IT
Enabled
Police
&
Security Services

- Mathew John, IPS

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I don't know how much benefits the officers and men who may read it will get from the efforts I have put in. My effort was always to help them understand the field better. I own the responsibility for any inaccuracies and defects, which could have inadvertently crept in. It is my fervent hope that it would help some people to understand the field better.

Chapter 1 - INTRODUCTION

During the last two decades, there has been a phenomenal growth in the use of computers in different fields, both in the government and private sectors. However, in departments or organizations like Police dealing with essential services and without which no development can take place or life in society cannot be normal, computerization has not reached at the desired levels. Criminals, other undesirable elements and breakers of law have, in general, been making the most of leading edge technologies and forcing the police to follow suit. In India, now well known for its knowledge of cutting edge software capabilities, the police force has been far behind many organizations, particularly in the private sector. Considering the fact that societal peace and stability are a 'sine-qua-non' for growth and development, police organizations should take to state- of- the- art technologies to be effective in the fight against terrorism, extremism, militancy and organized crimes.

The fire fighting nature of police work (which gives a low priority to technology updation thereby causing a reluctance to take to fast changes in technology), shortage of technically capable/oriented manpower, need for large scale training to understand and imbibe the new work culture, more generic problems like lack of infrastructure needed for IT in the country itself, absence of a national identity or social security system (which enables the fixation of identity of all individuals in developed countries), absence of local language interface, generally visible lack of interest, knowledge, or seriousness in I T in senior levels ,etc are serious problems. Shortage of funds can no longer be a handicap for computerization in view of the availability of sufficient funds under 'Police Modernization Scheme'.

As computers and computer aided techniques have become all pervasive, whether we like it or not, computers are going to make their presence felt everywhere – in our houses, offices, schools, public places, and may be even in our own bodies (in the form of embedded biometric chips /systems). Hence, it is only logical that police officers and organizations make serious efforts to understand how Information Technology could be effectively utilized for police work.

This research is meant to understand some of the basic issues involved, look at developed countries and their application of information technology for police work and to understand how in different Indian scenarios we could harness tools of information technology. IT would be useful to our professional competence and organizational systems to deliver better service to the common man. The Indian scenario, which is quite diverse, will be looked at in four categories mainly

1. Metropolitan cities like Delhi, Bombay, Kolkata, and Chennai.
2. Other urban centers including state capitals and district towns,
3. Developed villages like those close to cities and towns, villages in states like Kerala, and
4. Backward villages, say of North _East, remote areas of Bihar, Orissa, etc.

During the course of research, an attempt has been made to discuss, in order of priority, different applications and technologies relevant for these scenarios taking into account views of police officers, IT professionals, relevance and suitability of techniques in use in developed countries, etc

The thrust of the research was to see how IT could help police to improve its performance in areas where its performance as seen from various studies was rated as 'poor' or 'unsatisfactory'. An effort was made to revalidate and readjust such conclusions based on surveys among police officers and men, and knowledgeable general public etc. IT is not a panacea for all ills of police, but a very effective tool, if intelligently utilized, to handle problems more effectively. Many non-IT changes will have to be integrated with the use of IT to derive optimum benefit from such tools

The role of police can generally be described as preventive, investigative/detective, security and service oriented. Alternatively, it may be classified as crime, law and order, security, and service related. Today, the service role is getting increasing stress particularly in developed countries. In countries like the U S.A, Community Policing, which stresses pro-active and co-active policing with active public participation and service orientation, is getting priority. This is getting increasing focus in India too. While looking for technologies and applications, all these factors have to be taken due note of.

In this research, in addition to the normal policing activities with which the publics are directly concerned on a day-to-day basis, 'intelligence' and 'security' related tasks have also been given special attention. Efficient functioning of state intelligence and security branches is a must if police is to serve the society better. Though such areas are more in the realm of in-house management and are generally classified as 'confidential' or 'secret', as these have considerable data on people, places, incidents activities etc, I T will considerably improve their performance. The fact that these are days of 'intelligence driven', 'problem oriented 'and 'proactive policing' wherein intelligence has an important role has also been kept in mind while studying these areas. Views of selected state police units on the relevance and importance of different applications were duly considered while selecting applications on these fronts.

Computerization of police has just begun in most of the states. Many of them are yet to hear of even System Requirements Studies, which is a logical preliminary step. Hence, computerization process and its various stages have been given some attention and three perspectives, viz. Systemic, Procedural and Applications have been covered in a fairly detailed manner.

(i) In the Systemic view, how an organization changes over years, the problems likely to be faced, applications that are taken up, evolution of I T Dept.itself etc have been covered.

(ii) In the Procedural view, the correct procedures that may be adopted to better serve the interests of the Dept. and to optimize use of resources are touched.

This is to prevent short-cuts or supplier driven situations where the needs of the supplier overtake the interests of the police units, which are not very knowledgeable about the best way to go about the process. This is based on the systematic practices in force in U.S.

(iii) In the Applications' view, the types of applications and their normal chronological order in police systems have been gone into. It is hoped that these would help many officers not familiar with computerization to get a better feel of the processes involved. It may also equip them better to take a professional approach while taking decisions in the face of pressures from suppliers.

Today what we see in our country as computerization is generally word processing applications. Though word processing is essential, unless matched by data processing, analysis, etc, it is a costly and unproductive use of the computer's tremendous power of computer. In this study, the term 'computerization' has been generally used to denote applications other than word processing.

The examples of applications given (with more stress on intelligence and security work) are only illustrative and they are based primarily on field requirements. They are only meant for guidance. Most of the state units are yet to seriously consider such applications. As the views of selected states and their suggestions have been incorporated, it is hoped that these applications would prove useful. My experience in working in the intelligence and security fields and insight into the needs of state Special Branch, Security work etc gained while functioning as D G P in a state prompted me to pay some attention to these areas.

The areas which need improvement by police units as revealed from various unbiased studies are (a) bad behavior / conduct with the public (complainants, victims, the poor and the underdog, minorities, women, S.C/S.T etc), (b) violence /highhandedness (c) corruption (d) poor professional competence,(e) bias in favour of the rich, highly placed, educated ,business men etc ,(f) harassment of the weak, poor ,innocent, etc,(g) action under political pressure /influence, (h)failure to act as per law, (i) violation of law /rules by police officers /men,(j) links with criminals etc. Detailed studies meant to find solutions to such weaknesses have shown that improvement in Social Skills, Responsiveness and Transparency of police would, to a great extent, help solve such problems. How I.T. can contribute in such efforts has been discussed and analyzed. One of the basic aims of the research was to see how I T could help the police to improve its performance, particularly in areas where the public sees it as below par. As I T is only a tool and solutions to many problems lie elsewhere like change in control of police from politicians to more independent bodies, recuitment of better educated constabulary, better training, changes in rules and regulations, better pay and service conditions, a modern police act and drastic changes in the criminal justice system. Though IT is definitely not a panacea for all ills of police, it can help police to become more transparent and responsive and add to the overall professional competence of police. The approach to modernization in police using I.T. has to be from this perspective.

As the targeted groups for the product of research are senior police officers and police operatives in the field, a serious effort was made, to the extent possible, to avoid use of technical terms and jargons. As the IT field is quite technical though the intended beneficiaries are non-technical personnel, some technical terms have, in the absence of better alternatives, crept in. This is perhaps unavoidable. Hence, an effort has been made to explain such terms at relevant places. It is hoped that it this will help solve the problem. As the proof of the pudding is in the eating, the objectives of research will be met only if it helps at least some police officers to understand computerization better.

Chapter 2 - RESEARCH - SCOPE AND OBJECTIVES

Scope:

The caption "I T enabled police and security services" contains the following parameters in its scope.

1. Enabling better performance of various police functions using the various tools of Information Technology. This would cover investigation of cases, maintenance of law and order including traffic, intelligence, security and similar roles.
2. The term 'security services' is used here to refer to intelligence and security functions of police. In this section, some of the possible applications of I T for better performance of the tasks falling in the areas of intelligence collection, analysis etc and security roles will be covered
3. Police, as it historically evolved, was essentially meant to be a service to the common man to discharge certain functions on behalf of the society which the public at large cannot discharge due to lack of time, training etc.

Broadening the scope of police services to the society using IT tools will also be covered. This obviously means that the police has, apart from its traditional law enforcement role, an expanding service role. This research will also review how IT can be used to better discharge such functions.

Objectives:

The main objectives of the research are the following:

1) Analysis of the policing functions to see which are the areas where the Indian police are found to be weak in performance as perceived by the public and as revealed by past studies in respect of police performance. These results will be revalidated or modified based on a fresh reappraisal of the scenarios by surveys among different categories of people. In roles where the current levels of performance are assessed to be poor or unsatisfactory, how I T can help will be examined with particular reference to practices in developed countries without forgetting the different Indian scenarios.

2) In respect of specific areas of police work, what tools are available today and how they can be used effectively in different Indian scenarios will be gone into. In this, the experience of more I T savvy countries and police forces will be reviewed to see how best we can adapt them to meet our needs.

3) In areas like intelligence and security, some models and time permitting, a few softwares, will be developed for certain items of work in consultation with selected state units. Such models will be more in the nature of guidance and actual users could make suitable changes to meet their specific needs. The

models will also be P C based applications with access as the back end and visual basic 6.0 as the front end.

4) As four different Indian scenarios are being studied, specific applications, which should receive priority in the current scene, will be gone into particularly in respect of states, which have not seriously taken up computerization schemes. In these four scenarios too, the applications which should receive priority will be touched based on the experiences elsewhere and our needs.

5) As different states are in different stages of computerization work with some states like Andhra Pradesh having gone much ahead of other states, the applications that are being successfully used will be covered in the review of the existing scenarios in different states. This, it is hoped would help others to take cue from those lessons and adjust their plans accordingly. It would also make interested persons aware of what is happening in the country and what benefits others have gained from their work in the field.

Chapter 3 - METHODOLOGY

The basic aim of the research was to find out how information technology could be used for improvement of police performance in areas where it is currently rated as poor or unsatisfactory. The methods that are necessary for identification of such areas in the current situation are the first priority. Various studies of the past on police performance available in National police Academy and elsewhere were studied to make a tentative selection of such areas. Various **syndicate papers** prepared by senior police officers, **Establishing Success criteria and Baselines for performance in relation to Social Skills, Transparency and Responsiveness of Indian Police**----by Prof.R Ravikumar and Prof.S .S. Vaidyanathan-UNDP Project #IND/95/007 I. .I. M, /Bang/99,**Study on public perception of police -Dr.A K Saxena study (N P A)** were primarily used for the purpose. The following areas were tentatively selected for field-testing and revalidation.

(A) Bad behavior/and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.
(B) High handedness and violence (use of third degree and related issues) of police,
(C) Corruption,
(D) Professional failures/inadequacies.
(E) Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc
(F) Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.,
(G) Actions under political influence/pressure,
(H) Links with criminals, antisocial and rowdy elements,
(I) Failure to enforce law, rules etc,
(J) Violation of law, rules, due procedures etc by police officers and men.,
(K) Other similar actions like harassments of people during VVIP visits use of excessive force in law and order situations and abuse of authority.

A questionnaire (Annenxure- A) was designed to the revalidate the issues mentioned above designed in consultation with different senior police officers of the academy, some management experts of ASCI, Dr.A.K Saxena, research guide etc. This questionnaire was then circulated among the public, police officers of different ranks all over the country and I T professionals to elicit their views on the issues mentioned above. A five point Grading system (Very good, Good, Satisfactory, Poor, Very poor or Fully, To a great extent, To some extent, To a little extent, Not at all) was used where structured responses were required.

Based on an analysis of the results for the country as a country as a whole, the following areas were identified for poor /unsatisfactory performance

1. Actions under political influence/pressure
2. Corruption
3. Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.
4. Failure to enforce law, rules.

5. Professional failures/inadequacies
6. Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.
7. Links with criminals, antisocial and rowdy elements
8. Violation of law, rules, due procedures etc by police officers and men.
9. High handedness and violence (use of third degree and related issues) of police
10. Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority
11. Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.

Analysis of part of the data of the survey was done with the aid of a computer programme in Visual Basic 6.0 specially prepared for the purpose. In respect of unstructured questions, as the responses varied considerably, no computerized analysis was possible. They where separately analyzed through a manual process and results grouped together. The basic approach was to give more weightage to the views of police officers on professional issues where they are more knowledgeable. Similarly, in respect of IT and related parameters more weightage was given to views of IT professionals.

(a) **18 States namely Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Maharashtra, Gujarat, Goa, Delhi, Punjab, Mahayana, Uttaranchal, Uttar Pradesh, Madhya Pradesh, Bihar, Jharkhand, West Bengal, Assam and Tripura were visited** to study the level of computerization, problems being faced, perceptions of police officers of different levels on subject, applications being developed and similar parameters. In some states like Andhra Pradesh, Karnataka, Kerala, Uttar Pradesh and West Bengal, in addition to the state capitals, a few more places like **Commissionerates of Cyberabad, Vijayawada and Vishakapatnam and Srikakulam district (A.P.), Tumkur Dist (Karnataka), Calicut (Kerala), Pune (Maharashtra), Nainital (Uttaranchal), South24 Parganas (West Bengal) etc** were covered. **Visits to police stations were also made in these places** to see the 'as-is' position at the cutting edge level and study the useful applications in use or being developed.

Survey among police officers was used to understand their own perceptions about their work, need for I T and its importance and how far they compare with those of the public at large. In addition, their views helped us understand the problems in computerization in police, especially the resistance to change. The other methods used to collect data and get a correct understanding about the ground level situation in respect of computerization in different states included:

i. Discussions with the DGPs of the States visited to know their views on computerization, plans for the future, difficulties being experienced and gains from IT.

ii. Discussions with the ADGs/IGs in charge of computerization in a large number of States and also other officers working under them about various applications in use, problems in achieving progress, attitude of field officers

and related parameters. Similarly, discussions were also held with a large number of officers and staff working data entry personnel, programmers, etc.

iii. During visits to USA (New York, Los Angeles, Sacramento, etc) and Japan (Tokyo) discussions were held with police officers and also those dealing with IT matters about use of I T by them, benefits derived, problems that come up, etc. The Traffic Control Room of Tokyo Metropolitan City police was visited to see the functioning of the traffic management system. Lesson learnt from these have been incorporated in the results of the research.

iv. The reports on experiences and lessons learnt from computerization experiences in Australia and Canada were studied to see how things evolved in these countries. These included: 'E-Policing-Impact of IT on police practices – Janet Chan-David Brevton-Margot Legosz-Sally Doran in respect of Australia and 'The implications of using information technology for police investigations in Canada'- Technical Report by Dr.Marcel –Eugene LeBeuf.

v. Detailed searches in Internet were made through Google, vivisimo, etc to locate suitable materials relating to the subject on knowledge management, data interpretation, data integration, visualization, RMS, CAD, GIS, Mobile computing, cop link and similar applications relevant for day to day police work.

vi. Detailed analysis of websites of police units of New York, Washington, Chicago, Los Angeles, Sacramento, Tokyo, Singapore, London and of other cities were done to see how far I T has enabled them including parameters like their stage of development, use of I T by them as is reflected in them, thrust of police work, mission and public charter, service mentality and similar I.T related matters etc.

vii. Review of all websites of state police units including those of some cities like Calcutta, Chennai, Mumbai, Trivandrum and Pune and also of all Central Police Organisations/CPMFs to see their stages of development, computerization, IT ennoblement etc with the aim of noting good points. All these have been used in making recommendations about improvement of web sites.

viii. In respect of states, which couldn't be visited, the DGPs/Police chiefs were requested to provide details of computerization efforts plans for the future etc. In addition to these, the NCRB's data on the same given in its website were made use of.

ix. The visits to Different types of places including rural police stations, suburban centers, remote areas etc were made keeping the need to make suggestions about possible approach to computerization in the 4 typical scenarios referred to Para 4 RESEARCH-SCOPE AND OBJECTVES (page 5) and point 6 of Recommendations.

x. Field interviews were held with officers in charge of e-governance related work in states of Andhra Pradesh, and Karnataka, some Professors of IIM Bangalore and IIM Ahmedabad, IIT Guwahati, IIIT Hyderabad, senior personnel of Wipro Information Technology Limited, and some other soft ware firms.etc.

xi. The **Research instruments** used included questionnaire for the survey (annexure A) open letters to Chiefs of IIMs, IITs, IT Professionals in Software Technology parks, IISC, seeking their views on IT applications in police, technology options, relevant solutions, etc.

xii. Methods used for **Data Collection**, organization and analysis included in addition to field interviews all over the country, use of libraries of NPA, ASCI (both Hyderabad), surveys among selected students and faculty in IIMs, IITs, National Academy of Administration, Mussoorie, National Police Academy, Hyderabad, Software Technology Parks, Indian Institute of Science, Bangalore etc. All syndicate papers of various courses of senior officers in the Library of National Police Academy were also studied to get relevant materials on police performance and image. The results of the survey were analyzed, as referred to earlier, partly manually and partly using software prepared for the same.

xiii. For data presentation in the report, pie charts, bar diagrams, line graphs; tables, lists, tables and case studies were used.

xiv. Case studies were selected based on their relevance to prove a point or highlight an aspect of computerization relevant for the Indian scene.

xv. Some of the techniques like the use of random sampling, standard deviations, T-Test, and F-Test were not considered essential for the this research which is basically meant for ordinary police officers who would not understand their significance. But, the spirit of such techniques was kept in mind in data collection and analysis.

The thrust of the research was to make the computerization work in police more understandable to ordinary police officers. This report explains the various stages of the computerisation process, the IT applications currently in use by police departments in our country as compared to those in developed countries and changes in attitude and work culture needed for better results from use of I T in police work.

To conclude, it may be added that a combination of methods were used depending on their relevance for the collection of data and ascertainment of views, their analysis and presentation, keeping in mind the needs of the target group (police officers). The fact that this was not a pure academic exercise, where stricter research standards could have been applied, but an empirical one meant for day-to-day guidance was always given more weightage.

Chapter 4 - COMPUTERISATION PROCESS - Systemic, Procedural and Applications Views

There are several areas of police functioning where improvements are needed. These improvements can possibly be achieved in different ways as given below:

A.

Ways to improve
1. By improving efficiency
2. By reengineering
3. By Storing and Sharing Information.
4. By New Ways of Serving
5. By Improving Feedback.
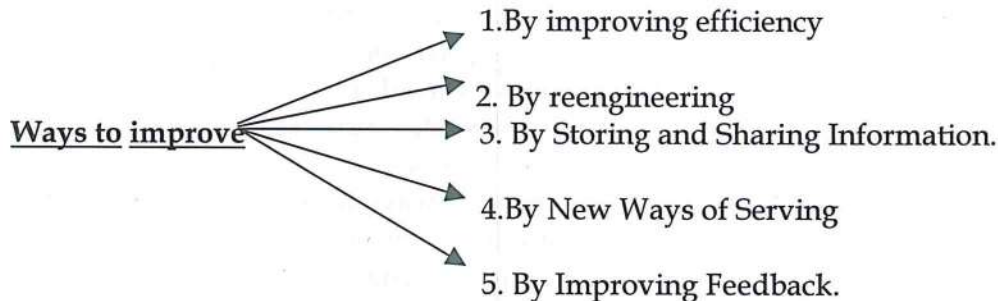
Information technology can contribute in all these areas of improvements as illustrated below by means of some selected examples. In actual practice, there may be, many other ways by which I.T may help to improve police performance. But, as technologies are only evolving and new user-friendly technologies and applications are continuously being developed, the future has much greater prospects than that can be dreamt of or imagined now.

(1) <u>By improving efficiency</u>. Tools of Information Technology can improve the efficiency of the police service in many ways. Some examples where police efficiency can be improved using I.T are faster registration of cases, supply of copies of documents, quick responses to public demands for emergency services, faster feedback for police from the public, replies to queries of public through email/websites, faster lifting of finger prints through digital cameras and quick search through computerized database on finger prints and photos of suspects in photo galleries, etc. The computerized dispatch systems being used in modern police systems have considerably reduced the time taken for police to reach the crime scene.

(2) <u>By Re-engineering</u> Computerization of existing systems/practices would bring in only partial benefits. To get the full benefits, re-engineering of the existing processes, practices and procedures is essential. Re-engineering of police procedures, processes and practices using IT will enable new/better ways of doing things. Computer matching of lost and stolen properties with those recovered or found else where, Computer Aided Dispatch systems to send police officers to deal with emerging situations or changing crime patterns, changes in signal timings in traffic control depending on speed and intensity of traffic, Automatic Vehicle Locator systems through computerized GIS /G P S systems, etc are some examples of how reengineering will facilitate better results from IT.

(3) <u>By Storing and Sharing Information</u> Computers today enable us to store huge quantities of information and analyze them quickly. Hence it is now possible

to make correct decisions quickly. They also provide for prompt sharing of information, say by email, simultaneously with officers at different levels in the police hierarchy saving time and energy, which can otherwise be more productively utilized. Once the databases of the police, transport, jail, judiciary etc are linked, information on arrest/release, wanted people, vehicle, property can be better shared ensuring better coordination in respect of follow up steps to be taken by different agencies, say on the occasion of arrest/release of a terrorist. Faster ways of reporting and giving/getting instructions, quick search of databases at national, state, district and local levels by detectives based on new clues received, patrol man's capability to conduct searches for wanted property, vehicles, cars, persons etc based on latest information are only a few other examples.

(4) Improving Feedback There are a number of ways in which feedback can be improved by computerization. Use of email, websites, SMS, Bulletin boards, Discussion groups etc are some examples. Internet, LAN and WAN, mobile computing etc can also help to improve feedback.

ᵽ _____ Computers have also opened up new ways of serving for the police. The Automatic Vehicle Locator Systems fitted in cars today enable the police to locate a stolen car through satellite systems and thereby catch the criminal. The computerized traffic monitoring system enables the Tokyo police to give the Japanese public information on the degree and type of congestion and speed of traffic ahead on national and other highways so that they can think of taking alternate routes. The ability to provide various help lines and feedback systems in police web sites will enable the police to be more service oriented and responsive to public demands for information

What does 'enablement' by I.T. mean? What are the dimensions of IT enabling? It is necessary to briefly dwell on these for clarity about the possible benefits that could follow. Information Technology (I.T.) **can substantially help** police at least in 4 major ways to improve performance. They are:

1) Better decision support systems
2) Better co-ordination.
3) IT enabled Tools.
4) IT enabled services.

Databases which can store past data with facilities for different types of queries, or "what if" situations, expert systems, data mining etc give police the capability to take better and data driven decisions. Facilities for sending emails with copies to different persons, tele or video-conferencing capabilities, mobile computing etc provide for better and faster coordination between senior levels, field staff, analysts, etc. I.T has made available various versatile tools for policing, which could not be thought of earlier. Mobile Computing, GIS applications, Crime Mapping, Digital matching of Fingerprints, etc are only a few examples. I.T has made available new ways of serving the public like registration of complaints through Web sites,

Automatic Vehicle Locator systems, Dynamic Traffic Signal Controls, Computerized Vehicle guidance systems, etc.

B. Service role of Police – Need for Re-emphasis

The service attitude is yet to pick up in government services, especially in police, due to the use of police to keep people under control, both in pre-and post-independence periods, poor administrative culture and inadequate service mentality in all public services in our country, illiteracy of people, etc. This is particularly lamentable as police was started essentially as a 'service' meant to reassure people of their safety and security and hence all their actions should be oriented towards this mission. According to Robert Peel, "police are public and public are police". This quotation acknowledges how police and public have to be closely linked and have to be mutually supportive .The Code of conduct for Indian police (MHA, 1985) says "the police must recognize that they are members of the public with the only difference that, in the interest of society and on its own behalf, they are employed to give full time attention to duties which are normally incumbent on every citizen to perform". In UK, police started as 'citizens' police' when the community appointed a few of its members to exclusively look after police/security functions

In India, the British used police to maintain law and order and help collection of revenue with 'control' as the keyword in their philosophy. The police act of 1861 still continues along with the hangover of the pre independence practices and work culture wherein service mentality is lacking. In the current situation in the country where terrorism, militancy, insurgency, and consequent violence are dominating the scene in many parts of the country, militarization of police has been showing an upward trend. In developed countries, particularly in Japan, USA, Netherlands, Israel etc. service to the society is being given increasing priority. Community policing where by the community and the police are partners in policing has made considerable advancement in countries like USA. This, as also service philosophy, has, of late, started taking roots in India too. Police in India have to pay greater attention to the "service" role whereby at the cutting edge level, the police makes service to the common people its mission imbibing the real spirit of democracy. Then only the image of police in the country will improve.

Situations, which have made the public proud of police, will show what service the common man in India expects of the police. According to one study, people were proud of the police in situations when police behavior clearly demonstrated the following:
1.Help to the poor, accident victims, women and children, students, the weak and aged, etc. 2. Empathetic listening. 3. Prompt response. 4.good investigation. 5.good law and order arrangements. 6.quick recoveries. 7. Good traffic arrangements. 8.neutrality during communal situations. 9.successes against terrorists, militants' etc. 10.relief operations11.guidance to the public.12.tracing of missing persons, vehicles, property etc.

Thus the people expect the police to be helpful to them in difficult situations whether or not they are pure enforcement situations warranting action by police.

On the other hand, police was found to be unpopular with the people in the following situations/cases:

1.bad conduct/ behavior with the public. 2.violence / high handedness. 3.corruption 4.bias in favor of the rich/ high in society / educated, etc. 5.harassment of poor/ illiterate/ weak. 6.action under political influence, 7.poor professional competence, 8.failure to act as per law/rules, 9.criminal links.10.violation of law/rules by police officers/ their relatives etc.

A glance at these will show that in reality these are situations where police failed to act to serve the common people. Hence, service mentality in police is a much-needed cultural change.

To serve the common cause better, we have to understand the attributes of a good service. These are:

1.attentiveness 2.reliability 3.responsiveness 4.competence 5.manners 6.fairness.

C. Importance of Social Skills, Transparency and Responsiveness.

Studies focusing on how to improve the quality of police service to the public (ref: Establishing success criteria and baselines for performance in relation to Social skills, Transparency and Responsiveness of Indian Police-Prof.R.Ravikumar and Prof. S.S.Vaidyanathan-UNDP Project) have shown that the most important areas needing attention in police are

1. Social Skills
2. Transparency
3. Responsiveness

Social skills emphasize the ability to balance between problem solving and concern for the feelings of others. Policemen often find it difficult to correctly distinguish between the general public and those wanting to take advantage of social niceties. Sense of mission, a part of the police culture, also at times results in bad behavior or even shocking excesses.' Peoples' skills'. i.e. Handling the public better have to be self -learnt, and not taught in class though on the job training, mentoring, close supervision etc. will help. It calls for more courteous and sympathetic behavior towards all, especially the poor illiterate, downtrodden, SC., ST, BC, minorities, women and children, aged, etc. It also means better community orientation.

Transparency means fairness and openness in dealings. Sharing of information (which can be shared) with the public, press etc. is essential. Bringing out handbooks on police practices, procedures etc. for the benefit of the public, publication of a citizen's charter by which the police organization commits itself to certain services with in a definite time frame at some quality level, Police websites which publish police related information which are essential for the public order, safety, etc, display in police stations in local languages about citizens rights for

services/ information, officers to be contacted etc., steps to keep off touts from the neighborhoods of police stations, etc will help to improve the situation. Internal transparency in the department is a prerequisite for such improvements.

Responsiveness means <u>speed, quality and appropriateness</u> of response.
Quality means efficiency and effectiveness of response.
Appropriateness means no over reaction or underestimation of the seriousness/ implications of an incident .It may be seen that **attentiveness is a test of responsiveness**. Lack of infrastructural facilities also effect response. It is said that one minute's delay reduces the chances of arrest of a criminal by 10%. It shows how prompt response is vital for efficient policing.

The impact of Social Skills, Transparency and Responsiveness on improvement of performance can be explained as given below:
  Responsiveness - leads to ⟶ Attentiveness
  Error free service and predictability ⟶ gives ⟶ Reliability
  Responsiveness ⟶ is ⟶ Responsiveness.
  Responsiveness, Transparency and Social Skills⟶ results in⟶Competence
  Manners ⟶ give ⟶ social Skills
  Fairness⟶ contributes to ⟶Transparency.

Some of the other steps that could improve the service of police, if we are to draw lessons from the business world, are
D.   Consumer (public) Focus or Centricity. The mission of Police function obviously is satisfaction of the people. To ensure this, instead of maintaining hands off and distant attitude visa -a –vis the public, the police should   get actively involved in problems of the public, whether or not pure law enforcement requires it. This is seen in countries like Israel or Holland, which has involvement in common man's life much beyond the requirements of law. According to C K Prahalad, a management expert in strategic thinking, consumers are becoming business collaborators who have as much to contribute to value creation as companies themselves do. The role of the consumer is being transformed from passive buyer to active participant in co-creating value through dialogue with providers of products and services. The current thinking about customer relationship is about facilitating dialogue and consumer engagement among dynamic consumer committees and heterogeneous individuals. There is need for creation of a consumer centric information infrastructure as consumers expect transparency and interface in their language. The information for a consumer- centric world needs to be geared to accept the importance of the consumer and encourage active participation in all aspects of experience. Public service agencies like police have to take a cue form the above words of Prof. Prahalad meant for business management, as these are more relevant foe public services, particularly in areas like community policing.
 A concomitant issue is the <u>involvement of the public in decision making in matters relating to police functions</u>, which affect the common people. Community policing which is becoming very popular in U S, Canada etc is a typical example. As in business or marketing of products/ services, customer expectation surveys and,

going one step further, customer evaluation of services could be thought of. These are days when many police organizations (Eg.A.P.) have brought out mission statements and public charters defining what the services and of what quality would be aimed at by the Police Dept. Keeping these in mind, evaluation of services could be done by the public so that corrective actions, wherever needed, can be taken.

Another area, which may have to receive more attention in the coming days, will be better net–working and organic linkage with other organizations. These are days when all of us are better networked through cell phones, emails, SMS services and other modern ways of linking people and organizations. In the current situation police also have to network with different organizations as part of investigation, prosecution, law and order arrangements etc. As in business where suppliers, service agencies etc become part of the intranet, police could set up integral links with all those whose close cooperation and involvement on a day to day basis are essential for better performance of the police functions. Such organic linkages can be effective only through I.T. In countries like the U S. and Canada, a patrol man or detective is able to search the national level data bases of F B I, state level data bases of transport or criminal justice system, jail or prosecution if warranted by duties. This and the continuous updating of databases taking place from time to time give access to the latest information to all those who have to handle live problems.

Another aspect, which needs attention, is the changes in the Internal administration of the dept. The internal administration of police department also needs to incorporate the spirit of democracy, which is the guiding principle of our society. While the Police act of 1861, made to better control India after the 1857 War of Independence, continues to guide the police dept, other corner stones of the criminal justice system are the Indian Penal code of 1860, Criminal Procedure Code of 18 97 and Indian Evidence act of 1872. Though some changes may have been introduced in these, it is perhaps time they are given a total re-look in order to bring in line with the functioning of modern and enlightened criminal justice systems elsewhere. More participative management, better communication cutting across rank structures particularly from bottom to top, better consultative style etc may perhaps enable better functioning of the Indian police.

These are days of continuous organizational learning. Military and police organizations which are rigidly structured tend to be slow in changing even outdated rules and regulations. Standing orders / regulations may need regular reviews to incorporate the spirit of changing times and new ways and styles of functioning. This is possible only through a process of continuous organizational learning, which is seen in business environments today. Similarly, training in police needs closer attention and priority. On the job training, which will teach new incumbents how to handle, live situations need more emphasis. This is already taking place in some areas. The "epiplex" e- learning' system of Karnataka police and the training /guidance system for dealing with women related cases in Tamilnadu are good examples which could be emulated by others. In all the above, I T can play an effective role. Some of these are not at all possible without the use of IT.

E. Computerization Process – Systemic View

Computerization of a department like police, even in its essential/basic functions, is quite a time consuming affair because of the diverse/multifarious functions police have to perform and the need to meet emerging and new challenges. Even in countries like US where resources or infrastructural problems are not serious, it has taken over a decade to reach current levels of maturity/nearly full computerization .So in a country like India where vast majority of people live in rural areas lacking in basic infrastructure like power, phone, and connectivity, problems are bound to be more severe. This is particularly so as a large section of Police force could at best be called semi- literate. Hence it will take a lot of time and effort to bridge the cultural divide between I.T and the police.

Even in the best of environments, the process would have to go through different stages to reach full maturity or state of this art level to make the full benefits of Information Technology available to people. In a city like Los Angeles, where serious computerization work began in 1993/1994, mobile computing is yet to be completed in respect of many vehicles. Even cities like Sacramento and San Francisco, have just started mobile computing work for their police departments. Hence, a country like India where extreme diversities exist with serious financial crunch for most states, it is bound to be a much slower process. But, what is needed is consistency and objectivity with one central authority coordinating the national needs emerging from internal security requirements and interstate cooperation and coordination without which I T cannot really make rapid progress.

Even in business organizations which are driven by profit motive, quest for excellence etc., there are different stages through which computerization has to go through. According to **Gibson and Nolan model**, the transformation can be in 6 stages viz. **initiation, contagion, control, integration, data administration and maturity.** While the **initiation** stage will be marked by unprepared ness and uncertainty, in **contagion** stage, some projects are selected at random and they take off and chaotic effects of rapid development will be experienced necessitating laying down of priorities. In **control** stage, reduced costs of clerical personnel, inventory control, professionalisation of data processing, trade off between centralization and decentralization etc are visible. In the **integration** stage, a shift from computer applications to data base applications, MIS and decision support systems will be seen. In the **data administration** stage, redundancy of data, inefficiencies etc necessitate creation of systems for data administration. In the **maturity** stage, computer and data resources get the potential to return continuing economic benefits. Senior levels like vice -President or equivalent may head EDP function. Some studies show that in India, a 5- stage process (**Initiation, Extension, Stagnation / Consolidation, Expansion / Automation and Integration**) would be more relevant as shown below.

Computerization /Information System growth

A) Systemic view -

STAGES OF INFORMATION SYSTEM (I.S.) Growth

Growth

Strategic IT Threshold

I – Initiation
II – Extension
III – Stagnation
IV – Expansion
V – Integration

I   II   III   IV   V

TIME
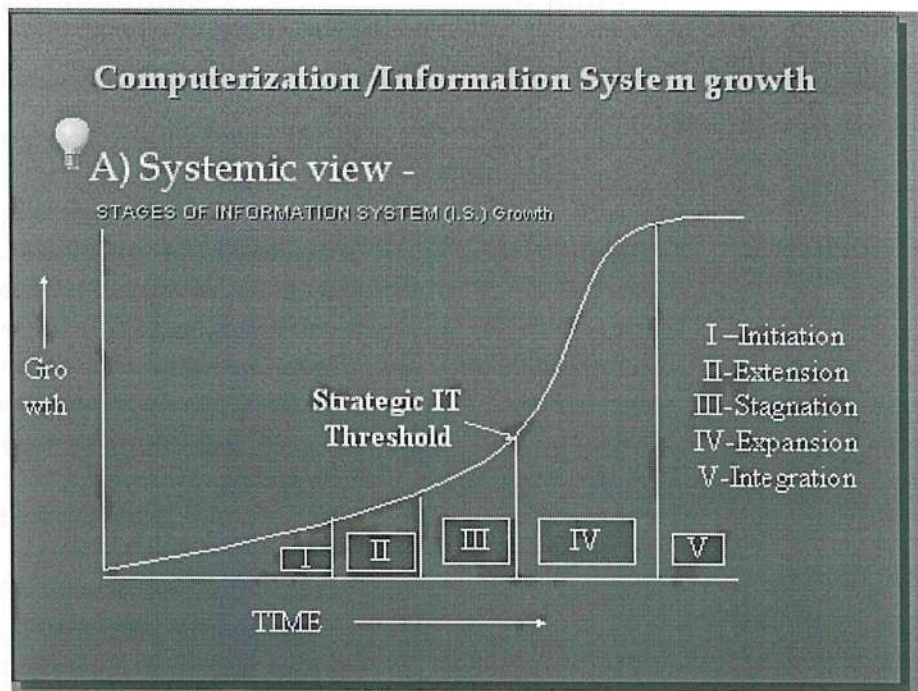
The changes that take place in these 5 stages in respect of **infrastructure, application portfolios, top management attitude, IT management and users** could be explained as give below:

(a) **Infrastructure:** From a stage of non-existence, in the **initiation stage**, it would consist of a few personal computers and, may be, even a mini. In **extension stage**, the number of PCs, works stations and minis go up and Internet and modems, lease lines etc get added. In the **next stage of stagnation**, LANs, more leased lines, email and some client- server systems may be visible. In the next **Expansion/Automation stage**, major LANS, High ended computers and near total connectivity, strategic applications, full-fledged decision support systems etc may be reached. In the **final stage of integration**, database integration, application level connectivity, new technologies etc are visible. The system finally emerges as a robust and state of the art one.

(b) **Application Portfolios.**   From the narrow and efficiency oriented ones of the past, in the **initiation stage**, computerized payroll, inventory management, accounts etc come up. In the <u>Extension</u> stage, others like order entries complement these. In the next **stage of stagnation**, Information systems for main business processes, production control, office automation, MIS, integrated databases etc come up. In the **expansion stage**, strategic applications, full-fledged Decision Support systems etc emerge. In the next **stage of integration**, I T based products/services develop. IT becomes all-pervasive giving value additions and a new leverage.

(c)**Top Management Attitude.** In the initial stage, the attitude of Top Management will change from remote oversight to minimal interest with participation in budgetary decisions. In the extension stage, it recognizes IT support and also influences IT budget. In the next stage, a more proactive role and realistic

expectations are seen with senior persons like General Manager/ Vice- President being put in direct charge of IT. In the next stage, a Chief Information Officer heads IT reporting directly to the Chief Executive who expedites IT projects and IT is always thought of in major decisions. In the final stage, in the planning itself IT is involved with information security, information privacy, data quality etc becoming important. The top management becomes enablers, stewards and mentors.

(d) **IT Management.** The role of IT changes from techno-centric to a small informal group of programmers. In the next stage, IT/ EDP/ MIS Manager who will have a separate budget heads I.T and formal processes emerge for I.T decisions. The next stage may see a Vice- President, or a General Manger (IT) heading the IT department, overseeing LAN, data base administration, IT planning, etc. In the Expansion stage, I S/ IT strategies emerge with I.T becoming a profit and also a service center with a separate cadre of its own. In the integration stage, I S/ I T planning, I S Security, Information privacy, data quality etc dominate and I.T finally develops as an organization or business center by itself.

(e) **Users:** To start with, users may be only passive recipients who, in the initiation stage, become partially aware of I.T's benefits. Occasional IT use, mixed feelings, unclear expectations, training a priority etc are other features of this stage. In the extension stage, demands grow and sophistication and satisfaction are demanded. Demands for more sophistication increases in the expansion stage and IT support is taken for granted and customers and vendors become users to later mature as partners and stakeholders.

The process will involve issues of different types— **Organizational, Infrastructural, Personnel, Technical and Managerial** —, which have to be tackled well for the process to go ahead smoothly. The **Organizational Issues** that will come up from time to time are structural changes, process redesign, and their effect on organizational efficiency, competitive advantage, new products and processes from IT etc. The **Infrastructural Issues** would cover quality of hardware, vendor support / back up, communication lines, power, space, funds for investment and operational costs. The **Technical Issues** would involve technical algorithms, technical obsolescence, quality of software development, and development of information system architecture/ platform, system integration and standardization of database applications. The **Managerial Issues** to be tackled are planning, centralization vs. decentralization, flow of authority and information, performance evaluation and control on expenses. The **Personnel Issues** relate to job scope and job satisfaction, user capabilities, employee rehabilitation and redundancy, training needs, conflict of authority etc. Though all these may not come up, most of these have to be tackled at one time or another.

The growth of Information systems is also analyzed by some in 2 phases namely **Evolutionary and 2) Revolutionary.** The diagram given below will clarify the position.

IS system growth stages
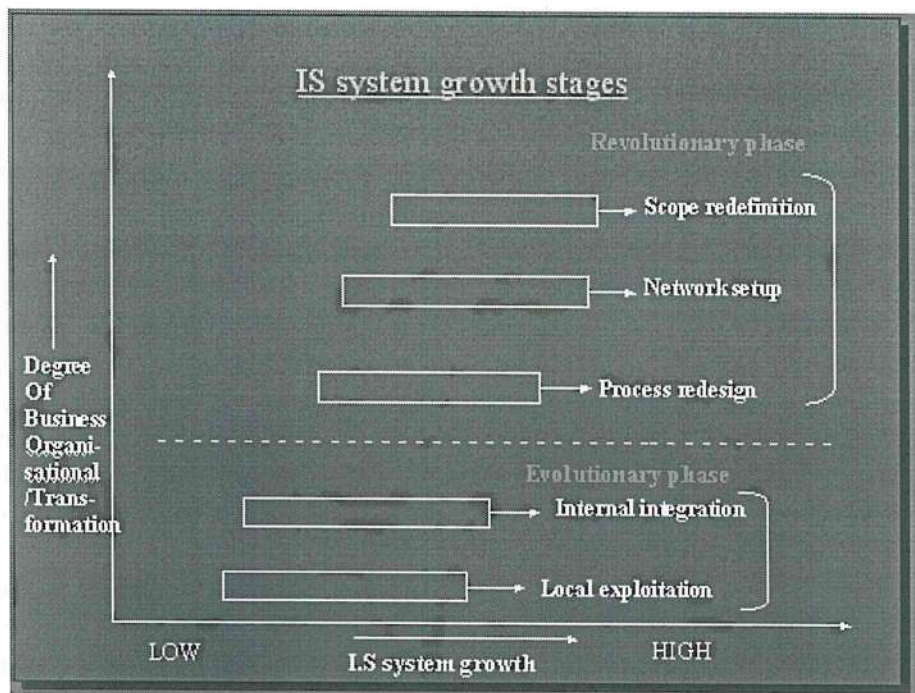
In the initial **Evolutionary phase, local exploitation** and later **internal integration** take place. In the Revolutionary **phase, business process redesign, business network setup and business scope redefinition** take place. These would involve re-engineering of processes to generate newer and better ways of functioning, network relationships and enlarged and faster communications and redefinition of business processes/scope. In the Evolutionary phase, the focus is on the Intranet and local issues and in the Revolutionary stage, it is on external factors, large users etc.

Another way of looking at the system growth process is to see it in 5 phases of **Automate, Control, Integrate, Informate and Transformate.** **Automate** refers to the period which see the development of those I.T applications that serve essentially to reduce operating time and increase operating efficiency. A lot of stress has been placed on reducing manual aspects of clerical, routine and tedious work, greater speed and accuracy and hence better service are visible. Pay roll, accounting, billing etc are some examples. In the **Control phase,** the IT system would primarily focus on control of operations, processes etc and inventory control, purchase control, scheduling and manufacturing controls would come up through I.T. In the **Integrate phase,** the focus will would be on integrated databases, manufacturing resource planning, common databases, LAN based data systems etc. In the **Informate phase,** IT is used to generate and deliver extensive management reports and the focus is on effective management and control. MSS, DSS, etc are some examples. It helps to improve organizational efficiency and hence more quantifiable and qualitative benefits by store control, production management, better forecasting, credit management etc. In the **Transformate phase,** sometimes radical change in the way an organization does business or nature of the firm itself takes place. The business itself may get transformed or its market share would drastically increase through strategic information systems. Strategic information system, new information

system based on practices/ services etc may come up. In a department like police, IT tools may transform traditional ways of reporting, patrolling, investigation or analysis.

Yet another way to look at the process was proposed by Thack and Woodman (1994) who tried to provide a comprehensive framework to understand use of IT in organizations. It was based on the way IT would support different viz.

1) **Individual Work Support**
2) **Group Work support**
3) **Advanced and Organizational Automation**
4) **Enhanced Global communications.**

In this view, the basic determinant for classification is how IT could be applied at **individual, group, and organizational and global levels.** Yet another way to look at the IS system growth process is three distinct phases - **automate, informate and transformate.** The automation phase will include all activities meant to speed up or increase efficiency. In the next phase, those activities meant to generate management reports for better control and efficiency will come. The final transformation will include activities, which transform the organization, any of its basic processes/products or create new business models.

Generally good organizations become better with the help of I.T. A good organization is one, which has strong organizational processes in place. Honesty, integrity, fairness and concern for the public are characteristics that are instrumental in defining such a police organization. In general, it may be mentioned that innovative and meaningful use of IT can be used to regenerate or recreate the organization as part of the larger process of organizational renewal.

