buffer, and a visual display screen similar
to a television screen.

CENTRAL PROCESSING UNIT (CPU): The component of the computer
that contains the main storage, arithmetic unit, and special
registers. It is synonymous with Central Processor.

CODE: It is either a system of symbols for representing data
or instructions in a computer or a tabulating machine, or
it is the translating of a program for the solution of a

GLOSSARY (continued)

problem on a given computer into a sequence of machine
language or pseudo instructions and addresses acceptable
to that computer.

COMPUTER (Digital): An electronic device capable of accepting
information and performing prescribed processes to the
information and supplying the required results in micro-
seconds.

DATA: Facts used as a source for processing a series of
actions or operations directed toward an end; the raw
material for the function of information processing.

DATA COMMONALITY: The identification and use of the same data
element by more than one person or organization.

DATA FOUNDATION OR DATA BASE: File of files of information
existing in permanent or semi-permanent storage, excluding
transitory or impermanent information to be operated upon
by the system or contributing to the operation of the sys-
tem.

DECISION MAKING: An organizational strategy for mounting a
collective response to a problem situation.

DISK: A storage device on which information is recorded on a
magnetizable surface. The disks rotate at a high speed,
providing rapid (random) access to information.

DRUM: A high-speed, rapid (random) access storage device
consisting of a rotating drum coated with a magnetic
material upon which data are stored.

GLOSSARY (continued)

ELECTRONIC DATA PROCESSING (EDP): The kind of automatic
    handling of information which is done by the million-
    operations-a-second electronic computer.

HARDWARE: Hardware is all of the mechanical, electrical,
    magnetic, and electronic components forming the
    equipment portion of an information system.

INFORMATION: Knowledge derived through the analysis of data.

INPUT: The acquisition of data and placement into the system.

INQUIRY (I/O): A device, generally a typewriter keyboard, used
    to "talk" to the computer, usually to get quick answers
    to random questions. Also, it may accept new data, send
    it into the computer for processing, receive the results,
    and convert them into a usable form.

INTEGRATED INFORMATION SYSTEM: Developing and coordinating
    the individual elements of a system so as to form a com-
    patible over-all system configuration.

INTERFACE: The intersection or common boundary of two or more
    logical or physical entities. In the context of this
    report, to interface two systems or effects is to inte-
    grate and coordinate the specific systems or efforts such
    that the results can be combined to provide a unified
    solution.

MAGNETIC TAPE: A ribbon of tape impregnated or coated with a

GLOSSARY (continued)

    magnetic material upon which data may be stored as
    magnetically polarized spots or wave forms.

MODEL BUILDING: The abstract construction of an ideal state
    of affairs which usually acts as a guide for subsequent
    design, development, and implementation of the concept.

OPTICAL SCANNER: A computer input device that recognizes many
    characters and digits by optical scanning.

OUTPUT: To present the results of the processing or the
    status of any data stored in the system.

PAPER TAPE: A ribbon-like strip of paper, one inch or less in
    width, used as a means of recording data in the form of
    coded perforations.

PROCESSING (of either information or data): To manipulate
    data according to specified rules.

PROGRAM: A series of instructions which cause a data-proces-
    sing systems to process a specific application.

PUNCHED CARD: A punched card is a card of standard size and
    shape in which data are stored in the form of punched
    holes. The hole locations are arranged in 80 or 90
    columns with a given pattern of holes in a column repre-
    senting one alphanumeric character or one digit. The
    data is read by mechanical, electrical, or photoelectrical
    sensing of the hole positions.

GLOSSARY (continued)

RAPID ACCESS (Random): Pertaining to the process of obtaining
  information from or placing information into storage where
  the time required for the access is independent of the
  information most recently obtained or placed in storage.
  This type of process is capable of operating at extremely
  fast speeds.

REAL-TIME, ON-LINE INFORMATION PROCESSING: Real-time means
  the processing of information in a sufficiently rapid
  manner so that the results are available in time to in-
  fluence the process being monitored or controlled. It is
  sufficiently fast that there is virtually no passage of
  time between inquiry and result. On-line pertains to
  operating devices under the direct control of the central
  processing unit.

RETRIEVAL: The recovering of desired information or data
  from a collection of documents or other graphic records.

SIMULATION: This is an exercise which generally uses a com-
  puter as a score keeper while people make decisions
  concerning a mathematical model of the business world.
  The model consists of a group of cause-and-effect formulas
  that determine what happens when a decision is made by
  a human competitor.