F. Computerization Process- A Procedures' View

While in a modern business organization a holistic approach to computerization through Enterprise Resource Planning (E R P) may be desirable, police organizations have normally been doing it in phases by implementation of different projects whose sizes, scopes, objectives, etc may differ. However, there are different systematic procedures to be followed for optimum yield from a project. In any I T project, as in the case of other projects, establishment of objectives, identification of resources, determination of needs, analysis of choices available, selection of the optimal alternative and implementation of the solution are important. But, the real challenge is in the accomplishment of the tasks. Establishment of the scope of the project based on organizational goals and objectives, getting the required technical help, formation of a working group, its education about various issues, requirements etc., IT technology assessment on the basis of overall system needs, system design, scheduling, cost estimation, management approval, actual selection of system, actual implementation, monitoring performance etc are all different steps involved in the accomplishment of the task.

The first step is the **establishment of the scope** within the bounds of organizational, vision, goals, objectives and price range and may involve a review of goals and objectives themselves. The cost and performance expectations of

managers and end-users by group and job type have to be identified. A valid cross section of end user community like patrol officers, dispatchers, emergency services etc.has to be involved in the process. Data Analysts, Business Analysts and Network Engineers have to create a snapshot of how information is to be processed using new technology. They should also know the Law enforcement operations, its needs etc. A Data Analyst is responsible for analysis of flow of information in the organization.

The sources of data, the processes that use/modify them etc have to be studied and the current systems for data integrity, accessibility, security etc have to be evaluated and opportunities for improvement identified. A Business Analyst analyses current business practices, policies and procedures and streamlines them, and generate the'as-is' and 'to be' models after updation of organizational policies and procedures. A Network Engineer analyses network infrastructure, computer equipment, software etc. and determines the system resource changes, hardware and software requirements etc. A working group from within the organization familiar with all the disciplines/ systems should be formed to work with the Data Analysts, Business Analysts and Network Engineers to help conduct Information Technology assessment and develop system needs, Request for proposal (RFP) interfaces, estimates of costs and schedules with one person acting as Project Manager to oversee the entire processes.

If the system is complex, the project team may have to be educated by the experts on existing system and information interfaces, planned and funded upgrades, product demonstration from invited vendors, information gathering conferences and shows, product data bases, internet, surveys, site visits of agencies using similar technologies etc. A preferential pool of vendors may be identified and a **Request For Information (RFI)** document should be developed for sending to potential vendors.

The **Information Technology assessment** is to determine what the business processes are, which one is key to the operations and how information is processed. It is **a baseline of where one is and what are the points of improvement.** The overall system needs should be determined from the results of IT assessment. The design of the system is to be done by the working group including Business Analyst, Data Analyst and Network Engineers based on overall system needs. A conference of potential vendors could be called and their comments on the proposed design could be pooled. Cost estimates could be informally prepared by discussing with other agencies that installed similar systems. More **formal estimate could come from actual vendors through a Request For Quotation.** The management approval in respect of cost, system capabilities, time schedules, next steps etc should be taken. Once it is obtained, purchasing, legal and other departments concerned should be informed about System Designs and other intentions. It is desirable to solicit their concerns, experiences and requirements through a single point of contact.

Technology assessment essentially determines how technology is used now and it involves review of the business processes/procedures and determining which are the core processes, developing **pictures of core processes ('as is' maps)**, analyzing **'as is maps'** to determine these processes and using the information to develop pictures of more efficient processes-the **'to-be'** maps. If the incident report

process is a core process in police, the 'as-is '–map may be that separate enquiries are conducted at the local, state and national level for criminal history. A software solution in the 'to – be' map could mean one enquiry to cover all these in one go.

A business process is essentially a collection of related activities – a chain of events- that produce a specific service or product and is characterized by a start, an end and a process, clearly defined inputs and outputs and value added from resulting outputs. Introduction of new technology often requires changes to policies and procedures to take advantage of efficiencies created by new technology. Business process review gives an opportunity to see how the organization operates and what improvements are needed to make the most of new technology. To start with, information on all core processes (that are vital for performance of the mission and organization survival) are collected by surveying and interviewing officers to find out current shortcomings and get ideas for further system needs.

The current IT infrastructure including review of computer networks, equipments, application in terms of data integrity, accessibility and security should be reviewed and used for preparation of the `as-is' mark which is a graphic representation of how information flows. The graph will show the chronological sequence of handling information and how information is transformed at each step. It is also used to compare the best practices of other agencies and formulation of solutions to support the objectives of modernization. A second review should reflect improvements in processes, information technique architecture and areas where new technology can replace outdated technologies.

Surveys and interviews also help to identify problems and shortcomings of the current system. Unwanted or unused capabilities could be high. Suggestions of end users regarding technologies or features not available to them should be noted. 'To-be' maps depict how processes could be streamlined and are thus   **a graphic representation of how information should flow after changes to the process have been implemented.** It will show where new technology will replace old methods. Results of interviews with technology users are used as a guide when developing overall system needs. In short, technology assessment is a long and involved task.

General Systems Specifications cover the overall look and response of the system that prospective vendors are to meet. Vendor characteristics like customer contact references, user groups, customer support and licensing issues, vendor - user interface, data input, search and related parameters, flexibility about linkages in respect of persons, addresses, vehicles, property etc., general operational specifications like 24 hours/ 7 day operation, acceptable downtime, response time, network security, user privileges etc are also covered.

Request For Proposal (RFP)

A team is needed to develop and evaluate a Request For Proposal (RFP) and members of the working group formed to review the organizational processes could be its members. It is **best to establish a project manager for RFP development, Evaluation and Implementation.** Requisites of a system can be achieved with minimum risk with the development of a RFP document which can tell potential vendors the objectives, current conditions, what is to be bought and how vendors should structure their proposals and how their responses would be evaluated. If a complex system is to be purchased, it will cost vendors considerable time and money

to develop a proposal and hence it is important to develop an understandable document. Vendors take a decision "bid/no bid" based on their probability of getting the job. The more complex the system, the smaller the vendor pool. Vendor feedback is critical for RFP.If a winner cannot be selected after evaluating all responses, it is almost impossible to get vendors to re-bid on a modified RFP.

Most RFPs are organized into major sections namely 1) cover letter 2) an introduction and summary section 3) preparation instructions, evaluation criteria and vendor qualification sections. 4) a statement of work section, 5) a system specification section 6) amplifying appendices and 7) a sample contract. Though there are no set formats, it is necessary to put all contents in a logical order. RFP can be published even through Internet. A good website for sample RFPs and similar documents is www.search.org.

The cover letter introduces the subject, summarizes the intent of the effort and informs the bidders important dates and responsibilities and is signed normally by the head of organization. The introduction usually includes the project objectives, due dates for proposal, the system environment, system-sizing parameters such as message volumes or number of records to store, critical interfaces, conversion of legacy records from older application software systems, implementation timelines, etc. Instructions for preparation for proposals are meant to organize responses in a like manner. The responses are normally broken down into three parts namely what the vendor will do (**technical volume**), how the vendor will manage the work (**manage volume**) and what it will cost (**cost volume**). Evaluating the technology and manage volumes first and then modifying scoring based on cost factors generally yields more success in the purchase of a complex IT system. It is common practice to have the cost volume bound separately. Others like statements regarding indemnity insurance may also be needed. Evaluation criteria should be published and these are normally project understanding, design risks, management methodology, experience and qualification, vendor plans for implementation, testing, project cost, financial risk, etc.

The vendors are given what they are to do in the statement of work. It will cover not only the hard ware and soft ware, but also the vendor project management, system spare parts, system acceptance testing, system maintenance and warranties, training and documentation. The vendor has to give project schedules and plans, and participate in the periodic reviews of progress. The statement of work is the one through which the vendor and project implementation are controlled.

The system specifications are also needed. Though they are difficult to write, most of the work would have been done in the 'as-is' and 'to –be' maps. What the equipments must do is already specified here. In addition, they should only specify external system behaviour, specific constraints on the implementation, be easy to change, serve as a ref pool for system maintainers, record forethought about maintenance of the system and characterize acceptable responses to desired events. Breaking a complex system into sets of simple subsystems and how each one interfaces with others will complete system specifications. Vendor specifications will always be meant to guide people to their products. Response criteria will have to be given to vendors and they should be able to get from the vendors at what level their

products would meet each specification, whether the software is part of the package or customized software would have to be written. They should be able to get a clear picture of what is being offered for what money and whether additional money needs to be spent. There should be additional sections for external agencies that would use the system. It is imperative to understand their systems, current operating environment, communication operations and average daily volume of calls.

Once the draft RFP is modified, edited by stakeholders and approved for release, it is given to the approved list of qualified vendors. It can be given in the Internet too for wider publicity. After release of the RFP, a bidder conference may be held and after this written questions and answers could be allowed for two weeks. Discussions by vendors should be only with an established point of contact in the organization. The purpose of bidders conference is to describe the system needed, allow the vendors to ask questions and give a verbal description of the needs. The Programme Manager may organize the bidders' conference.

Proposal Evaluation. An evaluation process in writing may be made and followed. The evaluation criteria and process should be set prior to viewing responses. An evaluation team may be made including some members of the working group or RFP development team and the Project Manager (RFP) may continue to manage the evaluation portion. In the cases of complex processes, specialists could also be called to evaluate them. It may be done at an insulated location with undivided attention.

During evaluation, all non-conforming bids are set aside. The evaluation team may be given a review of the system to be procured and major provisions of RFP. A matrix of the system specifications and vendor responses may also be given using prepared evaluation form. Members of the team may evaluate the 'manage' and 'technical' volume at their own pace. A group discussion could be held to hear evaluators describe their scoring. During evaluation of complex responses, a small set of proposals for a final and very detailed evaluation could be made. Finally, the team recommends a system and its associated costs. The authority for acceptance and actual procurement rests with the senior management. In some cases, statutes may restrict price and negotiations prior to a contract. In some cases, negotiations with a vendor are possible when the vendors' best and final price and terms may be allowed. A payment schedule must be worked out prior to the award of contract. A part of payment or certain funds may be held back until a critical technology piece is installed and working.

Installation Management. In the installation stage, the vendor should be asked to give a project review at critical times detailing the updated project schedule status and anticipated problems. He should also give in writing on periodic basis the status of the project, which could be circulated for study. The vendor should be asked to prepare various plans like overall project plan, management plan, implementation plan, testing plans, training plans and system transition plans. Plans are of two types namely strategic plan, which are prepared once and approved prior to execution, and changeable plans, which are constantly updated and made part of the review process. The vendor should be made responsible for documentation of the system and the work that is done. This may include manuals for off- the shelf items, vendor developed items, drawing of the finished systems,

testing and final reports. The documentation for supplied and developed software needs careful attention. A copy of the software source code and the development environment must be given or these must be placed in escrow by the vendor so that these would be handed over if he went out of business.

Payment schedule should be framed so that funds are not disbursed until the system is accepted. Acceptance testing should be spelt out in the RFP and acceptance process should be developed. All systems should be operated and people should be trained before acceptance. The vendor should make demonstrations and all parts and services should be delivered and the system must perform at the desired level.

A system transition plan, to switch from the old system to the new one, is needed if an existing system is being replaced. Vendor should have the ability to setup a new system and perform some tests on the network without taking down the old system. This gives the vendor an opportunity to make corrections to the new system without closing the facility. Vendor plans should include a fold- back plan in the event unexpected problems occur. Normally, the transition should occur over time giving time for working out of glitches. For example, if a complex RMS with mobile data terminals is being installed, the RMS server should be bought online with access provided to LAN- based workstations. Once the new Record Management System (RMS) server performs correctly, reporting function could be added allowing personnel to enter follow up reports online. Once reporting module is performing well, some legacy data from old RMS could be added. Finally, mobile data users could be added. If the transition spaces one module at a time, problems could be easily identified and tackled. Once the entire new system is online, the old system could be kept in place for a week or two to sort out glitches, if any. Putting the old system in place and turned off for a few weeks would avoid the vulnerability of having no operational system.

Data migration from the old to the new system may be an additional work for some systems. Migration to the new active database or flat file transfer may be possible. The first one provides the most comprehensive implementation, but is expensive as the legacy data must be cleansed and massaged to meet the requirements of the new system. Sometimes, additional budget may have to be provided for the migration. The flat file conversion is a less expensive process. Though such files are accessible, they may not be searched as new data entering into the new system and two operations will be required for each main search. In determining cost of migration, the manpower cost to clean up the existing data so that it matches the data sets required in the new system, the vendors work in actually massaging and loading the data and man power to check the vendors work and accept the migration should be covered.

The cost estimate of owning a new system should cover costs of maintenance, repairs and upgrades. The prospective vendor should propose maintenance costs for the years after the system goes out of warranty to give an idea of the near term costs. The long-term cost is best estimated by talking to people who have similar systems in operations. The maintenance cost includes hardware maintenance to the desired response time and software maintenance with software updates. Updates of high failure spare parts like power supplies and disk drives, head cleansing tapes, backup

tapes etc should also be covered. If life cycle cost is a determining factor in system selection, the vendor should provide an estimate of life cycle system cost and make this information part of evaluation criteria. In the case of new systems, only best estimates may be possible. Factors like costs of maintenances, system upgrades, system repairs, system replacement and training should be considered in calculating lifetime cost of the system.

G. Computerization Process – Applications' view

The computerization of police functions is achieved through successful implementation of different IT applications. These applications may be integrated in different degrees depending on the objectives and functional requirements. Normally, Record Management System (RMS, an organization wide system covering the storage/retrieval, manipulation, archiving and viewing of information, records, documents or files that are related to a subject), Computer Aided Dispatch (CAD, a system allows emergency operations and communications to be augmented assisted or partially controlled by an automated system) system, Geographical Information System (GIS, computerized system for linking and analyzing map data and related database information and used to capture, manage, manipulate and display specially referenced data in electronic format) and its associated more specialized applications like Crime Mapping and Vehicle Location System and Mobile Computing follow in chronological sequence. Others like Integrated Automated Finger Print Identification System, Digital Photographic files, etc, are techniques more specialized in nature.

In our country, the Crime Criminal Information System (CCIS) with 7 forms for data entry about **FIRS, Crimes, Arrests/Court surrenders, Property seized, Charge Sheets/Final Reports, Court Disposal and Appeals** could be called the core of the RMS at the national level. However, it is a sad fact that but for a handful of states, even a decade after its introduction, we are yet to make any worthwhile progress on this front. This raises questions about the sincerity and seriousness of the computerization work in police. As computers have become all pervasive, continued neglect on this front would do immense harm to all efforts to improve working of the criminal justice system and prevent attainment of results in modernization efforts in police.

I. Records Management System (RMS) is an organization wide system covering the storage/retrieval, manipulation, archiving and viewing of information, records, documents or files that are related to a subject and is the most basic and fundamental requirement in respect of police organizations. RMS considers the processes and means necessary for a document to exist covering its whole life. It provides for source of data inputs and multiple reporting mechanisms. The objective to be achieved in such a system will include accuracy and reliability of information, consolidation of records, elimination of duplications, consistent chains of reporting and analysis, minimum data handling, easiness in learning and usage. Its functions

may include linking of persons, addresses, vehicles, and airports/boats to each event, retrieval of information by one or any combination of information, print out of reports for each event, case number of event on event screen, audit trail of name and address searches, master tables for information common to many functions like name, location, vehicles and property and definitions of exemption. Requirements like general descriptions, major functions and types of data, reports, screen views, dissemination of data and reports -etc should be specified for

1) field reporting, 2) incident Reporting, 3) investigation case management,4) traffic management, 5)crime statistics, 6)officers' activities, 7)criminal records 8)crime analysis 9)gang activities, 10)evidence including forensic, scene of crime, and technical reports, 11)juvenile records,12) enquiries including mobile data enquiries,13)missingpersons,14)warrants,15)narcotics,16)vehicle,17)sex offenders 18) known associates, 19)licenses and permits,20)neighborhood organizations 21)personnel scheduling,22)training and qualification tracking,23) property tracking, etc.

There could be other records or databases based on local needs. Records are needed not only for documenting crime for Investigating Officers, but for Insurance Companies and others interested, passing of information from one unit/agency to another unit/agency, to see how officers spend time, for prosecution work, etc.

The field reporting may cover what happened, when, how, initial investigation details, etc. An officer activity may cover street checks and field interviews, reports on crime, suspicious activities, loitering in crime prone areas, links from people to people, people to vehicle, events, etc for unknown suspect identity.

RMS is a focal point for automatic entry, storage and retrieval of information. Automatic electronic document and text management tools integrated with Computer Aided Dispatch system and Mobile Computing can reduce data entry and help in timely distribution and use of information.

RMS has the following features:
1) Direct information inputs using laptops/ wireless data.
2) Capability to attach Multi-media files to reports
3) Quality control edits.
4) Use of forms that prompt officers for information (text templates)
5) Automatic duplication exclusion and routing information to proper units based on demands for information
6) Routing to supervisors for final assessment and quality control
7) Automatic evidence of reports for further process and analysis.
6) Calculation of solvability factors.
7) Prioritization of case allotment based on types, scope, agency specific rules and supervisor overrides.
8) Tracking mechanisms for status of cases by incidents, assigning officer or day assigned, due date etc.
9) Alert to supervisors for late reports.

10) Major case management capabilities so that tips/leads from other officers can be appended to a central registry and alert generated to primary I.O., Specialists, etc as per rules or permission to access to major/private cases.

11) Audit trails for those who accessed what files and when.

The print out of a home page of Record Management system is given below for a better understanding of a system.

It gives an idea of the general features, master indexes, different modules, specific features and reports that can be generated. It has the capabilities for digital photos, reading bar codes for property, graphs, and crime mappings and is laptop enabled.

It provides for 2 versions namely Professional for small organizations and an Enterprise version for medium and large organizations.

The above RMS' master indices include those for names, addresses and vehicles. There are specific modules for accidents, animal control, arrests and booking, bicycle registration, BOL (Be on outlook, cases) calls for service, citations, civil documents, community policing, field interviews, fire arms registrations, jail transactions, property pawn/registration and warrants. The case management details include confidential fund vouchers, daily activity log in, diagramming, geographic reference files, kick back messages, investigation alerts, mapping personnel (including training and equipment), photo line up, pop up alerts, and field reporting. Reporting formats covered include over 100 specific reports, special reports for Prosecution and other agencies, semi-custom reports, charges and graphics, do-yourself reports. There is a special file for alarm response.

II. Computer Aided Dispatch System (C A D)

A CAD system allows emergency operations and communications to be augmented assisted or partially controlled by an automated system. It's capabilities would include computer controlled emergency vehicle dispatching, vehicle status, incident reporting and management information. A CAD system could be interfaced with an emergency system (the 911 in U S) that provides automated routing of emergency calls to public safety answering points. CAD could be used by calltakers/dispatchers/supervisprs, officers in the field, records personnel, command and planning staff and network and communications' staff, etc. These objectives should be clearly stated while designing the system. The objectives could include streamlining of the processing of emergency calls and improving the ability to handle peak calls, increase in officer productivity and better resource management, enhancement of officer safety with detailed information on call locations and involved persons, simplification of the unit status monitoring function, capability for data base enquiries, up to date information for management control, etc.

The operating agencies and environment should be identified to give vendors an idea of hardware/soft ware requirements, system loading, peak hour loading (above 10 % normally) etc. These should cover police patrols (total no. of people, no. of patrols, officers on duty per shift, no. of marked /controlled vehicles, special units controlled),communications operations(no. of dispatch positions, number of call takers, no. of remote locations, no. of tel. report positions, no. of communication supervisor positions, no. of personnel in communications/shift), average daily volumes(calls for service, incidents based on calls for service, traffic stops, officer initiated incidents incoming 91 and other emergency calls), Fire Dept. (no. of persons in the dept., suppression ops, stations, engines, trucks, other units etc in field suppression ops, communications ops(no. of dispatch and call taker positions, remote positions, no. of people in communications,), average daily vol. of calls for service/emergency calls/incident based calls etc, emergency medical ops(no. of stations ,public ambulances, private companies dispatched, no. of personnel per ambulance for field operations) no. of dispatch and call taker positions, no. of remote locations, no. of people in communications, no of ambulance

zones for communications operations, average daily vol. of calls for service, incoming emergency calls, incidents based calls for service etc.
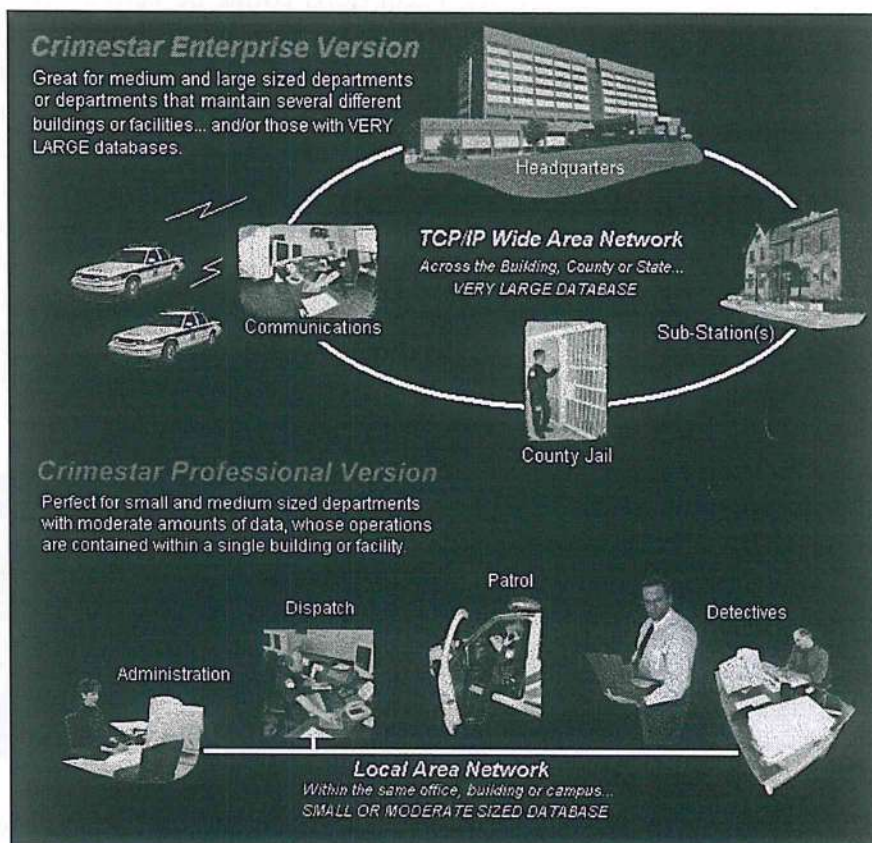
Given above is a printout of the details covered in the Crime Star 'Enterprise' and 'Professional' versions of the CAD system. The 'Professional' version is meant for small and medium sized police units with moderate amounts of data and whose operations are contained within a single building/ facility. The 'Enterprise' version can be used by very large databases of medium and large departments that maintain several different buildings or facilities.

Functional specifications define what the system should do, i.e. give capability to effectively serve the emergency needs of the community by dispatching resources automatically or assisting a call taker in dispatching resources. The system should record calls, maintain accountability of on duty personnel and provide resource information to management. It should give an audit trail of all accessed data and store information that will allow for report retrieval by a variety of methods. General CAD specifications may cover 1.passing on call for service data collected during call taking /dispatching to the RMS 2 Assignment and Integration of Report No. given during handling of a dispatched event   to other modules including court records, maintenance of Geo-Street Index, Address, verification of key addresses(e.g. incident location)and calculation or assignment of district codes/track no/patrol neighbourhood.3.interaction between the user and computer should be via pre-formatted fill – in-the –blank video screen layouts. Transactions, which add or change the database, are applied as they are received.4. Built –in

archiving capability.5.master files for information common to many functions like date/time display, address validation, street aliases, and intersections so that data are not entered multiple times. Specific exceptions could be stated.6.Requirements for each function like general description major functions and types of data, reports and screen views, dissemination of data and report writing should be written. The functions to be covered are a. duplicate call detection. b. Date/time display. c.address validation. d. Call taker functions.e.event routing. f.interaction with emergency call/911. g.resource recommendations. h. Notification procedures. I. Fire dispatch functions. j. Mobile Data Terminal functions. k. Remote site functions.l.Priority incident interrupt. m. Map display. n.out of dist.display.o.Admn.scheduling capabilities.p.maintenance functions.q..event capture reports.r.time analysis reports.s.management reporting.t.premise history/hazard inquiry.u.personnel file.v.business file.w. Catastrophic event processing.x.automatic vehicle location system etc.
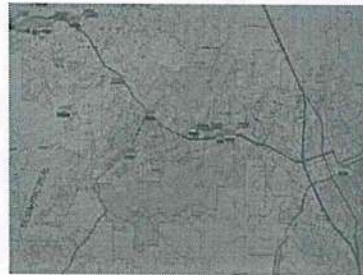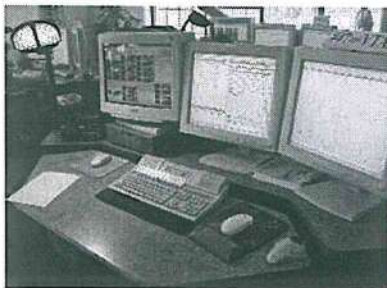
| A) Dispatch system | B) CAD Map Overview | C) CAD Map detailed view |

The above pictures A, B and C represent dispatch system, overview of the area of operation and detailed view of a place of an incident being handled. The picture C shows the place of incident (red flag) with its serial number and the two patrol cars responding to the incident.

III. GEOGRAPHIC INFORMATION SYSTEM (GIS)

A Geographical Information System (GIS) incorporates geographical features with tabular data to assess real world problems. GIS in its present form was first used in 1960 when it became possible to programmme maps using simple codes stored in a computer allowing future modifications. GIS uses the concept of overlaying different mapped features on top of each other to determine patterns and causes of spatial phenomenon. It is the high technological equivalent of a map, which stores data in an easily accessible digital format enabling complex analysis and modeling not possible earlier. The key to this is some 'spatial' data (referred locations on earth) and 'attribute' data (additional information), which can be tied to spatial data. GIS can also be defined as a computer system capable of assembling, storing, manipulating and displaying geographically referenced information. GIS practitioners also regard the total GIS as including the operations personnel and the data that go into the system. It is also a computer-based tool for mapping and

analyzing things that exist and events that happen on earth. It integrates common database operations such as query and statistical analyses with the unique benefits of visualization and geographic analysis offered by maps. It is an integrated system hardware, software and human ware linking topographic, demographic, utility, facility, image and other data that is geographically referenced.

The GIS hardware consists of the workstation running the software, attachment points for ancillary equipments, digitizer for conversion of hard copy data to digital data and a GPS data logger to collect data in the field. Hand held technology is an important data collection tool. Web servers have also become an important equipment of Web-enabled GIS. The software consists of application packages for creating, editing and analyzing spatial and attribute data. Extensions or add-ons extend the capabilities. 'X-tools' is such an arc view extension for editing capabilities. 'Component GIS' is the opposite of application software and it seeks to build software applications that meet a specific purpose and thus limited in their capabilities for analysis. Utilities are stand alones that perform a specific function. A file format utility converts one type of file to another. Web-GIS software helps to search data through Internet browsers.

GIS data is primarily of two types, namely Geodatabase referenced to locations one earth and attribute data that is data, which can be tied to spatial data. The Geodatabase could be in vector or rastor form. Documentation of GIS datasets is known as metadata. The human ware should be well trained in spatial analysis and skilled in the use of GIS software.

(a) Sample GIS Result Screen- **shows in a GIS map the incidents taking place in an area.**
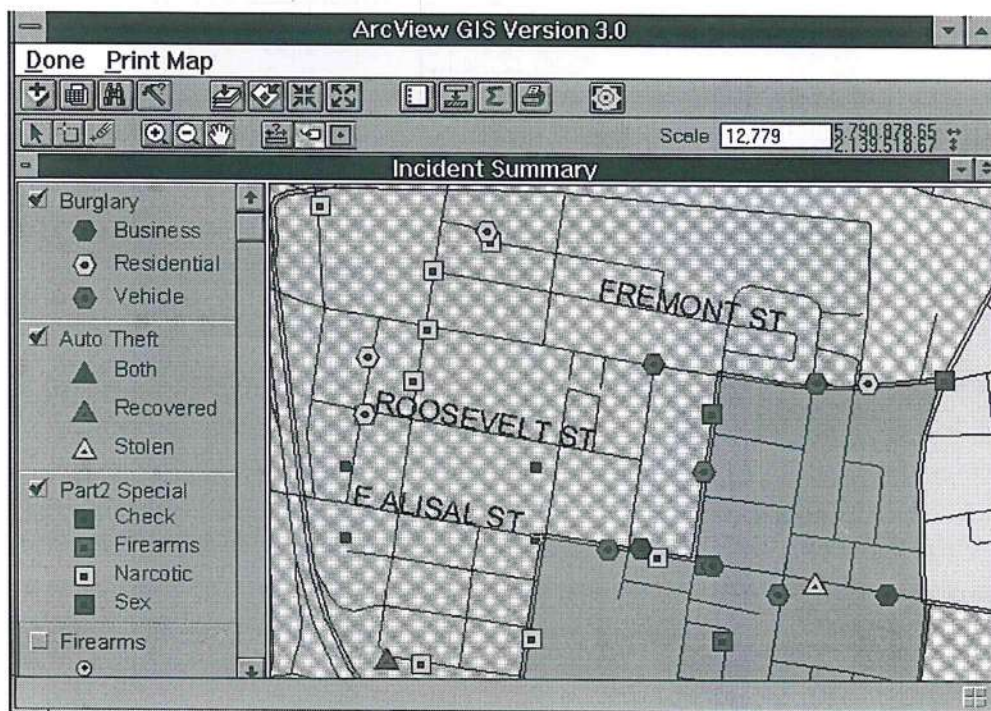
(b) *Visual Basic Police Menu Screen* –**shows the types of queries and searches possible in the GIS environment**

(C) *Seized, Found, Stolen and Recovered Firearms*: **shows the types of queries about various types and makes of firearms ,bullets (stolen,recovered,found seized or involved in different types of cases like robbery or assault ,say between two dates)possible in different areas at different distances from schools**
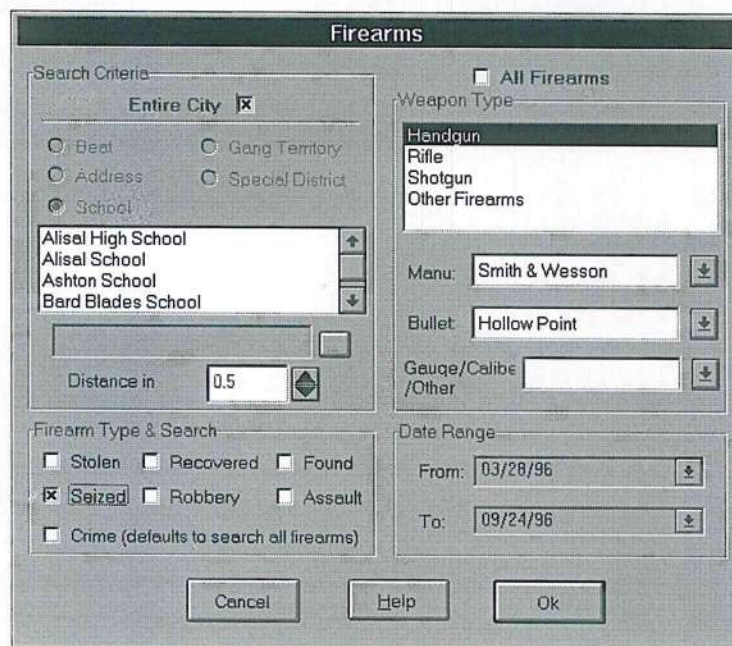
(d)*Subjects Near Certain Firearms*
(Based on FI location, Home Address, Incident Address). **This helps to locate on a map suspects and other persons of interest within a particular distance from the place of a particular firearm between two specified dates.**

Subjects Near Firearm

Display Against

FI Location	☒
Suspect Home Address	☐
Suspect Incident Location	☐
Person Home Address	☐
Person Incident Location	☐
Registrant Home Address	☐
Traffic Citation Address	☐

☐ All Firearms

Weapon Type

Handgun
Rifle
Shotgun
Other Firearms

Manu: _____ ±

Bullet: _____ ±

Gauge/Calibe/Other: _____ ±

Firearm Type & Search

☐ Stolen ☒ Recovered
☒ Found ☒ Seized
☐ Robbery ☐ Assault
☐ Crime (defaults to all firearms

Distance in miles: 0.5

Date Range

From Date: 03/28/96 ±   To Date: 09/24/96 ±

Cancel   Help   Ok

(e) *Searching for Firearms near Identified Subject*: **This helps to locate on a map firearms within a particular distance (between two specified dates) based on name, identity etc. Various display criteria like home address, incidents and traffic citations can be used for display.**

Firearms Incidents Near Subject

Display Against

FI Location	☒
Suspect Home Address	☐
Suspect Incident Location	☐
Person Home Address	☐
Person Incident Location	☐
Registrant Home Address	☐
Traffic Citation Address	☐

Search Criteria

◉ Subject ID
○ Name
○ Moniker

Subject ID: _____

Distance in miles: 0.5

Date Range

From: 03/28/96 ±   To: 09/24/96 ±

Cancel   Help   Ok

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(f) Subjects near Identified Incidents- **useful to locate suspects and other persons of interest between two dates within a distance of an incident. The display entries could be suspect house address, suspect incident location, traffic citation etc.**

Subjects Near Incident

Display Against
- FI Location [x]
- Suspect Home Address [ ]
- Suspect Incident Location [ ]
- Person Home Address [ ]
- Person Incident Location [ ]
- Registrant Home Address [ ]
- Traffic Citation Address [ ]

Search Type
- (•) By Field Interview Number
- ( ) By Report Number

FI Number: [ ]

Distance in [0.5]

Date Range
From: 03/28/96   To: 09/24/96

Cancel   Help   Ok

(g)*Subjects Near Location:*
(Based on FI location, Home Address, Incident Address)-**helps to locate or show on a map people within a distance from a place between the dates or on a day of the week within in specified hours ,people in specified areas, beats, gang ,territory etc.**

Subject Near Location

Search Criteria
Entire City [ ]

- ( ) Beat   ( ) Gang Territory
- ( ) Address   (•) Special District
- ( ) School

Twenty Block
Acosta Plaza
Downtown Business District

Display Against
- FI Location [x]
- Suspect Home Address [ ]
- Suspect Incident Location [ ]
- Person Home Address [x]
- Person Incident Location [ ]
- Registrant Home Address [ ]
- Traffic Citation Address [ ]

Distance in [0.5]

Day of Week
[ ] Su [ ] Mon [ ] Tu [ ] Wed
[ ] Th [ ] Fr [ ] Sa

Date Range
From 03/28/96 To 09/24/96

Time Range
From: 00 00 To: 00 00

Cancel   Help   Ok

(h)*Several Ways to list Addresses*: **The criteria could be intersection of streets,aliases of places or street addresses.**

```
┌─────────────────────────────────────────────────────────┐
│ ─               Select Address                           │
├─────────────────────────────────────────────────────────┤
│ By Street Address │ By Alias │ By Intersection │         │
│                                                           │
│                     Street Selected                       │
│                   ┌─────────────────────────────┐         │
│                   │ Lincoln Ave                 │         │
│                   └─────────────────────────────┘         │
│                   ┌─────────────────────────────┐         │
│                   │ Lincoln Ave                 │         │
│                   │ Linden St                   │         │
│                   │ Linwood Dr                  │         │
│                   │                             │         │
│                   │                             │         │
│                   │                             │         │
│                   └─────────────────────────────┘         │
│   Enter Street Number    Enter Street Name                │
│   ┌──────────┐           ┌──────────────────────┐         │
│   │ 222      │           │ Li                   │         │
│   └──────────┘           └──────────────────────┘         │
│                                                           │
│         ┌────────┐           ┌──────────┐                 │
│         │   Ok   │           │  Cancel  │                 │
│         └────────┘           └──────────┘                 │
└─────────────────────────────────────────────────────────┘
```

(i)*Incidents and FI's near a Specific Location*- **helps to locate on a map on any day of the week ,between two dates and seleted timings, incidents within a distance of a street location.**

```
┌─────────────────────────────────────────────────────────┐
│ ─            Incidents and FIs near Address              │
├─────────────────────────────────────────────────────────┤
│ ┌Street Address──────────────────────────┐ ┌Day of Week─┐│
│ │ ┌───────────────────────────────┐ ┌──┐ │ │ ☒ Sunday   ││
│ │ │ Garner Ave & N Sanborn Rd     │ │  │ │ │ ☐ Monday   ││
│ │ └───────────────────────────────┘ └──┘ │ │            ││
│ │       Distance in    ┌─────┐ ┌─┐       │ │ ☐ Tuesday  ││
│ │                      │ 0.5 │ │◆│       │ │            ││
│ │                      └─────┘ └─┘       │ │ ☐ Wednesday││
│ ├Date Range──────────────────────────────┤ │            ││
│ │                                        │ │ ☐ Thursday ││
│ │ From: 03/28/96  [↓]  To: 09/24/96  [↓] │ │            ││
│ │                                        │ │ ☐ Friday   ││
│ ├Time Range──────────────────────────────┤ │            ││
│ │                                        │ │ ☐ Saturday ││
│ │   From: 00  00    To: 00  00           │ │            ││
│ └────────────────────────────────────────┘ └────────────┘│
│    ┌────────┐      ┌────────┐      ┌────────┐            │
│    │ Cancel │      │  Help  │      │   Ok   │            │
│    └────────┘      └────────┘      └────────┘            │
└─────────────────────────────────────────────────────────┘
```

37

(j)*Stolen And Recovered Vehicles*- **helps to locate on a map stolen/recovered vehicles between two specified dates and within specified timings, with in a specified distance of a selected place. The references could be to beat, addresses, school, gang operational territory etc.**

(k)*Firearms, Sex and/or Narcotics Crimes near a Location Search*- **helps to show on a map the location of firearm, sex or narcotic crimes between two dates and within specified timings within a selected distance from a location. The location could be based on entries like of schools, locations, addresses, gang territory etc.**

(1)*Firearms, Sex and/or Narcotics Crimes near a Person Search-* helps to find out on a map the firearm, sex and/or narcotic crimes within a specified distance between two dates with respect to the location of a person . The search criteria could be subject Id.,name,etc.- The display could be against suspect's house address, incident location, a person's home address,traffic citations address, location of another incident, etc.

Part 2 - Special Incidents Near Subject

Display Against
- FI Location [x]
- Suspect Home Address [ ]
- Suspect Incident Location [ ]
- Person Home Address [ ]
- Person Incident Location [ ]
- Registrant Home Address [ ]
- Traffic Citation Address [ ]

Search Criteria
- ( ) Subject ID
- ( ) Name
- (•) Moniker

Distance in miles:
0.5

Moniker: Shorty

Part 2 Types
- [x] Firearms
- [ ] Narcotics
- [ ] Sex

Date Range
From: 03/28/96   To: 09/24/96

Cancel   Help   Ok

(m)*Person Tracking Screen-* helps to track a person in police or other records had on his identity between two dates, within specified houses, day of the week etc. The display could be against suspect home address, suspect incident location, a person's home address, person incident location, traffic citation address ,etc.

Person Location

Display Against
- FI Location [x]
- Suspect Home Address [ ]
- Suspect Incident Location [x]
- Person Home Address [ ]
- Person Incident Location [ ]
- Registrant Home Address [ ]
- Traffic Citation Address [ ]

Search Criteria
- (•) Subject ID
- ( ) Name
- ( ) Moniker

Subject ID: 1345

Date Range
From: 03/28/96   To: 09/24/96

Time Range
From: 00 00 To: 00 00

Day of Week
- [ ] Su [ ] Mon [ ] Tu [ ] Wed
- [ ] Th [ ] Fr [ ] Sa

Cancel   Help   Ok

(n)*Gang Member and Gang Search Screen-* **helps to locate in a map giving members/ gangs with reference to incident locations, traffic citation, home address of a person/suspect, incident   location etc.**

(o)*Search Violent Crimes for Age Specific Suspects and Victims-* **helps to locate in a map suspects or victims of different ranges of age   , between two dates, specific time intervals, days of the weeks etc.**

(p) *Searches for Gang and Hate Crimes:*
(Based on Location, Date, etc.)

	Special Circumstance

Page 3 of 3

Selected Items

Code	Description
GNG	Gang Related
HAT	HATE CRIME

Clear Item(s)

Help	Cancel	Back	Next	Finish

(q)_Beat or Area Summary Search Screen-_ **helps to get plottings in a map summary of incidents between two dates,48 hours/ a week/ month with in a particular distance of a location, a police beat,gang territory ,near a school, in a special area or address.**

	Incident Summary	

Search Criteria

Entire City ☐

- ○ Police Beat ● Gang Territory
- ○ Address   ○ Special District
- ○ School

FMT - Fremont Street Boys
HBL - Hebbron Barrio Locos
TBL - Tierra Barrio Locos
SEM - Salinas East Market St

Distance in   0

Date Range

- ○ Last 48 Hours
- ● Within Last Week
- ○ Within Last Month
- ○ Custom Date Range

From: 03/28/96
To: 09/24/96

Help	Cancel	Ok

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(r)_Traffic Citation Search Screen_: **helps to locate different types of traffic related offences in an area,between two dates etc**

```
┌─────────────────────────────────────────────────────────────┐
│                  Traffic Citation Search                      │
├─────────────────────────────────────────────────────────────┤
│ Page 3 of 3                                                   │
│                                                               │
│  ┌Primary──┬─Specific─┬─Pre-Defined─┐                         │
│  │                                                   Selected │
│  │  ┌──────┬──────────────────────┐   ┌──────────────────┐   │
│  │  │ Code │ Description          │   │                  │   │
│  │  │ H    │ Hazardous Traffic    │   │                  │   │
│  │  │ N    │ Non-Traffic          │   │                  │   │
│  │  │ T    │ Traffic Non-Hazardous│   │                  │   │
│  │  │      │                      │   │                  │   │
│  │  │      │                      │   └──────────────────┘   │
│  │  │      │                      │    ┌──────┐  ┌────────┐  │
│  │  │      │                      │    │ Clear│  │ Search │  │
│  │  └──────┴──────────────────────┘    └──────┘  └────────┘  │
│  │                                     ┌──────────────────┐  │
│  │                                     └──────────────────┘  │
│                                                               │
│  ┌──────┐      ┌────────┐   ┌──────┐  ┌──────┐  ┌────────┐   │
│  │ Help │      │ Cancel │   │ Back │  │ Next │  │ Finish │   │
│  └──────┘      └────────┘   └──────┘  └──────┘  └────────┘   │
└─────────────────────────────────────────────────────────────┘
```

(s)_Crime Code Search Screens:_
(Primary, Specific and Pre-Defined Codes)
Location Screen-   **helps to get in a map of crimes of different types based   on codes in a gang territory,near an address, police beat, school, special district. etc. Various distances could be specified with   reference to gangs, schools, other address etc.**

```
┌─────────────────────────────────────────────────────────────┐
│                    Crime Code Search                          │
├─────────────────────────────────────────────────────────────┤
│ Page 1 of 3                                                   │
│                                                               │
│                          Entire City ☐                        │
│                                                               │
│       ○ Police Beat  ● Gang Territory  ○ Address              │
│            ○ Special District    ○ School                     │
│       ┌────────────────────────────────────────┐ ▲           │
│       │ WSL - West Side Locos                   │              │
│       │ LPL - Los Projectos Locos               │              │
│       │ FMT - Fremont Street Boys               │              │
│       │ HBL - Hebbron Barrio Locos              │              │
│       │ TBL - Tierra Barrio Locos               │              │
│       │ SEM - Salinas East Market St            │ ▼           │
│       └────────────────────────────────────────┘              │
│                                                               │
│            ┌────────────────────────┐  ┌───┐                  │
│            └────────────────────────┘  └───┘                  │
│                Distance in      │ 0.5 │ ◆                      │
│                                                               │
│  ┌──────┐      ┌────────┐   ┌──────┐  ┌──────┐  ┌────────┐   │
│  │ Help │      │ Cancel │   │ Back │  │ Next │  │ Finish │   │
│  └──────┘      └────────┘   └──────┘  └──────┘  └────────┘   │
└─────────────────────────────────────────────────────────────┘
```

(t) *Crime Code Search Screens (cont'd):*
(Primary, Specific and Pre-Defined Codes)
Time Period Screen- **shows in a map between two dates, day of the week ,time ranges , a specific or all crimes.**

(u)*Crime Code Search Screens (cont'd):*
(Primary, Specific and Pre-Defined Codes)- **Crimes with particular codes numbers will be displayed in respect of a map in a particular areas selected.**

(v) _M.O. Search Screen_ :in a map shows the locations of cases with particular types of modus operandi.

(w) _Officer's Report, Field Interview location and Citation Search Screen_: Shows the work of a selected officer in respect of crime reports, field interviews and traffic citations.

For police, GIS is useful in planning, management and crime mapping. As GIS gives a digital representation of earth's surface, it can be used to perform new types of displays built upon different layers of information. GIS can be used in

emergency calls center to show call takers and dispatchers the exact location of calls for service, apartments, complex's, layouts, floor plans etc. A Global Positioning System (GPS) or Automated Vehicle Locater (A V L) uses a GIS to monitor whereabouts of patrol units and to recommend the closest unit.

To develop a GIS, digitized geographic data is the first requirement. Accurate address information has to be downloaded to the GIS. A Geo-coding process is necessary to maintain the changes that occur in the areas from time to time.

(z) GIS 3D map showing the relative risk of crime in Redlands, California.

Risk Factor Perspective

A contemporary three-dimensional map of Redlands, California. The vertical dimension portrays the relative risk of crime across the city.

Source: Redlands Police Department. Reproduced by permission.

1.GIS map showing the crime density on different days of the week for Bronx, New York.

A map showing the day with the highest average reported crime density, Bronx County, New York, October 1, 1995, to October 31, 1996.

Sources: Map by J. LeBeau, Southern Illinois University, with data from the New York City Police Department. Reproduced by permission.

Day of Highest Average Reported Crime Density

Bronx County, New York: October 1, 1995 - October 31, 1996

Sun. Mon. Tues. Wed. Thurs. Fri. Sat.

Precinct Boundary

Miles

Source: NYPD

J.L.B. 97
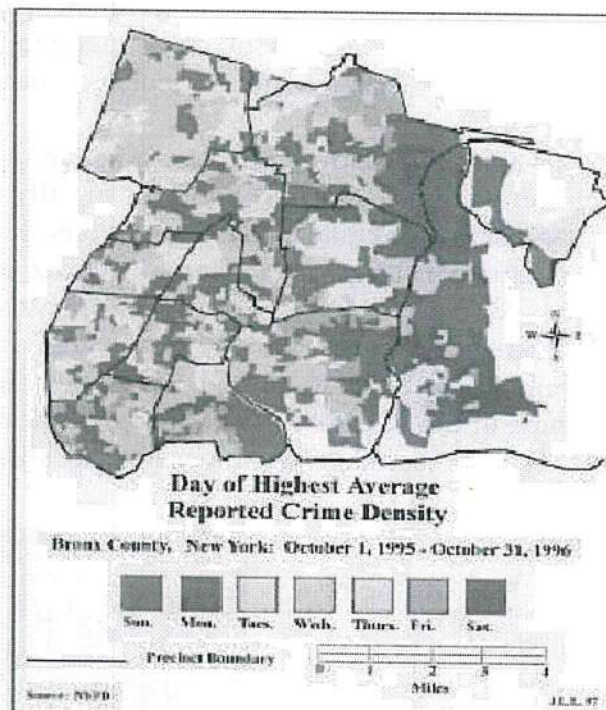
2.GIS map showing crime hot spots changing over time.

GIS Analysis Tools:
Hot spots: Change over Time

A map showing hot spot changes over time: Detroit, 1994 and 1997.

Source: Martin, Barnes, and Britt, 1998, figure 3, p.10. Reproduced by permission.

Arson Hot Spots in Detroit 1994 & 1997
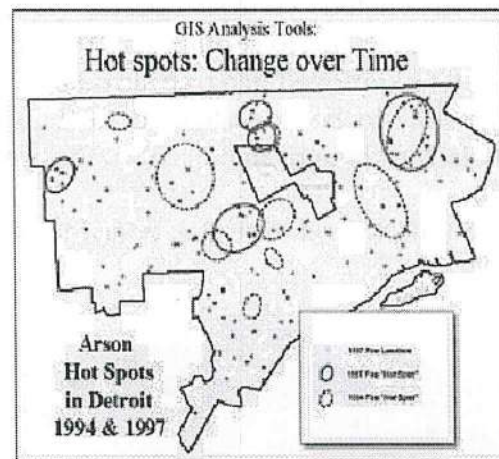
Crime Mapping: It involves focusing on where crimes happen rather than just the offenders who commit them. It is a tool for time analysis in the form <u>pattern analysis, problem analysis and operations analysis.</u> It is actually an extension of GIS software by combining data from GIS, Record Management System (RMS) and Computer Aided Dispatch (CAD) System to build up a more data driven decision-making. More and more police organizations are using this new tool in their day-to-day operations because of success of crime mapping efforts in reducing crime, solving problems and providing more efficient and effective services to the public.

The maps at a1 to i1 below show how crime mapping can be used for analysis of problems and patterns. Map a1 shows the top 10 calls for service superimposed on a beat. It is useful for, management decisions. Map b1 shows differences in burglaries in a particular target area. Map c1 gives zoomed in view of six types of crimes on a map .Map d1 shows telephone data analysis of 2 suspects with reference to telephone antenna locations. Map e1 is a three dimensional representation of crimes involving arms. Map f1 shows the co-relation between gang turfs and incidents of crime in the neighbourhood. Map g1 shows identification of hot spots of motorcycle bandit cases.map h1 shows identification of robbery hot spots.

(A) <u>Operations analysis-</u>
Location of Top 10 Calls for service locations

A map showing the location of the top 10 calls for service superimposed on a map of police beats.

Source: City of Redlands, California, 1999.

<u>Map a1.</u>

Top Ten Calls-for-Service Locations
October 1998
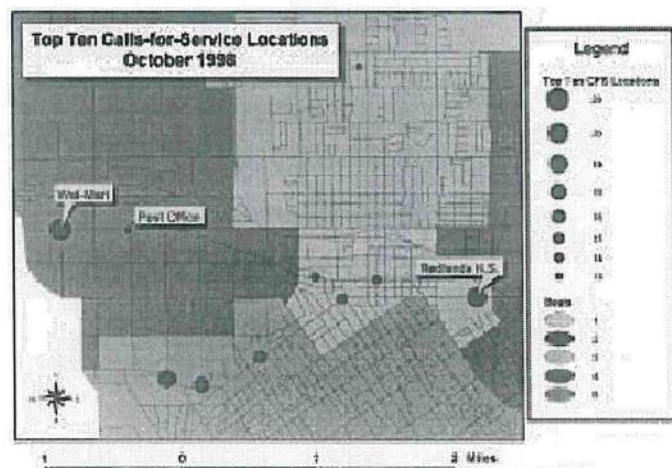
(A) *Problem analysis-Differences in number of burglaries in potential target areas.*

Map b1.

A CompStat map showing differences in counts of burglaries within potential target areas in Brooklyn, New York.

Source: D. Williamson, Center for Applied Studies of the Environment, Hunter College, New York, and New York City Police Department.
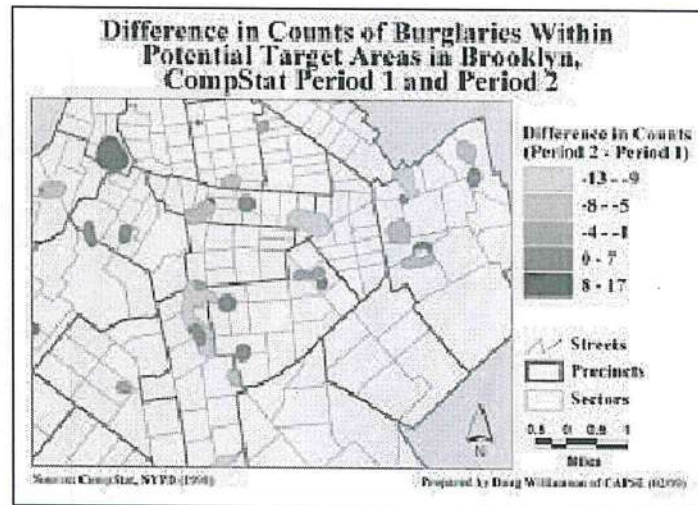
(C)*Pattern analysis-Distribution of top 6 types of crimes in a city.*

Map c1.

A zoomed-in view of six types of crimes on a map of Vancouver, British Columbia, Canada.

Source: Lodha and Verma, 1999. Reproduced by permission.
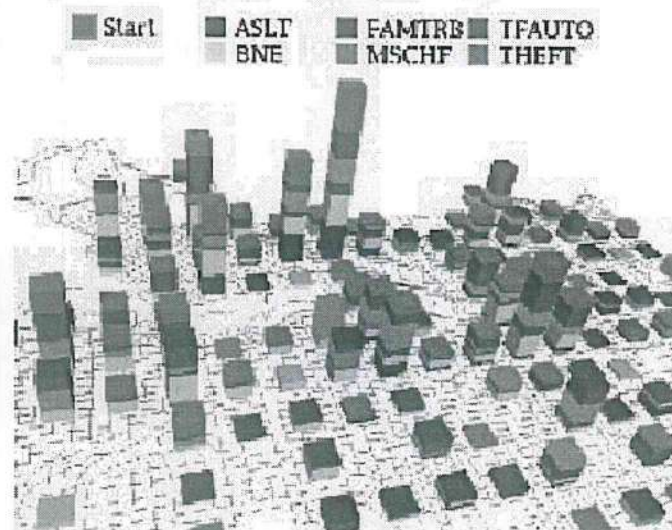
(B) _Telephone data analysis_-Suspects' activities and tel.antenna locations.

Map d1.
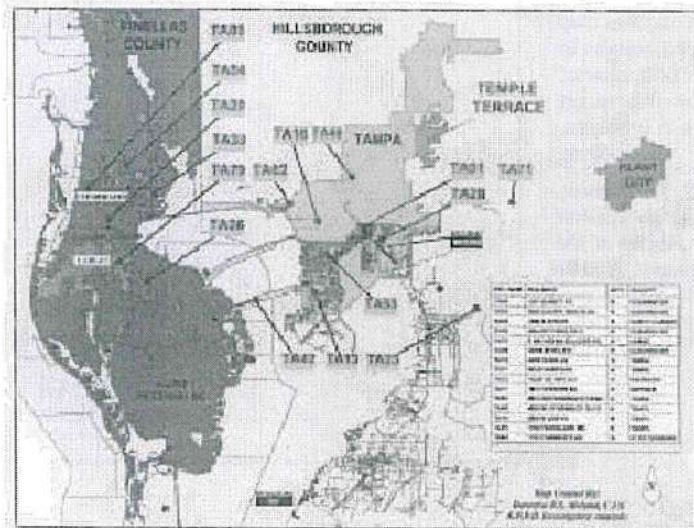
A map showing key telephone antenna locations delineating two suspects' activity.

Source: Robert S. Moland, St. Petersburg, Florida, Police Department. Originally published in Moland, 1998.

(C) Fire arms problem analysis-_Locations of Firearms incidents_
Map e1.
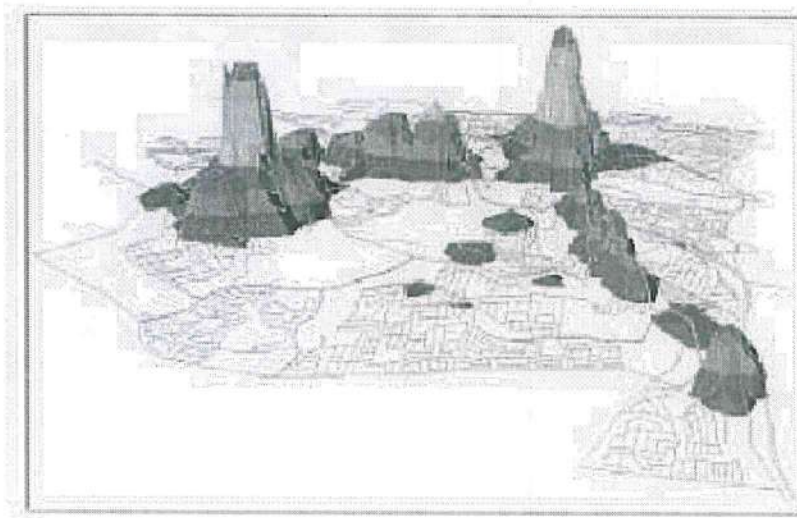
A map showing firearm incidents in Salinas, California.

Source: Salinas, California, Police Department. Reproduced by permission.

(D) <u>Gang activities analysis-</u>*Gang turfs and incident data*
<u>Map f 1.</u>
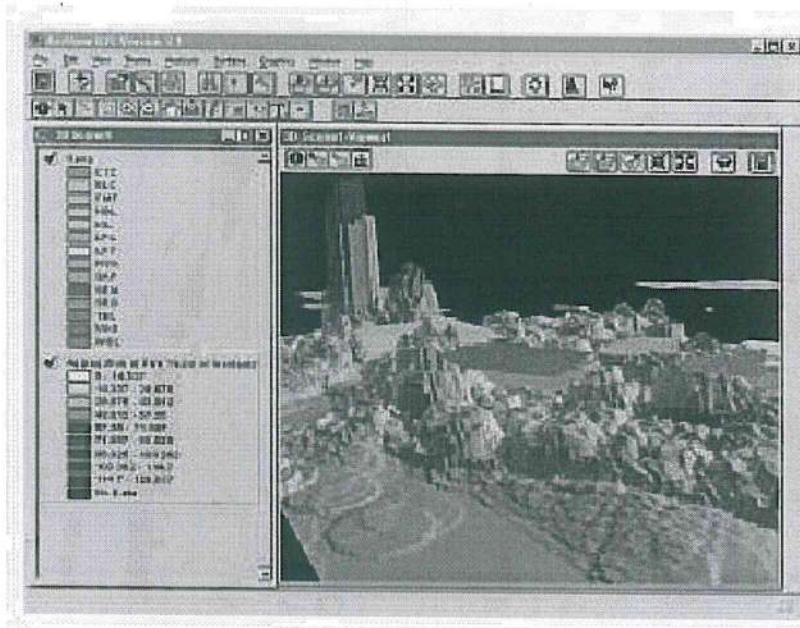
A 5-year analysis
of incident data
with an overlay
of identified gang
turfs in Salinas,
California.

*Source: Salinas,
California,
Police Department.
Reproduced by
permission.*

(E) GIS and forecasting crime.
<u>Map g 1.</u>

A map showing
probability bound-
aries in the
Los Angeles,
California,
Motorcycle Bandit
case.

*Source: Geggie,
1998. Reproduced
by permission.*
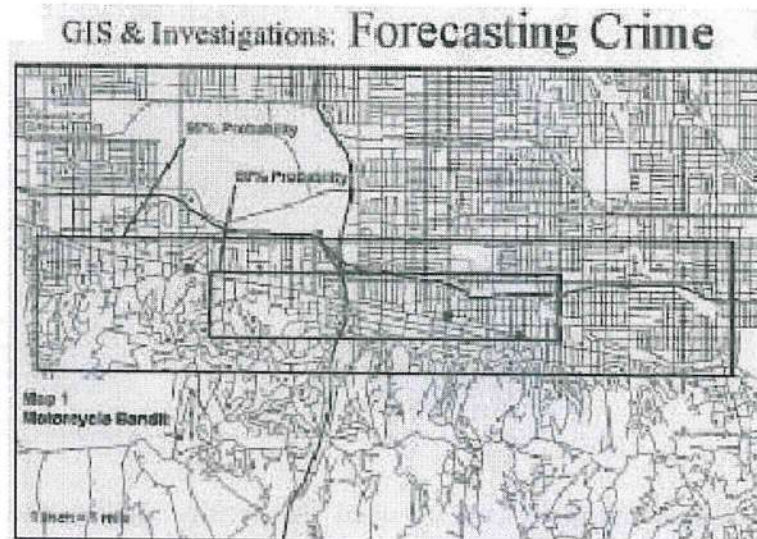
(F) *Identification of Hot spots.*
<u>Map h 1.</u>

A map showing
robbery hot spots,
using STAC, West
Bronx, New York.
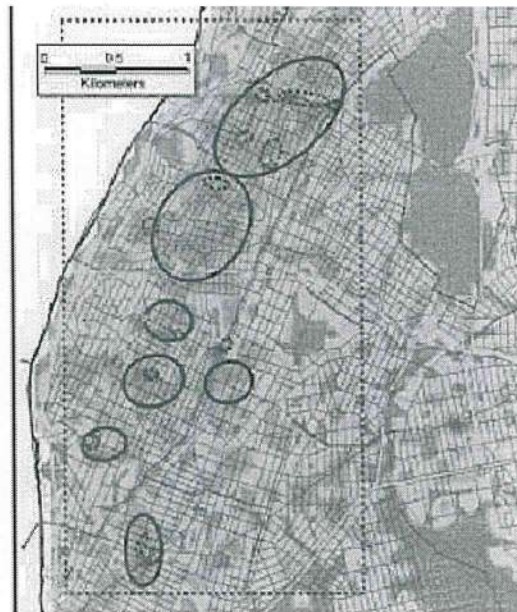
(I) <u>Community policing</u> *-Problem solvingPartnerships.*
<u>Map i1</u>

GIS & the Community:
Problem Solving Partnerships

Reducing Arson:
Community
Organizations
in Detroit

Community organi-
zations in Detroit
mapped as part of
an effort to reduce
Devil's Night arson.
*Source: Martin,
Barnes, and Britt,
1998. Reproduced
by permission.*

Crime mapping can be used to identify spatial and temporal elements of crime patterns and series. The geographical patterns and chronological sequences are assessed on a regular basis to develop a profile of who could be possible for a crime as well as the time of day and day of week for the targeted area. The profile can be used to apprehend criminals by querying known offender databases and providing investigative levels. By correlating the current pattern to similar criminal

event, an attempt is made to clear cases and enhance the prosecution of habitual offenders.

In problem analysis, crime mapping is used as an instrument for problem solving by scanning, analyzing, responding and assessing of community problems. It allows police to conduct pre and post test of police community initiatives and take measures for the displacement of crime and disorder.

In operations analysis crime mapping is used to allocate resources, conduct comparative work load analysis, design more efficient schedules and realign police boundaries so that officers are in a better position to respond to calls for service and neighborhood concerns in a more timely and effective manner.

State and Local Governments can use crime mapping to develop strategic plans. Producing maps that provide visual pictures and reference points for understanding the scope and nature of crime and criminal is the essence of crime mapping. The Adage "a Picture is worth a thousand words"- holds true to Commanders, line personnel and citizens. Using digital maps to display temporal and special crime patterns incorporating symbolization and colour and underlaying an orthophoto adds new understanding to the relationships otherwise not apparent between crime, criminals, victims, targets and other temporal, /special dimensions. The flexibility of GIS and ability to produce results of "What- If- Scenarios" make it invaluable for decision-making and strategic modeling.

The steps for developing crime-mapping capabilities include: -
Capabilities of crime analysis unit to produce quality product quickly, geographic data that includes
Points, lines and polygons that represent geographic locations, streets, alleys, rivers, parks, lakes, bars, banks, ATMs, crack houses, sex offender residences, schools etc. The base map and its peripheral layers of data make up the starting point for crime mapping system. Access to crime data including offences, accidents, criminals, victims, arrest information, traffic cases, field contacts etc available in RMS, access to imagery data including mug shots, crime scene photos, floor plans that can be stored as a layer etc are other essential requirements.

IV. Mobile Data Communications/Mobile Computing.

Mobile Data Systems installed in Police vehicles can increase the effectiveness by providing timely access to information and reduce the burden on the dispatch staff and free valuable voice communication resources by reducing the number of routine enquiries generated by field officers.

Such communication systems have a low data transfer rate compared to that of a LAN. These systems require radio towers, base stations, base station links, radio network controllers, message switches, radios and modems. Though these can be tied to the public telephone system, it is fairly costly. Encryption can be used for security. In U.S. three types are available and they are the traditional private radio system and two commercial systems. Factors namely coverage, capacity and cost are important in selection.

A Mobile Data Computer normally seen in Police patrol cars.

In U S, Private radio systems provide a communications radio network. This is often used after obtaining clearance from the concerned authorities. Cost is an important factor and it can be millions of dollars. This uses 800 MHz.s. Trunking radio or the standard 150MHz radio frequencies. Different channel for voice may be required and if so two complete systems would be needed. Wireless Telephone Companies offer commercial services like the circuit switched cellular and packet radio systems normally for a month fee for service. These are shared systems and may not be available during a disaster because of increase demand. Circuit switched cellular systems can transmit a continuous stream of data and modems can be added. This provides the greatest capacity and hence data can be transmitted at a greater rate. Though costly, these are best suited for large file transfers, faxes and Internet access. Packet radio systems break the data streams into smaller packets over transmission and hence a large number of users share the network. Implementation cost can be higher as new infrastructures have to be built-up. Coverage is usually limited to metropolitan areas. It use is normally for person-to-person data communication like email or route management services.

A private radio system and packet radio system would require a radio. A circuit switched system requires a cellular phone. Both need a transmitter/receiver with availability to accept and interface like a modem for connection to a computer.

A detailed analysis of system coverage, data capacities, the environment (Indoor/outdoor), high /low, day/night, the existing infrastructure, expected growth, type of data to be communicated, interfaces required, problem faced in the existing system, type of security, plain or encrypted data, procedures that are dependent on the system and that may need a change etc are required.

The existing radio system may be mapped against the geographical limits of the unit concerned and the signal strength, range etc measured. Coverage prediction software can be used to select sight locations and identify potential areas of insufficient coverage. Remote sights may be collocated with existing public safety communication sites and the need to duplicate building, power and telecommunication assets could be minimized.

An analysis of the potential loading of the system by going into factors like peak number of active users, number of inbound and outbound messages per terminal per hour, size of messages, turn of times for base and mobile stations, potential system delays and coverage reliability should be done. Large files,

fingerprints etc would consume a lot of system resources and if these are expected, it should be clarified. The percentage a channel is actually in use for specific period is important to know the user needs. Hike in usage at a particular time of the day calls for special considerations and cause blocks due to channel congestion, which would necessitate additional channels. The vendors selected may do a summary of data loading and it could be compared.

The mobile data system selected should consist of multiple remote sites and all transmitters should be capable of continuous operation with sufficient power outputs in a short time like 10 milliseconds or less and be able to withstand frequent on and off switching cycles. Receivers at remote sites should be capable of measuring and reporting signal strength. Loss of one of the remote sites should not prevent operation of the remaining system. A single system controller device should keep track of activity on the system and provide control of remote sites. It may keep use of cellular, trunking or frequency reused technology, but should be capable dynamically reassigning system assets to make maximum use of remote sites. Communication with remote sites can be made by microwave or lease wire line. The system controller could also perform some network functions and data conversions.

In a wireless WAN, they are many factors that affect the performance of a mobile data system. In a motionless situation, short term fading and multipath come into play. Fading is the result of signal variations caused by rain, buildings and path loss if the receiver is out of range of a base station; multipath is caused by reception of multiple copies of the same signal arriving at different times/levels and is common in either a stationery or dynamic environment. This cause errors and reduce performance. When a trans receiver is in motion, fading from nearby structures, both moving and fixed, signal variations due to coverage problems in fringe areas radio, frequency interference from other sources and pathloss from foliage take place. Other factors include data resends due to miss and connection of the sending and receiving units, packet delay or drops, congest from large number of users or other network delays.

In mobile commuting choosing the best alternative depends on cost, coverage and expected use. Taking the time to explore all options is key to choosing a mobile data communication system. As Technology advances the greater amount of data than is possible today can be transmitted with greater reliability.

V. Connectivity, Security and other issues

In any computer network, connectivity especially its reliability, bandwidth and speed are vital. All systems on a path way must follow a set of communication rules for data to arrive at its intended destination and for the sending and receiving systems to understand each other (communication Protocols). Special computers called 'servers' are used to store information and to manage

What is a Local Area Network?

- Wires Within and Between Buildings on Same Campus
- Connects Workstation Computers to Servers, Printers
- Enables Resource Sharing (Files, Printers, Databases)
- Facilitates Technical Support (e.g., Cloning, Backups)
- Necessary for Wide Area Net and Shared Internet Access
- The SERVER is the conceptual center of your network

Desktop PC   Desktop PC   Server   Network Printer   Desktop PC

Set up of a small LAN

other common resources. In a police system, while one server would be running software for a CAD system, another may be running the complementary software for RMS.

Networks could be large or small. A Local Area Network (LAN) as a collection of computers in one geographic location and may consist of servers, workstations/ users' computers and transmission medium (cabling/wireless) or the LAN infrastructure. The server is a computer used as a repository for information. As its failure can be quite serious, it is built to maximize reliability with redundant internal power supplies, which are "hot swappable" (so that a failed power supply can be replaced while the server is fully operational). "Hot swappable" disks, a UPS linked to a generator and remote management capabilities (so that support staff is informed of failures and can take action from a different location.) are other basic needs.

Servers are kept in restricted areas with limited physical access and protected with good physical security wherein authorized persons escort visitors.

Infrastructure is the most technically complex component of a network and consists of active devices such as routers, hubs and switches, transmission medium (cables) etc.

'Ethernet', a type of LAN with normally 10 MBPS cabling, is currently the dominant Networking Technology because of its scalability, ease of migration, low cost and minimal learning curve. A fast Ethernet can handle 100 MBPS and up to 1024 computers can be connected to a LAN with a maximum cable length of 100 meters (though 90 meters is normally the outer limit). The Network Protocol of choice is TCP/IP. Each work area or office should have a minimum of two information outlet ports for voice and data. Active devices are used to handle and manipulate data as it travels along the cabling of a network. A file is transmitted by breaking it down into smaller packets of information and sending it with packets from unrelated files. By interspersing packets more than one transmission can be made over a cable at the same time. When a file is sent in packets, the sending computer specifies the number of packets and how to put them back at the other end. The receiving computer acknowledges its receipt of every packet in order and assembles them correctly. The active devices used to manipulate data over the network include hubs, switches, routers or combinations. Hubs are inexpensive devices that act as repeaters and as they can create congestion problems, these are recommended for 10 or fewer users. Only 2 hubs can be in the path of a data packet. Ethernet switches which are intelligent network devices forwarding packets only to the correct computers based on a packet's actual destination address are used for connecting servers and workstations. A network may have several switches. A small network would use the core switch for the servers, P Cs and other equipment. In a large network, the core switch handles information from the servers to small switches called workgroup switches and these switches in turn handle data to PCs, printers and other peripheral equipments. Routers are primarily used in wide area networks (WAN), are costly complex to configure, but can further reduce congestion. A small network is one that has 1 to 5 servers and fewer than 25 workstations. This can be constructed with one or two Ethernet /fast Ethernet switches with the fast one as the core for the network. Enterprise-wide servers are

connected to the network via 100mbps connection on fast Ethernet switch. The users are connected via 10mbps connection on the fast Ethernet switch. The users are connected to the network via 10 mbps connection on an Ethernet switch. While majority of switches can be 10 mbps, the switch needs to have at least one 100mbps uplink with the server. Without a firewall security, the net wok should not be connected to any other network. Without additional authentication beyond user name and password, no dial up modems or workstations with dial up should be connected to the network. Information on the servers should be backed up regularly and the media should be stored in fireproof facility in a controlled space.

A large network is one which has more than 3 servers and more than 100 work stations. A fast Ethernet switch router should be use das it's core and enterprise wide servers should be connected via 100 mbps on fast Ethernet switch users should be connected to the network via 10 mbps connection on Ethernet switch. The up link should be of 100mbps.

For connection to other organizations, the choices are dedicated cables form tel. company, leased cables of commercial vendors, dial up, internet and wireless .For short distances up to a few kms, wireless may be enough. Dial up may be limited to public access with user I Ds and pass words. When distances are more than a few kms, direct point-to-point connection with higher data transfer rate is desirable. This is costlier and also need expensive hard ware.

Asynchronous transfer mode (ATM) is the international standard which is expected to become the dominant one for all telecommunication carriers and can send voice, data and video on a single transport mechanism. It can give priority for certain traffic types and can also handle scalable band widths Frame relays provide packet switching across the interface between user devices (routers, bridges, host machines) and net work equipment (eg. switching nodes) It allows one site to communicate with many sites while requiring only one interface to the net work ISDN is similar to dial up, but digital and can be in2 configurations of Basic Rate Interface (BRI) and the Primary Rate interface (PRI). BRI offers 2 64 k channels and the two can be integrated to get 129kbps. PRI offers 23 64 k channels and can yield up to 1.544 mbps. The cost is correspondingly much higher.

Internet is universally available, but sensitive data need to be encrypted Extranet is a collaborative network that uses Internet technology to link businesses with suppliers, customers or others having common goals. It is a closed user group which can be used to exchange large volumes of data using Electronic Data Interchange (EDI), share product catalogues exclusively for those in the trade, collaborate with others on joint development efforts, jointly develop user training programmes with others, access services provided by one to a group of others, share common interest exclusively with other partners etc.

Wide Area Network (WAN)

WAN interconnects LANS even across the globe. Wireless can be used with a tower, which transmits it to distant places, and from towers lines carry the data The speed over wire less unlike in LAN is much slower.

Security is of utmost priority in law enforcement systems as a compromise in it can expose under cover officers and informants and put them in danger. Confidential information can be disclosed without authorization and may make it vulnerable to law suits. Data can be altered or expunged., loss of reputation, break down of system, risks to ability to

Planetel Internal Systems WAN

A sketch of a typical WAN.

prosecute offenders are some results. The dangers could be from criminals, hackers, outside intruders, inside sabotage, virus attacks including Trojan-horses and "electronic bombs". The police personnel, data, computer related assets, and agency's reputation need protection.

Any system connected to another has risks, as the system is as strong as the weakest link only. A firewall is essential. Any dial up should be thro additional authentication beyond password and Id. Systems should be backed up regularly and the media should be kept in fire proof and other wise secure place away from the compute room. Systems connecting to others should do a thorough risk assessment and balance the costs and risks and plan security, which may involve physical security, administrative controls and technical controls.

After the risk assessment, a list of security policies and procedures covering acceptable and unacceptable uses, access levels of user accounts including remote ones, new employee check in and existing employee check out, how operating system security updates are installed, incident handling procedure and disaster recovery plans should be implemented.

Under tech. Controls come firewall and monitoring of access, encryption of sensitive data before transmission, additional levels of authentication for systems containing sensitive information, external web servers out side the firewall etc. Data encryption should be done before sending to Internet thus ensuring a Virtual Private network invisible to the users between the two firewalls. In Internet, in addition to firewalls, additional authentication techniques like dynamic pass words should exist. The best technique is using VPNs between 2 firewalls. In the case of extra net too, encryption and firewalls should control access. Wireless messages also need encryption, as what is sent over is public property.
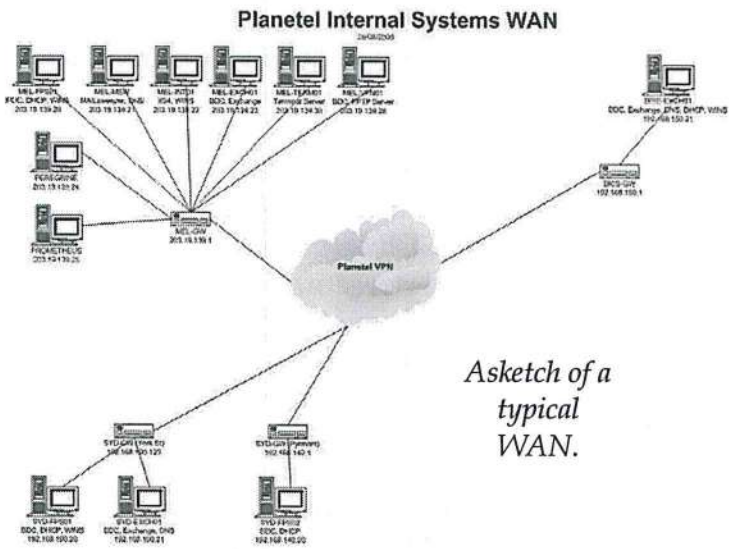
Chapter 5 - CURRENT LEVELS OF COMPUTERISATION IN STATE POLICE AND CPMFS – A REVIEW

The thrust of computerization in state police units and Central Para Military Forces, including Assam Rifles (C P M F) differs. Hence, different parameters have been taken up for a comparative analysis of current levels of computerization. In the case of State Police Units, the progress achieved has been tabulated under the heads

1) Crime related matters
2) Community Policing and Other Service matters
3) Other Applications
4) Comments

In the case of CPMFs, as crime, community policing and matters of general service are not directly relevant, the tabulation has been done under the heads

1) Work or Operations related
2) Administration/Accounts related
3) Other applications
4) Comments

Some comments have been given to highlight certain items or point out some seemingly positive or negative features. Comparisons between state police units and CPMFs are rather difficult, except in a very general sense, in view of the different roles they perform.

Analyses of websites of these organizations and their comparison with the contents of some modern police organizations have also been attempted as web sites also reflect, atleast partially, the level and quality of computerization.

Some states have developed their own applications, but most states have not looked beyond National Crime Records Bureau (NCRB). Even the progress in respect of NCRB's common applications like CCIS, Portrait Building, and Lost and Recovered Vehicles is rather poor in most of the states. Some comments have been made to reflect the true overall position. Police Units which have made more progress in computerization like Karnataka and Andhra Pradesh can try to give more dynamic data to the public. But, this point is not very relevant for CPMF's who are not meant to directly serve the public. But, the websites will, in their cases too, reflect the level of computerization as can be seen in the case of CBI. While data available in respect of Assam, Tripura, West Bengal, Bihar, Jharkhand, Madhya Pradesh, Uttar Pradesh, Uttaranchal, Punjab, Haryana, Delhi, Maharashtra, Gujarat, Goa, Karnataka, Andhra Pradesh and Kerala (18 States) were based on field visits, observations and discussions with officers dealing with the subject, in a few cases they were taken from the NCRB's website or given by the State Police in response to requests made to them.

The comments are based on prima facie impressions gained during field visits, perusal of websites etc and are meant purely for illustrative purposes. They are not relevant for a full comparison of relative progress. Despite the seemingly same tabular statements in respect of Indian and Foreign websites, Indian websites are no match to those listed in respect of foreign countries because of their high quality, dynamic nature, short download time, stability and similar features.

A. State Police Units.

TABLE –1

B.C P M Fs

TABLE – 2

C .USEFUL APPLICATIONS IN USE IN STATEs/CPMFs – A BRIEF REVIEW

Among the various applications in use in different states and central organizations, the following may be worth studying by state police units for their relevance and possible use.

Andhra Pradesh

E-COPS (Computerized Operation of Police Services) is a total package for all police applications including coverage of links needed in the state with jails, courts, forensic science labs, state government etc. and at the center with Ministry of Home Affairs, Intelligence Bureau, NCRB, CBI, BPR & D, S PGs etc. Most of its applications are yet to be developed and a few, which have been developed, are in use in some units.

As the organization developed it (CMC) and others involved like Microsoft, Oracle and---- are capable and well reputed, it will fulfill the objectives set. But, the cost/investment, development of infrastructure required, training and development of the personnel will be quite time consuming and challenging. It can serve as a good model for others who are yet to think of a holistic approach to computerization of police systems after a proper System Requirements Studies (SRS). The 'Intelligence Messenger' in use in Andhra Pradesh to Communicate information pertaining to incidents, activities etc will also be quite useful for Special Branches, Police stations etc. The entry of Case Diaries, maintenance of Police station Registers, etc in Databases are quite new to our country.

Assam Rifles

Assam Rifles package for Unit administration may be useful for armed police battalions with suitable changes, especially for those operating in insurgency prone

areas. There are also quite a good number of administration packages for pay rolls, stores management, etc.

CBI

The CBI packages for plan of action (investigation) evidence analysis, statements of witnesses and accused and their details, comments of different officers etc will be quite useful for investigating officers, particularly of CID (Crime Unit). Creation of a package for re –creation of the sequence of events in respect of crime/incident based on various statements and other materials available as is done in some Visual Imaging soft wares in U S (or analysis of the sequence of events) will be useful to bring out bring collaborations.

CISF
The packages relating to management of funds may be useful who may have to handle private funds particularly in Armed Police Battalions.

SSB

The monitoring system for cash and receipt diary would be successful to keep track of pending items of work.

Delhi
The packages on transfer of lower level personnels, house allotments, SMS systems for enquiring about vehicles, passports, arms etc will be good for use in similar units, particularly in metropolitan cities.

Karnataka
The `Zygox" software for management of digital finger prints, e-learning packages for training of police officers and men in different applications, video conferencing system up to district level, district level training units, e-building and e-attendance in Karnataka Police Housing Corporation, use of templates for preparation of returns at different levels, etc. are found quite useful.

Chandigarh
The single window complaints management system in use in Chandigarh city will benefit the public.

Kerala
The GIS based `Traffic Accident Management System' being developed, Discussion Forum/Bulletin Board in Trivandrum City Police website, Vehicle Tracking System for Sabarimala pilgrimage, etc. are quite useful.

Madhya Pradesh
The information available in websites on senior police officers, their postings, training, gradation lists, information on retired officers, etc in websites is quite good.

UttarPradesh
The current website of Uttar Pradesh police (www.uppolice.up.nic.in) is quite modern and forward looking with a lot of information, giving guidance and tips to the public, links to other police websites, central organizations etc. It also has very useful links with websites providing access to all sections of law in respect of all Acts, which will be beneficial for all police officers, particularly investigating officers, prosecuting agencies and supervisory levels. Other packages developed by

Uttarpradesh police SCRB on mafia, economic offences, and VIP security; complain information, Thana management etc are also quite useful.

Tamil Nadu

The guidance system for women related cases, the complaints and press write-ups management systems in use in Chennai city would be quite beneficial to all police organizations.

West Bengal

West Bengal has a strong email messaging system linking all police stations and senior hierarchy and other units, which is a dial up system between districts and lower levels. The Criminal Tracking System that operates at police stations, district and state level (web based at state level) giving details of criminals, their activities, locations etc is useful. The police personnel Management System, Digital MTO for management of vehicles and electronic file monitoring system is in use in police headquarters are worth studying.

D. Analysis of Websites of State Police Units, CPMFs and some Foreign Police Organisations.

Some General Principles

Websites, especially their home pages, can generally be said to represent organizations or persons owning them in all their features-objectives, mission, vision, activities, interests, products and services and other facts or features which the organizations or persons would like the world at large to know. A Web site thus, as an interface in the web world, is a typical miniature representation of the organization or person concerned.

The website of a police organization can provide, in addition to general features like its vision and mission, organizational structure, activities and achievements, its service philosophy, priorities, transparency or lack of it and what image it wants to project about itself, the nature of police problems, the way they are being tackled, extent of proactive and co-active policing, community policing and information sharing with the community. The extent of use of IT in police work, especially in facing emerging threats, would also be clear from a thorough reading of the website. The stage of development of the web site itself would speak a lot about the organization or person owning it and level of I T use.

In terms of development, websites can be classified into 4 generations based primarily on their contents:

Generation	Contents
I	Brochures on line, addresses, telephone numbers, contact numbers, etc.
II	Mission Statements, Messages from Chiefs, organizational structure, crime prevention tips, community policing goals, recruitment matters, etc.
III	Interactive portals, dynamic information- Crime statistics, crime mapping, offender databases, inmate databases, crime queries, most wanted, unsolved crimes, current traffic accidents etc. Statistical information- application forms, permit information, crime report forms, etc.
IV	Data in generation III plus behind the scene reading of browsing habits, victim information, chat on site visits, use of data for prevention, investigation, etc.

Keeping the above points in mind, an analysis of some selected and important web sites- both foreign and Indian- is given below for a comparative study. The points to be noticed about different websites have been highlighted. Based on such a study, some useful suggestions have been made about desirable features of a good police website.

STATE POLICE UNITS

Refer Table 3

CPMFs
Refer Table 4

FOREIGN POLICE ORGANISATIONS

Refer Table 5

E. Web sites --Points to be kept in mind while designing its structure and contents.

The following points could be considered while designing the structure and contents of police websites:

1. Simplicity: It is desirable to keep it simple and straightforward as the website of CIA is. Among Indian websites, the latest one of UP police (www.uppolice.up.nic.in) also could be seen as a good example.

2. Fast Downloads: The Down loads will be faster if photos and graphics are less atleast in Indian conditions where the bandwidth and speed are real problems. In case photos and similar details are considered unavoidable, a low graphics option may be given as in sites like that of WWW.dawn.com, a Pakistani newspaper site.

3. Good interface: The point that the basic aim of a website is to give a good interface to the public should always be kept in mind. Hence, materials useful to the public should be the cynosure of attention in it. Guidance to public (in local language) on various issues, tips, information needed by them, procedures to be followed, FAQs, Dos and Don'ts, pitfalls to be avoided etc should receive sufficient attention as the public, esp. in India, are not knowledgeable about many matters they are supposed to know. Some good Indian Examples are websites of Mumbai city and U P police.

4. Transparency, Facilitation, supply of information, Saving of Time and Effort for the Public: Provisions for Registration of a case on line, lodging of complaints, queries on progress of cases/complaints/verifications (passports, servants, employment, etc where ever possible), SMS queries on vehicles, firearms, property as in Delhi, etc may be attempted as people these days, esp. in cities, are very busy. Websites could help to same time and effort of the public it would be welcome.

5. Community Policing: As Community Policing has an important role to play in participative, proactive and coactive policing, it is worthwhile to give sufficient focus on efforts on this front a sis being done by police of many developed countries. The websites of Los Angeles and Chicago police are some good examples.

6. Aim at data driven ones: Indian websites are not data driven, as we have not built up databases. However, the point that data driven sites are more interesting, informative and useful to the public should always be kept in mind and efforts to reach this objective should be continuously made.

7. Regular updation: Most of the website are not being updated regularly with the result that sometimes data /information totally out of date figure in our websites. Regular updating of all websites should be done, as it is a sign of efficiency of the organization concerned.

8. Linkages: Linkages to other websites of interest like those of CPMFs, other police websites, those with which functional linkages exist like those of CBI, Interpol, FSLs, Fire and other Emergency Services, Jails, Courts, Prosecuting Agencies, References to Laws and Rules, etc would be functionally useful. The website of U P police has successfully done many of these.

9. Facilitate regular public interaction: Provisions for better and regular interaction with the public through web using Discussion forums, Bulletin boards, questions to local officers etc as is being attempted by Trivandrum city police web site is desirable to improve public contacts, remove misconceptions about police, etc.

10. Police related news/information: Police related news, important developments on cases, which are of public interest/attention; especially sensational cases, etc. may be covered.

11. <u>Downloadable Forms</u>: Downloadable forms for licenses, permits, etc., recruitment to police, police reports/clearance reports, applications for driving license or any form, which the public may need in relation to police related matters may be included.
12. <u>Vision, Mission, Public charter</u>, etc
13. <u>Crime statistics (updated)</u>, <u>wanted, missing, lost/found property</u> etc
14. <u>Hierarchy of Police officers</u>, <u>their responsibilities</u> about delivery of services, tel .nos, email address and other contact information, etc.

These comments essentially relate to general parameters in respect of websites. The technical points about web page design are not covered here as they are beyond the scope of this research.

Chapter 6 - Analysis of Survey Results

A survey using the questionnaire (at Annexure-A) was undertaken among police officers of different ranks all over the country, I T professionals and public at large to elicit their views primarily on image and performance of police in their respective areas, various factors contributing to 'poor' or 'unsatisfactory' image where it exists, the role of police in different service areas etc. A five point Grading system (Very good, Good, Satisfactory, Poor, Very poor or Fully, To a great extent, To some extent, To a little extent, Not at all) was used where structured responses were required. Other points covered were importance of different police roles for the common man, views on use of I T indifferent areas of police work like crime, law and order and security, relevance of social skills, transparency and responsiveness in improving the quality y of police service, the common problems seen in police with regards to use of IT, the essential requirements that have to be met for successful implementation of I T for police work etc. A total of 1257 samples (police --, I T men- and other general public-) were collected from different parts of the country. Those working in I T field in Police have been covered under police reducing, to that extent, the number of I T respondents.

Analysis of responses in respect of image and performance of police at <u>district level</u> showed that only 20.8% felt that these were 'very good'. Another 35.5 % felt that these were 'good' and 32.7% opined that these were 'satisfactory'. The corresponding percentages for <u>state</u> and <u>national</u> levels were 12.7 %, 39. % and 35.4% and 7.5%, 22.5% and 49.1% for 'very good', 'good' and 'satisfactory' respectively. The police officers and men had a better, perhaps exaggerated, view of their image and performance with 23 %, 40% and 30.2% rating them as 'very good',' good' and 'satisfactory' respectively. However, at state and national levels, perhaps distance playing a more corrective role, the corresponding percentages came down to15.2%, 44.7% and 32.75 for state level and 9.1%, 24.5% and 50.9% for national level. Among other professions, only 1.2 to 11.8%, 5.9 to 35.3% and 41.2 to 52.9% gave 'very good', 'good' and 'satisfactory' ratings. It was seen that while police officers and men considered the image and performance of police at dist and state levels to be good, others were prepared to give a 'satisfactory' rating only. Even police officers and men considered the image and performance of police at national level as 'satisfactory' only. Generally women, youth and minorities gave a poorer rating.