SOFTWARE: Software includes design documentation, computer
  programs and their supporting description documentation
  for operational and support functions, operator methods

GLOSSARY (Continued)

  and procedures handbooks, orientation materials, and
  system exercising and training materials.

SYSTEM: A set of components and their attributes inter-
  related by process or structure possessing a functional
  purpose and organizational unity. Depending on the
  context it may be either an organization or a set of
  informational relationships.

SYSTEMS ANALYSIS: A specialized method of subdividing an
  integrated complex into its more basic parts in order
  to examine each   component's use and relationship to other
  components. This process requires ascertaining some
  relatable denominator as quantitative value.

SYB-SYSTEM: A subdivision of a system; a system contained
  within a system.

APPENDIX A

POLICE DEPARTMENT QUESTIONNAIRE

Background Information

1. How many police officers are
    employed by your department?   _____

2. How many cadets are
    employed by your department?   _____

3. How many civilians are
    employed by your department?   _____

4. How many square miles of area
    are served by your department?   _____

5. How many people live in this area?   _____

System Development Information

6. Other than CPIC or provincial level systems (e.g., vehicle
    registration, driver registration, etc.), are you
    currently using computerized systems?

                                    Yes of No
    If no, please go to question 8.

7. If yes, please check off the applications areas which
    are currently computerized.

Occurrence Reporting   _____

Traffic Accident Reporting   _____

Summons and Traffic Ticket Reporting_____

Evidence and Property Control   _____

Computer Assisted Dispatch   _____

Court Liaison   _____

Officer Scheduling   _____

Statistical Reporting   _____

Crime Analysis   _____

Manpower Projections   _____

Personnel   _____

Vehicle Maintenance   _____

Stores   _____

Accounting   _____

Payroll   _____

Budget Control   _____

Management Reporting   _____

Information on Plans for Future Development

8. Have you formulated specific plans for the future
    development of computerized applications?

                                    Yes or No
    If no, please go to question 10.

9. If yes, please check off the application areas planned
    for future development.

    Occurence Reporting   _____

    Traffic Accident Reporting   _____

    Summons and Traffic Ticket Reporting _____

    Evidence and Property Control   _____

    Computer Assisted Dispatch   _____

    Court Liaison   _____

    Officer Scheduling   _____

    Statistical Reporting   _____

    Crime Analysis   _____

    Manpower Projections   _____

    Personnel   _____

    Vehicle Maintenance   _____

    Stores   _____

    Accounting   _____

    Payroll   _____

    Budget Control   _____

    Management Reporting   _____

Computer-Related Information

10. Does your department own or rent computer equipment
    which is located on-site at the department?

                                      Yes of No

    If no, please go to question 12.

11. If yes, please indicate the cost of this equipment.

        Purchase Cost $_____
            or
        Monthly Rental $_____

12. Does your department use other computer facilities?

                                      Yes or No

13. If yes, please check off those facilities used.

        City or Regional Government   . _____

        University   _____

        Service Bureau (Private Data Centre) _____

        Provincial Government   _____

        Other (please specify) _____

        _____

        _____

14. Does your department have an internal group responsible
    for the development and maintenance of systems and
    procedures?

                                      Yes or No

    If no, please go to question 16.

Organization and Cost Information

15. If yes, please answer the following questions:

   15 a)   What is the reporting relationship of the
           group? (i.e., does the group report
           to the Chief, the Deputy Chief, Superintendent,
           Inspector, etc?)

   Please Specify _____

   _____

   _____

   _____

   _____

   15 b)   How many police officers are employed in this
           group? _____

   15 c)   How many civilians are employed in this
           group? _____

   15 d)   Describe the educational and professional
           background of the individual members of
           this group.

           _____

           _____

           _____

           _____

15 e)   What is the group called? (e.g., Information
        Services, Data Processing, Systems and
        Procedures, etc.)

        Please Specify _____

        _____

        _____

        _____

        _____

16. Do you have access to outside professional staff
    assistance? (e.g., City Data Processing Department)

                                        Yes or No

17. How much was spent on automated data processing
    during last year (1976) in the following cost
    categories?

        Staff Costs   _____

        Equipment Costs   _____

        Other (please specify)   _____

    _____

    _____

    _____

    _____

END