The Pie diagrams aa to cc show the image and performance of police a dist, state and national levels as revealed by the results of the survey. The colour coding given below has been uniformly applied.

very good ■ good □ satisfactory □ poor ■ very poor

General
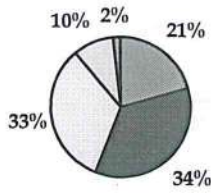
| (aa) DISTRICT | (bb) STATE | (cc) NATIONAL |

(aa) DISTRICT: 21%, 34%, 33%, 10%, 2%

(bb) STATE: 13%, 38%, 36%, 11%, 2%

(cc) NATIONAL: 7%, 23%, 49%, 19%, 2%
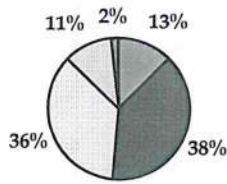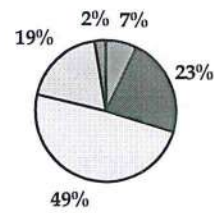
The Pie diagrams (a) to (c) given below depicts pictorially the views of non – police respondents on the image and performance of police at dist, state and national levels. Similarly, those at (d) to (f) represent the views of police officers. The colour coding used for the representation is as given below:

Non-Police

(a) DISTRICT: 7%, 24%, 43%, 21%, 5%

(b) STATE: 4%, 20%, 44%, 27%, 5%

(c) NATIONAL: 1%, 16%, 42%, 34%, 7%
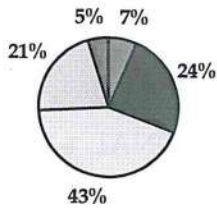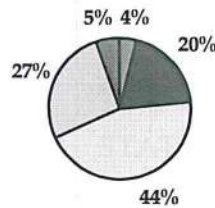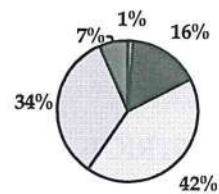
(a) DISTRICT   (b) STATE   (c) NATIONAL

Police

(d) DISTRICT: 1%, 23%, 40%, 30%, 6%

(e) STATE: 1%, 15%, 44%, 33%, 7%

(f) NATIONAL: 1%, 9%, 24%, 52%, 14%
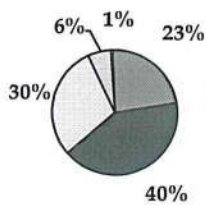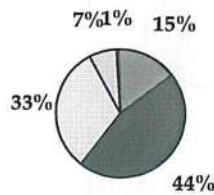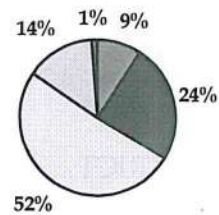
(d) DISTRICT   (e) STATE   (f) NATIONAL

The diagrams at (g), (h), (i) and (j), (k), (l) represent the views of Male & Female respondents on the subject.

Male

(g) DISTRICT: 2%, 21%, 35%, 33%, 9%

(h) STATE: 2%, 13%, 39%, 35%, 11%

(i) NATIONAL: 8%, 23%, 48%, 19%, 2%
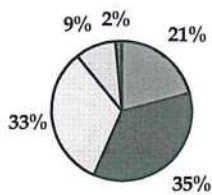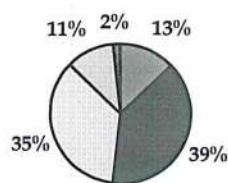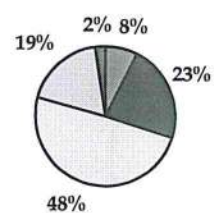
(g) DISTRICT   (h) STATE   (i) NATIONAL

Female

(j) DISTRICT

11% 3% 15%
39% 32%

(k) STATE

13% 2% 10%
41% 34%

(l) NATIONAL

3% 3% 23%
25% 46%
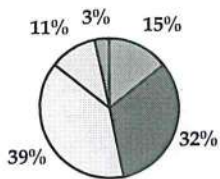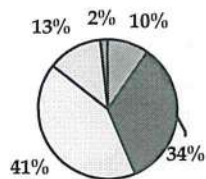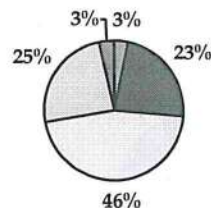
The views of different age groups (below 25, 26-40, 41-60, above 60) are represented in diagrams (m) to (x) below:

Age-wise (Below 25)
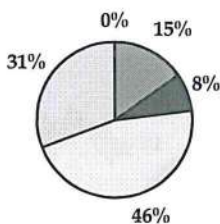
(m) DISTRICT
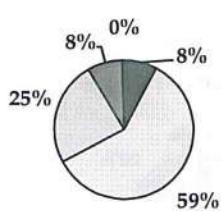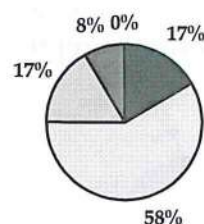
0% 15%
31% 8%
46%

(n) STATE

8% 0% 8%
25% 59%

(o) NATIONAL

8% 0% 17%
17% 58%

Age-wise (26-40)

(p) DISTRICT

11% 3% 17%
36% 33%

(q) STATE

14% 3% 11%
37% 35%

(r) NATIONAL

3% 6% 22%
23% 46%

Age-wise (41-60)

(s) DISTRICT

11% 3% 17%
36% 33%

(t) STATE

14% 3% 11%
37% 35%

(u) NATIONAL

3% 6% 22%
23% 46%
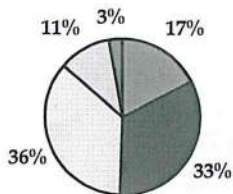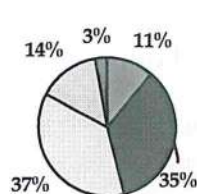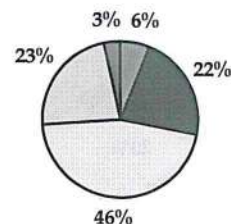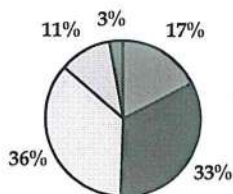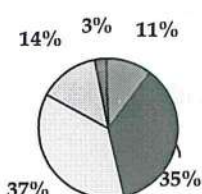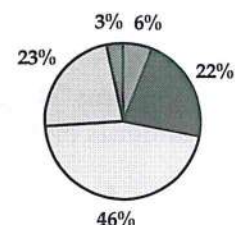
Age-wise (Above-60)
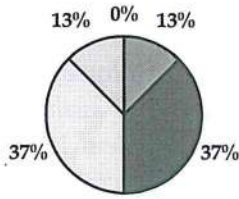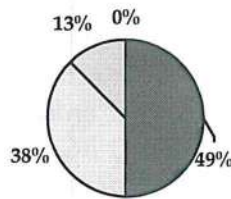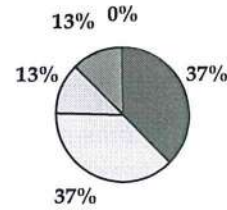
(v) DISTRICT   (w) STATE   (x) NATIONAL

The relevance of the following factors in contributing to the poor or unsatisfactory image and performance was tested in the survey. It showed the following results (in terms of percentages)

Serial No.	FACTORS	DEGREE OF RELEVANCE				
		Fully	To a great extent	To some extent	To a little extent	Not at all
1	Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.	10.6	38.3	30.1	14.4	6.7
2	High handedness and violence (use of third degree and related issues) of police	4.2	22.3	42.5	20.0	11.1
3	Corruption	12.9	38.5	27.5	12.3	8.8
4	Professional failures/inadequacies.	7.7	25.4	42.7	16.6	7.6
5	Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.	4.8	16.5	29.5	30.2	19.0
6	Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.	14.8	35.3	24.3	11.9	13.7
7	Actions under political influence/pressure	19.3	39.5	21.1	10.4	9.8
8	Links with criminals, antisocial and rowdy elements	5.5	19.3	38.6	22.1	14.5
9	Failure to enforce law, rules etc	6.4	21.1	42.3	19.4	10.8
10	Violation of law, rules, due procedures etc by police officers and men.	5.0	15.4	37.6	30.7	11.3
11	Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority	7.3	20.3	35.4	24.0	13.0

When the values of "fully" and "to a great extent" are taken together in method A ,the order of priority of various factors contributing to the unsatisfactory and poor image and performance of police is "Actions under political influence/pressure", "Corruption", "Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.", "Bad behaviour / and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc." followed by "Professional failures/inadequacies", "Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority", "Failure to enforce law, rules etc", "High handedness and violence (use of third degree and related issues) of police", etc. However if a combination of "fully", "to a great extent" &" to a some extent" are taken together in method B, the order of priority is "High handedness and violence (use of third degree and related issues) of police", "Professional

failures/inadequacies", "Violation of law, rules, due procedures etc by police officers and men.", "Failure to enforce law, rules etc", "Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.", "Links with criminals, antisocial and rowdy elements", "Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority", "Corruption", "Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.", "Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.", "Actions under political influence/pressure". If the irrelevance of such factors are graded in method C, then the order of priority changes to "Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.", "Professional failures/inadequacies, "Corruption", "Actions under political influence/pressure", "Failure to enforce law, rules etc", "High handedness and violence (use of third degree and related issues) of police", etc. violation of law, rules, due procedures by police officers and men , "Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority", "Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.", "Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.", "Links with criminals, antisocial and rowdy elements".

Method (A)- the percentages of "fully"and"to a great extent" are added together.
Method (B)- the percentages of "fully"," to a great extent" and "to some extent" are added together.
Method (C)-the percentages of " to a little extent" are also added together to the values under Method B

GRAPH --A
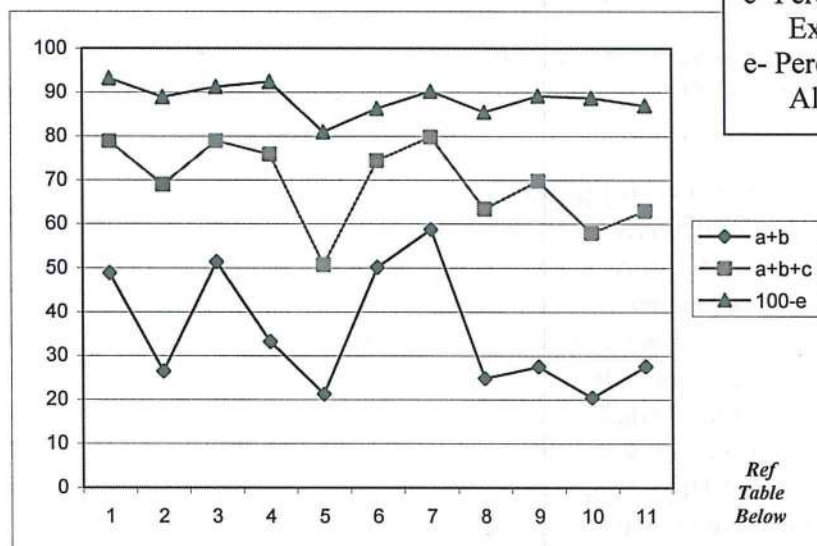
a – Percentage of Fully
b- Percentage of To a Great Extent
c- Percentage of To Some Extent
e- Percentage of Not at All

Ref Table Below

When the views of only non-police personnel are taken into account and a similar analysis is done, the order of priority for the factors listed under in serial numbers (see below) from 1 to 11 in method A works out as 7,3,6,1,4,11,9,8,10,2,5.Similarly, the order of priority for (B) works out as 7,3,9,6,4,1,8,2,10,11,5. In respect of method (C), the similar order would be 3,7,9, 4,1,6, 8,10,2,11&5. It is only natural that on the issue of image and performance of police, the views of public i.e. non-police personnel have to be given more importance. Hence, more than the views of the earlier Para where the views of police officers were dominating the scene, views of non-police men as discussed in this para is summed out below as a more reliable of the different factors adversely affecting the image and performance of police in India now.

S.No	FACTORS	Order of Priority			Average of A, B&C	Order of Priority
		A	B	C		
1	Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.	4	6	5	5.0	6
2	High handedness and violence (use of third degree and related issues) of police	10	8	9	9.0	9
3	Corruption	2	2	1	1.7	2
4	Professional failures/inadequacies.	5	5	4	4.7	5
5	Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.	11	11	11	11.0	11
6	Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.	3	4	6	4.3	3
7	Actions under political influence/pressure	1	1	2	1.3	1
8	Links with criminals, antisocial and rowdy elements	8	7	7	7.3	7
9	Failure to enforce law, rules etc	7	3	3	4.3	4
10	Violation of law, rules, due procedures etc by police officers and men.	9	9	8	8.7	8
11	Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority	6			10	10

GRAPH --B
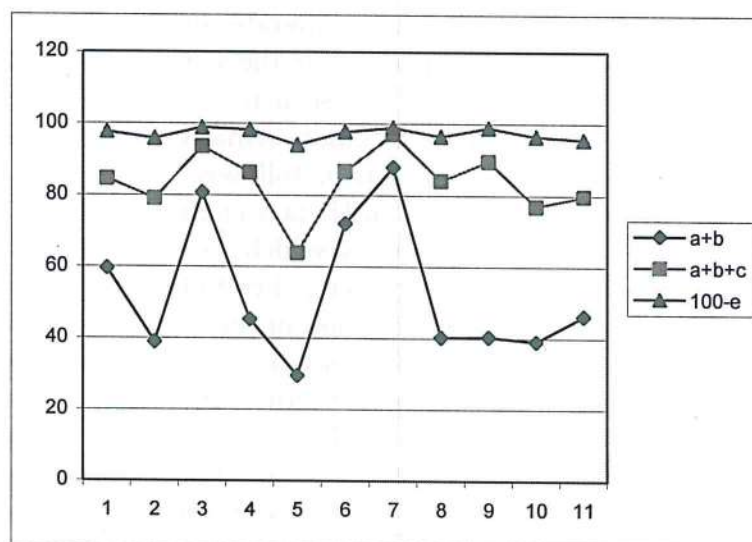
a – Percentage of Fully
b- Percentage of Toa Great Extent
c- Percentage of To Some Extent
e- Percentage of Not at All

NOTE: Graphs A and B are based on all values taken together.

Thus the survey showed that the following factors in the order of importance given below are mainly responsible for the poor image and performance of the police.

1 Actions under political influence/pressure
2. Corruption
3. Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.
4. Failure to enforce law, rules.
5. Professional failures/inadequacies
6. Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.
7. Links with criminals, antisocial and rowdy elements
8. Violation of law, rules, due procedures etc by police officers and men.
9. High handedness and violence (use of third degree and related issues) of police
10. Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority
11. Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.

A look at the graphs (A) & (B) will also show how these factors have relatively similar higher values in both the cases.

On the issue of a more pro-active role for police, the issues which received more first preference responses, in order of priority, were management of public grievances/complaints, location of missing persons, vehicles, and property, prompt supply of information on issues of importance to public like emergencies, accidents and other calamities, traffic problems and parking, women related issues and family problems, help to the weak, old, poor, illiterate, suffering, etc. If the first, second and third preference choices are taken together, more or less the same pattern emerges. Hence, it is clear that the public want police to be more responsive to public grievances and complaints, location of missing persons, recovery of lost property, vehicles, etc, prompt supply of information about accidents, emergencies, traffic problems etc and deal empathetically with issues relating to women, children and family, render help to the poor, weak, old suffering, illiterate, etc.

On the issue of priority of police functions for the common man, the first preference was for law and order followed by crime, security and service areas. If the first, second ad third preferences are taken together, crime comes first as in all developed countries were law and order is stable, followed by law and order, security and service areas. Priority for law and order is a fact in the current Indian scenario mainly because of the law and order issues, which regularly affect common man's life in many areas prompting people to prefer police to play a greater role to make the situation normal so that they can pursue their normal life.

29.2% respondents felt that improvements in social skills, responsiveness and transparency would fully help the police to improve their service to the common man. In addition, another 35.7% and 9.2% felt that it would help 'to a great extent' and 'to some extent' respectively. Hence, it is clear that over 64%felt that improvement in social skills, transparency and responsiveness is essential to

improve quality of police service and thereby police image and public satisfaction of police work. It may be added that earlier studies like the one on **Establishing Success criteria and Baselines for performance in relation to Social Skills, Transparency and Responsiveness of Indian Police** (Prof.R Ravikumar and Prof.S .S. Vaidyanathan-UNDP Project #IND/95/007. I. M. /Bang/99) had shown the same results. It confirms that these are the three areas where the police hierarchy, especially those in charge of police training, should focus on to improve performance and image of police.

The main suggestions made to improve the **Social Skills** of police were identification of those, particularly at the cutting edge level, with poor social skills and training to them to change their attitudes to public and behavioural patterns, use of better communication methods including multi-media, audio-visuals, role plays, net working etc, supply of more information to the public on issues of general concern, progress of cases and other complaints, more transparency through interactive web-sites, broad band connections,email,cell phones, discussion forums, seminars, etc.More fair and open dealings ,weeding out candidates with negative psychological attitudes during recruitment, regular interaction with the public and better and quicker methods for redressal of public grievances were the others. In many of these like communication through emails, interactive websites which can provide information on matters of public concern, discussion or chat forums, more transparent and dynamic information systems, faster redressal of grievances (eg.single window systems), regular interaction with the people, etc., I T has a very prominent part to play. Some of these are not possible without tools of I T.

Suggestions to improve **Transparency** included use of websites to supply forms and other documents needed by the public, to register complaints and monitor their progress, customer service/public relations desk with computer based information for the public, issue of press notes and releases on sensational cases and other items of public concern. Facilities like email, Bulletin boards, discussion forums, chats, etc., through which the public can raise police related issues before local police officers, regular video-conference by the dist S.P., public display in websites and before local police offices in local language about procedures to be followed in various police related matters, rights of the accused, complainants etc, prompt responses to all public grievances, write –up in local news papers, etc.were also suggested to improve transparency. Most of these are possible only through I T showing clearly how I T could improve transparency in police working if the police hierarchy is keen on doing so removing the shroud of secrecy surrounding many police matters.

Various measures suggested to improve **Responsiveness** were computer based systems that could information to the public on matters of public concern, good networking including intranets with access to all police personnel to provide up-to-date information, circulars, manuals, etc, notebook and mobile computers with secure wireless connectivity to the main data bases and systems on a need to know basis for field officers, I.Os etc, an effective email system for police, use of websites and their regular updation, I T based systems to follow up complaints, progress of investigation or enquiry into complaints, help lines, monitoring systems for accidents/emergencies, issue of news letters, press handouts etc on all important

matters concerning the public etc.Others include use of Geographical Information System, thematic mapping of police stations, closer supervision and better monitoring of delivery of services by senior officers, better feed back systems, facilities to answer online questions by the public and genuine concern for the weaker sections, minorities, women and children, the old, weak, aged and the poor. I T is an essential component in most of these.

Suggestions to improve intelligence work using I T included creation of databases of different types in all functional areas, data analysis using data warehousing and data mining technologies, use of web/digital cameras for monitoring, indexing of all names of interest, use of performance monitoring systems, use of internet for browsing for details of interest, email monitoring, use of local area and wide area networks, recruitment of more technical personnel, use of MIS, GIS, GPS, etc. Computerized monitoring and bugging systems, interpretation of various related pieces of information using visualization and other knowledge management techniques, Net working including usage of Virtual Private networks, intranets, dynamic cipher systems, online updation facilities etc were the other important ones.

Similarly, suggestions for improving security work, particularly of VIPs, and vital installations included use of automated computer controlled video surveillance equipments, digital cameras, close circuit T Vs, net working, use of smart cards, biometric security devices, computerized cipher systems, faster intelligence sharing among different security and intelligence agencies using I T, faster storage and sharing of photos and other details of suspects, satellite monitoring systems for sensitive areas, computerized surveillance systems, use of virtual private networks and dynamic cipher systems,etc. I T has a prominent role to play in most of these.

The problems, which were highlighted in relation to introduction of I T in police work in order of priority, were need for large-scale training of different types (hard ware, soft ware, application packages, basics of computers,) and lack of capable trainers, low level of awareness about I T both in senior and junior ranks, lack of management commitment, prejudice about desk work, use of gadgetry etc, shortage of funds, non- availability of suitable application packages, infrastructural problems about power, connectivity, manpower and office space, maintenance, low level of literacy among cutting edge personnel, resistance to change and change management, fear of loss of jobs, shortage of staff, problems of security of information, poor state of records, internal rivalries, lack of coordination, lack of knowledge of English, lack of will and priority for I T, poor work environment, bureaucratic procedures and even political interference .Of these, training related issues, funds, infrastructure related ones, ,resistance to change and change management, poor records, security issues and development of suitable soft wares are important and need to be systematically tackled if improvements using I T are to take place. Other major essential requirements suggested included restructuring of the organization, improvement in communications (both internal and external), and development of basic skills of data entry, communication and other skills by on the job training or e--learning techniques to the cutting edge level /operational people to develop confidence in handling such systems. As seen from the e-learning system in operation in Karnataka and training in women related problems in Tamil nadu, it

would be possible to achieve the desired results if systematic well-motivated officers make efforts with proper monitoring and follow up.

To the question if too much hype is being made about use of I T in improving governance, 15.6 % felt it was fully correct while 15.9 % felt it was correct to a great extent and 24% felt it was correct to some extent. 21.3 % felt it was not so and 15.1 % did not respond. The reasons given for the hype are too much talk about I T without the public really experiencing results except in spheres like railway and air reservations, lack of exposure to I T, low levels of literacy, absence of regional language interface and user friendly systems, prejudice of police officers to technology and desk jobs, slow speed at which I T is being introduced and lack of seriousness on this front except in a few states like A.P., Karnataka and West Bengal,. From the above, it was seen that a substantial section felt that, at least to some extent, hype on use of I T existed. If police and other organizations are to accept I T, this attitude, which causes resistance to change, has to be changed by suitable motivation, introduction of I T in stages, familiarization and training at all levels.

Instances of successful use of I T mentioned were better records management, matching of fingerprints, photos and property, crime and criminal information, portrait building pay roll,etc systems of NCRB, digitization of finger prints, use of I T based methods in the investigation of sensational cases, Crime mapping, security of vital installations, accounting and personnel management packages, GIS, Interactive websites, matching of missing persons and unidentified dead bodies, on line registration of case/complaints,tele and videoconferencing ,wide area networks, biometric systems, computerized Modus operandi systems,etc.The survey revealed the inadequate knowledge of I T and its capabilities, and very low level of use of I T in governmental systems even now. In such a scenario, considerable familiarization training, gradual introduction of I T applications and proper monitoring would be basic requirements to achieve optimum results.

The possible benefits, which were mentioned, were related to better communication, faster and better investigation, faster reporting, more efficiency, better decisions, better supervision, savings in time, improved office and records management, better follow up, easier access to records, more transparency, etc. The survey showed low levels of understanding of the relevance and benefits of IT in the police hierarchy and also the government officers in general.

The suggested priority areas for computerization in police were handling of public complaints and similar service areas, matching of missing property, vehicles etc with recovered ones, and missing personnel with unidentified dead bodies, digitization of finger prints, photos, etc, records management, training of officers and men, better communications and net working, traffic management, tele and video conferencing, management of natural calamities, emergenices and accidents, office automation, internet applications like email, web site management ,etc.

The summary of survey results in respect of image of performance in police at district, state and national level, factors contributing to bad image and performance, views of male and female separately on the above two issues and also the views of different age groups are given in tables below:

General Performance and image of Police:

Levels	Very good	Good	Satisfactory	Poor	Very poor
District	20.5	35.4	33.0	9.5	1.6
State	12.5	38.8	35.8	11.2	1.7
National	7.3	22.5	48.9	18.9	2.4

Views of Non Police Respondents

Levels	Very good	Good	Satisfactory	Poor	Very poor
District	6.73	24.24	43	21	4.7
State	3.9	19.5	45	27	5.3
National	1.45	15.94	42	34	6.5

Views of Police Respondents

Levels	Very good	Good	Satisfactory	Poor	Very poor
District	23.0	40.0	30.2	6.2	0.6
State	15.2	44.7	32.7	6.8	0.6
National	9.1	24.5	50.9	14.4	1.2

Views of Male Respondents

Levels	Very good	Good	Satisfactory	Poor	Very poor
District	20.8	35.5	32.7	9.4	1.5
State	12.7	39.0	35.4	11.2	1.7
National	7.5	22.5	49.1	18.6	2.3

Views of Female Respondents

Levels	Very good	Good	Satisfactory	Poor	Very poor
District	14.5	32.3	38.7	11.3	3.2
State	9.7	33.9	41.9	12.9	1.6
National	3.3	23.0	45.9	24.6	3.3

Views of Respondents Age group wise:

Below 25					
Levels	Very good	Good	Satisfactory	Poor	Very poor
District	15.4	7.7	46.2	30.8	0.0
State	0.0	8.3	58.3	25.0	8.3
National	0.0	16.7	58.3	16.7	8.3

26-40					
Levels	Very good	Good	Satisfactory	Poor	Very poor
District	17.4	33.3	35.7	10.8	2.9
State	11.2	34.8	36.9	14.2	2.9
National	6.1	21.8	45.9	22.7	3.4

41-60					
Levels	Very good	Good	Satisfactory	Poor	Very poor
District	20.3	38.0	32.2	8.6	0.9
State	13.7	41.5	34.4	9.5	0.9
National	8.2	22.7	50.5	16.9	1.6

	Above 60				
Levels	Very good	Good	Satisfactory	Poor	Very poor
District	12.5	37.5	37.5	12.5	0.0
State	0.0	50.0	37.5	12.5	0.0
National	0.0	37.5	37.5	12.5	12.5

The contribution of various factors for the poor or unsatisfactory image are tabulated in table.. ...

	Fully	To a great extent	To some extent	To a little extent	Not at all
1 Actions under political influence/pressure	10.6	38.3	30.1	14.4	6.7
2. Corruption	4.2	22.3	42.5	20.0	11.1
3. Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.	12.9	38.5	27.5	12.3	8.8
4. Failure to enforce law, rules.	7.7	25.4	42.7	16.6	7.6
5. Professional failures/inadequacies	4.8	16.5	29.5	30.2	19.0
6. Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.	14.8	35.3	24.3	11.9	13.7
7. Links with criminals, antisocial and rowdy elements	19.3	39.5	21.1	10.4	9.8
8. Violation of law, rules, due procedures etc by police officers and men.	5.5	19.3	38.6	22.1	14.5
9. High handedness and violence (use of third degree and related issues) of police	6.4	21.1	42.3	19.4	10.8
10. Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority	5.0	15.4	37.6	30.7	11.3
11. Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.	7.3	20.3	35.4	24.0	13.0

Chapter 7 - COMPUTERIZATION EXPERIENCES

– SOME CASE STUDIES

(INDIA AND ABROAD)

Case I - New York police's Crime Statistics

'Comp stat' - Weekly detailed crime review of New York police- reviews crime scene in all precincts/boroughs/city wide, facilitates changes in strategies/plans, shift of resources, ensures accountability, etc.

'Comp Stat' is a fully computerized and detailed crime review/statistics for each precinct or borough and the city as a whole. It is automatically generated and available on New York Police's website (www.nypd.com) to enable immediate analysis and corrective action by all concerned. Till a few years back, New York City had the reputation of a city prone to frequent crimes, esp. of the gang types. However, in the recent years, the crime statistics and the overall situation have shown considerable improvement. The principle of taking care of minor crimes to control more serious ones and using the linkages of petty criminals to trace bigger 'sharks' were successfully utilized by Police chiefs and the former mayor Guilianni to control crime and to improve the overall situation. 'Compustat' is today being effectively used by New York Police to watch crime scene very minutely, hold area officers accountable, effect changes in plans /strategies, shift resources where necessary, focus on new issues and trends and maintain good control over trouble spots.

'Compstat' is essentially used to review the situation in weekly meetings of officers in charge of different Precincts (equivalent to police stations), Boroughs and other command staff. It is also useful in comparing the weekly figures with cumulative figures for the previous 28 days and for the year till date. Those areas, which have shown an increase compared to the previous period, appear in gray colour (with those which have higher figures heading the list) to enable better concentration on such areas. The following are other features of the 'Comp Stat'

1. Each precinct, borough or city as a whole gets a figure, + or - showing the % change, in the scenario in comparison with the previous period.
2. Ranking of Precincts in the city as a whole and also with in boroughs and among boroughs for all crimes is also done. This is followed by separate analyses for all complaints and arrests, murders and arrests,, rapes and arrests, robberies and arrests, assaults and arrests, burglaries and arrests, larceny and arrests, other complaints and arrests, shootings and arrests, etc.with precincts with higher figures figuring at the top.
3. Murder, rape, robbery, assault, burglary, larceny, shooting, and other cases are then compared with corresponding periods of two previous years and the % change worked out. Such comparisons are also made for the figures of the

previous 28 days and the year to date also. Percentage changes vis-à-vis those for the 2 previous years and 10 years are also worked out.

4. Similarly, arrests for all crimes under the above categories are also worked out on the above lines. There are similar figures for summons (parking. moving and other crimes) and warrants also. Figures for felony, misdemeanour and other violations are also worked out for the city as a whole and then separately for each borough and precinct. Comparisons with the figures of the corresponding periods of the past 2 years, changes in comparison with those for the previous 2 year and 10 year periods are also done.

5. The same statistics are given in websites of the city, boroughs etc for the public to see and ask questions thereby ensuring transparency. One notable feature is that the 'Comp stat' figures are automatic and online and come out of the day to day registration of cases, complaints, arrests and other police measures which go on in the normal course and no extra work or time is needed to produce these.

During internal discussions, officers in whose areas crimes have increased have to explain the actions taken by them, being planned etc and then changes in plans, strategies etc evolved. As other officers are waiting in the wings to take over command from those who are under performers, there is competition among those occupying command positions to perform and produce better results.

Hence, it is only computerization which can promptly bring out such precise and online figures for the whole city or any part of it giving any detail required in respect of any case and comparisons with different time periods of the past as may be considered necessary.

Case II-Sacramento Police-some features of its working with focus on 911 Control Room and Mobile Computers

Sacramento is the capital of California State whose Governor now is Arnold Schazenwagger, hero of the 'Bay Watch' serial and movies like 'Terminator'. Sacramento, has a population of approx. 2 lakhs. The city police are now changing over from radio communications to Mobile Data Computing in their patrol cars. The city police has 220 cars, each of which is quite rugged costing about $ 50000.The computer systems being fitted are also quite rugged ones received from U.S. army sources. The cars run about 30000 miles /year and last for over 3 to 4 years when they are replaced to ensure reliability.

The city police operate basically through patrol vehicles controlled from 2 centers.. Thus, including the office of the Chief of Police, there are only 3 offices for the police in this medium sized city. The cars are operated through master keys and patrol officers get available cars when they report for duty. Normally, only one 'police officer' (the lowest rank) will be available in a patrol car, but he is always in regular touch with the control room, which also knows his exact position and cars

near by because of the use of GIS and GPS in cars. In addition to the personal weapon of the officer, there is an additional bigger weapon available in the car. Once an officer takes over a car, he enters his Id No., weapon No.,etc to ensure correct identity, keep the control room informed of his location on duty and for record.

The basic aim of computerization of patrol cars in the city is to deliver reliable information quickly to field officers. As the police officers are not very knowledgeable on computers, the basic approach has been to `Keep It Simple Stupid (KISS)'. The essential components of police computerization are Records Management system (RMS), GIS based Computer Aided Dispatch (CAD) system and Mobile Data Computers.

It may be is interesting to see the rank structure of the city's police. A Dy. Chief assists the Chief of police and under him there are 4 Captains who are responsible for **Operations** (meaning there by all field work by uniformed police), **Technical services, Investigation and Homeland security and Enquiry services.** The computer wing is under the Captain in charge of Tech services. The ranks below are Lt., Sergeant, Detective and Police officer. The Police Chief comes under the Sheriff of the area who is an elected person and could even be a retired senior police officer .A Sheriff may have a few towns and counties under his charge. Above Sheriff comes the Attorney general for the state. Various databases on crime, registration of vehicles, prisons, offenders, jails etc at the state level are in his charge.

In the cars fitted with Mobile Computers, Mobile Report Element looks after the query and search functions. It has a touch sensitive screen and where ever possible list boxes have also been provided so that the requirement for data entry is limited. Initially, an officer enters his Id.No, weapon No, password etc to prove his identity. Generally, the queries from patrols will be about warrants, vehicles or property. In respect of these, he is able to search various data bases like national level crime data being maintained by the FBI, state level ones maintained by the Attorney General, local confidential databases of police, transport dept., licensing authority, etc. The data out put of such queries, before going to the patrols, are carefully gone through by a section staffed by experienced field officers in the Chief's office to ensure that the information is actionable and that field officers are given what ever guidance is called for. This, (called data 'scrubbing') is being done to ensure accuracy of data so that no civil action comes up for wrong arrests, custody, etc.

The 911 or emergency services are also stationed in the chief's office .It has 3 groups of people working at any time .A few people working under a supervisor attend to **incoming calls** and enter data in the screens before them in a standard pattern. In cases where action is to be taken by some other authority, appropriate guidance is given and in such cases,a report may not be generated. Reports entered and followed up have regular serial numbers and these go to courts too. Once the call requiring action and follow up is over, it is automatically transferred to another section which **passes instructions to patrols or others in the field for immediate action**. This section is also manned by a few personnel under a separate supervisor

General of Police. All the police stations, circle and sub divisional offices are connected by wireless (VHF) and also through computers. Dial up facility exists in all offices for email, transfer of files etc..The details of Hardwares and Soft wares available in different offices are as given below.

Hard ware.

Dist Hqrs.   Sub-div./ Circle. / P.S.

Two servers, 2 Pcs
For S.P./Addl.S.P and 7 for DCRB,
Laser jet printers-3, a few web cameras and modems, 10 KVA UPS, Line printer-1, batteries, etc.

P.C-1, dot matrix printer-1, 0.5 KVA UPS-1, modem-1, batteries etc.

Operating Systems: *Windows 98/2000/2000 Advanced Server /XP.*
Application Software: SQL Server, Oracle 9i,Office XP, e-cops, CCIS, etc.

Computerization work

As part of the efforts to computerize the functioning of the dist police set up, it was decided in 2002 to take up computerization of Srikakulam dist as a 'pilot' project along with introduction of computers at police station level in Hyderabad, Vishakhapatnam and Vijayawada Commissionerates. The idea was that as Srikakulam is a remote area, the problems of computerization resulting from connectivity, power and other infrastructural items could be better understood and solutions worked out before introduction of computers in other districts.

Training: The training given for the officers and staff at the police station/circle/Sub Division level was basically about fundamentals of 'e-cops', the system for computerized operation of police services in A.P. and CCIS packages. Initially, 127 PCs were trained in e-cops as end users and 10 PCs as System Administrators. The I.O's and supervisory officers were not initially trained.However, later, at dist. Level, 3 Dy.SP's, 11 Circle Inspectors, and 57 Sub-Inspectors were trained.

Connectivity. All police stations have telephone connections, but , in rural areas, at times considerable delays occur to get the lines repaired. Such disruptions are not very common and do not seriously affect data transmission through dial-up as the numbers of cases being registered are not high.

Power. More than telephone connectivity, it is the power disruption, which has been a problem. The rural areas get power supply, on an average, for about 10 hours /day

only. Hence, despite the availability of U.P.S, computers have been breaking down.. But, as the average number of cases being registered per police station /day is only one or two, it has not been a serious problem though registration often gets delayed on this count.

Other infrastructure. The difficulties have been more in respect of other infrastructural support. There are 6 firms namely CMC, HCL, Wipro, E-Soft, Pioneer online, and RC-All Tech involved in attending to the software and hard ware problems. As most of them have no local representative permanently stationed at Srikakulam, problems have to be attended to from places like Vishakhapatnam, Vijayawada or Hyderabad.This has been causing a lot of delays, particularly as HCL has no local office to handle hardware related problems and spare parts have to be brought from Hyderabad. Sometimes, delays to the extent of one and half months have occurred in uploading of data from some police stations.

Other Problems There were also minor problems relating to motherboards, display cards, hard disks, boot-up, CD writer, modems and printers, batteries of UPS,etc.. In general, hardware maintenance has been a serious problem.

Use of Computers in police stations As most of the police stations are in rural areas only, generally the same pattern is followed in all. All CCIS forms like FIR, Arrests, Property, Crime and Final Repot/Charge Sheet are being entered. General Diary, some police station Registers, Case diaries, some returns are also in computers. Some instructions of supervisory officers are being issued thro' email which is in regular use.

Some police stations have started building up local databases. In each police station, 2 constables have been trained who generally handle computer related work. Some of the Officers-in-charge has also been taking interest in the use of computers. As Government was serous about computerization/e-governance, no criticism could be heard. On the other hand, it's facilities and advantages are being mentioned.

Benefits from computerization

As the public are not aware of the 'e-cops' and its relevance for them, they are not utilizing the facilities. A case registered in one police station can be traced at any police station or senior officers' offices and its current status can be seen. The scope for malpractices in FIRs like delayed registration and manipulation of contents has come down because of the need for regular transfer of FIRs to District Police Office. Better transparency, reduced dependence on officials for routine data, faster grievances handling, ready availability of details of crime and criminals and missing vehicles and persons, expeditious follow up on current cases, quicker results and better relations with the public are the visible benfits of computerization.

Monitoring of the cases for senior officers is easier as CD's are available on line. This has improved crime related work and documentation in general. The

investigations, particularly of grave crimes, can be monitored easily and instructions passed on to effect improvements in investigations.

For the department, faster exchange of critical information within and outside, reduction in paper work, better use of human resources, easy access to information, better work flow and coordination, vertical integration, instant system wide alerts, better morale, efficiency etc are some of the other benefits.

Suggestions Experiences in the District have shown the need for training of all I.O's and supervisory officers in computer related applications and data entry. To improve use of computers for investigation and maintenance of records, it is also necessary to effect changes in the attitudes of officers and men through appropriate training programmes. At present CDs are written in hand which are then entered in computers resulting in duplication of efforts and waste of time. There is no facility to incorporate sketches, scene of crime reports etc. prepared by investigating officers.

It is also necessary to increase the RAM and capacity of hard disks to avoid system delays when the sizes of databases go up.

In general, the impact of computerization has been good though many parts of e-cops are yet to be implemented. The public would derive the benefits only when their access to computer and capability to use it improve. This experience has given many lessons to the Department to better implement the computerization project in other districts.

Case V- Delhi Traffic Police.- Efforts to computerize traffic control system

Delhi is one of the most rapidly expanding metropolitan cities in the country with a vehicle population of over 35 lakhs for its 1.32 crores people (in 2000). The one vehicle /family in 2000 is expected to go up soon to one vehicle /2 persons. The higher levels of pollutants like carbon dioxide, sulphur dioxide and suspended particles in the air are primarily related to road traffic and increasing congestion. The Supreme Court, taking note of these, had asked the traffic authorities for proper management and control of traffic.Modernization of traffic control system, on an experimental basis, was considered a logical step to meet the needs.

It was decided to try a state of the art computerized traffic control system in use in places like Singapore, Hong Kong, and Beijing in Delhi for the first time in India. Though international studies had shown considerable reduction in travel time, travel cost and environmental parameters, it was considered necessary to evaluate it in several unique traffic requirements in Delhi like mixed traffic, delays and environmental degradation. An area comprising of 44 intersections in NDMC and MCD involving major roads like Mathura road, Connaught Place, Ring road, and Jawaharlal Lal Nehru Marg was selected for the purpose

The computerized Area traffic control system for signals based on actual traffic flow data being tried is a fully responsive one. It is called Split Cycle Offset Optimization Technique (SCOOT). It is a method of coordination that adjusts signal timings in frequent small increments to match the latest traffic situation. Data from vehicle detectors located on roads are passed on to a central computer through controllers (36), which are connected through 12 Pairs of telephone lines to the control room at the Teen Murthi traffic lines. The control room has a Digital Alpha computer, linked via a Terminal server to GUI (graphical user interface), printers etc, connected to a console terminal and a system status (alarm) panel. A communication cabinet linked to modems (8), Front End processor, power supply etc is also connected to the alpha computer via Ethernet network.

Based on the inputs received from field detectors on the road traffic flow characteristics/parameters, the most appropriate signal plan will be selected from a library of plans stored in the computer. SCOOT adjusts timings of signals in frequent, small increments to match the latest traffic situation after a central on line computer analyzes data from the vehicle detectors embedded on roads. The timings are predicted to minimize congestion. The SCOOT calculation programme (kernel) is superimposed on the fixed time system to adopt them to traffic conditions which are coming from the vehicle detectors located upstream of each signal stop line, usually just down stream of an adjacent junction. The SCOOT kernel uses a computer model of the real time traffic network to constantly calculate optimum signal settings. For short-term variations, it makes small changes and longer-term trends are satisfied by the accumulation of small alterations over several minutes.

The task of optimization is divided into three: optimization of cycle times, green splits and offsets. For the benefit of cycle time, a group of nodes are combined together for a common cycle time and as traffic demand increases, SCOOT increases the cycle time automatically taking the optimum cycle of the most critical node as the regional cycle time. SCOOT records the patterns of traffic entering each link during each cycle of up stream signals (cycle profile). When most of the traffic on a link is discharged from one particular stage at the upstream junction, the profile will show a marked peak during one part of the cycle indicating a platoon of vehicles proceeding down the link. SCOOT will attempt to coordinate the down steam node so as to give green signal to the platoon of vehicles taking into account the platoon dispersion. As it won't be possible to give perfect coordination for all platoons, the SCOOT will choose reduction of total delay as the basis. It uses the cycle profile of detector occupancy as the basis for all its calculations. It calculates the given length on each link, no .of stops and degree of saturation. From these, it calculates the measure of efficiency of operations of each link (known as P.I. or performance index). It also stores the average occupancy of each detector and uses it as a measure of congestion of each link.

Split optimizer. In free flowing traffic conditions, the split optimizer attempts to balance the degree of saturation on all approaches to a node subject to constraints of minimum green time. When demand exceeds capacity, SCOOT attempts to balance

queues to prevent upstream queue blocking. It is possible to weight a particular approach link so that it will be more saturated than others .It is also possible to nominate one down stream link as a main exit link such that if it gets blocked, SCOOT reduces the upstream green time to reduce the amount of traffic entering the congested area.

The cycle time optimizer runs every few minutes and can change the re green cycle time in steps of 4 secs either way. It chooses a cycle time that would keep the most heavily loaded links at or near the 90% saturation thus running the most critical junction at its optimum cycle time. If one link is over 90 %, the cycle time is increased and if all are below 90%, it is reduced. It also calculates the optimum cycle time for each node and if any is at half cycle time, then it would be allowed to double the cycle. But, switching between cycle time and double cycle time too frequently is avoided to prevent a major disturbance in the network.

The offset optimizer runs during a predetermined stage at each node. It calculates an efficiency index (delays, stops and congestions) for offsets a few seconds either side of the current offset and choosing one with the lowest PI. If SCOOT detects congestion on a link, then it is weighted to contribute more to the PI in inverse proportion to the link length. Thus, if a short link is congested, SCOOT gives it priority for good coordination. It is possible to permanently weight a link if good coordination is important.

SCOOT's features include:

1. Public transport priority through Vehicle locator systems
2. Online model storing and updation of information on flow profile, queue data, degree of saturation and congestion,
3. Three optimizers- 'split' for relative stage duration, 'offset' for improving coordination along links and 'cycle time' for a region which is updated every few cycles.
4. Full detector monitoring
5. Numerical and graphical output on delay, queues at green, flows and other messages are available on link, node or region basis.
6. Online parameter changes,
7. Facilitation of use of "demand dependency" within SCOOT by feeding status of traffic lights into the scoot prog.
8. Gating or action at a distance method of restricting the flow of traffic into a congested area etc and
9. Congestion offsets and use of other links congestion information.' It is seen that signal coordination saves 15 % of travel time.

The central computer system controls signals by selecting and implementing the principal timings for each signalized intersection in the network. These constitute the timing plan for the intersection and comprise the cycle time, the phase splits and the offset (time difference in the starting times of the coordinate green phase of adjacent intersections. A control is implemented by the system transmitting to the controller

each second a request to run a particular traffic stage. A stage may comprise of one or more traffic or pedestrian signal phases, which are run at the same time.

In SCOOT, operator intervention can be done in emergencies or unforeseen situations. CCTV monitoring, public display systems etc are also possible. Scoot uses vehicle detectors to measure traffic profiles in real time and the loops are placed at the upstream end of the link to obtain the profile of the vehicles approaching the node. The latest version of the scoot also utilizes information from the next links at each exit from an intersection thereby providing the benefit of stop line data at a node.

If system, after pilot studies, is selected it will be a quantum jump in computerization of traffic control in India which could be followed by other cities too. Days may not be far off when our cities could emulate cities like Tokyo to improve traffic management in metropolitan cities, which are bursting at their seams due to fast increasing traffic load and consequent high pollution levels. Computerization will definitely mean saving of time, fuel cost and lesser pollution.

Case- VI Tamilnadu

Web- Based E-Training Programmes in Dispute Resolution, Interviewing and Record Keeping For Women Police Officers Dealing With Women Related Cases.

1. Police stations manned exclusively by women police officers to deal with women related cases like demands for dowry, wife's murder or suicide resulting from such demands or extortions, family disputes, marital problems, false promises of marriage, sexual assault, rape, and kidnapping were based on the acceptance of State Women's Commission's Recommendations to that effect. The first one was opened in the 'Thousand Lights' area in Central Madras on April 13, 1992 and the number gradually went up to 188.

2. A study conducted into the problems of domestic violence showed that the women police stations were not performing with the efficiency possible of them due to inadequate knowledge in this specialised field, insufficient training in interviewing and counselling, etc. Support from social workers and psychologists were very little. Record maintenance in such police stations where 80% of the work related to women related problems needed drastic improvement, as all details needed for analysis of such cases were not being brought on record. More than the normally required time was also being taken in investigation of such cases. As it was not possible to train them in regular professional centres, it was decided to organise web-based training generally at their own places of posting and at their own pace and time.

3. To improve the maintenance of records, it was considered necessary to computerise their records (including administration records) with the capability to fully document each step. Capability for referrals to professionals, evaluation of risks, guidance on legal and procedural issues and ability to track from enquiry to final stages was also included. The documentation system developed called "Contact Sheet" contained a detailed questionnaire, a danger score sheet to

assess the risk and take prompt action in risky cases and facilities for all types of reports needed. An investigation manual was also built into with out any change in the procedures being followed.

4. Queen's Award of 15,000 pounds from U K was made available for a new web-based training for 30 officers selected from Chennai, Coimbatore and Madurai to give a wide geographic coverage and taking into account availability of Internet facility. Majority of the officers had good working knowledge of English as 50% of them were postgraduates and 20% of them were graduates.

5. The technique used was making available on a web created for the purpose 6 modules of domestic disputes resolution and counseling. A database (called "Contact Sheet") was also developed for processing cases of disputes and violence. Skills for data entry and management were taught in their own offices. An enhanced interactive computerized course in dealing with petitions of domestic disputes and domestic violence, a user guide to help them in dealing with different varieties of domestic violence and a revised investigation manual for crimes against women were thus the major components of the programme.

   It was proposed to use officers trained in the project as additional resource personnel for further training.

6. Shri K. Radhakrishnan, IPS, then Deputy Director /Training (and now Inspector General/Vigilance and Anti Corruption), Tamil Nadu was selected as its Project Director. Prof. Mangai Natarajan of the University of New York was the Project Consultant and Evaluator with a training team from a NGO ('Crime Prevention for Victim Care') with some criminologists, prepared materials for the programme. It was felt that once a complaint was filed with the police, reconciliation between the parties without going to the court should be tried first failing which only registration of case should be taken up Hence, several Counselling sessions became an integral part of the procedure to be followed before taking action in the court against the offending party. Training in interviewing and counseling, support from social workers and psychologists, computerized record maintenance for keeping full data about such cases, proper analysis etc were also essential. Enabling women police officers to make decisions about the best way to proceed was also needed.

7. Though western models were adapted for the dispute resolution package, they were tailored to the needs of the local culture of disputes. 6 Modules (Introduction to domestic/family violence, DR techniques, Basics of negotiation, Basics of mediation, Basics of arbitration, Counselling approach to interviewing) were included. Meaning of Private and Public Violence, Differences between domestic disputes and violence, impact of domestic violence, nature and types of family/domestic violence, behavior patterns of abusers, characteristics of women victims etc were covered. In DR techniques, negotiation and arbitration in various forms of disputes and importance of alternate dispute resolution were covered. In Counselling, objectives, major ingredients, theoretical approaches to counseling and helping, methods of counseling and helping, basic counselling skills, tasks and conditions for counselling, ethical issues, characteristics of counselor etc were covered as these would help in better handling of petitioners who are emotionally distressed. Counselling approach would also help the

petitioners and counter petitioners to resolve disputes amicably. It also helps women police to identify the cases were professional counseling is required.

8. In interviewing skills, a sequence of practical sessions that covered basics of counseling, human behavior and development needs, self awareness and self esteem, attitudes and personality requirements of a counselor, skills in interviewing and listening, stress, anger and time management, martial and family counseling, networking, introduction to dispute resolution, negotiations, case studies and role playing and dilemmas in using dispute resolution techniques in police work were covered.

9. The Data management system was designed to incorporate the intricate details of petitions or information coming about the cases in preliminary interviews with the petitioner and accused. Earlier when a case was resolved, only the date, petition number, names and addresses, and a few lines about the outcome in large ledgers were only_written. Even senior police officers were not able to get the required details of the petitions or cases registered. Methods to identify high risk cases, a list of references and crime investigation guides and documentation of every action/case, guidance to officers to track the case from inquires to the final stage etc. were also found essential. Since 80% of the time of women police stations was spent on such matters, a standard database system to incorporate all crime investigation documents (except a few like inquest reports, seizure statements, observation statements which are prepared at a scene of crime) was adopted with case diary files available in electronic and hard copy forms. The **administration records** of the women police stations viz. Nominal roll, Attendance register, General Diary, Sentry relief book, Duty roster, Message book, Memo book, Cash book, Inspection book, Extra time remuneration register, Diet bill register, Arms issue register, Tapal/mail book, and Property register were also computerized.

10. **The Petition Enquiry system**: It has databases on Victim information, Abuser information, Witness information and I.O's disposal. It is also provided with pop up/help menu for definition of terms, legal sections, etc. a handbook on legal issues and directory of service providers like de-addiction centers, counsellors, hospital and legal aid centres, shelter homes, NGOs, etc. Eventualities like follow up, referrals and disposals are built in. The state of the art case management system can track victim/abuser information across districts, thousands of files etc.

11. Data entry for petitions consist of Petition receipt, Petition details (with annual serial no), Petitioner details, complaint (information about counter petitioner given by the petitioner) in one of the 3 types namely general, pre-marital and marital, abuse, history of abuse, violence, referrals, victim statement (only items not otherwise covered), counter petitioner statement/s, witness statements, follow up, enquiry disposal, disposal details (entered by I.O). There is a provision for reopening of a case earlier disposed of .A Current register keeps records of papers received from higher levels and from here it is possible to link up with existing records from petition enquiry register. A counselling register keeps details of those referred to professional family/marriage counsellors. A compromise follow up register keeps record of follow of such cases. An 'Sridhan'

register keeps details of restored 'sridhan'. A Help line (for child and woman) notes details of calls received and action taken thereon.

12. _In the **Investigation Part**, provisions for the following exist.

1.F I R, 2.C.D., 3.Statements, 4.Medical Memo5.Post mortem Examination Register, 6.Report accompanying the Post mortem Exam. Requisition, 7.History of the Case, 8.Death Report, 9.Arrest Card, 10.Arrest Intimation Memo, 11.Remand Report, 12.Property Recovered/seized, 13.Remand Extension Report, 14.Letter to Magistrate (for sending physical evidence, chemical evidence, F.Ps, etc for forensic, biological ballistic, etc exam), 15.Letters (to D.M.RDO, Tahsildar, RTO, MVI, Social Welfare Officer, P.M.Doctor, Medical College Dean, RMO, etc), 16.Case Progress (till finally disposed of in appeal courts), 17.Final Reports, 18.Memo of Evidence,19.List of Documents,20.F I R Index Register,21.Prisoner Search Registwer,22.Process Register,23.C.D File Upload for external documents(inquest reports, observation statements at the scene of crime, sketch of the scene of crime, statements about properties seized, etc made outside the P.S. and are uploaded to the C D file).

There is a provision for C D file review to see any part of the C D file and a Multiple Choice Analysis by which a variety of reports can be generated making the analysis job easy. It is useful for analysing the age group, place, type of problems etc, which cause serious incidents like suicides, areas and timings where eve teasing is more, etc.

13. **Reports have** facilities to print 1.petitioner Enquiry report, 2.counter petitioner statement, 3.witness statements, 4.disposal, 5.follow up, 6.monthly reports, and 7..Yearly reports. The **Legal assistance covers** details of all-important crimes against women with all related parameters.

14. For evaluation, the "Action-Research" model pioneered about 50 years ago by Kurt Levin of U S was used. The evaluation plan consisted of two parts 1) Process evaluation and 2) Impact evaluation and the project consultant Dr.Natarajan was the Evaluator. In the process evaluation, the process of performance delivery including whether the training programme was delivered properly, does the training address the needs of trainees and the problems encountered during the delivery of training were studied. A variety of data collection methods like interviews with trainees and petitioners, observations of handling of cases, test scores, hours spent in the use of computers in learning and entering data and review of contact sheets, training modules and class room sessions provided by external sources including faculty from the university's social work department and lawyers who provided training in interviewing and D R techniques were used. Initially, most of the trainees were not used to computers or use of English language. Once the modules were translated into Tamil and posted on websites, the trainees were informed by email and telephone. In addition to delivery of lectures on different modules for a week, 'Crime prevention for Victim care' teams visited the sites to answer questions.

15. Impact evaluation was meant to see the theoretical knowledge and application of dispute resolution techniques, counselling, data entry and management. In the post -training /on the job review of the impact of training, it was found that the trainees actually developed all the skills expected of them and also maintained records in computers proving that, if professionally managed, use of I T for training in police and record keeping was very much possible The system was very user friendly and provided for data analysis of all types about Preliminary enquiries, Investigations and Police station administration.

16. The `Contact Sheet' included fields for background of the petitions, places and parties involved, provisions for risk assessment in order to discuss need for proper care with a   score sheet enabling calculation of risk of injury or death. This was to help officers to record the seriousness of a case and enable a speedy decision to help those with high-risk levels. Computerization was also meant to keep electronic records and generate information for statistical reports for supervisors/ policy decisions. Any documents including, handwritten, paper documents were scanned and   kept with the petitions.

In conclusion, it may be mentioned that it was a very successful initiative to motivate and give web-based training to a group of field officers to enable them to function better using capabilities of I T.The computerization of all records of such police stations (petition enquiry, investigation, station administration, etc.) providing for all reports, though simpler compared to general police stations, can be a model for similar efforts elsewhere. But, the care taken in pursuing various steps, regular monitoring and expertise mobilized to make the experiment successful are worth following in respect of similar ventures elsewhere.

Case VII - I.T. use for investigations –Canadian experience

A survey conducted among investigating officers after stabilisation of the applications for investigations in Canada showed that they were happy with the availability of real time information and rapid information exchange with Jail, Correctional services, Justice dept., and international police organizations made possible by computerisation. Saving of time, greater autonomy, use of internet by all for email, address, building and general information searches, faster and better communication with the outside world, direct communication with the management and intranet for internal communication were the other benefits.

Electronic listening, digital photography, Photo galleries, GPS, Video technology etc were very useful for investigation. But, use of digital photography, which was yet to be fully recognised by courts, however, was very useful to identify victims and help witnesses. Use of GPS for tracking vehicles showed impressive results. Interrogations taken on digital video were a breakthrough in serious cases to review their own performance, see body language, etc. Details of different gangs could be searched in respect of cycle gangs, South American gangs, and organised

crime gangs though there were doubts about the quality information received. Investigation officers felt that the Mobile computers had given them the capability to move with their offices and some of them were entering reports directly from vehicles.

Many I.O s were, however, not interested in updation of files with details with from investigations as they felt that it was a waste of time involving complicated and bureaucratic procedures. Hence, in some areas, the discretion on it was left to I .Os. There were doubts about security of entries, leakage of information and resultant damage to sources and as also doubts as to what details should be entered. As no standard data dictionary was available, Investigating officers themselves were deciding on it often keeping information with them. There was wide gap between what was possible and actual practice which was not in the overall interest of efficiency.

Compatibility between soft ware and technical tools was a challenge. At some places, connectivity between different emergency services was a problem. But, in London Police Department of Ontario, local dispatching, integrated file management, radio, voice and data communications and mobile computers in all patrol cars were connected in real time. Partly, the problems were caused by purchase of cheap systems and incompatibility resulting from competition among firms. Ideally, the employees, technical experts and Companies supplying equipments or soft ware should work together as a team to ensure integration of tools, systems, personnel and quality needs. But, it was not always happening.

The methods to deal with cyber crimes were still evolving only. Hard disk analysis, surfing, electronic monitoring of Internet and participation in chat groups were in use. Multi-disciplinary teams were found desirable. Need for good cooperation of crime analysts, Internet service Providers (ISPs), Telephone companies and international police agencies etc was being felt. Some reluctance to share information to police by ISPs was some times visible though in cases of child pornography, cooperation was available. But, lack of I T in legal forums was a problem. Courts were not initially equipped to give even copies of CDs and police had to do it which was an additional burden. In many cases, I.Os had to be open to an evolving world and some were learning the technical capability needed for good investigation from private companies. Training programmes that didn't teach too much in too little a time were required for many investigating officers. Systems to transfer Investigative experience were also needed.

Case VIII - Impact of I T on police practices in Australia.

In Queens land police, a survey was conducted to assess extent of use, time spent on I T system, sense of competence with I T, exposure and satisfaction with training, views on ease of use, quality and types of information handled, problems

with the system, satisfaction level with the support services, changes in work practices and overall policing due to I T etc. It showed that I T had led to improved information sharing and communications in addition to the better quality of service. It resulted in more transparent procedures and allowed complainants and victims to get faster feedback on the progress of the cases. In police, officers involved in operations were happy that the mobile data faculty gave direct access to data on outstanding warrants and vehicles and personnel of interest. I.T led to closer scrutiny of work of juniors by seniors and made supervisors aware of day-to-day activities. Some resistance was seen when it was used for surveillance of officers. It put constraints on police discretion in some areas. It streamlined administrative processes by avoiding duplication of forms/ multiple entries of data. It made a difference in detection work and made police origination more transparent. However, a lot on this front was yet to be achieved.

In mobile data systems, criminal name index was changed to' persons of interest' and 'personnel and property interest systems 'to show people, vehicles and property of interest to police. Criminal offences index was to show details of offences and court briefs. Link was also given to Transport dept. to query details of driving licenses and Localities register to change the fragmented policies on information management system. The survey showed the following problems:

1. Lack of integrated information system for operational police.
2. Poor quality data and information services for many mission critical processes.
3. Poor ability to exchange information with other related state and national agencies.
4. Poor integration of voice, data and radio communications
5. Multiple entries of data
6. Need to access multiple databases to retrieve related information.
7. Limited ability to analyze data/information
8. Timeliness and quality of data capture
9. Security of information, information systems and usage etc.

The 'Polaris' system was in use in Queens' area. It was found as per the survey, to be easy to use and comprehensive and giving greater flexibility while searching for information by needing only one entry and providing access to all available information on the topic with one query. In it's Incident Management System, when one call is received information is recorded by the connection center about the nature of the offence, name of informant, location of the problem and the time the patrol car acknowledges the call, arrives and leaves the scene. In the Olympic Incident Management System, it had the capability to map Automatic Vehicle Locator and officer down notification capability.

Information Security was thro access control, pass words, Audit drill, approval before developing or changing the agency's soft ware applications., implementing, operating, maintaining and securing the info system, specifying, developing, modifying or purchasing info system for the agency's needs, recovering the info system in case of a break down etc.

72 % felt that it made a 'great difference' on police work and 26% felt that it made 'little difference. Only 2% said that it had made no difference. Generally senior ranks, who had put in a lot of service, felt that it had made a lot of difference. It was opined that while court brief, investigation, patrolling, informing public on progress of their cases, interaction with the public, responding to the calls etc took the same or less time, paper work, planning, organizing, and analyzing info, supervising and checking of staff took same or more time.

Higher ranks generally found that their paper work had increased. Officers 'response about I T in police work was generally positive as it had made them more effective (79%) and made work easier (66%). I Os claimed that they were getting better results with I .T.A substantial No felt that their paper work had increased a lot. Officers in lower ranks felt that I T reduced their discretion and made them more rules conscious. Many opined that it had reduced their stress. A substantial majority had opined that quality of information had improved while on security of info they were not sure of the same. While info sharing had increased, info. Overload was being complained of. by older sections. Better communication and better problem solving policing were experienced. Some felt that they had to spend more time on paper work at the cost of fieldwork. There were better results in execution of warrants, getting persons and vehicles of interest. Police were no longer required to carry police knowledge in their heads.

Victims and complainants got better feed back on their complaints by ringing up showing that I T had improved police's customer interface. On quality of response, there were doubts. I T caused reduction in no. of field units and thereby in field contacts. Majority of junior levels felt that I T had helped them to work more effectively, eased their work, and helped them to do their work better. While quality of work generally improved, it made it harder to take short cuts or write off files.

In general, majority felt that I T had led to improved police service to the public by making the police more responsive and procedures more transparent. Some, however, lamented the loss of local knowledge and retreat from the 'hands on' methods for collection of intelligence.

Practical and Technical problems

61% felt occasional problems and 34% felt frequent problems. Overall hard ware performance was rated as 86%. Lack of integration, inadequacy of resources, data quality etc were minor problems. 'Down' time caused some operational difficulties. Slow speed was another. For lower levels, inadequate no of computers was also a problem. During peak periods, network was not able to cope with the traffic. Data quality improved. System integration problems were experienced. Inadequate training, decay of skills due to too early training, etc were other problems. Many learnt by trial and error.

Police officers accepted it as an integral part of policing which made work easier, improved communications and information sharing among officers. It

facilitated closer scrutiny by higher levels and made supervisory levels aware of their day-to-day activities and workload. I T was, however, accused of overemphasis on accountability and not improving participation. Cultural conflict between 'management cop culture' and 'field cop culture' between who manage computers and field officers was seen at some places. It led to improved management practices.

Computer Aided Dispatch System resulted in better management of vehicles and information driven patrol activities. Better detection of cases and apprehension of offenders by increasing the range and timeliness of information, by giving tools to profile suspects and identify offending patterns and making it easier to identify and crack repeat offenders. It assisted in problem oriented policing by aiding in identification of problem areas and addresses, by highlighting trends and patterns that warrant activities by police and other agencies and by better information. Sharing. Intelligence driven, rather than random, patrolling was made possible. I T enabled police to do some existing tasks better and more efficiently, record and gain access to offence details, enforce warrants and run criminal history checks. Some spoke of the possibilities of intelligence driven patrols, hot spots and repeat offender analysis and proactive crime investigation.

Streamlining of administration was yet to be achieved and paper and electronic record multiple entries of data etc. continued. Resentment over operations police coming under external scrutiny was seen. If I T is to be used for intelligence driven patrolling, community and problem oriented policing, in addition to info system that can give data on 'hot spots' and 'hot times', analysists capable of interpreting the information and work allocation systems that deploy patrols accordingly are needed. Structures to follow up I T methods /yields are needed for effective use of I T technology based organizational change by altering the structural conditions of policing will eventually have an impact on the deeply embedded assumptions of police practices. Police will need more I T to solve their problems and clash between architects and users of I T systems have to be avoided. Users of IT expects I T to make their life easier and more efficient without changes in existing policing and management styles. Architects of systems expect the organisation to move towards a more sophisticated mode of info usage-for resource management, strategic planning and policy decisions.

Three types of factors were influencing the course of technical change and its impact on organizations:

1. The nature of technology and how it is managed (technical).
2. Assumptions inherent in the technology and the extent to which these are congruent with those held by those with in the organization (cultural).
3. Interests at stake in technological change and the conflicts/ bargaining that may result (political).

Flaws in system design and failure to build and maintain support for technology with in the organization can lead to power struggles (as information is a source of power) that may thwart the original aims of new technology. Autonomy

may be threatened by external interference or internal surveillance. In respect of I T, compatibility with org. values, simplicity, flexibility, reversibility, cohesiveness, superiority to current methods etc. also have to be ensured. Other relevant factors are

1. Whether the change is incremental or radical,
2. User's participation in design,
3. How well the planning and testing were done
4. How much training was given
5. What is the level of support
6. Were the initial problems dealt with well, etc. How it changed the balance of power in the dept. and also vis-à-vis external agencies is also to be noted.

Chapter 8 - INVESTIGATION OF CRIMES INVOLVING DIGITAL

DEVICES - SPECIALPROCEDURES

Cyber-crimes are not new crimes, but rather classic crimes exploiting, computing power and accessibility to information. The growth of technical adeptness coupled with anonymity, seems to encourage such crimes using computer systems/digital devices since there is a small chance of being caught, let alone a being prosecuted. To catch and prosecute criminals involved in such crimes, investigators have to employ special forensic procedures.

Digital forensics, relatively a new science, derived as a synonym for computer forensics, has expanded its definition to include the forensics of all digital technology. It is defined as the use of scientifically derived and proven methods towards the preservation, collection, validation, identification, analysis, interpretation, documentation and presentation of digital evidence derived from digital sources for the purpose of facilitation or furthering the reconstruction of criminal events or helping to anticipate unauthorized actions shown to be disruptive to planned operations. Digital forensics has to encompass all digital devices, which are in use today that can be exploited for criminal activity. It has, however, no standard or consistent forensic methodology and uses a set of procedures and tools built from the experiences of law enforcement, system administrators and hackers.

It was the lack of software to assist in forensic steps with UNIX platform that prompted 'Farmer and Venema', the first to outline some basic steps in computer forensic analysis, to construct their own suite known as ' Coroner's Tool kit' primarily for a systematic search for evidence. Their guidelines include 'secure and isolate', 'record the scene', 'conduct a systematic search for evidence','collect and package evidence' and 'maintain chain of custody'. No software tools were, however, created for non-Unix platforms. Another attempt to outline a viable digital forensic process is described by 'Mandia and Prosise'. It is an incident responsive methodology with focus on pre-incident preparation, the process of preparing tools and equipments having forensic skills and their updating on new technologies that might be useful in dealing with new incidents. Other steps covered include detection of incidents, initial response, strategy formulation, network monitoring, recovery, reporting and follow-up. It provides detailed description for specific platforms such as Windows NT/2000 and UNIX. Since its focus is purely on computer crime, it does not address the forensic processes of other digital devices such as personal digital assistants, peripheral devices, cell phones or future digital technology. The US Department of Justice (DOJ) has also attempted to build a generalized process that will be applicable to most electronic devices abstracting the process from specific technologies and listing the types of evidence that may be found on electronic devices, their potential location, and types of I T crimes that may be associated with the evidence. It lists the commonly cited hidden evidence locations such as deleted files, hidden partitions and slack space and type of information, which may be stored as social security numbers, source codes, images etc. This process includes the

phases of "collection, examination, analysis, and reporting". Finally, Digital Forensic Research Workshop (DFRW), one of the first large scale consortiums led by academic rather than law enforcement, is another significant participant in developing the forensic process. It has arrived at a forensic framework that includes steps such as "identification, preservation, collection, examination, analysis, presentation and decision". The bottleneck in this case is that analytical procedures and protocols are neither standardized nor do researchers use standard technology.

Contemporary law and case laws, especially for seizing digital evidence (all digital data that can establish that a crime has been committed) are found wanting in many respects. The requirements of Investigations in automated environment require standard methods and procedures as evidence has to be gathered in a way that will be accepted by a court of law and during investigation, every care must be taken to avoid doing anything which might corrupt or add to the data.

1. COMPUTER FORENSIC PROCESS.

The acquisition and analysis of digital evidence can be split into 3 distinct steps viz. Seizure, Acquisition and Analysis of evidence.

Seizure. Investigating officers do seizure of evidence and its analysis is by qualified experts. Any tool developed for seizure of digital evidence has to be user friendly. For ensuring integrity of the evidence seized, 'write blocking' of storage media, i.e. ensuring that nothing is written on a particular media that has been blocked, is essential as no change should be made while handling digital evidence. This can be implemented through hardware and software.

Duplicating evidence for analysis (making a replica of the evidence by bit stream backup) is also essential, as original evidence shout not be used for analysis. Bit stream imaging differs from copying in that copying applies to data that is not deleted. Bit stream image is a mirror image of the copied disk with the same hash value. For authentication and seizure of evidence, mathematical hashing- equivalent to one-way encryption -is used. The digital evidence – which is a big numerical number, is encrypted using an algorithm so that it results in a new random number of fixed length called the `message digest'. The digital evidence may be of any size, but on application of the hash algorithm, the resulting message digest would always be of a fixed length.

If the contents of the digital evidence remain the same, the hash algorithm will generate the same message digest every time it is applied on the digital evidence. This property is useful in authenticating seized digital evidence before a court of law. Hash algorithm is a one-way function and this property is of great importance from the legal point of view as it prevents manipulation of digital evidence. Each digital evidence can be seized uniquely by specifying the message digest. Any alteration, even in a single bit, would result in a different message digest thereby rendering the whole evidence unbelievable in a court of law. It is hence

essential to divide the large storage devices into smaller blocks so that even if one block gets altered, all the evidence is not lost. In another technique using Cyclical Redundancy Checksum (CRC), two different digital evidence will produce the same CRC roughly only once in 4 billion. However, one can force CRC value of one digital evidence to match that of another by altering non- printing characters within the digital evidence. Hence, the <u>choice for digital evidence authentication is the hash.</u>

Hash algorithm must be applied to the disc, dividing it into various blocks.

1.   Separate hash values for each block should be calculated and encrypted and

      stored.

2.   The hash value of the whole disk must be calculated and stored.
3.   Another hash value of the hash values calculated for each block.

A floppy used to acquire evidence must contain the following essential information.

1.   Encrypted hash value of each block
2.   Hash value calculated for the set of hash values of each block.
3.   Hash value of the total storage media.
4.   Case details.
5.   Details of computer hardware including storage media and serial.
6.

The investigating officer should make four floppies. The original is sealed and forwarded to the forensic lab for examination and a copy is given to the suspect after obtaining a receipt. The third copy is kept on record and the fourth copy is submitted to the court.

The acquisition officer having decided the best process for acquisition verifies the information pertaining to the Media Storage Number, CPU Number, and thereafter on authentication makes a bit stream. At each stage, the generated hash values are compared with the hash values generated for the corresponding blocks during seizure so that the acquisition of evidence is authenticated at each stage. Any deviation observed is recorded and intimated to the investigating officer. The duplicated evidence is ready for lamination. Incase there are discrepancies, they are brought on record.

Both the seizure and acquisition require use of Hash Algorithm on the storage media, which is very time consuming. It would be ideal to complete both processes simultaneously, but as on today the demand is that these two processes

should be separated. The seizure and acquisition tool should consist of write protect software for protecting all media drives, bootable software, essential components of DOS, Hash Algorithm, Computer detail and disk detail extraction tool.

The seizure officer should extract the following details.

1.   Details of the CPU and configuration.
2.   Computer's date and time.
3.   Storage media serial numbers.

Thereafter the investigating officer must enter the investigators name, case no, actual date and time of seizure etc in memory.

Acquisition of Evidence. Globally accepted technology for acquisition of evidence is bit-stream backup of the seized evidence in a non-invasive manner. Different products for the purpose have differences in implementation as given below:

(a) **Safe back**: Developed for law enforcement agencies, it is a law enforcement standard which copies and preserves data contained on the hard disk. It finds out attempts made to hide data in bad sectors and even in sectors with invalid CRCs.

(b) **Encase**: Here the copied file is compressed using a patented algorithm and it provides an option of preview of the evidence in a non-invasive manner before acquisition so that relevant evidence may be seized.

© **Expert witness**: It uses a wizard interface for acquisition of data.

(d) **I look**: Makes a Bit stream backup available free of cost to law enforcement personnel.

(e) **DIBS**: Data Image Backup System: It uses a unique and patented technology for acquisition of Digital Image Called DIVA (Digital Integrity Verification and Authentication Protocol). It copies a media onto a 5.2 GB optical re-writ able disks maintaining the disk geometry. A pre-specified area of each cartridge is set aside to store integrity verification information for each block.

(f)**RAIDS** is a patented hardware and software of DIBS USA Inc. It is useful for making a bit-stream image. It has no input device and hence the possibility of making errors while making a bit-stream copy is very much eliminated.

Various Scenarios used for Acquisition of Evidence could be

(a) Through Parallel post.

The suspect computer is seized and brought to lab and evidence is acquired through parallel post.

(b)<u>Drive to Drive Acquisition at the lab.</u> The suspect IDE Hard Disk is removed from the computer and data is transferred to the forensic lab computer.

©<u>Drive to Drive Acquisition: (at the scene of the crime)</u>

(d)<u>Through Network Cable acquisition</u>: This situation may arise when it is not possible to remove the suspect computers or media drive since it is on the network.

Analysis of Evidence. The results depends on the quality of tools as well as the analytical capabilities of the expert. **A good analysis tool should have the capability to**

1. Non-invasively preview of the contents of the drive.
2. Map the disk geometry, identify, partitions and list the file structure.
3. Import customs sets of file hashes to enable identification of systems and other utility files.
4. Sort files by draft criteria, including time-maps.
5. Browse basic file system, swap files, file stack, print spool files, file located in the recycle bin, unallocated space, bad clusters and erased files.
6. Support viewing of various types of files including PST files, support for MS outlook etc.
7. Capability to open files without reading file extension.
8. Search and analyze media without changing file contents, time stamps or hash values
9. Conduct keyword search and highlight the hits and capability to achieve them.
10. View of all relevant time-stamps of files.
11. Bookmark files of interest, file segments or images.
12. Identify all graphic files and display them with bookmarks.
13. E-script macro-language capability.
14. 16-bit Unicode capability (foreign language support)
15. Restore deleted evidence.
16. Stitch information in lost clusters.
17. Archive evidence and report generation.
18. Graphically map (vol. Bitmap view) showing disc allocation by cluster or sector.
19. Show Hex /text view showing the contents of any file.
20. Format reports that show the contents of the case, dates, times and investigator involved.

Most of the tools are DOS-based and are described below.

1. Ana-Disc: This tool detects the extra sectors or tracks created to hide data. It is able to read data even when it is written to unformatted diskettes.
2. P-Table: This programme identifies partition tables and operating system in use on a hard disk drive.
3. Get-Free- a data collection tool used to capture unallocated space.
4. Get-Slack – a tool for capturing files slack.
5. Get-SWAP- Utility to capture static swap and page files for analysis.
6. Text-Search Plus: Used to locate key strings of text and graphic files.
7. File list: a disk-cataloguing tool used to revaluate computer used time lines.
8. Get-Names- to list English names found on computer media.
9. Get HTML- Identifies and reconstructs HTML documents.
10. Get GIF-identifies and reconstructs GIF files.
11. Hex Search: A utility tool useful in finding binary data patterns associated with File header and foreign language data patterns.
12. Seized - to lock and secure evidence computers- It protects the computer Used for analysis from being accidentally handled by authorized people.

All these capabilities have been integrated into one suite with a user-friendly interface so that the process of analysis is made easy. The forensic soft wares normally available are

1. Encase. This is the most commonly used forensic software. It identifies and lists system files. It has a databank of Hash values of known system files. All files on hard disk are hashed and those files whose hash values match the hash values in the database are presumed to be system-files. It has the capability to reconstruct images in the selected folders and display them and to graphically depict the timelines of a selected file with dates of creation, access, modification etc. It makes a report at the end of analysis and provides for encrypt also. This is a powerful tool for automating complex and repetitive operations. It supports viewing of compound files such as registry files, OLE files and email files.

2. Expert Witness has capabilities similar to that of Encase, but with much better-user friendly front-end. It graphically depicts media under analysis displaying each sector as a square using different colours. This utility is of immense help as it gives a detailed overview of the physical layout of any selected volume to the investigator.

3. I LOOK. This versatile software is available free of cost to the law enforcement agencies and can be used to examine bit-steam images obtained from any forensic imaging system that creates a straight sector dump of the imaged media. This software has all the utilities of **Encase** and **Expert Witness** and supports the volume bitmap view, comprehensive scripting languages, compiler and runtime engine. It has Integrated thumb nail viewer for all files of any selected volume.

4. **DIBS.** The features of DIBS for analysis are similar to that of ENCASE. It has a special utility called <u>Quick View plus.</u> This software needs a file by reading its contents rather than reading its extension. This utility is of immense help because.

1. The file extension may have been internally altered to conceal information or to deceive the investigator.
2. As an integrated package, it can be utilized for different files.

True Back and Cyber Check

These are cyber forensic tools recently developed by C-DAC, Trivandrum guided by a team of experts from the I T and law enforcement headed by Prof. N Balakrishnan of Indian Institute of Science, Bangalore as per user requirements designed by a research team of the National Police Academy, Hyderabad.The basic objectives of the soft wares 'True Back' (acquisition tool) and 'Cyber Check' (data analysis tool) are

(a) Development of indigenous tools for disk and network forensics,

(b) Provision of tech.services for law enforcement agencies,

(c) Training for law enforcement agencies in cyber crime investigation and

(d) Creation of a center for cyber forensics with the state of the art facilities.

True Back creates a bit-stream duplicate of a storage media (IDE hard disk) to another media as an image without modifying the contents. **Cyber Check** loads the image taken by True Back and helps to analyze for evidence in deleted, unused and slack areas. It can analyze IDE and SCSI hard disk images, CD-Rom, Floppy images and USB storage device images. It locks the images in read only mode and analyses for evidence in various areas like deleted, unused and slag and extracts the necessary information. It can support different views like disk, cluster, timeline, report, gallery, picture, text / hex, mailbox and registry views.

Installation.

The system requirements include Pentium-IV, 1.7 GHZ, 512 MB SD Ram, 40 GB hard disk, CD-rewrite, 10/100 PCI Ethernet, and 5.25 CDROM Drive (52x) .

When cyber check is launched, create "Boot Disk" option comes up and when selected creates a True Back (TB) boot disk. T.B. ensures data integrity of the image by comparing hash values of both the source and image media using MD5 hashing algorithm. It can be used to calculate the hash value of the suspect media using MD5 hash algorithm for the purpose of seizng the suspect media.   .   Suspect machine could be Intel, AT 486 or higher IT compatible with 4 MB Ram or more,

DOS 6.22 or above. T.B., which comes in bootable floppy with DOS 6.0 conversion, need not be installed. It can be used to seize and acquire simultaneously.

If the suspect computer is running, after ensuring drives are empty and after noting down the computer screen contents, computer may be switched off by pulling of cord from the computer. If the computer is off, all drives including the CD-Rom may be emptied by inserting a pin in the small opening at the front of the casing. Power supply to drives may be disconnected by opening the case and the bootable software of the' T.B. may be inserted in the drive and power supply may be reconnected and the system switched on. The booting has to be from T.B. since it is only one accessible for booting. Because of the rapidly changing technology, it may not be always possible to access computer set up for change the booting sequence to boot from the T.B. It may have to be restarted to access the CMOS and ensure that T.B. is used to boot from the appropriate drive. Once booting takes place, cease or acquire option is chosen with the latter only in the presence of a computer forensic expert.

Different screens appear and details may be filled in. If the suspect computer date is different from the actual date, the fact may be mentioned in the seizure memo. Different procedures are followed for floppy, CD-ROMs, hard Disks etc and floppies and CD-ROMs are seized in batch mode and at the end T.B. will generate one disk seizure floppy and one seizure memo is prepared giving details of each floppy or CD ROM seized.

Floppy. The suspect Floppy is seized after verifying the information about it is checked   and after the system hashes the information extracted from it. The sequence number, identity number and hash values are noted down on the seizure memo and for more floppies, the procedure may continue.

CD-ROM. The suspect CD-ROM is placed in the drive and the software extracts it's contents and seizure process is done and the sequence number, identify number and hash value are noted on the physical seizure memo. The same procedure is continued with other CD-ROMs, if any.

HARD DISK (IDE). To minimize the data that would become inadmissible in case of inadvertent corruption, the seizure is done in blocks. The True Back automatically calculates the optimization size of blocks. But, IO can change it to a higher value. The block size must be a multiple of 64 or it will have to be rounded off to a multiple of 64. If the block size specified is less than the default value, an error image will come up and IO will be advised to choose the size calculated by true back. This is applicable in the case IDE/SCSI/USB storage media. For IDE, enter a block size greater than displayed sectors and screen will display information selected and extracted from the suspect hard disk.

SCSI HARD DISK In this case too, the block size is selected and extraction follows.

USB HARD DISK The same procedure is repeated and seizure report will show the information provided for blocks and details extracted from the suspect disk.

For preparation of the digital seizure floppy, a sterile floppy is inserted in A drive and details like floppy number, crime number, seizure memo number etc are entered. For creating another copy (4 Copies needed) the prompt will continue. If more copies are needed, it could also be done. In the cases of more disks, same procedures follow.

Acquisition, which follows seizure, is done in Forensic Lab. It could be in local or parallel port modes. In local mode, the seized digital evidence is connected to the computer workstation and a direct suspect storage media to sterile storage media transfer of data take place. The computer is to be booted with True Back software and in this process, information about IO, date, time etc are filled up. Destination hard disk identity will have to confirmed and suspect storage media is to be selected. Cyber Check seizure floppy is to be inserted and its sequence number and identity on its label are entered and matching is to take place. The suspect floppy is inserted as to verify the sequence number and identity number. The acquisition programme is run and completed. The same procedure is followed in the case of more floppies, CDS with new sequence number, identify numbers etc. Computer screen will display details of other storage media attached to the computer and further acquisition may follow.

In parallel port mode, the suspect computer is directly connected to the trusted computer workstation and suspect computer storage media is imaged on the sterile storage media in the computer workstation through a parallel port. This is a slow process and should be resorted to only when it is not possible or advisable to remove the storage media from the suspect computer. Before starting the acquisition process, a sterile hard disk of capacity more than that of the storage media to be acquired should be ensured. The disk ID will be needed. The parallel port of the suspect machine and the forensic workstation are connected to a parallel port cable and True Back software is booted and the acquisition in parallel is checked. The suspect machine is selected and checked. In the forensic workstation, True Back software is booted and forensic workstation is selected. Once both the machines have done same process, parallel port connection is done and acquisition proceeds further ask for the local mode.

Seizure and Acquisition using True Back.

This is to be done only in presence of computer forensic expert or when it is not feasible to seize original media physically because of criticality of suspect storage media to operations. The forensic expert must carry his computer forensic workstation with hot swappable disk trays/disks for extra primary/secondary master/slave authentication of A: and /or C: Drives. Sterile disks of adequate capacities are to be ensured and in the sterile storage media is details of I.O, crime

number, etc are entered along with suspect's name, names of witnesses etc. When these are entered, the destination disk is selected and then the suspect storage media. In case of floppy or CD-Rom, it will have to be inserted. Once all information entered are checked, the acquisition process starts. In the case of more floppies or CD-ROMs, process continues till all are finished. The screen will also show details of other storage media attached to the computer and yet to be acquired.

CYBER CHECK. Access to Cyber Check (Analysis Tool) is given to only to the authorized who have to enter password, user name, laboratory reference number etc. The image saved by True Back is selected and probe is started. If more than one file, the first is selected. It keeps track of all user activities along with log in and log out. A folder is selected for exporting files that are seen in used free cluster, lost clusters, swap files, slack data etc. Cyber Check automatically checks for integrity of evidence by hash verification if it is chosen. If ` Extract Used Free Clusters' is enabled, it will identify and extract the contents of those clusters, which were previously used for allocation of data, but are now marked as free. If `Extract Slack' is enabled, data in it are extracted to a folder. Integrity check is done block by block and mismatches are highlighted.

In probe tab, windows explorer views of the evidence files are visible. If a file is selected, it can be seen in text view below. Table, gallery, timeline or report view can be selected and details appear on the right. `Append To Report' will open the folder's structure to the report. `Export Folder Structure' saves the folder structure to the default export folder. Keywords tab enables keywords searches and each keyword can have a separate session. Book Mark Tab will mark the evidences found during analyses to a separate folder. Folders, files or selected data can be separately book marked. Table view will show all files and folders and all information pertaining to them in separate categories of deleted, data mismatched, signature mismatched etc Similarly, `Over written' view will show details in overwritten areas. Registry view will show registries of different categories. `Gallery View' is a quick way to see the all the image file in a folder. `Time line View' gives a graphical representation for the patterns of file creation, access, last written attributes. `Report View' will give all the information regarding evidence files added to the probe and also about files and folders. Drive geometry, boot sector information, folder structuring, file/slack contents etc can all be seen.

Sub Tabs

Text Tab. Text Tabs show text contents highlighted in a file with data in slack areas in a different colour. For deleted files, but for the first cluster, all are displayed in red colour. Hex Tab shows hex clusters of file contents. Disc Tab gives graphical representation of suspect hard disk. In cluster view, cluster- wise details are visible. Each stop in a disk is a sector and sector numbers are also given. For locking the view of a highlighted pane while scrolling through, lock check box can be used.

First Steps in investigation are

1. Slack extraction.
2. Extraction of used unallocated clusters and lost clusters.
3. Export SWAP files and
4. Signature analysis.

Which come in <u>time line tab</u>. To view mismatch files, select advanced option and all files to be checked. For a particular file, it alone can be selected. For a particular time range, it may be selected. Mismatch of categories like created, last accessed, etc can also be seen.

Most graphic and text files contain a few bytes at the beginning of the sector that constitute a unique signature of the file. The software will verify the signature of every file its searches against a list of known file signatures and associated extensions. If there is a mismatch that is hiding a file or renaming extension to conceal identity, the software will identify them and include in the signature attitudes of the file in <u>Table view.</u> <u>Right clicking does exporting.</u> In <u>Block view</u> , block by block representation of the file (Blue for used block, white for unused block and red for mismatch blocks) is seen.

Search can be done for file or keywords. Files with specific extensions can be searched in clusters, folders, slack, etc. File can be searched in respect of 'cases' (capital/small) documents, image, audio, video etc. For keyword searches, keywords are created first. Default search is non-case sensitive. Search results can be seen in <u>keywords view.</u>

Timeline will show timeline view of files say between two-time periods, file attribute wise, category wise (deleted ones etc). Signature mismatch zooming will give detailed view. Also <u>temporary files/ mail box/ registry view </u>is possible. In some cases, recovery of formatted disk may be possible using <u>recover partitions</u>.

Once a user is logged in for a probe, cyber check keeps track of all activities in its report, which can be saved using a password. Report file, which will be encrypted, will contain complete information of the. Evidence file system, partitions and drive geometry, hash verification details, details of 'mismatch' blocks in case of hash mismatch, user login and logout information, exported folder structure, exported content of text file and slack information and picture files as image.

2. A working Strategy for investigation

Investigations in automated environment should be completed in 3 stages.

1. **Pre-investigation.**

Collect information about the environment under investigation .It will help in the choice of equipment/specialists during the subsequent stages.

2. **Searches and Seizure (and Acquisition)**

Very often, there is only one opportunity and search and seizure have to be conducted in such a way that procedure followed and evidence seized is as per law.

3. **Analyses of seized material**

Evidence has to be extracted from the seized materials and operation has to be carried out in such a way that evidence will be admissible.

```
┌─────────┐                                    ┌─────────┐
│ Start   │                                    │  End    │
└─────────┘                                    └─────────┘

      ↕              ↕              ↕

┌──────────┐   ┌──────────┐   ┌──────────┐
│ Pre      │   │ Search,  │   │ Analysis │
│ investi- │   │ seizure  │   │ of seized│
│ gation   │   │ and      │   │ material │
│          │   │ acqui-   │   │          │
│          │   │ sition   │   │          │
└──────────┘   └──────────┘   └──────────┘
```
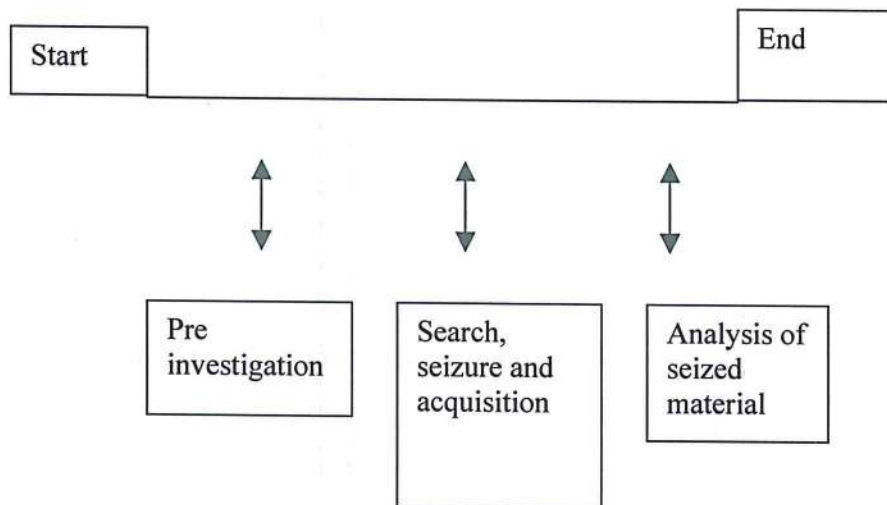
The block diagram above represents search, seizure and acquisition in the correct chronological order.

<u>Pre- search and seizure Stage</u>. The equipment containing the digital evidence may be contraband, a fruit of the crime, a tool of offense, or merely a storage container holding evidence of the offence. Computer and related evidence range from the mainframe computer to the pocket seized Personal Digital Assistant to the floppy disk, CD, or-electronic-chip. Images, audio, text or other data on these media can be easily altered or destroyed. It is hence essential that the evidence is protected, seized and searched in accordance with the guidelines.

<u>At Scene of search and seizure.</u> If possible, the I.O.should get himself and the equipments being carried searched in the presence of witnesses and also ensures he has the appropriate authority to search and seize.

Acquisition of Evidence

This is the crucial stage where a bit stream backup of the seized evidence is prepared. This bit stream backup is then used for analysis. Thus it is essential that this process is completed under due supervision and copied image of the seized evidence result in the same message digest. The seized computer or storage media shall be sent to a computer forensic lab. The investigating officer should furnish details of the software used by him for seizing the evidence.

Computer related crimes can broadly be classified into 4 categories.

1.<u>Computer as a target</u>: This category would include such crimes in which the contents of a computer are targets. This includes unauthoriesed access, data theft, data modification etc.

2.<u>Computer as an instrumentality</u>: This would include sending threatening emails, manipulating computer contents for credit card frauds, telecommunication frauds etc.

3.<u>Computer as incidental to other crimes</u>: This includes use of computers for drug trafficking, money laundering, child pornography etc.

4. <u>Crimes associated with prevalence of computers</u>: which would include copyright violation, software piracy, component thefts, etc.

An investigating officer during the course of investigation may be looking for any of the following.

1. Hardware as fruits of crime: This would include stolen, misappropriated illegal hardware.

1. Hardware as an instrumentality: Hardware components, which have played a significant role in the commission of crime. `Sniffer', a hardware for unauthoriesed capturing of credit card numbers for connecting theft, frauds etc.is a typical example.
2. Hardware as evidence: CD writer being used for duplicating pornographic CD ROMS for sale would be included in this category.
3. Information as fruit of crime: It includes pirated computer programs, stolen trade secrets, or passwords or any other information obtained by criminal means.
4. Information as instrumentality: Programs that help in gaining unauthorized access into computer systems and break passwords so that information can be recovered unauthorized comes in this category.

6   Information as evidence. It is this category of evidence, which would be the most sought of. Threatening letters stored in the computer of the suspect or email messages in the mailbox etc., which support the prosecution in presenting a case, are examples.

Acquisition of Evidence

This is the crucial stage where a bit-steam backup of the seized evidence is prepared and sent for analysis. It is essential that this process is completed under due supervision and the copied image of the seized evidence should result in the same message digest. Bit Stream backup. i.e. copying bit by bit all data on a disk including deleted files, swap files, stack space, FAT unallocated space and FAT undressed space, is the method used for acquisition It is thus a mirror image of the copied disk with the same hash value. For authentication and seizure of evidence, mathematical hashing, equivalent to one-way encryption- is used. The digital evidence – which is a big numerical number, is encrypted using an algorithm –so that it results in a new member of fixed length called the 'message digest'. By comparison of this message digest with the message digest generated by the earlier data of the same document, integrity of the document can be checked. If the Hash Algorithm poses problem for authenticating large storage devices, it is essential to divide the large storage into smaller blocks so that even if one block gets altered, all the evidence is not rendered useless.

Cyclical Redundancy Check (CRC) is another possible method, which is order sensitive; but its drawback is that one can force the CRC of one digital evidence to match that of another by altering non-printing characters. The final choice for digital evidence is hence hash. Its limitation is that it is useful only for information stored on a disk, and not on information in transit as in case of Internet.

Pre-search and seizure-Precautions

1. Only trained and qualified personal should conduct seizure.
2. Ensure the appropriate power and authority to search and seize.
3. Formulate a plan and course of action that you would undertake.
4. If acquisition of evidence is to be done at the site, get a computer forensic officer- and preserve the place till his arrival.
5. At the scene of search and seizure, have yourself and the equipments you are carrying searched in the presence of witnesses.

Windows remain the most widely used operating system. Investigators must be familiar with how windows work to ensure a fruitful investigation.   NTFS stores attributes of files and folders in a system file called the `Master File Table' (MFT). The attributes of utmost interest to the forensic analyst are filename, MAC (the date and time of last modification, last access and creation) and the data or the location of the data on the disk   NTFS uses, another system file BITMAP, to keep track of what clusters have been allocated on the disk. A single bit is used to indicate if the cluster has been allocated or not. So when a file is allocated, this bit is set to 1;

if the file is deleted, this bit is set 0. Clusters holding the data of deleted files compose part of the unallocated space on the disk. Unallocated space is a huge source of information for the analyst because deleted file data residing there may not have been overwritten yet.

When a file is deleted, it is moved to the recycle bin where a record is created in system file of the recycle bin (NIFO) for the particular file. This entry contains useful information for the analyst such as files allocation before it was deleted, the file's original name and path and date of deletion.

`Short cut' files in windows provide the analyst with another source of information about files. Shortcut files contain MAC time of the files that they refer to and the full paths to the referred files. Remnants of the deleted shortcut files can be searched in the unallocated space, stack space and swap space of the disk. The forensic analyst may look at windows registry to find information about hardware and software used. Another source is the NTF - $SLOGFILE which records all transactions done on the NTFS. The $SLOGFILE is used to restore the NTFS if the system crashes and may contain index entries for folders, a copy of the MFT record, and other potentially useful information that the examiner can use. For eg, evidence of a filename may exist only in $SLOGFILE and nowhere else. Sectors and tracks can be marked intentionally.

1. Bad, when in fact they are perfectly good and used for hiding information.
2. Some partitions may be deliberately marked hidden using specific software.
3. The partition table may have been modified so that one or more of the working partitions are no longer recorded.

Tools for Acquisition of data.

1. Bit stream imaging.
2. Magnets-optic imaging.
3. Graphic file extraction.
4. Mirror imaging- forensic replication.

Basic Dos and Don't for Seizing Evidence

1. Depute a member of the team to record evidence of all those present including the suspect, and the system administrator. He should get information about the OS (Operating System), network connectivity, the password policy, add on utility software used etc.
2. Keep persons away, especially the suspect, from any device to be seized.
3. After searching other employees and users, let them go out of the premises.
4. Do not seize any networked computer without forensic computing advice.

5. Photograph, video or sketch and label the scene and computer before proceeding any further. This should include all cables, connections and external devices attached to the computer.
6. Do not perform any unnecessary keyboard strokes, or mouse clicks. It may destroy fingerprints.
7. Do not perform any form of examination of the computer. It may alter evidence.
8. If the computer is OFF, do not turn it `ON' immediately.
9. If the computer is ON, Photograph, record and note the contents of the screen prior to proceeding further.
10. Do not shut down computer in the normal mode. Pull out the power code.
11. Record the message digest displayed with care.
12. Look for the following and seize if need be:

    1. Pagers
    2. Fax simile machines.
    3. Cell Phones and Caller ID Devices.
    4. Smart Cards.

3. Other digital devices.

As criminals can use email, GSM cell phones etc for their criminal activities, it is essential to know their forensics too.

(i) E-mail tracking

The following points are to be kept in mind while attempting email tracking.

1. A typical email passes through at least 4 computers during its journey as most organizations have dedicated machines called 'servers' to handle mail. Port 25, on systems connected to Internet, is used to transmit and receive mail. Unethical advertisers, those with criminal intentions etc use mail 'relaying' to conceal the source of their mail and hence it is necessary to have methods to reach the culprit or real source of fake mails.

2. From a detailed Header analysis of the mail, the IP address of the originating mail server, the first mail server through which the culprit mail passed its way to the destination, can be found. The investigator should then use one of the proprietary soft wares like Sam Spade or Neotrace (freewares) or internet resources like www.apnic.net,www.arin.net,www.lacnic.net,www.ripe.net and conduct a WHOIS search for the IP address of the originating mail server. By this, we can get the real address of the Administrator of the mail server and by searching his database, the originator of the fake mail can be traced.

3. Tracking decisions should be based on the IP address found in the header information and not in hostnames.
4. Spams use fake received Header lines. The trail from mail server to mail server and use of some common sense, when information makes no sense, will reveal the true details.
5. The I P address that is finally reached is the IP-address of the computer that sent the email or the sender could try to hide behind and 'anon miser service' where we can get to the IP address of the 'anon miser' company.
6. Most people who dial into the Internet almost always get a new IP address every time they connect to the Internet. Many times we can report the IP address and full email internet headers to the person's ISP and the ISP can track this down to a unique end user (by examining login and logout) and take action.
7. E viruses: some of the emails have been infested with a virus, which is using a person's computer to spread itself.
8. Open Mail-servers: Some companies may be involved in the Spam, but they may also have a misconfigured email server, which is allowing a spammer to send the email through their mail server.

(ii) Mobile telephones- Forensics.

Criminals commonly use GSM telephones and hence there is a need for investigators to understand what evidence can be obtained from the GSM system. GSM allows users to roam seamlessly between networks and separate user identity from the phone equipment. Information from the mobile system can give the investigator crucial information on the criminals. It is important that the information contained in the system is retrieved with a forensically sound method.

European countries created a Group special Mobile _GSM as a fully digital system allowing both speech and data services and roaming across networks and countries. The term GSM has been chosen as a trademark' Global System for Mobile Communications'. It makes use of various systems and equipments given below whose understanding is important from the forensic point of view.

Mobile station is the user equipment in GSM.The station consists of 2 entities, the mobile equipment ME (phone itself) and the subscriber identity module (SIM) in the from of a smart card contained inside the phone. The MEs in GSM are independent of network providers. The identity of the subscriber is obtained from the SIM that has to be inserted into the ME to make it work The SIM contains the IMSI (International Mobile subscriber Identity) which uniquely identifies the subscriber to the network. It also contains information necessary to encrypt the connections on the radio interface. The ME itself is identified by an IMEI (International Mobile Equipment Identity), which can be obtained from the network on request. **The Base Receiver Station (BRS)** is the entity corresponding to one site communicating with the mobile stations. Usually, the BTS will have an antenna with several TRXS (radio receivers) that each communicates on one radio frequency. A

Base Station Controller takes care of different procedures regarding call stop, location update and handover for each MS. **Mobile Switching Center (MSC)** is a normal ISDN switch which extend functionality to handle mobile subscribers. Its basic function is to switch speech and data connection between BSCs, other GSM networks and external non-mobile networks. There will normally be a few BSCs per MSC. The MSC and BSCs are connected via a highly standardized A-interface. Usually network providers choose BSCs, MSCs and location register from one manufacturer. With each MSC, there is a Visitors Location Register (VLR) which stores data about all customers who are roaming within the location area of the MSC.These data are updated with the location update procedure from MS through MSC or through Home Location Register (HLR). The HLR is the home register of the subscriber storing subscription information, with certification information. As HLR is a centralized database, that need to be accessed during every call setup and data transmission in the GSM network and hence this entity needs to have very large data transmission capacity. Equipment Identity Register (EIR) is one, which registers IMEIs of mobile stations in use. By implementing the EIR, the network provider can black list stolen or malfunctioning MS so that their use is not allowed by the network.

GSM Security

GSM provides authentification of users and encryption of the traffic. Giving the user and network-shared secret called `KI', a 128-bit number stored on the SIM Card and not directly accessible to the user, does this. Each time the mobile, connects to the network, the network authenticates the user by sending a random number to the mobile. The SIM then uses an authentification algorithm to compute an authentification token SRES using the random number and 'KI' The mobile sends the SRES back to the network. At the same time, an encryption by KI is computed. This key is used for encryption of subsequent traffic across the air interface. So even if an attacker could crack the key KI, the attack is not very significant as the key changes each time authentication is done.

Evidence in the Subscriber Identify Module (SIM). The name of the network provider is printed in the SIM along with a unique identification number that can be used to get information from the provider such as the subscriber name and address and phone number associated with the SIM. Phone records can be retrieved from this number.

Access to the SIM A Personal Identification Number (PIN), a four-digit code, is required to access the SIM. If the user fails to enter a valid PIN 3 times, the card-gets blocked. To reopen it, a 8 digit no called `PUK' is needed. If the user fails to enter correct PUK during 10 trials, the cards gets permanently blocked. PIN codes for a card can be changed and deactivated by the user. The PUK code can't be changed. Since PUK code is fixed, the network operator usually keeps track of the PUK codes of all its users. The Investigator can always gain access to a SIM card by asking the network operator for the PUK code.

Forensic Analysis of the SIM Cards To access the SIM Card logically, software that implements the GSM SIM access mechanism is needed. The contents of the SIM card

are organized as a series of files containing binary data that can be downloaded once the user has authenticated himself with a PIN or PUK Code. The best forensic procedure would be to download the entire memory of the SIM and compute a hash value of the memory. There are tools available to download binary contents of individual factor (SIM Manager Pro, Chipit, POU spy or SIM-Scan). Most of the files refer to network intervals that the user never sees and therefore does not represent evidence on the usage of the phone.

Location Information, Serial number, IMSI and MSISDN: The LOCI-file bytes 5-9 contain information about Location Area Identifier (LAI). Where the mobile is currently located. The network operator can assist the investigator in identifying which area the identifier corresponds to. The serial number, the IMSI, and MSISDM provide a unique identification of the customer. The serial number, which is possible to obtain without giving PIN, identifies the SIM. The IMSI is the customer identification whereas the MSISDM is the phone number of the mobile.

<u>Text Messages:</u> User can type short text messages on the phone and get it to another user via Central Short Message Service (SMS). Most SIM Cards have 12 slots for text messages. When a user deletes a message, only the status byte is set to `0'. Thus a deleted message can be reversed as long as the slot hasn't been overwritten. Interpreting byte 2-176 of the stored message does recording. <u>Short Dial Numbers</u>

Most SIM Cards have around 100 slots for storing short dial numbers. When a short number is deleted, the information is overwritten with the fux value FF. This, it is not possible to recover deleted short dial-numbers, but identifying empty slots between used slots will normally indicate that a stored number has been deleted. <u>Last Number Dialed:</u> The SIM also has the ability to store the information on the last dialed number. Most cards have 5 slots for this. The numbers are stored in a binary encoded format that can be interpreted by specific programmes. Investigators should therefore also investigate the phone for calling logs.

Attacks on the SIM Module

A person knowing that deleted text messages are still accessible on the card could use the card editor to overwrite the messages with other information. Of more interest to a criminal would be to attack the SIM to impersonate another subscriber. If this could be done, a criminal would make calls on other subscribers accounts and impersonate them.. In GSM system, the subscriber identity is only stored on the SIM so the protection against impersonation relys only on the SIM security features. The IMSI can be directly received from the SIM Card if the user knows the PIN or PUK Code. The IMSI will be transferred unencrypted across the interface whenever a mobile registers with a new network. The `KI' can be found if the encryption algorithm contains weaknesses (chosen plain text attack). A tool to extract `KI' from SIM has been implemented in the programme SIM Scan. Both IMSI and `KI' can therefore be obtained by anyone with access to SIM card and knowledge of PIN or PUK. The attacker, therefore, needs to get hold of a fresh card without any subscriber information. These cards can be ordered from the same source from

where network providers get them. The card then must be programmed with a special tool for programming of fresh cards. Such a tool is distributed together with SIM-Scan package. An Attacker can get hold of a genuine smart card programmer and the programme the card to act as SIM. The most forensically sound procedure for analysis of phones would therefore be to find a way to digitally image the contents of phone memory chips and analyze the contents offline.

Tools for accessing the phone memory directly are available on the Internet for many phones (Nokia, Motorola, and Erickson). These flashers seem to be unauthorized by the phone manufacturers. Using such tools for forensic imaging would therefore seem questionable; but might be the only way to retrieve-information that could be sued as relevant evidence. Most phones can be connected to a computer for data transfer using wireless interfaces such as IrDa or BlueTooth.

Electronic Evidence in the Network. GSM networks contain information that can be of value as evidence. The most valuable information is the cell Data Record database of the network operator. This database contains information on each and every cell made in the mobile network.

Subscriber Location. The location service works by performing triangulation of a mobile between different base stations, by using field strength measurements reported from the phone to the network. The location service can be worked from the mobile at the user's request. It can also be worked from the network, when the user calls can emergency call center.

Attack on the Network. The transmission protocol on the air interface has flaws in the lack of mutual authentication and lack of mandatory encryption. The protocol specifies that the network can order the MS to turn on or off encryption.

Chapter 9 - INTELLIGENCE AND SECURITY – SOME POSSIBLE APPLICATIONS

Intelligence in simple terms is information pertaining to a nation's security, i.e., law and order, security of vital installations, VIPs and other assets or persons who are important to the nation. In common parlance, it will boil down to processed information collected in advance pertaining to activities of people who may pose a threat to law and order or any other matter pertaining to security in general. By security, we mean activities involved in protecting a country, building, person or any other asset against attacks, danger etc. It could include a government organization that protects a country and its secrets.

Though in police, tasks pertaining to intelligence collection, security, etc. are low profile in nature, they are quite critical for the maintenance of law and order, fight against crime, etc. Intelligence and security organizations have to necessarily keep track of activities of people or organizations that could cause threat to any aspect of security. Hence, they would have to collect and store information about persons, organizations, activities etc so that counter measures can be taken. All these would involve collection of intelligence of different types, their analysis and processing, maintenance of records, etc.

Though successful intelligence and security work depends primarily on people involved in such tasks, tools of information technology can aid them and also make their functioning easier and more efficient. There are I T applications which would speed up or contribute substantially to intelligence operations of sensitive nature like monitoring of communications, what is proposed to be attempted here are development of the data structures, query patterns etc for a few typical data bases in certain critical, but mundane, areas of intelligence and security work. These cover areas like source work (sources/contacts/targets, their reports), indexing of names (suspect /name index), general data bases (meetings, incidents, organizations, foreign funds), counter intelligence (missing Pak nationals), security (threat assessment, vital installation security) and monitoring of performance of officers/branches/units (performance monitor for officers, units/branches). In the present/first stage of computerization, these record building efforts have to have priority to teach our officers systems thinking and building up of structures for tomorrow, which would only improve functioning of intelligence and security work in police.

In our country, computerization in police work, particularly in respect of intelligence and security, is at present at a very lower level. Hence, what is being attempted is an analysis of some of the ways in which data could be stored and the information required, culled out through queries. The type of information, particular heads under which it is done, etc. primarily depends on needs for future retrieval, the type of information the management or senior police officers would like to keep. It may also differ from state to state and in a state itself, it could vary depending on the security environment. Hence, the fields of databases, queries etc that are given below are quite tentative. However, they are based on long experience in intelligence and security tasks, consultations with a number of senior experienced field operatives and considerable analytical thinking.

Databases and Queries

1) **Sources/Contacts/Targets**. In this database, details of listed sources/contacts/targets, which are really the suppliers of information, or are being developed for the purpose and are required for day to day needs (not considered very sensitive), are kept for ready recall. It is primarily meant to know from time to time,

the type of asset, its performance, type of access, quality and level of reporting, motivation, progress being achieved, amounts being spent, etc.

1. Type

| S |
| C |
| T |

S-Source,
C-Casual Contact,
T-Target

2. Pseudonym

(Code name used for the case)

3. Level

| N |
| S |
| D |
| L |
| O |

N-National, S-State, Date-
D-District, L-Local
O- Observer Source

4. Handling Officer.

5. Rank of Handling Officer

6. Unit

7. Party /Organization   1.

8. Party/Organization   2

9. Party/Organization.   3

In cases where a source/casual contact/target is capable of covering more than one party/organization.

10. Target/Contact name

Pseudonym of the source when it was a target/contact, that is, before becoming a source.

11. Target /Contact. Officer

Officer who was handling the case as a target/contact.

12. Raising officer

Officer who raised it as a source from C or T level.

13. Rank of Raising Officer
14 Source Date

Date of registration as source.

14. Target date.

Date from which it was

15. Contact Date
16. Pay Per Month

Approved as a target. /Contact

Pay fixed for the source.

17. Motive		Factors, which motivate a person to give information, are
	Money	
	Friendship	
	Entertainment	
	Political	
	Religious	
	Caste	
	Others like offer of employment, help etc	

18. Location

Place at which the source/contact/target is located.

19. Reliability

A	
B	
C	

A-Very reliable and can be acted upon without further corroboration.
B- Reliable
C- Less than reliable

20. Potential

Useful for operations
Will go up further in party/Organization
Others

To reflect the future potential and other capabilities.

21. File Reference

Reference of the file in which reports are filed.

22. Overall Grading.

Outstanding
Very Good
Good
Satisfactory
Average
Poor

Reflects the overall grading of the source/target/ contact

Please note:

The following assumptions are made: A **source** is defined as a fully motivated person inside a party/organization desired to be covered and who is under the direction and control of the handling officer and makes full disclosures.

1) A target is a person of the desired level within a party/organization assigned to an officer to be raised as a source for its coverage at or above the desired level.
2) A contact is a person within or outside, the party or organization though not under the direction/control of the handling officer, but gives information within his knowledge, partially or fully
3) Some targets may fail to develop as sources /casual contacts or may develop as casual contacts only.

4) Some casual contacts may also develop as sources.

Comments: a **pseudonym** is a code used to hide the real identity of the person. **Level** refers to the organizational position of the person in the main organization. Handling officer is the officer who actually collects the information from the person concerned.

Queries.

1. List all S/C/T of _____ level in _____ party/organization

2. List all S/C/T of _____ level in _____ raised after_____ date.

3. List all S/C/T of _____ Officer.

4. List all S/C/T of _____ unit.

5. List all S/C/T at _____ or in _____ district.

6. List all S/C/T with _____ as motive.

7. List all Sources whose pay ≥ _____ Rs per month.

8. List all Officers who have not raised any source of_____ level between _____ and_____ dates.

9. List all sources raised between _____ and _____ dates.

10. List all sources raised by _____ officer.

11. List all sources of _____ level raised by officers of _____ rank.

12. List all officers of _____ rank who have not raised sources (source raised=nil)

13. List all sources handled by _____ officer/rank.

14. List all sources in_____ party/organization whose overall grading =_____.

15. List all S/C/T whose overall grading = poor.

16. List all sources of _____ level (or unit), whose overall grading = outstanding/very good/good etc.

Comments. There could be many others too.

2.REPORTS.

The aim of this database is to store details of reports /information given by sources/contacts/targets with all relevant parameters with facilities for ready recall of all essential points.

1. Source/Contact/Target [   ]

2. Handling Officer

3. Rank of Handling Officer

4. Unit of Handling Officer.

5. Party/Organization

6. Report No.

7. File Reference

8. Date of Report

9. Level of Report

10. Reliability Grading

| A |
| B |
| C |

A-Very reliable and can be acted upon without corroboration, B-Reliable, C- less than reliable

11. Security Grading

| TS | S | C | O |

TS-Top Secret
S-Secret
C-Confidential
O-Open

12. Main Points

| 1 |
| 2 |
| 3 |
| 4 |

13. New Leads/ Trends.

| 1 |
| 2 |
| 3 |

14. Overall Grading:

| 1 | 2 | 3 | 4 | 5 |

5- Outstanding4- Very Good
3-Good 2-Average/Satisfactory
1- Poor.

15. Action Taken

16. Comments

Comments. I.Nom-de-plumeof source /contact/target 5.The main organization whose coverage is desired 6.Report numbers may follow annual serial numbers.8.Date of giving information to the handling officer.9.The actual level of each report is to be given.15.Action taken like filing, sending report to higher authorities, or other follow up steps.

Standard Queries on Reports

1. List main points of Reports of _____ of _____ level between_____ and _____dates. .

2. List   all `overall grading' of reports of _____Handling officer between_____ and _____ dates.

3. List all new leads/trends between _____ and _____dates given by_____.

4. List all main points of reports of _____ between_____ and_____ dates and with reliability grading and overall grading.

5.List all main points of sources/contacts/targets of -- level in -------between --date and -----dates.

6. List main points, new trends/leads, reliability grading, and overall grading of all `S' level reports of _____ (source).

7. List all main points, overall grading of all sources of_____Handling officer in --- .

Please Note:

1. It is presumed that a report covers one party/organization only. If it covers more than one, the main party may be shown with `comments' part highlighting coverage of others.

2. If any part of a report has a higher security grading, the whole report may be given that grading.

3. Different `paras' of information may be given separate grades A, B or C after assessing reliabilities.

4. If report covers information of different levels, the level of the predominant part may be given.

3.SUSPECTS LIST/NAME INDEX

The aim is to prepare a long-term index of all persons, organizations, activities etc of interest or on which some suspicion has come up so that whenever required the concerned references can be easily obtained.

1. Name
[   ]

2. Aliases:
| 1 |
| 2. |
| 3. |

3. Father's Name
[   ]

[   ]

4. Address

5. Name of Party /Organization

6. Organizational Position.

7. Nature of Suspicion/ Interest.

8. File reference.

9. Comments Including Activities Of interest.

Queries.

Queries are generally made to locate the file reference where the desired information is available. It could be on part of a name / name, aliases, father's name, address, party/organization, nature of suspicion/interest, file ref etc. Often only a couple of points among the possible items may only be available.

4.Performance MONITOR for OFFICERS.

The aim is to monitor the performance of officers working in Special Branch from time to time keeping track of the specific items of work allotted, progress being made, and to enable supervision, guidance, etc.

1) Name

2) Rank

3) Unit/Branch

4) Period   From | Month | Year   To | Month | Year

I   Tasks and   Performance

	Task Areas	Sources Handled	Performance Grading	Targets Allotted	Performance Grading	Casual Contacts	Performance Grading
1			♣		♣		♣
2							
3							
4							
5							
6							

♣ 5- Outstanding 4- Very Good 3-Good 2-Average/Satisfactory 1- Poor.

Operations

Operations	Comments on Performance	Overall grading
1		♣
2		
3		
Projects	Comments on Performance ♣	
1		
2		
3		
Studies	Comments on Performance ♣	
1		
2		
3		
Surveys	Comments on Performance ♣	
1		
2		
3		
Enquiries	Comments on Performance ♣	
1		
2		
3		
4		
5		
Other areas of work	Comments on performance ♣	
1		
2		
3		
4		
5		

II) Rewards/ Recognition/ Punishment

a) Medals/Certificates

b) Rewards

c) Other recognition

d) Punishment.

e) Other remarks/comments of relevance

III) Outstanding Performance

IV) Overall Comments

a) That of Unit- in charge

b) District –in charge

c) Higher levels.

V) Overall grading for the Period

1/2/3/4/5

1-Poor 2-Average 3-Good
4-Verygood 5-Out-tanding

Comments

The overall grading would be a selection from a list box containing Outstanding/very good/good/satisfactory/below average. The rank of officers at points like b) and c) under overall comments may be suited added as per needs.

♣ Here too combo boxes could be placed to make selection from among a few standardized items.

With necessary changes in the task areas and measures for their performance, it could be used to monitor performance of officers in other branches like Police stations, traffic and cid .

5.Performance MONITOR for unit/Branch.

The aim is to keep track of the performance of a unit or branch consisting of a few officers, equipments and other resources during a particular period in the light of the tasks assigned to it.

Period   From

Month	Year

To

Month	Year

1. Name of Unit/Branch

2. Officer in charge

3. Immediate supervisory officer

4. Names of officers.

Sl. No.	Name	Rank
1.		
2		
3.		
4		
5		
6		
Etc.		

5. Tasks Assigned.

	Task	Officers Involved	Sources Handled	Performance	Target Assigned	Performance	Casual Contacts	Performance
1				♣		♣		♣
2								
3								
4								
5								
6								

6) Operations, Projects, Studies, surveys etc.

Operations	Comments on Performance	Grading **Five Point Scale**
1		♣
2		
3		
Projects	Comments on Performance	Grading
1		♣
2		
3		
Studies	Comments on Performance	Grading
1		♣
2		
3		
Surveys	Comments on Performance	Grading
1		♣
2		
3		
Enquiries	Comments on	Grading

	Performance	
Passports		♣
Employment		
Arms License.		
Citizenship		
Complaints		
Others		
Other areas of work	Comments on performance	Grading
1		
2		
3		

7.Misc.types of work

Type	Number	Comments on Performance

8. Outstanding Performance

9 Poor performance

10. Overall Comments:

    a. Immediate supervisory Level

    b. Next Higher level

    c. Next Higher level.

11. Overall Grading

1	2	3	4	5

1- Outstanding. 2 Very good 3.Good 4.Satisfactory. 5. Below average

Comments: The grading would be from a list box of Outstanding/very good/good/satisfactory/below average. The performance of officers could also be

given such a list box. The rank of officers at points under a), b) and c) under 10 could be given appropriately.

♣ At these places there could be combo boxes from which selections could be made.. For review of the performance of a unit or branch, performance of all individual officers. Separate data entry for unit performance may not be much once data about individual officers are completed as these could be recalled or copied from there.

6. INCIDENTS

The aim of this database is to store all related parameters of various types of incidents for ready recall. Some standard query systems are built in to facilitate information recall.

1) Type
    (List box)

Murder
Arson
Looting
Explosion
Firing
Encounter
Dacoity
Robbery
Kidnapping
Riot
Bandh
Rasto Rokho
Gherao
General Strike
Pen Down strike
Hunger strike
Others

2) Category

Political	
Labour	
Students/youth	
White Collar	
Farmers	
Agricultural Laborers	
Teachers	
Women	
Professionals	
Unorganized groups	
Terrorist	
Extremist	
Criminal	
Communal	
Caste	
Insurgents	
Others	

3. Date From [   ]   Date to [   ]

4. Time from [   ]   Time to [   ]

5. Place [   ]

6. Police Station [   ]

7. District [   ]

8. Case/Reference [   ]

9. Killed [   ]

10. Injured [   ]

11. Nature of weapons Used [   ]

12. Morale of Aggressessors. [   ]

13. Morale of victims [   ]

14. Arrests

15. Seizures

16. Property lost/
Damaged (including value)

17. Aggressor Party

18. Aggressor Party -
    Religion

17. Aggressor Party-
    Caste.

18. Suspects

19. Victims

20. Victims- Religion

21. Victims-Caste

22. Immediate
    Provocation

23. Agent provocateurs

24. Communal/Caste
    Factors.

_____

25. Places affected

_____

26. Impact

| Tehsil |
| State |
| Dist |
| Regional |
| Others |

27. Police actions

_____

28. Preventive actions
    Taken

29. Follow-up action
    Needed

30. Political fallout

_____

31. Motive

_____

32. Remarks.

_____

There could be other fields too. The order of these could be changed while programming.

Queries

1) List all incidents of type _____ between _____ and _____ dates in _____ district/districts.
2) List all incidents of _____ (type) involving _____ groups

3) List people killed in_____incidents where victim religion =-------and /or aggressor religion=_____.

4) List incidents in_____district between _____and_____dates where victims caste = - ---and aggressor caste=---------.

5) List_____type incidents in_____district/policestations.

6) List all communal/caste incidents in_____police station/ district_____ between _____ and _____dates.

7) List number of people killed and injured in communal/caste incidents in_____district between --- and --- dates.

8) List people killed in terrorist incidents in district_____ between_____ and_____dates.

9) List all incidents/explosion /arson/looting in _____police station between_____and _____ dates.

Comments

This will be a major database, which will be regularly used. More fields, types of incidents etc could be added depending on local needs.

7. ORGANISATIONS

The aim of this database is to store information about various organizations of interest for ready recall. The parameters normally required have been given, but more could be added based on local needs. More queries could also be added.

1. Name

2. Short Name

3. Type

Political
Women's
Farmers
Labour
Students/Youth
Agricultural Workers
White Collar
Traders
Professionals
Intellectuals
Others.

4. Activities of
   Interest

Law and order
Religious
Communal
Caste
Terrorist
Extremist
Militant
Fundamentalist
Insurgent
Subversive
Antinational
Agitational
Others

5) Fields of
   Interest

Rural Development
Environmental issues
Social welfare
Tribal welfare
Backward classes welfare
Scheduled Castes welfare
Minorities Welfare
Others

6. Date of   Formation

7. Place of
   Formation

8. District of
   Formation

9. Background
   of
   Formation

10. Founding
    Fathers

11. Aims

12. Headquarters/
    Registered office

13. Registration No,
    If any

14. Date of
    Registration

15. Law under which
    Registered

16. Office Bearers.

17. Main Demands

18. Leading Figures

19. Strong holds/
    Pockets of
    Influence

20. Others areas
    of influence

21. Type of followers

Specify
Region, caste, urban/rural
Etc.

22. Links
- Internal

Type	Name of organization	People involved
Political		
Criminal		
Cultural		
Caste		
Religious		
Regional		
Militant		
Fundamentalist		
Terrorist		
Sectarian		
Insurgent		
Other suspicious		
Others		

23. links - External

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Type	Name of organization	Key people involved.
Control		
Funds		
Ideological		
Others		

24.Membership

Type	Number	Membership fees
Candidate		
Associate		
Regular		
Others		

25Assets:

A)- Land

B) Buildings

C) Vehicles

D) Telephon

E) Others

26. Internal Sources of funds

27. Foreign Funds

Yes	go to `Foreign Funds` ◆
No	

28) Bank Accounts

29) Governing Body

30) Working /Executive
    Committee

31) General Council/ body

32) Activities (in gist)

Initial
Last few years
Current

33) Suspicious or other
   Activities of Interest

34. Remarks

Queries.

1) List all communal/caste/extremist-linked organizations in ---- - dist with office bearers, activities of interest, etc.

2) List all organization receiving Foreign Funds >$ from US, UK and activities of interest.

3) List all organizations linked to _____ group with activities of the past 3 years and activities of interest.

4) List all office bearers, sources of funds, and activities of interest of_____.

5) List all organizations with fields of interest = -- - - and activities of interest = ----.

6) List all organizations registered between—and --- dates in ---dist with types of followers, pockets of influence, links, and suspicious activities and activities of interest.

8. MEETINGS

Aim of this is to store data on all meetings of law and order or intelligence interest.

1. Nature

Open
Secret/Clandestine
Top Secret

2. Category included

General Public
Women
Students/Youth
labour
White Collar
Farmers
Agricultural Workers
Teachers
Others

3. Special interest Type, if any
   Involved/participating

Left Extremist
Militant
Insurgent
Terrorist
Fundamentalist
Communal
Caste
Other Extremist
Others

4. Date

5. Time. From   To

6 Venue and Place

7. Police Station

8. District

9. Size

10. Crowd type

11. Areas from

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12. Nature of inducements

Transport	
Food	
Cash	
Liquor	
Sight seeing	
Caste	
Religion	
Others	

13. Prominent Speakers/Participants

Speakers	Gist of speeches

14. Party/organization involved

15. Aims
16. Decisions Taken

17. Discords seen/differences

18. Impact

19) Details of incidents, if any.

20) Cases, if any

21) Type of response

Voluntary
Organized
Emotional
Disinterested

22) Highlights

23) Remarks

Comments. If any incident takes place in connection with the meeting, its details could be collected from the incident database

Queries are not included as they could be of any relevant combination of factors as indicated in earlier cases.

9. SECURITY OF VITAL INSTALLATIONS

The aim of this database is to store information of general and security interest in respect of all vital installations for ready recall as and when situations of law and order interest develop in or close to it.

1. Full Name

2. Short Name

3. Registered Office

4. Director Board/ Governing Body

5. Chairman

6. Chief Executive

7. Owned by

Government of India
State Government
Joint Sector
Private Sector
Foreigners/foreign co.

8. Share Capital

Total authorized
Issued
Subscribed

9. Loans

Foreign
Indian Banks
Others

10. Total Investment

11. Main products (last 3 years)

12. Important Exports

13. Important Imports

14. Profits.

15. Foreign Collaboration

16. Total Employees

Management	
Others	

17. Subsidiary/Companies/Firms

18. Associate units.

19. Associations of officers/
    Workers, strengths, political
    And other links, etc.

20 Suspicious/objectionable
   Activities of interest
       During the last 3 years

21.Main suppliers of sensitive items.

22.Total branches, sub. Units.

23. Importance and grading from
    National Security angle

Importance	Grading
	List box for A, /B/C (say for Very Important, Important and Marginally Important.)

24Security environment
   In the District/locality

25.Specific threats if any, from

Workers	
Extremists	
Foreign agencies	
Criminals/anti-social elements.	
Terrorists/Fundamentalist	
Others	

26.Other security Security
    Problems..

Financial	
Management	

27.Vulnerabilities
    /Grading

Very High
High
Moderate
Marginal
Nil

28.Details of Security inspections
    And   implementation of
    Recommendations

29.Existing security setup and its
    Capabilities and limitations.

30. Addl. Security/resources
    Needed.
31.General /Overall Comments.

Comments
Queries for the database could be designed on the lines of earlier cases.

10.MISSING PAK NATIONALS

There are a fairly large number of unaccounted for Pakistani visitors who after coming over on visa get lost the country. The aim of this of this database is to store data on such cases, as they could be a source of threat. The aim of this database is to store data on such persons and take steps to trace them out.

1. Name

2. Aliases

3. Father's Name

4.Place of Residence/postal address
   In Pakistan

5. Place of Birth

6.Date of birth /Age.
7. Religion
8. Caste:

9.Educational Qualifications

10.Details of colleges/school
    attended.
11.Close friends/ associates/links in India..

12.Port of entry.
13.Date of entry.
14.Port of exit
15.Date of exit

16.Passport Number

17.Visa reference

18.purpose of visit as
  per record and in reality
19 Places visited

20.People visited
21.Suspect activities ,if any,of people visited

22. Cases involved

23. Convictions, if any

24. Arrests if any

25. Other activities, if any.
(To be selected from a list Box)

Type	Activities.
Political	
Criminal	
Religious	
Caste	
Communal	
Terrorist	
Extremist	
Fundamentalist	
Anti-national	
Others	

26. Entry in electoral roll, if any.

27. Citizenship, if any acquired.

28. Persons involved in it.

29. Cases, if any, pending
With courts, Govt., etc.

30. Other suspect activities, if any.

31. Nature of suspicion, if any.

32 File Reference

33. Other points

34. Overall Conclusions/Remarks.

Comments. Queries are not repeated as they can be made on the lines of other databases.
Data field could be added as per details needed.

11.FOREIGN FUNDS

The aim of this database is to store information about   organizations which receive substantial foreign funds and details of such receipts and activities undertaken by such organizations in violation of provisions of law and rules regarding them, misutilization, diversion etc for undesirable or personal interests, etc.

1.Organisation's Name

2. Short Name

3. Donor Organizations

4.Donor Country
(Country in which donor
Organization
. Is located)

5) Purposes

6) Projects involved

7.Comments on links,

Suspicions, if any,
Noticed etc about the
Donor or recipient Organization

8) Registration with MHA

Yes		Registration Number
No		

9) Bank Accounts

10) Foreign Funds received

Years	Amount

11) Comments on misutilization.

Years	Misutilisation/diversion

12) Links of recipient, if any, with

a) Political Parties
b) Journalists
c) Government Employees
d) Other suspect links.

13) Adverse activities, if Any, noticed

Type	Activities
a) Criminal	
b) Political	
c) Conversion	
d) Subversive	
e) Extremist/militant	
d) Others	

14) Returns to Government

| Regular |
| Irregular |
| Nil |

15) General Remarks.

16.) Over all comments.

.

Comments.

1. Name of the recipient 2. Any acronym or short name by which it is known.

5.Purposes for which funds are given. 6. Names of projects financed.7.Any adverse information or suspicions, which have come to notice about the donor organization 10.Foreign Funds received during 3 previous years may be given.11. These may cover violation of the provisions of FCRA/FEMA, Conditions laid by Govt. while giving approval for receipt of Foreign funds, diversion for personal, political, communal, religious, anti –national and any other objectionable activity.

12.THREAT ASSESSMENTS

1. Name

2. Address

3. Activities (Fields Only)
   (To be selected from a list Box)

Type	Details
Political	
Criminal	
Religious	
Caste	
Communal	
Terrorist	
Extremist	
Fundamentalist	
Others	

4. Positions held/may be held. (Memo field)

Past	
Now	
Future	

5. Main activities

Past	
Now	

6. Activities of direct Relevance to security

Type	Details.
Political	
Labour	
Farmers	
Religious	
Caste	
Criminal	
Communal	
Others	

7. Activities of special Interest

8. Background of

Family	
Education	
Financial	

9. Enmities noticed

Personal	
Political	
Criminal	
Others	

10. Cases, if any, and people Involved

Type	Details
Convicted	
Arrested	
Suspected	
Others	

11.Attacks, if any, in the past

Type	Details.
Convicted	
Arrested	

Suspected	
Others	

12. Places of vulnerabilities.

13. Security suspects, if any

14. Vulnerabilities grading

Very high
High
Moderate
Marginal
Nil

15. Security
    Categorization needed

Type	Reasons

16. Special precautions needed

17. Other Comments.

Comments. Queries could be to extract any type of information needed. Like type of threat, reasons for the same, people involved, categorization needed etc.

13.VILLAGE/HAMLET LEVEL DATA

The aim of this database is to store information about villages and other places of interest which are important from insurgency, terrorism, miilitancy, extremism, fundamentalism or other similar activities which are to be kept track of with a focus on identification of those who help, support or in any way enable such activities to be sustained. General data about the village, crime and related activitities are also stored to enable an overall view of the situation.

I. General Data

1. Name   Name of the village or hamlet.

2. Revenue Village   Renevue village of which it is a part.

3. Name of police station

4. Block/Mandal/Taluk

Block, Mandal or Taluk of which it is a part.

5. Sub division

Name of subdivision

6. District

7 District council (if any)

(Where the place is part of a tribal district council)

8. Assembly constituency

9. Lok Sabha constituency

10. Distance from police station And direction.

____Kms, of (E/W/N/S/NE/SE etc)_____police station

11. Near by salient features

(Reference of easily identifiable features, places or offices nearby)

12. Shortest/best route to the Village

(From Police station or any other near by prominent place)

13. Population Complexion

Tribal groups	Non Tribal Groups

X ⎫ ⎬ Y

Total Population = X + Y = _____

14. Religious Complexion.

Category	(in figures or percentages)
Hindus	%
Forward Castes	%
Backward Castes	%
Scheduled Castes	%
Scheduled Tribes	%
Muslims	
	%
	%
Christians	
	%
	%
	%
Others	%
	%
	%

15. Political Complexion
(Approximate percentage
Influence of different
Political parties may
be given)

Name	Percentage of influence

16. Political leaders from the Village

Name	Attitude to

	terrorism/extremism/insurgency
	Pro/anti/neutral (in list box)

17.Close by villages

18.Key Persons (name of important people from the village may be given under the heads given below and their attitude to extremism.terrorism, insurgency etc

Category.	Name.	Attitude to terrorism./ extremis/i nsurgency
Headman.		Pro/anti/n eutral (in list box)
MLA/M.P.		
MDC		
Doctors		
Engineers		
Senior Officers of State Government/Central Governments		
Other Government Employees		
Teachers		
Public sector officers/employees		
Religious Activists		
Social Activists		
Cultural Activists		
Others important people		

19. Most influential people
    (Villagers)

Name	Attitude to terrorism/.extremism/insurgency
	Pro/anti/neutral(in list box.)

20. Most influential outsiders.

Name	Attitude to terrorism/.extremism/insurgency
	Pro/anti/neutral (in list box.)

21. Places of Worship, if any

Temples	
Mosques	
Churches	
Gurudawaras	

22. Educational Establishments, if any

School	
Colleges	
Other Institutions, if any	

23. Government and other important Establishments, if any

PART - II

1. (a) <u>Influence of Insurgents/Terrorists/Militants/Fundamentalist/Extremists.</u>

Type	Name	Nature of Influence		Growth or decline during the last 3 years
Terrorists	1. 2.	Nil Moderate High	1	Nil Moderate decline High decline Moderate growth High growth.
Extremists	1. 2.	Nil Moderate High	1	Nil Moderate decline High decline Moderate growth High growth.
Militants	1. 2.	Nil Moderate High	1	Nil Moderate decline High decline Moderate growth High growth.
Etc				

2. Group wise details

Sl.no	Categories	Names	Attitude
	Leaders		Anti/pro/neutral in list box.
	Activists/Cadres		
	Surrendered cadres		
	Militants/ Supporters/sympathizers.		
	Financiers		
	Informants		
	Shelterers		
	Routes		
	Weapon/explosives dumps		
	Others places of interest		
	Targets		
	Victims		
	Others hostile/ill disposed		

3.Incidents (last 3 years)

Case FIR No.	Type	Brief Facts	Property loss	People Killed	Injured	Kidnapped	Suspects	Arrested	Charge Sheeted	Convicted

4.Unreported incidents (last years)

Type	Details	Brief Facts	Remarks

5. Anti-social elements ((Including suspected)

Type	Names	Attitude)
Listed Bad characters		(pro/anti/neutral in list box)
Drunkards		
Drug addicts		
Thieves		
Robbers/dacoits		
Bootleggers		
Extortionists		
Kidnappers		
Accomplices		
Others of interest		

6) Gangs

Name	Members	Linkages with political parties/insurgents/terrorists/militants/ Fundamentalist/others.

Part III
Remarks:
(Any other worthwhile information
and an overall assessment
of the village situation
may be given)

Standard queries
1. List all villages in— P.S. where terrorists/extremists/etc have moderate/high influence.
2. List all informers/shelterers/ supporters /etc of----_ in -----Rev. Village /PS.
3. List all villages in----subdiv/mandal where growth of – during the last 3 years was---
4. List all villages in --- subdiv/mandal where tribal s> non tribals
5. List all villages in_dist where where tribals> non tribals and extremist /terrorist influence = nil
6. List all villages in ---mandal/taluk where decline of ----- during the last 3 years was high, etc

Softwares:

Among the various soft ware models mentioned above, operational models (beta versions) in respect of Sources/Contacts/Targets, Reports, Name Index and Organizations have been prepared along with some queries there on. These are being circulated for any comments, modifications required, etc after some trials for data entry are done in states. As the source codes are also made available it should be possible to make suitable changes in the structures, queries, etc and make them relevant for day-to-day work. Any comments regarding deficiencies, improvements needed problems, etc would be welcome as they would help to debug this versions and make them more relevant for day-today use.

Note: Pl.Refer to the software models folder in the cd

RECOMMENDATIONS

As the Research was basically meant to show information technology could be used to improve the performance of police, particularly in areas where the public satisfaction levels are `Poor' or `unsatisfactory' and to see how information technology could help improve the functioning of intelligence and security work, it is considered necessary to make certain recommendations for the same. These recommendations have been evolved from a study of ground situation on computerization front in 18 state police units by field visits and some exposure to practices in developed countries like US and Japan. The study of available literature in respect of computerization experiences in countries like U S A, Canada and Australia which have made good progress was also helpful in this effort.

1) It is necessary to have one agency to lay down the norms for computerization efforts in different wings of Criminal Justice System like police, judiciary, jail, and correction agencies. This is mainly because these are all integral links in Criminal Justice System processes and transfer of data and online linkages between them is often required. If different agencies followed their own standards and norms, it would create problems in exchange of data when computerization makes more progress and transfer of data between linked files of different agencies would become a must for efficient functioning. In US, for example, the National Law Enforcement and Correction Technology Center (NLECTC), which is a program of US department of Justice, plays this role.

2) As Law and order is a state subject, the basic responsibility for computerization, which is part of modernization efforts, rests with the state. However, Government of India basically funds modernization of police forces, in many cases fully and in others substantially. Though computerization of criminals' records was initiated through NCRB over a decade back, in most of the states, it has not made much progress in view of problems of lack of priority, failure of the NCRB to take care of states requirements, shortage of funds and personnel, procedural delays, etc. As a result of this, even in respect of the much talked about Crime Criminal Information system (CCIS), the core of any Record Management System for our country, only marginal or insignificant progress has been made by most states.. If this trend continues, total computerization of police systems in most of the states will remain a distant dream.

Discussions with management experts who have studied problems on this front in police show that the basic problem is lack of interest or accountability by any one for such items of work, which will be a crying need for tomorrow. NCRB has no powers to enforce, implement or ensure progress of computerization of police systems in a coordinated manner all over the country.

A system which can ensure uniform progress and implementation of different tasks and applications is a must at least in respect of data directly connected with problems of national security, whether they relate to crimes and criminals,

underworld, terrorists, insurgents, militants, extremists, religious fundamentalists or suspects of any type. This can perhaps be achieved by Centre contributing all the funds for computerization of police systems as part of e-governance or improvement in the delivery of service to a common man. Computerization of police will definitely bring in transparency, responsiveness and a better work culture which is now outdated and not service oriented. Modernization has no meaning in police unless change in outdated and exploitative work culture and necessary attitudinal changes are ensured.

An agency to ensure uniform computerization of all data needed for national security needs is a still unrecognized need in our country. Perhaps, we may need a 9/11 like situation to open our eyes as happened in U S. More effective Coordination through police division in the Ministry of Home Affairs, supply of hardware, software and other applications in a uniformed way to all regions and all levels could be thought of with the NCRB playing a more effective role. If FBI could take care of such needs in US where about 18,000 police forces of Federal, State and local levels operate, perhaps there is no reason why this cannot be done in our country where we have about 3 dozen agencies only are relevant of the purpose. Like FBI in US, the CBI play a more effective role in respect of computerization of criminal records needed for national security needs.

3) Computerization of criminal records started by NCRB through CCIS has not made progress partly due to virtual neglect of investigation work, which is the core of police work in developed countries. The lob sided priority for Law and Order, Security and Similar arrangements to the neglect of crime work is partly responsible for poor performance and image of police. It is also reflected in the virtual absence of a Criminal Intelligence System covering the whole country, even when terrorists, insurgents, extremists, militants and fundamentalists who pose serious threats to the security of the country do not go by the boundaries of state or nations. Police performance in areas where it is poor/unsatisfactory cannot improve unless the lob sided system is set right and a balanced one with the creation of a crime section in each police station who will exclusively deal with crime and investigation work. Creation Of a national level criminal Intelligence system coordinated by CBI is also another basic needed. This will not be really effective or productive unless crime and criminal records, modus operandi bureaus, linkages of criminals, gang analysis, etc are done through computerized systems. It is worthwhile to note that NCRB, of late, has taken up some work on this.

4) Improvement in crime and investigation work and reemphasis on investigation cannot be achieved unless the problems in Criminal Justice System are tackled to ensure faster trials and convictions. Though these are deeper issues on which Justice Mallimath Committee made recommendations, these are yet to be considered by the Government. As computerization is not an isolated phenomenon, which can produce magical results by itself, necessary systemic changes are a sine –qua –non-for success of computerization efforts. These may be ensured through a parallel process if return of investment in computerization is to produce the desired results.

5) It is a sad fact that we are yet to seriously apply our mind to the issue of having a register of Indian citizens. We have millions and millions of Bangladesh, Nepal and other foreign nationals moving around in the guise of Indian nationals. Though it may be a larger issue involving Census Commissioner, Election commission and many other authorities, in this context it is enough to say that Police computerization cannot produce the expected or desired results unless the identity of all persons in the country can be known. It is high time the work is taken up, may be in phases, covering certain states, cities or districts first so that this important issue directly affecting national security gets enough focus.

6) Computerization even in developed countries has been a time consuming process and calls for drastic change in work culture. In our country too, it would take a long time for the common man to get full benefits. The progress will be achieved in phase for which priorities will have to be laid down and followed. . As scenarios in our country differ greatly even between rural areas and also urban centers themselves; different norms would have to be followed. It is felt that 4-tier approach namely **metropolitan cities, other cities and district headquarters and towns, developed villages and backward villages** may perhaps be suitable in our current scenario. Keeping this in mind, certain proposals on priorities in these 4 scenarios have been made keeping current levels of connectivity, infrastructure, education and civic consciousness of people in mind.

Common Features: CCIS forms, Portrait building, Digital F P processing capability, Digital cameras, Templates for returns, Guidance systems in local language about various police procedures, citizens' rights and duties vis-à-vis police matters and responsibilities of police on these, local officers who are accountable for the same and officers to whom complaints /grievances on these could be sent, their tel. and other contact details, wanted persons etc.

Backward Rural areas: databases on local criminals, gangs, if any, sensitive localities/villages. Local religious places, schools/colleges, banks, Power houses and similar installations, local patrolling system etc.

Developed rural areas: In addition to the two listed above, websites of dist rict police and other units may give details of all police stations, names of senior officers, their telephone numbers, names of authorities to whom complaints for non-service could be sent, details of vehicles lost/recovered, missing persons, wanted people of different types, police and law and order related news, reward systems, progress of cases, enquiries/verifications etc.

Nonmetr opolitan cities, other state capitals, and towns: In addition to web sites, police bulletin boards, discussion fora, community policing matters, online registration of complaints (both FIRs and Others) thorough a single window system, SMS queries on vehicles, property, verifications, arms matters etc (to avoid visits to police stations).

Metropolitan cities: In addition to generally all in previous 3 lists, dynamic data driven crime related information, downloadable forms for various applications, permits, licenses, reports, recruitment, payment of traffic fines and other

payments for police related issues through credit cards, traffic related information about blockades/diversions, etc.

7) Service philosophy which is being given increasing importance in modern police organizations has to be given serious attention by police in India too and necessary systemic changes effected in police manuals, regulations, standing orders, training programmes, mission statements, public charters etc, if the current attitude of mistrust, dominance, control etc rather than service is to change. The service philosophy and practices which should have evolved in the post Independence era has failed to emerge in view of the illiteracy and low level of education and civic consciousness of our people and poor quality of average politicians. If computerization is to benefit the public, their preparedness for the same, strong inculcation of service attitude in all levels of police, particularly at police station level is a sine –qua –non. Training in police should have a predominant thrust for development of service attitude among all officers and men.

8) Computerization would mean a lot of changes in the way systems would function. Hence, a lot of computer related training at all levels would be required. While some may be for familiarization of officers and men with new applications and systems, some may be to give hands on training to those who have to handle and maintain the systems. This is particularly important in our system where power, connectivity, other infrastructures, maintenance, tech. expertise etc are serious problems. Hence, in each district there should be a computer-training center under the dist S.P. as is being done in Karnataka.

9) Computerization will bring optimum benefits only if re-engineering of the processes and procedures is done. Without this, computerization can bring in only the benefits of automation of old methods. Hence, before actual computerization, a relook at the procedures, and practices to make them simple and relevant for today and computers is essential. These could be done by changes in the standing orders, regulations, and introduction of new standard operating procedures for different aspects of police work.

10) Changes in the organizational structure to give I T its due place is another basic need. In developed countries, in a company or corporation, a Chief Information Officer looks after the I.T. work and he combines in him the domain (business) knowledge and also the I.T. Knowledge. In police too, such a functioning even at district level is a basic need for effective computerization. In a district, he could be called Dy.S.P Headquarters/Chief Information Officer and should be an officer well versed in all aspects of police work, but has sufficient knowledge and interest in IT matters. It has to be seen that I T, which is today only a tool, is gradually emerging as the Information Infrastructure with out which no system will be able to function

11) There is a need for conscious and sustained efforts to change the organizational settings and outdated work culture of police are to get returns on investment in IT. Information has to be built up with reliability, integrity and security realizing the fact tomorrow's police are going to depend on them.

12) It is the actual experience in most organizations that the most serious problem in IT is in respect of performance of systems. Hence, sufficient safeguards should be introduced in all deals and contracts to ensure this.

13) The introduction of IT should be, first and foremost, to serve the causes of the public, who are the masters in a democracy and whose service is the motto of all public service organizations. Secondly, IT should benefit the officers and staff who handle it with out whose genuine interest and motivation, computerization efforts cannot succeed. In all practices, these should be given enough attention.

14) In selection of initial applications, those which are easy to implement and will benefit maximum people or those though difficult to implement, will make the maximum impact in view of the holistic and visible benefits (as was seen in the case of computerization of railway reservation system) may be selected.

15) It is necessary to get a regular System Requirements Studies (SRS) Studies (SRS) done thorough a firm which has sufficient domain knowledge and exposure to police systems. It will give a holistic approach to the needs and applications after which implementation could be in phases in a planned manner to achieve the desired results. This is particularly so as the ERP approach is unlikely to be relevant for Indian police systems.

16) Even in the case of simple applications, enough planning and testing should be done through pilot schemes before introduction of the system throughout the organization as the literacy levels are rather low and people take time to get used to new systems and work cultures.

17) Training needs are substantial and training has to be thorough. While training of senior levels could be for familiarization, the ones for those who will actually work on the new applications should be meticulous. E-learning packages could be developed to meet the needs. Too early training will result in wastes due to decay of skills and hence training for operators has to be well –timed.

18) Successful use of IT will necessitate changes in policies and management styles and these have to be understood and planned for.

19) IT will help in 'proactive' policing and enable 'problem oriented' policing by prompt identification of `hot spots', MOB analysis, suspect's analysis etc. For this, development of relevant databases, GIS applications etc are essential.

20) IT facilitates and enable better community policing which tries to change the culture of "us Vs them" through 'coactive' and participative methods and thereby ensure better satisfaction of the community. Hence, applications needed for these should receive priority.

21) The orientation of police websites needs change by focusing on items of use- information, guidance, and tips, etc- to the common man. Prominence should be given to advice (in local language) on police related practices and procedures in different situations, online complaints registration, dos and don'ts, services given and those responsible for them, jurisdiction and location of police stations, their maps, telephone numbers, responsibilities of the hierarchy of police officers, mission and public charter, names of supervisory /vigilance officers who could be approached with complaints for non performance of duties etc.

22) It should also have an enquiry system to see the progress of complaints, verification for passports/servants/employment, investigation, lost/found property, etc. using the single window concept. Websites of police stations and districts should display all relevant information as to what to do and when in specific eventualities, details of vigilance authorities who will properly attend to complaints on the services, rights and duties of a complainant, name and ranks/numbers of police officers on duty, etc

23) In cities and towns when traffic problems arise due to law and order arrangements, VVIP visits, other emergencies etc timely guidance to public may be given about alternate routes in websites, information supply through SMS by tie-up with service providers, public display systems, etc. As is being done in Delhi, a vehicle control system could give information to public on specific queries on details of vehicles, ownership, sales /transfers, cases pending whether wanted or not, insurance etc by net working with transport, insurance, registration, licensing authority etc.

24) In VVIP security situations, a vehicle movement system, could record details like reg. no, body details etc of vehicles crossing a point. A smart machine can even check authenticity of records of passports, license, visa, traveller's cheques etc.

25) In the analysis of the survey results (chapter 6) it was found that the main reasons, as per the results of the survey, for the unsatisfactory or poor image of police in many areas were:

1) *Actions under political influence/pressure*
2) *Corruption*
3) *Bias in favour of the Rich, Powerful, Business Men, Powerful, etc.*
4) *Failure to enforce law, rules.*
5) *Professional failures/inadequacies*
6) *Bad behaviour /and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.*
7) *Links with criminals, antisocial and rowdy elements*
8) *Violation of law, rules, due procedures etc by police officers and men.*
9) *High handedness and violence (use of third degree and related issues) of police*
10) *Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority*
11) *Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.*

It was shown in **ways to improve (chapter- IV)** how **Social Skills, Transparency and Responsiveness** are helpful, to a large extent, to overcome **these problems.** Various methods to improve these were covered in the analysis of survey results. But, I T by itself is not a full remedy as many other factors like attitudinal changes, changes in work culture, more professional training, closer supervision and stricter enforcement of rules and regulations ,better enforcement discipline are all needed. A better educated force, removal of existing prejudices against S Cs, S Ts, minorities, weaker sections, women, poor etc are also necessary for police to become a real service as I T is not a panacea for all evils in police or Administration .It can definitely make a good police

better but I T cannot by itself make a bad police a good one as many non –I T factors also have to come in play.

a. Better professionalism, closer supervision, good leadership, insistence on correct procedures and laying down standard operating procedures for different items of work in different situations can reduce actions under political pressures /influence. So is the case with corruption, bias in favour of or against certain groups, failure to enforce law, rules, and links with criminals etc. Better social skills will reduce high handedness and violence harassments of people, excessive use of force, even bias against or in favour of some groups. In all these, I T can play a significant role by laying down rules, procedures, and records, follow up, prompt high lighting of exceptions to the rule or deviant professional conduct. Transparency and better responsiveness that I T systems can provide will also go a long way in removing public dissatisfaction on such issues

b. Social skills of police are improved through better communication methods, use of audio-visuals, multi-media, networking, interactive websites, broad band connections, emails, cell phones, discussion forums, dynamic information systems, single window based complaints management systems, regular interaction with the public possible today through computer based systems, various capabilities computers give to supply more information to the public on complaints, cases, natural calamities, accidents and other issues of public concern.

c. Better Transparency for police will come through faster registration of cases ,complaints and giving information on progress of cases/complaints through websites and other computer based methods, supply of forms, documents ,reports etc through web sites, public relations backed by computerized or other dynamic information systems, regular use of email, bulletin boards, discussion forums, computer chats,etc. for bringing issues to police officers, regular video-conferences by important police functionaries like Dist S.P, public display in websites and before public offices on police procedures, rights of accused/complaints etc., prompt replies to complaints, regular issue of press handouts /releases etc. In most of these, I T has an important role to play.

d. Better Responsiveness in police could be enabled by I T by ensuring more, reliable and faster information supply to public, faster police responses in the field, better networking, availability of circulars, manuals etc in intranets, supply of note book and mobile computers with secure wireless connectivity to databases to field officers, effective email system, regularly updated websites, I T based follow up systems, help lines esp. for women, children, etc, accident and emergency monitoring systems, use of GIS, GPS, thematic mapping of Police station areas, close supervision and better monitoring of service delivery enabled by I.T., IT based feed back and online questioning systems etc. As IT methods are only evolving newer and more user-friendly systems could be anticipated.

CONCLUSIONS

It may be worthwhile to make some comments in conclusion about the nature of computerization and prospects for the future. It is no exaggeration to say that the field continues to be neglected even after a decade of commencement of efforts on this front but for a couple of states like Andhra Pradesh and, Karnataka. There a few other states like West Bengal and Tamilnadu, which have also shown progress in some areas. If the progress continues in the current fashion, it would take another decade for most of the states to achieve any worthwhile progress.

The basic objective of improving the quality of police service using I T, particularly in areas where the public assesses performance as 'poor' or 'unsatisfactory' where tested through the survey. The ways in which I T as a tool can be effective were covered while covering the results of the survey. But, the importance of the human factor and building in the service mentality at all levels of policing, instead of continuing to depend on outdated legacy systems was also highlighted in the portions dealing with the need for reemphasis of service role. Many in police many not like such an approach, though in line with the democratic principles as it will impose heavier responsibilities on senior levels. But, it is an essential requirement for attitudinal change and improvement in the quality of service police has to render. How transparency, Responsiveness and Social Skills of police have to improve and what role I T can play in that was adequately covered under Analysis of survey results and Recommendations.

Non I T factors like training for attitudinal change, introduction of community policing based on pro-active, co-active, problem solving and intelligence led policing and people friendly or community centered approach have to go with introduction of I T if a real qualitative change is to be achieved.

The use of I T tools to improve working of Intelligence and security was covered in chapter IX. Basically, some examples of databases and queries, which can help to improve their working, were stressed. Depending on the types of activities a large number of such databases will have to be created, improved and integrated. There are operational improvements too, which are possible with use of I T in monitoring, surveillance, clandestine photography and interception including of emails. But, as these are more technical and specialized, they were considered beyond the scope of this study. Even in improvement of intelligence and security, the human factor has to be tackled separately though I T can help in better tasking, supervision and monitoring of performance. In security proper also some parameters about V I P security, installation security etc were covered by way of examples. Many such databases have to be built up and integrated here too. Computer based hardware also will have their contributions to make.

An attempt was made under 'Recommendations' to suggest some priority areas for computerization in the 4 scenarios mentioned in the Introduction

1. Metropolitan cities like Delhi, Bombay, Kolkata, and Chennai.
2. Other urban centers including state capitals and district towns,
3. Developed villages like those close to cities and towns, villages in states like Kerala, and

4. Backward villages, say of North -East, remote areas of Bihar, Orissa, etc).

These were based on study of what is going on now, what is possible and what are being done in such situations in developed countries. The principle that the first beneficiary should be the public and then the   cutting edge level functionaries in police was always kept in mind. More items could be added as progress is made or priorities change or on operational needs. For remote rural areas, the Srikakulam experiment has been used as a model.

In police computerization it is safe to say that normally the role of software is only 5 % and actual implementation is 95%. The failure to implement or make sufficient progress in CCIS even after 10 years only proves this. Hence, implementation requires all the stress.

While e-government, i.e. automating existing systems using computers, may bring in some benefits, what needs to be aimed at is e-governance wherein re-engineering or review of her existing processes and procedures will also be done. This is essential to optimise results. Reduction in the number and types of returns, change in the channels of communication, etc to suit the new capabilities of computer should be done to save manpower and effort and use them more productively elsewhere or render newer forms of service to people.

Use of I T alone will bring in all possible results unless organizational changes needed are also taken care of. I T will have to be involved in strategic and operational planning and I T heads should be I T professionals good knowledge of police domain. This is needed to remove the disconnection seen between I T and operational needs and ensure dynamic synchronization of management strategies and I T capabilities on which management experts like C K Prahalad laid stress.

Actual Performance of the systems is a major problem in police in view of the low computer knowledge and fast changing technology. Hence, sufficient user training, holding back part of the payments till full satisfaction level is achieved, safeguards like warranty clauses, future maintenance requirements, sourcing to only those with proven capabilities or track records and good support systems should be ensured. The practice of going for the lowest quotation often lands in problems in respect of computers, esp. software.

Security need of police systems need good care in view of the sensitivity of data, which may be stored. In addition to need to know principle, designing for security, access restrictions at different levels, audits, logging of all transactions, etc as may be needed will have to be scrupulously followed.

From the progress seen so far and the lack of seriousness on the issue, it is safe to presume that Indian police will take unduly long time to reach the state of the art level and to derive optimum results from investments in I T. I t will be failure of men behind the IT rather than that of I T methods which are regularly improving. But as there cannot be modernization of police with out computerization, it can only be delayed but not avoided however strong the skepticism on the subject may be. The faster we modernize Indian police, the better it will be for the public, especially the common man, the weak, poor, illiterate, the underdog, minorities, etc.

Future Research Areas

There is normally a disconnect between emerging strategic and operational needs of a business or organization and capabilities of IT. This is more so in Governmental organizations like police, particularly in India, which are behind business in respect of IT because of problems of funds, low priority for IT and normal time lag involved in adopting new techniques. There has to be a continuous and dynamic synchronization of the strategic/operational needs and capabilities of IT so that the police and other security agencies can effectively deal with problems like terrorism, extremism, militancy, insurgency and fundamentalism. According to C K Prahalad, management strategy expert, the disconnect between managerial imperatives and IT capabilities is caused by changes in the business environment and technologies used. He suggests the use of an application 'scorecard' by IT and operational managers for a focused dialogue that can in turn lead to a shared agenda and careful partition of effort. New technologies are needed to handle evolving situations and the scorecard will give managers a framework to understand the operational needs and how IT can be made to rise to the occasion. Thus, even if full computerization is achieved in a police organization, to meet new challenges, IT has to be a constant and continuing area of research.

Knowledge Management, Data Integration, Data Interpretation, Data mining and Visualization will be important areas for future research in Indian police now on the threshold of computerization. Inspite of having state-of-the-art IT systems, the US is doing research in these areas in an attempt to evolve better techniques to deal with emerging problems like those of international terrorism. As terrorism, extremism, insurgency, etc are major problems of national security; we will have to research our own models in IT to deal with such problems.

1. **Knowledge Management** is a relatively new and developing area, which has introduced a methodology for the planned, capture and re-use of organizational knowledge. Enabling organizations to capture, share, and apply the collective experience and know-how of their people is seen as fundamental to competing in the knowledge economy. There has been a wave of enthusiasm and activity centered on knowledge management.

We are not able to utilize the knowledge and valuable experiences of officers and managers who retire and leave after a few decades of service in the police. Knowledge management systems can fill this gap by enabling us to capture, store and learn from past knowledge and experiences. In police, suitable knowledge management systems could be evolved for investigation, intelligence, security and other fields of work. Any of these fields, say,

investigation, could be further subdivided into categories like murder, property offences, accidents, sexual offences, communal riots, terrorists acts, etc. The motives, modus operandi, evidence collected and proved, methods used and all other relevant parameters could be captured and stored for future use. Investigative details of a large number of such cases successfully investigated and proved could be then queried to get logical answers for the questions of tomorrow.

2. Data integration. It is another possible area for research. Partial data on a particular topic, situation, person, organization or incident may exist in the files of, say, local police, CID, Special Branch, Intelligence Bureau, CBI, Research and Analysis Wing, other police units, etc. Integration of such data which may even be conflicting is normally a very challenging task. It is possible today to develop systems for integration of such diverse data, analyze them in different ways and see what possibilities and intelligence can emerge.

3. Data Interpretation: This will be another interesting area for research. In police work, information on a topic, activity or person may be available in databases of different states, organizations, places, in different formats depending on the purposes for which they were prepared. Today we are not able to link such information about which no awareness may even exist. Even if all the past data were captured, their scientific interpretation would be a serious problem because of the absence of rules for the same, incompatibility of databases, differences in hardware and software, etc. To interpret and make use of past data, new methods for data interpretation, will have to be evolved.

4. Visualization is a modern interpretation technique being used to bring out relationships or correlations between environmental facts in complex situations that might go unnoticed. It is an approach in which a computer-generated visual representation is used to improve our understanding as a picture is worth 1000 words. It encompasses diverse applications from data visualization - where numbers are turned into pictures - to virtual environments for training - where the subject is placed in a visual reconstruction of a real environment. In it, art and science blend correctly to give a good representation. For eg, by seeing a map (GIS and Cartography), we may be able to notice a relationship or co-relation between circumstantial facts that might have gone unnoticed. Today 3 dimensional and textured models for visualization, which are more appealing, are possible

The picture given below is a visualization of Napoleon's disastrous Russian campaign with the green portion showing the march to Moscow and the black portion representing the return trip with the thickness of the lines showing the size of his troops on different occasions en-route. The shapes of routes, temperatures etc are also represented giving a much better representation of the campaign

<u>Fig. 1</u>

In police work, Geographical Information System (GIS) and Cartography can be combined to communicate information aimed at crime prevention. Visualization using line maps, textured surfaces and 3 dimensional pictures are used today by CBI, CIA, US Army etc. to develop better and more logical understanding of complex and dynamic systems involving terrorism, drug traffic, money laundering and other crimes of international ramifications. In policing work, it can give possible lines of investigation or enquiry through which materials could be collected to contradict or corroborate and thereby lead to truth. A <u>Visualization showing linkages</u> of a set of persons is given below.

<u>Fig.2. Visualization –linkages of people.</u>
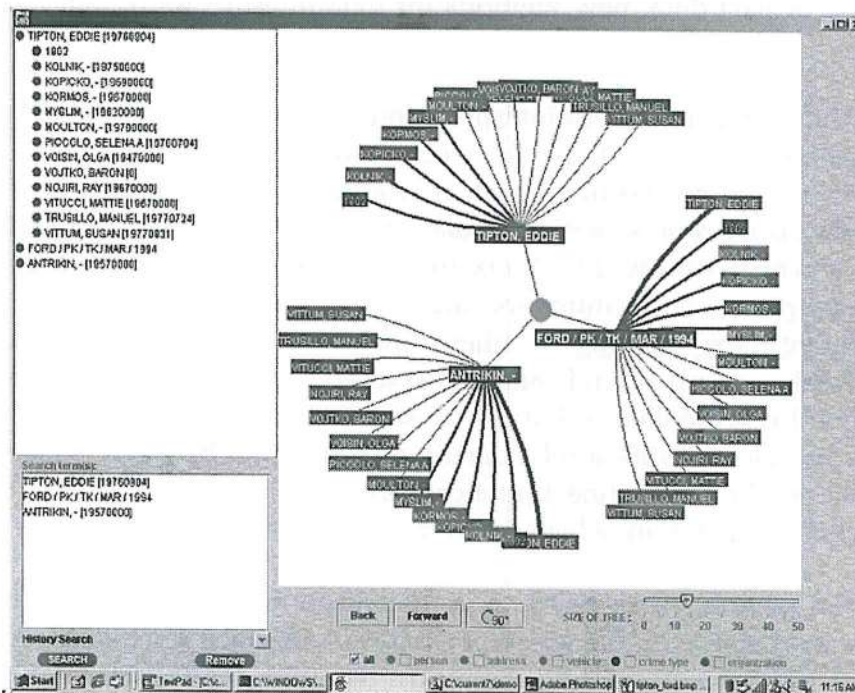
Fig.3   Visualization of a gang structure is illustrated below
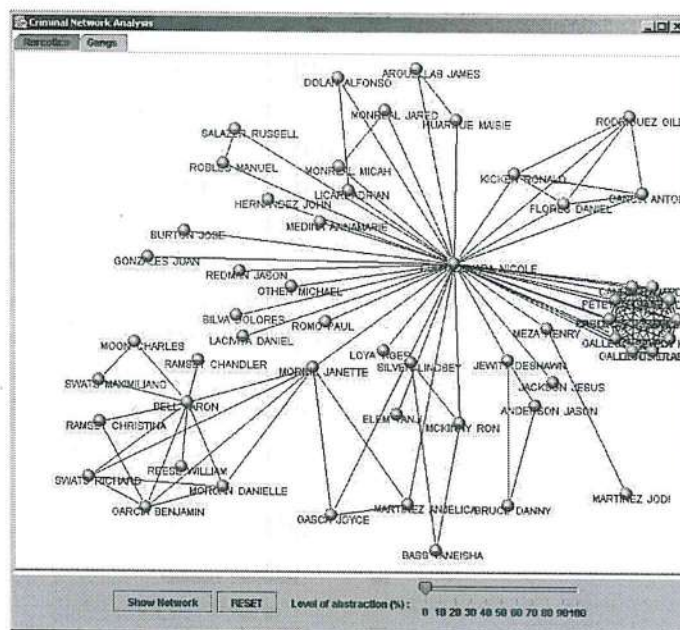
5) Data mining. It is analysis of data in a database using tools, which look for trends or anomalies without any knowledge of the meaning of the data. It is also known as **knowledge-discovery in databases (KDD).** IBM invented it to automatically search large stores of data for patterns. To do this, data mining uses computational techniques from Statistics and Pattern recognition. It can also defined as "The nontrivial extraction of implicit, previously unknown, and potentially useful information from data". Basically, data mining gives information that wouldn't be available otherwise. Data mining implies scanning the data for any relationships, and then when one is found, coming up with an interesting explanation.

COPLINK, a new application used by many US police units, allows a computer to make high-speed connections that would take a human weeks using specialized data mining algorithms. It organizes and rapidly analyzes vast quantities of structured and seemingly unrelated data housed in various incompatible databases and record management systems, over a highly secure intranet-based platform. It can be applied to regional, multi-state, or federal intelligence information sharing initiatives to provide enhanced compliance by helping to consolidate, analyze, and visualize on a per session basis without replicating data or including it permanently in another agency's system. The COPLINK computer program can mesh data in minutes and sift millions of pieces of information and produce connections from seemingly insignificant pieces of data. More than 100 agencies in U S use COPLINK which is now available even for use in Europe. It was born in a university lecture room as a solution to the daily dilemma of trying to combine data on suspects, vehicles, crimes, mug shots and gang intelligence. COPLINK,

provides a kind of instant institutional memory, like a veteran detective who never forgets.

The picture below shows how COPLINK can connect different datasets and figure meaningful hidden relationships among them. System administrators can adjust security protocols by adding and deleting user's and group's access permissions, user suspensions, and resetting of user passwords. The search feature allows query results to be displayed in easy-to-sort Summary Tables showing key information in column format. **COPLINK Mobile** allows access to the functionality of COPLINK from a remote location using a PDA or tablet type device. **COPLINK Detect** generates intelligence analysis results from multiple data sources including identification of previously unknown relationships. Notifications can be received on a cellular phone, pager, email or by text notification within COPLINK.

Fig. 4. ---Cop Link and its functionalism — pl see the fig. Below.
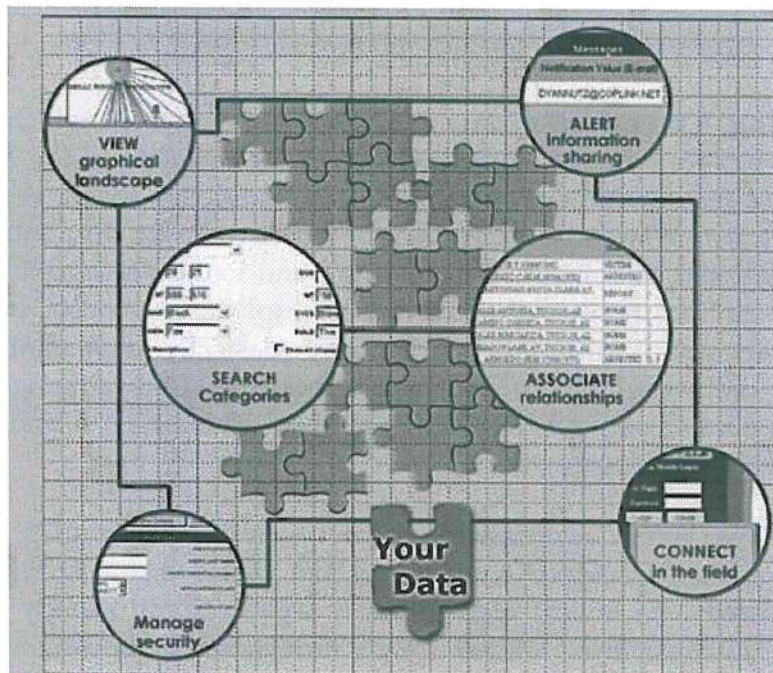
Indian police and security agencies will have to evolve a similar capability by researching our needs in this important field. We too have disconnected databases spread over different organizations. Since COPLINK is spreading to Europe too, the possibility of its application in our scenario could also be studied in corporation with the company concerned

Data mining, visualization and analysis can be used to identify suspicious patterns of telephone activities, (say, intense ones involving certain connections) to expose commonality, pathways and networks. Even if the volume of numbers is large, the volume of calls can be summarized to develop frequency counts and visualized (using proven technology) to reveal

multiple patterns, merge or alias telephone numbers to view any organization, geographical area or phone exchange as a single element, discover existing and emerging networks and their relationships, group telephone numbers by area, codes, exchanges, subscribers or other characteristics to display patterns and trends. Such analysis can reveal a number of doubtful behaviors including telephone frauds, drug trafficking as well as volatile connections between people and organizations. It can track chronological or sequential calling patterns. Vast quantities of data from any data source can be extracted in one search and analyzed to visually expose patterns of activities, relationships between suspects, organizations, I D numbers, vehicles etc through even instant displays. It can also analyze clusters of related data and produce statistical information and share it with other agencies.

Fig. 5.6 and 7 represent analysis of data relating to telephones.
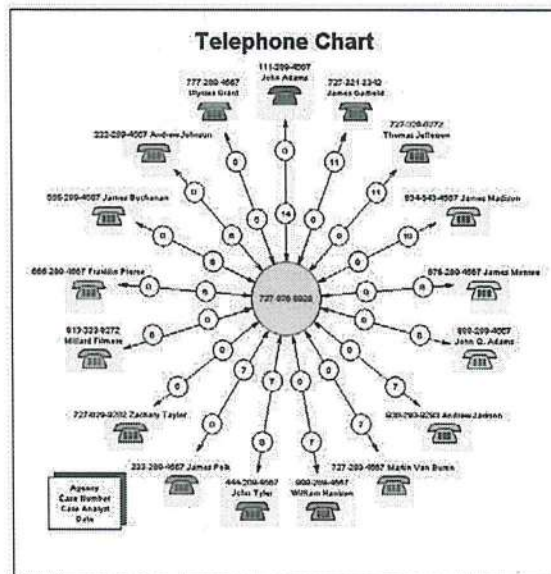
Fig.5.
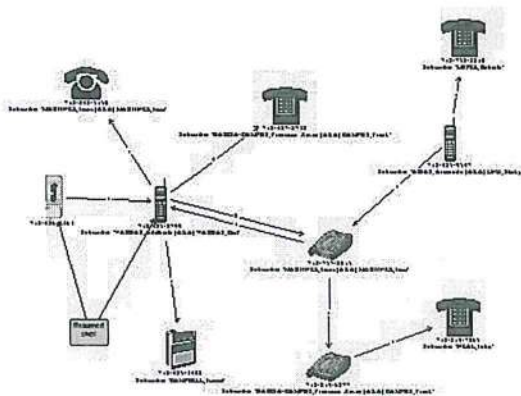
Fig.6.
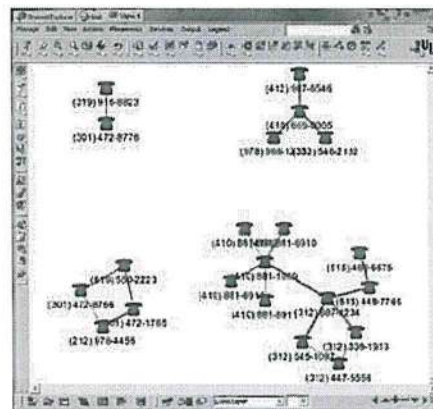
Fig.7.

Investigating terrorist groups require inter-agency communication and collaboration and analysis of data from multiple sources. Data mining can be used to identify relationships between groups and members, link group members and connect networks. It can expose connections between group members, outside individuals, other organizations, location, facilities and communication networks and reveal group operations, shared assets, materials, supplies, technologies used for making weapons etc., It enables better understanding of behaviors, detection of threats, assessment of unlawful activities by evaluating funding resources, recruiting methods, communication networks, storage facilities etc.

Thus **knowledge management, Data interpretation, Data integration, visualization, Data Mining**, etc are important future research areas for Indian police, which is on the threshold of computerization. Though these are all being researched in the West, what will be more productive for us will be results produced with reference to our situation by those who have a thorough understanding of our social scenarios, behavioral patterns, modus operandi, etc as crimes and other police problems are matters of social engineering with particular reference to the societies concerned.

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Study on

"I.T. ENABLED POLICE AND SECURITY SERVICES"

Part I.

BIO-DATA

1. Name
2. Address

3. Age
4. Sex
5. Ed. Qualifications
6. Profession
7. Post held
8. No. of years of experience.

Part II.

QUESTIONNAIRE

(Please tick mark ☑ your responses where multiple choices are given)

1   (A)   As an impartial observer, how do you rate the image and performance of police in your

a) District :   1. Very good   2. Good   3. Satisfactory   4. Poor   5. Very poor

b) State   :   1. Very good   2. Good   3. Satisfactory   4. Poor   5. Very poor

c) Country :   1. Very good   2. Good   3. Satisfactory   4. Poor   5. Very poor

If your response is 1,2,or 3, please go to (C) below.

(B)   If the image and performance of police is Poor/Very poor (i.e. your response is 4 or 5), in what degrees have the following contributed to it?

(1) *Bad behaviour/and conduct with the public, esp. the complainants, witnesses, victims, women and children, etc.*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(2) *High handedness and violence (use of third degree and related issues) of police*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(3) *Corruption*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(4) *Professional failures/inadequacies.*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(5) *Bias against minorities, SC, ST, BC, the Poor and Downtrodden, Illiterate etc.*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(6) *Bias in favour of the Rich, Powerful, Business Men, Powerful etc*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(7) *Actions under political influence/pressure*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(8) Links with criminals, antisocial and rowdy elements
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(9) *Failure to enforce law, rules etc*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(10) *Violation of law, rules, due procedures etc by police officers and men.*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(11) *Other similar actions like harassments of people during VVIP visits, use of excessive force in law and order situations and abuse of authority*
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

(C) Do you think that there is need for police to play a more pro-active role in different service areas? If yes, please prioritise the areas in the current situation in the country. (Please enter 1, 2, 3 etc based on their importance. you may add more items to the list, change the order, etc. also)

(a) Management of public grievances/complaints. ☐
(b) Verifications for employment, passports, employment of servants etc. ☐
(c) Prompt supply of information about traffic blockades, accidents, emergencies, parking places etc. ☐
(d) Location of missing persons, vehicles, property etc ☐
(e) Marital disputes, dowry cases, demand for dowry, and similar family problems. ☐
(f) Help to the old, weak, illiterate, poor, suffering etc. ☐
(g) ☐
(h) ☐

2   (A) List the following areas of police functions in order of priority for the common man.

(a) Crime related work   ☐
(b) Law and order work   ☐
(c) Security related work.   ☐
(d) Others including work involving general service to the society ☐

(Please indicate their priorities by serial nos.1, 2, 3, 4, etc)

(B)Please indicate the extent to which IT can help the police to improve its performance in different functional areas. (You may add your own items to any of the lists, change their order of priority, etc.) **Degree of their use may be indicated, with a tick mark, with the following scale:**
(a) Fully (b) To a great extent (c) To some extent (d) To a little extent (e) Not at all

I. CRIME	Use of IT			Degree of use		
1. Timely registration of cases under correct sections of law	Yes/ No	(a)	(b)	(c)	(d)	(e)
2. Apprehension of the accused.	Yes/ No	(a)	(b)	(c)	(d)	(e)
3. Supervision of investigation and follow-up.	Yes/ No	(a)	(b)	(c)	(d)	(e)
4. Monitoring the work of investigating officers	Yes/ No	(a)	(b)	(c)	(d)	(e)
5. Follow up of cases in courts.	Yes/ No	(a)	(b)	(c)	(d)	(e)
6. Monitoring of wanted persons, vehicles, property etc.	Yes/ No	(a)	(b)	(c)	(d)	(e)
7. Cyber Crimes		(a)	(b)	(c)	(d)	(e)
8.		(a)	(b)	(c)	(d)	(e)

II. Law and Order Work	Use of IT			Degree of Use		
1. Mobilization and deployment of forces	Yes/ No	(a)	(b)	(c)	(d)	(e)
2. Assessment of emerging situations.	Yes/ No	(a)	(b)	(c)	(d)	(e)
3. Fast response to an incident.	Yes/ No	(a)	(b)	(c)	(d)	(e)
4. Incident management system.	Yes/ No	(a)	(b)	(c)	(d)	(e)
5. Briefing of officers and men.	Yes/ No	(a)	(b)	(c)	(d)	(e)
6. Command and Control.	Yes/ No	(a)	(b)	(c)	(d)	(e)
7.		(a)	(b)	(c)	(d)	(e)

8.

		(a)	(b)	(c)	(d)	(e)

III. Security related work. Use of IT Degree of Use

	Use of IT	(a)	(b)	(c)	(d)	(e)
1. Threat Assessments in VIP security work	Yes/ No	(a)	(b)	(c)	(d)	(e)
2. Surveillance on security suspects.	Yes/ No	(a)	(b)	(c)	(d)	(e)
3. Enquiries about suspect people/ places/ activities etc.	Yes/ No	(a)	(b)	(c)	(d)	(e)
4. Mobilization of officers and men	Yes/ No	(a)	(b)	(c)	(d)	(e)
5. Management of security gadgets.	Yes/ No	(a)	(b)	(c)	(d)	(e)

IV. Other areas including general service to the society Use of IT Degree of Use

	Use of IT	(a)	(b)	(c)	(d)	(e)
1. Management of public complaints/grievances.	Yes/ No	(a)	(b)	(c)	(d)	(e)
2. Verifications about employment, passport, servants etc	Yes/ No	(a)	(b)	(c)	(d)	(e)
3. Missing persons, vehicles, property etc	Yes/ No	(a)	(b)	(c)	(d)	(e)
4. Marital and domestic disputes, abuse of women, dowry demands and other issues relating to women etc	Yes/ No	(a)	(b)	(c)	(d)	(e)
5. Supply of information of interest in respect of accidents, traffic blockades/ diversions, natural calamities, etc	Yes/ No	(a)	(b)	(c)	(d)	(e)
6.		(a)	(b)	(c)	(d)	(e)
7.		(a)	(b)	(c)	(d)	(e)

3   (A) To what extent can improvement in social skills (i.e. ability to balance between problem solving and concern for the feelings of others), Responsiveness(i.e. speed ,quality and appropriateness of response) and transparency (fairness and openness in dealings) of police help to improve service to the common people?

(a) Fully.(b) To a great extent (c) to some extent (d) to a little extent (e) Not at all

(B) What are the ways in which the following can help to improve performance of police and what are your proposals, if any, for the same? (The recommended

solution may be given against each item. You may add to the list, change their order, etc)

1. Social Skills	Use of IT	Recommended IT Solutions
(a) Communication Skills	Yes/No	
(b) Empathy		
(c) Sympathy for the poor, illiterate, downtrodden etc.	Yes/No Yes/No	
(d) Consideration for women, children, aged etc.	Yes/No	
(e)		
(f)		
(g)		

2. Transparency	Use of IT	Recommended IT Solutions
(a) Fairness	Yes/No	
(b) Sharing of information with the press for the information of the public	Yes/No	
(c) Prompt supply of documents and other information to which public have a right	Yes/No	
(d) Prompt registration of cases and receipt of complaint etc.	Yes/No	
(e)		
(f)		
(g)		

3. Responsiveness	Use of IT	Recommended IT Solutions
(a) Prompt visit to the scene of crime/incident	Yes/No	
(b) Display of an attitude of care and concern	Yes/No	
(c) Attentiveness to the public	Yes/No	
(d) Better supervision by senior officers	Yes/No	
(e) Issue of Hand Book containing information on police matters, procedures etc. for guidance of the public	Yes/No	
(f)		

4. What are the areas in intelligence and security work where IT can play an effective role? (You may add to the lists, change the order, etc.)

A. Intelligence Work	Use of IT	Recommended Solution
1. Management of information system	Yes/No	
2. Interrogation reports	Yes/No	
3. Enquiries and verifications	Yes/No	
4. Monitoring the performance of officers	Yes/No	
5. Activities of foreigners	Yes/No	
6. Watch on organizations receiving substantial foreign funds	Yes/No	
7.	Yes/No	
8.		
9.		

B. Security Work	Use of IT	Recommended Solution
1. Security of vital installations	Yes/No	
2. Departmental security	Yes/No	
3. Matters of personnel security like verification for employment, sensitive jobs/assignments etc.	Yes/No	
4. Watch on security suspects, places, activities, etc.	Yes/No Yes/No	
5.		
6.		

5. What in your view are the problems in order of priority that will have to be faced while introducing IT tools as an aid to police work?

1.

2.

3.

4.

5.

6.

Etc.

6. List <u>in order of priority</u> the essential requirements that have to be met to successfully make use of IT for police work?(you may add to the list, change the order,etc)

    a. Training of officers and men in_____☐

    b. Recruitment/ Hiring of more IT savvy officers and men   ☐

    c. Restructuring of the organization i.e. changes in the organizational structure, levels, roles etc. ☐

    d. Reengineering of the processes i.e. reporting system, functional roles and responsibilities etc., ☐

    e. Improvement in the communication system ☐

    f.   ☐

    g.   ☐

    h.   ☐

7. (A) Do you agree with the view that too much hype is made about the role of IT in improving governance including policing?
(a) Fully (b) To a great extent (c) to some extent (d) to a little extent (e) Not at all

(B) If yes what are the reasons for it?

8. (A) What are the instances of successful use of IT in police and criminal justice system in general that have taken place in your department, state etc.?

    1.

    2.

    3.

    4.

    5.

    6.

(B) What benefits have you experienced/seen from these?

    1.

    2.

    3.

    4.

    5.

    6.

Abbreviations

Abbreviation	Full Form
ADG	Additional Director General
AP	Andhra Pradesh
ASCI	Administrative Staff College of India
BC	Backward Class
BPR&D	Bureau of Police Research and Development
BRS	Base Receiver Station
BSF	Border Security Force
CAD	Computer Aided Dispatch System
CBI	Central Bureau of Investigation
CCIS	Crime Criminal Information System
CCTV	Close Circuit Television
CD	Case Diary
C-DAC	Center For Development of Automated Computing
CIA	Central Intelligence Agency
CID	Criminal Investigation Department
CISF	Central Industrial Security Force
CMC	Computer Maintenance Corporation
CMOS	Complementary Metal-Oxide Semiconductor
COD	Core Of Detectives
CPU	Central Processing Unit
CRC	Cyclical Redundancy Check
CRPF	Central Reserve Police Force
DIBS	Data Image Backup System
DIVA	Digital Integrity Verification Authentication
DM	District Magistrate
DOJ	Department of Justice
DOS	Disk Operating System
DR	Dispute Resolution
Dy.SP	Deputy Superintendent of Police
EIR	Equipment Identity Registrar
EOW	Economic Offences Wing
EPD	Electronic Parts Department

FACTS	Fingerprint Analysis and Criminal Tracking System
FAQ	Frequently Asked Question
FIR	First Information Report
FSL	Forensic Science Laboratory
GB	Giga Byte
GD	General Diary
GIF	Graphics Interchange Format
GIS	Geographical Information System
GPF	General Provident Fund
GSM	Global System for Mobile Communications
GUI	Graphical User Interface
HCL	Hindustan Computers Limited
HLR	Home Location Register
HTML	Hypertext Markup Language
IB	Intelligence Bureau
IDE	Intelligent Drive Electronics
IG	Inspector General
IIM	Indian Institute of Management
IISC	Indian Institute of Science
IIT	Indian Institute of Technology
IMEI	International Equipment Mobile Identity
Interpol	International Police Organization
IP	Internet Protocol
IPC	Indian Penal Code
IPS	Indian Police Service
ISP	Internet Service Provider
IT	Information Technology
ITBF	Indo-Tibetan Border Police
Kbps	Kilobytes Per Second
KVA	Kilo Volt Ampere
LA	Los Angeles
LAI	Location Area Identifier
LAN	Local Area Network
Mbps	Megabits Per Second

MCD	Municipal Corporation Of Delhi
MFT	Master File Table
MHA	Ministry Of Home Affairs
MOB	Modus Operandi Bureau
MP	Madhya Pradesh
MPDA	Maine Professionals Drivers Association
MS	Microsoft
MSC	Mobile Switching Center
MVI	Motor Vehicle Inspector
NCRB	National Crime Records Bureau
NDMC	New Delhi Municipal Corporation
NGO	Non Governmental Organization
NIM	National Intelligence Model
NPA	National Police Academy
NTFS	New Technologies File System
OS	Operating System
PC	Personal Computer
PCI	Peripheral Component Interconnect
PIN	Personal Identification Number
PIS	Personal Information System
PM	Post Mortem
PS	Police Station
PSMS	Police Station Management System
PTC	Police Training College
RAM	Random Access Memory
RDO	Revenue Divisional Officer
RMO	Resident Medical Officer
ROM	Read Only Memory
SB	Special Branch
SC	Scheduled Caste
SCOOT	Split Cycle Offset Optimization Technique
SCRB	State Crime Records Bureau
SCSI	Small Computer System Interface
SI	Sub Inspector
SIM	Subscriber Identity Module
SMS	Short Message Service
SP	Superintendent of Police

SPG	Special Protection Group
SRS	System Requirement Studies
SSB	Special Services Bureau
ST	Scheduled Tribe
UP	Uttar Pradesh
UPS	Uninterrupted Power Supply
USB	Universal Serial Bus
VHF	Very High Frequency
VIP	Very Important Person
VLR	Vehicle Location Register
VVIP	Very Very Important Person
WAN	Wide Area Network

TABLE –1

State	CCIS* Packages	PSMS* and Other Police Station related applications	Other applications	Comments
Andhra Pradesh	CCIS data in respect of all the 7 forms being entered from 1996. Extent of backlog over 30 %.	E-cops as a package for total computerization of Andhra Pradesh Police is being implemented partially in Hyderabad, Vijay Wada and Vishakapatnam cities and Srikakulam district since September/October, 2002. Cyberabad Commissioner-ate and a few districts were to start this year. In some units, in addition to the CCIS forms, email etc, some Police station registers, CDs,	1) Recruitment process 2) Digitized F. P.system 3) 'Intelligence Messenger system' for reporting on incidents, law and order matters and other items of interest to Special Branch.	**Some re-engineering has been done to reduce the no. of returns** at different levels, esp. P S and dist **and to build templates for routine ones.** Better **transparency, responsiveness,** better supervision, and **reduction in no. of returns.** public yet to feel **the change.**

TABLE –1

Arunachal Pradesh	CCIS package (FIRs, Crime Details, Arrests, Final Reports and Property detail forms) in use since Oct.1994.12874 records created by august 2004.	PS level databases also. In databases. Police stations are yet to be given computers. 8 P.Ss may get it in 2004-05.	Port building, motor vehicles and crime in India software of NCRB in use. Payroll, comparative crime statistics, monitoring of departmental enquiries/ suspension cases, transfers and postings and daily situation reports from districts are done through computers.	
Assam	From 1999, data about FIRs, arrests, and property initially seized are being entered.	No PSMS scheme is in use(Computers given to police stations at district headquarters only)	At district level, word processing and some local applications only are in use.	Computerization is yet to make noticeable progress.
Bihar	FIRs and Charge sheets/Final Reports are being entered from 2000, but discontinued after entering 2,800 records due to some technical problems.	No PSMS and no computers at police station level.	Data about vehicles lost and recovered are being kept in SCRB. Databases on accidental deaths, suicides etc are being prepared.	Familiarization of men and officers, entry of CCIS data, creation of useful applications and supply of computers to all units/police stations to handle issues of public interest may be beneficial.

TABLE –1

			Chandigarh
Chandigarh		Payrolls, PIS, Traffic challan system, Complaints management system, Passport verification system etc computerized.	SCRB, which has very limited manpower, is being strengthened. Being a newly formed State, any worth while progress is yet to be made.
		No other application is in use. Some training on fundamentals of computers, MS-Office and introduction to Internet is being given.	
Chattisgarh	Police stations are yet to be given computers. About 100 may be given this year.	In most of the districts only FIR form is being filled up.	
Delhi	PSMS is yet to be taken up and also supply of computers to PSs.	Entry of only FIRs, Arrests and property initially seized in CCIS forms. Crime Branch staff entering the CCIS data complained of Hardware and software Incompatibility.	Computerization work is mostly limited to police headquarters and that too to administrative matters. Different operational branches, however, have some databases locally built up. The people would benefit more from computerization at police station level, which is yet
		PIS, Packages on House allotments, transfers and postings of junior level officers, Pay, GPF, income tax, budgeting, ledger entries, purchases, licenses of hotels/restaurants, arms and ammunition, places of entertainment, etc in databases at police hqrs. Ops group, S.B., Crime, Economic offences wings, D C Ps in the field, etc have some local databases. GIS based applications for traffic, police stations, special operations; Internet and single window system for non -FIR related complaints at District level etc are being planned. A LAN exists for senior police officers. A Computerized Area Traffic Signal Control System 'Split Cycle Offset Optimization Technique (SCOOT) based on actual traffic, using a Digital Alpha Computer in Teen Murthi traffic lines, is being tried as a pilot project in some busy areas. A computer based Interceptor System against over speeding vehicles	

TABLE –1

			is also being tried to computerize traffic control system. Facility for SMS based queries for public about stolen/unclaimed vehicles, passport verification, police station tel.numbers, and stolen firearms.	to commence.
			A System Required Studies (SRS) has been done to evolve a systematic and holistic model for computerization of Goa police and follow up action is being taken to cover different offices in LANS and the entire State in a WAN whose servers will be located at the police headquarters.	Though much progress has not been made, completion of SRS, interest in computerization seen among officers and staff may speed up the computerization work.
Goa	Some data entry about FIRs, Crimes, arrests, etc has taken place in respect of data from ____ . Some local databases are in use in CID.	Computers given to a few police stations of Panaji. Some local databases needed for day-to-day operations, word processing etc being done. PSMS is yet to be evolved.		

TABLE –1

State				
Gujarat	Data entry in respect of 7 forms of CCIS is being done since 1996 (6 lakhs records done) in respect of I P C and Central Acts cases. Dial up connectivity exists between districts and police stations. Gujarat State WAN has links up to taluk level and hence data transfer, emails upto taluk level is easy.	NO plan for PSMS has so far been evolved.	Accidental deaths, suicides, monthly crime statistics etc based on NCRB Packages. Portrait Building System and database on stolen/ recovered vehicles maintained at State and district levels. MOB, PIS, Pay roll, IPS service records, transfer details, assembly questions, training, gradation list, inventory details, departmental enquires, petrol consumption of vehicles, income tax, police medal matters, training programme in PTC etc in databases. LANs and some local software in use at Dist level. State WAN is available. Email facility up to taluk level.	A number of training programmes on CCIS applications, pc operation, office automation, computer fundamentals etc are being organized.
Harayana	CCIS form about FIR is being entered since 1995.	No PSMS has been made for computerization at Police station level, but computers given to all police stations.	Database has been created for issues of identify cards. Fingerprints are digitized using the FACTS software of CMC. PIS, pay roll, Inventory/Stores management, Vehicle management through computers. Data on lost and recovered vehicles, missing persons/unidentified dead bodies, crime statistics, accidental deaths/suicides, firearms, portrait building software etc in use in SCRB. State has its own website Harayanapolice.com	All Police stations, district and other units, and up to Assistant level in police hqrs given computers. Applications other than word-processing especially those useful to the public are yet to pick up.
Jharkhand	FIRs, Charge sheets and	No PSMS or no	A LAN is in use in CCIS cell.	

TABLE –1

	Final Reports are being entered from 2000 with nearly 50% completion.	computerization at police station level.		
Karnataka	CCIS being fully implemented since 1991 with nearly 30% backlog only, which is a major achievement. Data integrity, however, yet to be ensured. Local language interface being planned.	A PSMS package is being prepared with the help of Wipro. Some templates in use in some police stations of Bangalore, Tumkur etc. as part of office automation .E-beat system being tried in some P.Ss in Bangalore, Hubli, Mysore etc.	1) NCRB's Portrait Building system given to all police stations. Database on vehicles lost /recovered is available at district level. 2) A WAN and video conferencing system connects police headquarters with districts. 3) Payroll, crime review, MOB, Automobile thefts, fortnightly crime statements, counterfeit currency cases, disposal of IPC cases, visa extension cases, history sheets, progress of cases case diaries, training management, budget, inventory, personal particulars of Dy.S.Ps, Inspectors etc. in police headquarters etc in databases. 4) **FPs digitized using 'Zygox' software.** 5) **E-bidding/tenders, e-attendance, computerized project management etc being trend** in state police housing corporation' 6) 'Epiplex' e-learning package in use for training police personnel in applications.	1) A cyber crime unit under COD. 2) All police stations given atleast one computer. 3) Computer training units being setup at district level. 4) e-mail and file transfer facility up to dist level through data lines and to P.Ss by dial -up. 5) **The progress computerization is quite systematic and overall progress is very good**
Kerala	Data entry in respect of FIRs from 1995(over 17,000 records completed).	PSMS not yet taken up, but a police station record	1) FIR in traffic cases is being done through CCIS from August 2003. Geographical Kerala accident management system for traffic police is being developed. Also a vehicle tracking system for	A Kerala police intranet site with information on active criminals,

TABLE –1

	Absence of Malayalam interface and non-availability of reports locally needed are major problems.	management system to keep crime records, administration and man management being tried.	sabarimala pilgrimage. 2) Public are using NCRB database about stolen /recovered vehicles. 3) Email facility available with the district headquarters. 4) Payroll system and PIS have been computerized. 5) Soft wares for Vigilance and Anti-Corruption Bureau cases, Crime monitoring room for major crimes, M.O.Criminal Information System, Monthly Crime Proceedings/Crime statistics (P S to state level), arrests in property offences, road accidents, Excise/Abkari cases in use. 6) SCRB has some special databases on cases of narcotics, forest and hill products, sandalwoods, counterfeit currency, explosives, hawala, tax evasion etc.	MO B criminals, sensational cases, Departmental circulars, crime bulletins, tel.directory, I.T act, crime and law bulletins, etc with dial-up access. Computerization, esp. at public interface level, is yet to show progress.
Madhya Pradesh.	Data from 1995-96 in CCIS forms with over 18,lakhs records, but some backlog exists.	No PSMS in use except in Indore city where it is being tried at local level. In other police stations with computers, generally only word processing is being done.	1) Database on stolen/missing vehicles and Portrait Building software of NCRB are available at district level for public use. 2) Soft wares for Pay roll and other accounts matters, receipt and despatch, vehicle management, dossiers, parole etc in use in police hqrs and some units. 3) Madhya Pradesh Police website from 2003 has following facilities (a) lodging of complaints and follow up (b) provision of information on crime and criminals by the public (c) information on missing persons, vehicles /unidentified dead bodies (d) information about police headquarters (e) telephone numbers and particulars of all police stations, (f) information about senior police officers, their	State SCRB is well organized with good training capabilities. Computerization at police station level and creation of useful databases yet to take off.

TABLE –1

Maharashtra	Computers under CCIS project have been installed in Commission rates and districts. SCRB server has at present a total database of nearly 16 lakh records covering data from 1998.with nearly – % penndancy.	NO PSMS package in use. But, some P.Ss in places like pune have computers where in a lot of data needed for day-to-day operations are stored.	postings, transfers, gradation lists, details of retired officers etc,(g)crime in India and in MP, (h) Tenders issued by MP Police (i)information on general traffic rules, rights and duties of citizens, Community policing etc 4) A 128 KBPS Internet gateway at Bhopal with a firewall proxy server and e-mail facility. There is a Gigabit connection linking the police headquarters, Home Department and other police officers at state capital through 5 servers and 235 outlets 5) Computers given to all senior police officers including Dy.S Ps in civil police. Since 2000, computers being given to police stations. . 6) Digitization of district wise F.P. records centrally at Bhopal with the help of CMC was being done. 1) In Mumbai, databases on Organized gangs, digitized F.Ps, software for Mobile and Land tel interception, PIS, Payrolls, Buildings data, Recruitment data, weekly statistical weekly report, Jail inmates, arrests in property cases since 1931, MOB, stolen cars, arrested, wanted, proclaimed offenders, MPDA detentions, encounters, shootouts, seizure of fire arms, etc are in use in Commissioner Police. 2) A more user friendly Portrait Building System in colour is being proposed for purchase. 3) In police stations of Pune which have been given computers, local databases on criminal gangs, sensitive localities, important establishments like Banks, Schools and Colleges, Temples, Mosques	Though a systematic System Requirements Study (SRS) was done involving CMC and experts for computerization of maharashtra police systems, no follow up action was taken. Hence, computerization at P S level in dists has not

TABLE –1

			and other religious establishments etc which are important from the operational point of view are being kept. 4) Efforts are on to prepare GIS applications like patrolling system for the city with the help of Kalyani Computer Systems.	taken off.
Manipur	CCIS forms introduced in 1995. NCRB computers installed in October 2000 and record maintenance started in March 1, 2000	No PSMS or PS level use of computers	Some software for management of Manipur Police Risk fund, posting of police personnel and similar applications have been started Efforts to take up publications relating to establishment and accounts matters, LAN, WAN, Police website, etc are under planning stage	
Pondicherry			PIS, Payroll, home guards pay roll, payment of arrears, Motor Transport Management details, case disposal information system, traffic warning/ violation data etc in computers.	
Punjab	CCIS forms are being filled up from 1-1-2004.	No PSMS.	1) Data about stolen /recovered vehicles given to public at 3 places @Rs.20. 2) F.Ps are digitized on CMC system 3) NCRB database on arrested and wanted persons, Lost /recovered weapons, missing persons etc being used. 4) Pay roll, GPF, Identity cards etc computerized in some dists. Also local databases for GP F,I T returns, Establishment matters,crime related matters,P I S,deployment of security personnel etc in data bases in some dists. 5) LANs exist at Police hqrs, PTC Phillaur and a few Community Policing Centers where	Computerization at Police station and creation of useful databases are yet to take place as also entry of CCIS data.

TABLE –1

			public can make enquiries about passports and other matters of interest to them. 6) Amritsar, Bhatinda, Ludhiana, Tarantaran and Kapurthala have, at dist hqrs, on their own initiative, set up a single window system to handle public complaints. 7) Generally, at dist hqrs, 4/5 computers have been given. In 5 dists, even police stations have been given computers. ISDN lines connect police hqrs to dists. Email facility exists between dists and police hqrs.	
Sikkim	Data in 4 CCIS forms viz. FIR, Crime details Arrests and Property seized being entered from.-----.-- -% Back log	No PSMS in use.19 of the 27 police stations given computers.	Pay Roll, PIS, Arms Records computerized. Some periodical reports for internal use also in computers. A LAN at police hqrs with 100 MBPS speed. A WAN being planned.	The benefits of computerization have been basically for internal management.
Tamil Nadu	FIR form is being filled up in all cases from-- and others only in cases involving property, murder and unidentified dead bodies.	A Separate system for computerization of police station work proposed, yet to be approved.	1) Databases to purse public complaints, press write-ups on police, and daily sitreps in some areas of Chennai Commissionerate are in computers. 2) Portrait building system of NCRB has been given to dists, actual use very limited. 3) To give guidance to women police stations and other officers investigating or dealing with women related cases/problems, a guidance/expert system is being used through a server in PTC, Chennai to which access through dial-up is available. 4) Police hqrs, Chennai city police, economics offences wing, and a few districts have their own websites. 5) GIS is available up to district level with	**Use of guidance system for women related cases, Complaints and press write –up management system of Chennai are good applications.** Creation of databases, entry

TABLE –1

State				
			capability to load even police station level data. 6) Email, voice mail and fax operate up to dist level through police's microwave system. A WAN linking all PSs is proposed. 7) Fingerprints of suspects are kept in digital format. 8)At dist level, a few local databases are in use	of all CCIS data and computerization at police station level to benefit the public are yet to take place.
Tripura	FIRs, crime details, arrests, property seized, Firearms etc. data from 1.1.2001in computers.	A trial version of PSMS of NCRB modified to meet the States needs is ready, but yet to be tried.	A trial version PIS is available, but yet to be used. Payroll, data on extremists, interrogation reports etc are in databases in Special Branch and some districts.. Digitization of fingerprints is under consideration.	
Uttaranchal	No serous data entry in respect of CCIS forms is seen. It was stated that difficulties are being experienced about Hindi version of CCIS and translation of FIRs in hindi to English.	PSMS yet to be planned. Computers are yet to be given to P.Ss.	1) Computers given to senior officers, different units at the headquarters. Dist SPs, Intelligence wing.etc .Use is mostly limited to word processing applications 2) Fortnightly crime reports and statements of monthly expenditure only are now coming as data. Some intelligence and security related reports, and daily crime reports from dists are proposed to be started soon	The state is new and SCRB/DCRBs are yet to be formed. Computerisation work yet to receive attention.
Uttar Pradesh	Data entry about FIRs of	No.PSMS is in	1) NCRB's Portrait Building System has been	70 server and 866

TABLE –1

	IPC cases is being done. Progress is marginal and only 107853 cases have so far been entered.	use.P.Ss of Lucknow and Gautam Budh Nagar dists have only been given computers.	implemented with effect from 1994,but so far only 324 photographs were generated with success in 84 cases. 2) Software packages for Fortnightly crime reports, special report cases, nominal rolls, mafia information system, pay roll system, traffic challan system, Library management system etc exist. Actual use is very limited and that too to pay roll, nominal rolls, special report cases, traffic statistics, mafia information system, portrait building system etc 3) Up police has it's own website uppolice.up.nic.in.which is quite modern and informative. 4). Dist, Range, Zonal and other units are connected to NIC centers through dial-up 5) Digitization of F.Ps is proposed using FACTS system of CMC	Client computers in use, mostly for word processing applications and local databases. **Some useful applications like, Thana management system, Mafia /gang information system, monitoring systems for complaints, Innvestigations, EOW, VIP security etc are available in SCRB, and worthwhile progress is yet to be achieved even in respect of CCIS data.**
West Bengal	FIRs, crime details, arrests, property seized, charge sheets/final reports are entered in all police stations from 1996.	No PSMS is in use, but a 'Thana Criminal Tracking System' is in	District and State level Criminal Tracking systems getting data from police stations/districts are operational. The State Criminal Tracking System is web based. State WAN maintained by WEBEL Connects police headquarters to districts. Police stations are linked with dialup.	

TABLE –1

Calcutta Police In Calcutta police FIRs, Crimes, property, arrests etc are being entered from 1.1.2003. FIRs of some Minor Acts are not being entered.	operation in police stations to store data on crime and criminals, their activities, locations etc. Local databases, daily reports to senior levels etc in computers/throu gh email.	Email system is effective and used by all. Police personnel management system, packages for Inventory management and Stores Management, Vehicle Management System (digital MTO) accounts and budgets matters etc are in operation at police headquarters. A document tracking system and computer processing of files with the Government are in operation. In police hqrs. **Calcutta Police** In Calcutta police, processing of licenses for arms, footstalls, visa extensions, payrolls, vehicle management systems, warrant and arrests etc are in databases. Similarly, traffic police have databases on traffic information and structures, Traffic citations and also an Interactive Voice Response System in computers. LANS are used in Traffic between computer cell, traffic guards and headquarters. Data on. Stolen/recovered vehicles are available for the public in Commissioner's office. Daily situation reports, disposition lists etc are sent through email.

Name of CPMF or CPO	Operations related Applications.	Administration/Accounts related	Other applications	Comments
Assam Rifles	Monthly crime report	Soft wares for administration of units, legal issues, vigilance cases, officers' matters, EPD stores,	Carrier, CTS, Golf, dental cases, etc	
Central Bureau of Investigation	FIRs, Plan of action for investigation, evidence analysis, statement of witnesses and accused, witnesses details, comments of officers, disposal of the cases, dossiers, bank statements, calculation of disproportion of assets, modus operandi, legal database, telephone system analysis	PIS, Payroll, Budget, Inventory Management, Vehicle details, accommodation etc managed through computers.	Divisions and policy division modules, travel details, RBI guidance etc.in computer databases. Also storage, analysis and generation of statistical data.	Network covering the whole country and computerization of work has made good progress.
CISF		PIS (including postings, Seniority level, ACR details), Management of Non-government funds (like risk, medical, welfare, education), cash books, bank drafts, in and out registers, loan accounts reminders, disbursements, personal, financial operations, procurement etc. using softwares.	LAN is in use for mails between different branches at the hqrs.	

TABLE - 2

CRPF		Payroll, GPF and other accounting packages.		
ITBP		Payrolls, Accounts packages, special selection board, pension matters, cash monitoring system, diary monitoring system etc in computers	Motor vehicle coordination	
NCRB	Packages developed for crimes and criminals system(C C I S), PSMS, PIS, Firearms coordination, Training management, Talash' System, Prosecution management, Jail management, Forensic Labs, History sheets,	Inventory management, Financial Accounts coordination, ACR Tracking System for MP.		
SSB		Payroll system for headquarters and battalions in respect of non-gazetted staff, receipt and dispatch system for headquarters, SOs diary to keep track of branch work etc using softwares.		

TABLE -3

State	Website Address	Website Details			Points to note	General Remarks
		Crime Matters	Community policing and other Service matters.	Other professional Issues		
Andhra Pradesh	www.apstatepolice.org	Crime scenario review, Case status, Usage Reports, Kidnapping, Murder, Unidentified persons, Arrested Persons, Most Wanted, Motor Vehicles Recovered, Traffic Accidents etc	Women Protection Cell, 'maitri' Committees (for Community policing) Complaint Desk, public interface--Citizen's Rights, How to report an offence and to whom, Journey of a FIR/ case progress, Permissions, Rules and Licenses (for newspapers, magazines, periodicals, PSOs, escorts, arms and ammunitions, explosives, mild blasts, cine theatres, hotels/restaurants etc). Offences and Penalties, Traffic rules, fines, parking Beware of (house breaking, thefts, cheating, etc), May I help you-, crime stopper cell, rakshak/colt patrols, traffic monitors, women protection cell, complaint desk, Organizing youth thro sports, youth clubs, rehabilitation of surrendered, good behaviour certificate to rehabilitated, gram sabhas, social welfare hostels community centers, facilitating drinking water, etc (to contain extremist influence).	Organizational chart, search for 'who is who', Units, Medals, Fascinating facts. Foreigners' Registration and immigration, Pak Nationals, Visa Extension, Police Clearance Certificate, Emigration Clearance Rules, Tenders. Traffic Monitors, Be a cop., missing heroes, those killed etc	Stress on guidance to public, community policing, efforts to contain left extremist influence among youth.	
Assam	www.assampolice.com	Most Wanted, lodge a FIR, crime stopper (complaint to DGP, IG (L&O), etc from any where)	Community policing, Traffic and Tourist information, Citizen's rights, Security tips. Public utility (tel. no of PSs and other police units, hotels, hospitals, bus timings, fire, ambulance, Indian airlines, etc. in Guwahati), help line for women	News letter, Missing persons, Motor Accidents, parking areas in Gauhati, traffic fines, Events, write ups, Missing persons, etc	Considerable information for the public including web site registration of complaints	Some details yet to be done. Some data out of date.
Delhi	www.delhipolice.com www.delhitrafficpolice.nic.in	Crime Trends. Wanted/most wanted, kidnapped kids, etc.	Help lines for neighborhood watch, women, etc. servant verification, auto thefts, Citizen's charter, Delhi Traffic police information (speed limits, compounding of offences, restrictions on movement of vehicles, road safety tips,) Guidelines for foreigners/ personal security, safeguards for women, SMS queries enabled in respect of vehicles, passports etc,	History, organizational chart, Stolen/unclaimed vehicles. Press Release	Fairly good traffic police site. Community policing missing. Information useful to public limited. No dynamic data, computer registration of complaints, information on progress of case complaints etc.	
Goa	www.goapolice.com	Crime update Most Wanted, statistics of Narcotic cases/ Gambling Cases, accident report analysis	Citizen's charter, bulletin board, Incase of Emergency, Drugs and youth, Tips for tourists, Tips for women, Traffic Rules, Driving Safety, Incase of accident, traffic signs, traffic offences, Help yourself, Foreigners' forms	Organization Chart, Manpower, Police stations, Anti Narcotic cell Vigilance cell	Stress on guidance to public	
Haryana	www.haryanapolice.nic.in	Crime trends, achievements	Tips for citizens -FIR lodging, house and road safety, safety in running trains, tel nos and email addresses of all senior officers, help line for complaints /suggestions. All tel nos of P Ss and other offices given on dist web sites		Too many photos/ pictures. Some sites yet to be developed. Stress on information useful to the public.	

TABLE -3

State	Website	Most Wanted / Missing Persons	Stolen Vehicles, Guidelines for Tourist, Maps, Tips for citizens, Helpline	Be a Cop / New Initiatives	Stress on supply of information/guidance.	
Himachal Pradesh	www.hppolice.nic.in					Data driven applications can be given
Karnataka	www.karnatakastatepolice.org	Crime Statistics, Criminal Intelligence Gazette (Missing/wanted persons, escaped prisoners, narcotic and forest offences,), unclaimed/recovered vehicles, counterfeit currency, dowry, accidental etc deaths, most wanted (including rewards for them)	Other sites, motor vehicle verification counter, help line (emergency, elders, women children,) email addresses of all senior officers including Dist. S.Ps,	Mission Statement, Citizens charter, Karnataka State Police Manual, tenders, arrangements for elections, recruitments	Too many photos on home page. Nothing on community policing. down loadable forms complaints registration, their progress etc,	
Kerala including Trivandrum city police	Www.keralapolice.org www.tvmcitypolice.org		Trivandrum city. Community policing focus with facility for complaints, online services for passport enquiry, follow up, facility to give information, discussion forum. facility to raise questions and get answers form local officers, help line for missing, unidentified dead bodies, unclaimed vehicles, citizen page for blood donation	Trivandrum city Foreigners' rules. Registration, messages, news bulletins, opinion polls, today in city (news) links with other city police units like Bombay Delhi, site map.	Kerala police site is difficult to access without much useful information for the public. Trivandrum city police's site is good with a community interaction portal focus on community policing focus, but no crime data /review	Kerala police site needs better access.
Madhya Pradesh	www.mppolice.nic.in	Crime data (under construction) criminals wanted, arrested with query facility for names, dist, age etc., habitual offenders	Write up on community policing, stress on community involvement. guidelines, etc. Rights and duties of citizens, traffic rules, Downloadable forms for arms license, foreigner's registration, vehicle enquiry about stolen ones, information to police	Annual admn.report, gradation list of officers, transfer orders, tenders. lost and found- unidentified dead bodies, missing persons arms, property and vehicles (with search facility)	A fairly good site with accessibility problems	
Maharashtra	Mumbai www.mumbaipolice.com	No crime data. Most wanted, intriguing cases,	'Police and you' covers whom to contact for help, alert citizen line for giving help to police, Anti- extortion cell, precautions /self help for residential areas, vehicle theft, communally sensitive areas, guidance about (emergency situations, double money schemes, gulf jobs, property purchase, banking precautions, accidents, licenses, drunken driving, pollution, regulation of nuisance etc). Contact persons for licenses, hotel, ticket selling etc, licenses, police band, pass port verification, foreigners registration, application for fairs, melas and important functions, loud speakers, localized processions, Preventive tips	Police time covers some interesting facts about police and police related matters. , Be a cop,	An extremely good site as far as guidance to public on matters concerning them is concerned.	
	Pune www.punepolice.com	Daily Arrested, Accused Most Wanted/beware criminals list, Steps against crime, cyber crime unit, cases registered in last 24 hours	Aid Police Unit, Licensing, help line, Stolen vehicles, Neighborhood watch committee, mahila panchayat, and precautions against housebreaks, cheating, and instructions for vehicles Missing persons. Servant and other verifications, Motor Accidents	Property Recovered, Unclaimed Property, Unidentified dead bodies, Juvenile Aid, different braches in C.P.'s office, Motor accident data, recovered property, Foreigner's registration,	Community policing efforts seen. Efforts to give information and help to public	Many items of data out of date

TABLE -3

	Website			
Punjab	www.punjabpolice.org	Crime Bulletin, Lost and Found, Most Wanted, Absconders, Missing persons	Safety tips for homes, vehicles, persons/child, and property. Public information alerts on issues like fake notes in circulation, public guidance on issues like arms, public information on chandigarh, useful tel nos.	Unidentified dead bodies, police related news, information on retired and retiring officers, skills (cover operational commandos, FSL, FPB, computers, wireless etc) achievements in sports, Medal winners	
Rajasthan	www.rajpolice.nic.in	Crime statistics for the last 3 years about different types of crimes including those under local and special laws with comments, on changes etc.	Detailed Crime prevention tips of various types, Help lines of different types (some under construction), detailed FAQs to give detailed guidance to public on police matters	Incidents, Suspects list, Police misconduct.	Very useful and detailed crime prevention tips, guidance on police procedures. Help line etc tel no of all places /officers, but no downloadable forms.
Tamil Nadu	Www.tn.gov.in/police/home.htm	Crime Profile showing major crime (1999-2002), Crime prevention (yellow/blue/regular patrols in Chennai, slum adoption prog, association of NGOs), Friends of police (for patrols, traffic assistance, crime prevention, intelligence, bandobust, law and order, prohibition), Crime stopper (computerized system for information and prompt follow up, redress of public grievances, prevention of arrack cases/ gambling, village vig, committees, self –help groups).	FAQs covering various police related matters, links to various related sites of the state like fire and rescue services, prison, training college, Chennai traffic police, chingelpet range etc. Comprehensive Policy note of Chief minister on police matters, contact tel nos at all places. Missing persons. Women Help line (for dowry, domestic violence, harassment by in –laws, alcoholic spouses, prostitution, sexual harassment, love related cases, promiscuity, female infanticide, bigamy, street fights, child harassment, missing children/girls) etc.	Organization, Modernization, Welfare, Recruitment Photo Gallery	Very informative with systematic representation of facts on police matters including tel nos of all P.Ss, senior officers, but no dynamic data, not much guidance /assistance to public, too many photos on home page. Difficulties in accessing
Uttar Pradesh	www.uppolice.up.nic.in	Identifiable. Crime trends, most wanted, Lost /recovered arms, lost /recovered autos, missing persons, dead bodies.	**Services.** Fortnightly crime report, Nominal roll system, Download applications software, Police IIFS. **Citizen's charter.** Facility to send complaints to officers of different levels including DGP. **Help line. Dos and don'ts** -- Kidnapping and hostage survival-safety at home, while traveling, at residence and office. safety Tips. For women at home, for frequent female travelers, 4-wheeler safety, for a child's dos and don'ts, schools must adopt, you must remember while going on vacation, request to your neighbor for. **Links.** India and abroad – links to police websites in India, links to IPC, CrPC and other sites where different provisions of Laws could be referred to, DNA and other sites of interest.	**About Us.** General, Police Welfare Schemes, Achievements, Sports event, Police modern schools, Police guesthouse. **Organization** Structure, IP S/P P S lists, Deputationists, Other services, medals	A very good site with a lot of useful information and guidance to the public. Crime review is limited to password holders only. Community policing is not covered. The revised home page and linked pages are quite modern, easily accessible and contain a lot of useful information

TABLE -3

West Bengal	www.kolkatapolice.org www.kolkatatrafficpolice.com	Vehicle crime, Computer and Internet related, Missing vehicles, Traced Vehicles. Most Wanted.	Links to CIA, FBI, Interpol, London Police, New York Police, New Zealand police magazine, Miami beach citizens police academy etc. UN and US Government Websites **Contacts.** Public Telephone Directory, Police Telephone Directory, Government Telephone Directory, email addresses of different officers/Offices. **Important Forms**- Driving licenses (learners and regular), Recruitment. **Contacts Us.** Different Units at Lucknow- their telephone and email addresses. **Press room.** Latest Reports/Press Releases, News on police matters. **Police magazine.** Articles in the latest UP Police Magazine	Police Auction, Bulletin
		Personal Safety Consumer Fraud Traffic police's organization, traffic rules, maps, SMS, feedback etc		

TABLE –4

Training Institutions	Website Address	Website Details			Points to note	General Remarks
		Work/ operations related.	Administration related.	Other professional Issues		
Border Security Force	www.bsf.nic.in			Mostly information on its organization, awards, medals, photos, police links, contact us. Tenders, Welfare Units, etc.	General info on BSF only.	
C R P F	www.crpf.nic.in			History, Org structure, career prospects, training, sports and adventure activities welfare activities, news, mission, act and rules, tenders etc	Starts with crpf song. Links to all other central CPMFs. Too many photos.	
CISF	Www.cisf.nic.in/cisf.india.org	Consulting areas, different types of security like Document security, materials security, fire security, why cisf, etc	Tenders, contact us	Mostly on the organization	Mostly general information on the orgn, its training, knowledge areas etc	

TABLE –4

Central Bureau of Investigation	Www.cbi.nic.in/	Wanted Persons, Fraud., Alerts	How to Join CBI	Motto, Mission, Vision, Stress on industry, impartiality and integrity.	Guidance to people lacking and thrust is on the organization, its performance etc
ITBP	www.itbp.nic.in	Gallantry awards,	Tenders	General information on the orgaisation, picture gallery, homage to martyrs adventure sports, police links, news letter etc	Nothing much of public interest other than those for interested in knowing about itbp.
National Crime Record Bureau	www.ncrb.nic.in	Missing Persons	Download FAQ. Details of software developed by it and in use in different states/organization.	Origin, Objectives, Activities Prison Statistics	A good site, but data on software in use in many states are missing.

TABLE –5

City/Organi-zation	Websites	Home site-Salient Features			Points to note	General Remarks
		Crime Matter	Community policing in other Service matters	Other professional Issues		
New York Police	www.ci.nyc.n y.us/html/N ypd/home.ht ml	Crime statistics, most wanted, most wanted terrorists/ Felons, crime stoppers, report line, organized crime control.	Help Resources, Threat Advisory (Severe, high, elevated, guarded and low), Recent Press releases/News, search features, helpful information, traffic information, traffic ticket information on towed vehicles, emergencies, non-emergencies help lines, terrorist hot line, NYPD switchboards.	Counter Terrorism, Missing persons, Reward cases, chief Commissioner and other senior officers, Top Cops, invitation to join New York Police, Memorial pages, police museums, image gallery, pension fund etc. NYPD Bureaus, Patrols, detectives criminal justice, transportation, support services, personnel, internal affairs, housing, training gear, items for purchase, image gallery, photos, vehicles, equipments, careers, auctions, recognized/rewarde d etc.	An impressive website which focuses crime, terrorists, threat advisory and other problem in New York City. (a) Other being helpful to justice and (b) Favorabl e for police etc.	
Washingto n DC Police	www.Mpdc.d c.gov/mains. shtm	Crime Statistics, Crime solvers, Sex offender-registry, police reports etc. Hate crime section.	Working together policing for prevention, services, innovation, Police reports, clearance reports, offence/incident reports, few reports on neighborhood crimes, special events permits (parade, pickets, demonstration, street	MPDC News, MPDC House. Address and other features (Telephone Directory, D.C. Council, elected offices, feedback etc).	Crime solution is a programme involving crime business and media working together to capture,	Stress on feedback on Services. Information to the public on matters of

TABLE –5

					interest
		closing, etc), and applications/permits. Victim assistance, Bill of rights, domestic violence intake center, gays and lesbian unit, victim surveys. Programmes and services, citizen complaints, online service, talk to the Mayor, tips, traffic safety issues, complaints, commendations, etc.	Telephone number to five information, to get cash rewards, feedback on govt-services, service reports, complaints about websites, related links, feedback on way to improve services, 311-non emergency services, ways to improve 911-emergency – steps to improve.	suspects and fight crime, pursue, unsolved cases and marked people.	
Chicago Police	www.cityofc hicago.org/p olice	Under Report and Selection: Annual Reports, Hate Crime Reports, Index crime statistics and other reports. Prevention and safety Taps. Crime alerts, bike safety, child safety, gang awareness, personal safety, seasonal safety, Traffic safety etc. covered. Under Personal safety. ATM, Alley, General, Home safety tips, more home safety tips, public transportation tips, general safety awareness, strategies for women, domestic violence, etc covered. Gang Awareness Information about gangs. Ana use Crime Duty, Etc. Community Policing Details of Beat Meetings, Crime watch and success stories, District Advisory Council, Hotlines and CPD Contacts, How CAPS works, Senior Services. Senior citizens, Chicago Police	Department News Last one month's result of safety checks. Get Involved Community Policing, Employment opportunities, Address to CPD contacts, Missing persons, most wanted are covered.		Advice to the public on safety tips/prevent ion/ 2) Focus on gang crime, Crime reports.

TABLE –5

Los Angeles Police	www.lapdonline.org	Crime statistics, most wanted of different types, crime. Watch related information of different types, reporting crime, cyber crime and related issues, crime prevention tips for community awareness business, disabled domestic abuse, sexual assault, drug abuse, fraud preventions, hate crimes, home and crime tips.	officers. Country policing related matters of different types-			Focus on crime, service to the public (prevention tips) crime repots and out reach programmes, safety etc.
FBI	www.fbi.gov.	Crime related tips. Advice not to open unknown mails, privacy in cyber space, success in fighting computer frauds, of criminal rights. Investigation progress, Anti- , anti theft case, frauds (Governmental, bank, insurance, health care etc) Case interviews, Top FBI Stores.	For the family Tips to parents on drugs, school shooter, internet safety, protection to senior citizens, tips on internet fraud scams. FBI's promotions. Protection of US from Terrorism, foreign institution operation, High tech crimes, cyber attacks, public corruption, email rights protection, violent and white collar crimes, support to study, federal, city, and partners.	Counter Terrorism Tasks Combat terrorism Watch, 24-hour global terrorism center, most wanted.	Crime prevention types Information on cases under FBI investigation, Centralized Territories.	FBI
CIA	The war on Terrorism	Press Releases, and statistics, World fact book-	About CIA, Vision, Mission, CIA Today, At the CIA,		Computer crimes. Threat	CIA

TABLE –5

	What is new at CIA, recent statements, speeches, etc.	information about all centers, club of state, fact work on intelligence, prevention, papers, related etc. For Kids- Who we are and what we do, history of CIA, CIA Intelligence Banklist Spy-Function archives Kids anti- drug page do. 5 categories of (high, elevated,	Tour C/A FAQ's Recent Advisory like at CIA etc. Director of CIA Intelligence Country, CIA Various documentation officers etc. National Institution Different organization camp under it, on intelligence, its collection processing etc.	advisories.
London Metropolitan Police		Reporting Crime, Rogue web/internet sites, cyber crime and related links.		Focused on crime work only.
Singapore Police		Crime related episodes, crime prevention advice, and lodging of police reports.	Certified copy of police reports, application for license/permits, safety and security features, passport Services, civil, emergency, license certificates etc,	Electronic police center-Info on police matters, certified copy of police reports, application for jobs, driving tests and licensing police/prison news.	Stress on facilities of experts needed by police.
Tokyo Metropolitan Police	www.keishicho.metro.tokyo.Jp	Wanted people	What to do in case of earth quakes, to people living in Tokyo, fire arms, hotline information about drug abuse, lost and find applications for police,	Organization of police department	Service approach. 1) Show on firearms, drugs etc.