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TR-07-91
Ottawa Police Department Strategic Information Management System: Phase 2

Comnetix Computer Systems

TECHNICAL REPORT

March 1991

NOTE: Further information about this report can be obtained by calling the CPRC information number (613) 998-6342

Ottawa Police

Strategic Information Management System

Phase 2 Report
March 28, 1991

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1 Introduction

This document encompasses the whole of the Phase 2 Report for the project entitled "Police Strategic Information Management System", sponsored by the Canadian Police Research Centre and supported by the Royal Canadian Mounted Police for implementation at the Ottawa Police.

As a direct result of the preparation of the Phase 1 Report and the analyses executed in the preparation of Phase 2, the project has focused directly on two potential areas for the development of executive information systems. These have been identified when considering the availability of data and the potential value to the executive of the Ottawa Police. The availability of data has been determined being careful to minimize the impact on the existing operational computer systems. Thus, although it would be beneficial to consider the implementation of other executive information systems, it has been considered that the impact of these systems on the current operational information systems would be unacceptably high.

There have been two major challenges to the development of executive information systems at the Ottawa Police. First, systems of data coding have either not been developed or are not compatible across operational systems. For example, a unified system of identifying operational units has not been implemented. This significantly limits the opportunities to provide statistical information at various levels of the Department. Another example is the coding of types of events (i.e. incidents or calls for service). There is currently no identified correspondence between the systems for the Records Management as compared to the Computer Aided Dispatch Systems. At this point in time, the Ottawa Police has decided not to alter its coding structures or consider an integrated set of operational information systems. It is our understanding that the strategy which has been adopted is one that suggests it would be more reasonable to evaluate those alternatives after the observed success of the current project. The impact of these decisions forces the current project to provide executive information on either the RMS or CAD data in isolation. No reasonable integration of the information in the two systems can be identified under these constraints.

It is our understanding that the Ottawa Police is aware of the value of a fully integrated operational data model. As the Department evolves its current systems towards this paradigm, more powerful executive information systems will become possible. We would suggest that a project

might be considered within the Department that will target a specific data model and develop a plan to evolve from the current scenarios to the integrated environment.

Allowing for the current state of automation at the Ottawa Police, the current project has not been able to provide an integrated executive information system across all the operational databases. Rather, it has been able only to define executive information systems for each of RMS and CAD data. This report therefore is structured in two parts. The first focuses on gaining strategic information from the data retained within the Records Management System. The second is aimed at the information that can be constructed from the data in the Computer Aided Dispatch System.

The details of the data requirements, user interface and general internal design are furnished as components of this report.

For the data requirements, this document includes the specifications for the layout of the data files to be furnished by the Ottawa Police. They are predicated on the specific, custom architecture of the data files unique to the Ottawa Police. For each file within each strategic information system, two tables are presented. The first table is organized according to the data files currently used in the operational systems themselves. It shows which fields are to be included or excluded in the download file. Further, if any download fields are to be computed from one or more fields in the operational system, their specifications are detailed in the "comments" column. The second table shows the detailed layout of the resulting download files.

The user interface is specified with samples of prototypical screens. It may be the case that the actual screens developed for the systems vary slightly from the samples provided herein. However, the functionality and intent of the screens will remain as described.

The general internal design is provided so that Ottawa Police technical staff may have suitable knowledge as to the projected processing characteristics of the system. It also acts as a common base of understanding between the technical staff internal to Comnetix and the staff of the Ottawa Police.

2 Operating Environment

The desktop system developed within this project will strive to permit the user to graphically view the provided data at varying levels of aggregation. At the highest levels of aggregation, the information will provide a gross summary of the activities of the Ottawa Police at the most coarse categories. However, the user will have the ability to investigate any returned information at progressively detailed levels of aggregation.

It is understood that the Systems staff at the Ottawa Police will be preparing files to be downloaded to the desktop computers based on the specifications of fields found below. The download files will be prepared on a regular basis, with a frequency dictated by the Department. As well, the same download file preparation programs could be run on an ad-hoc basis, as per the Strategic information needs of the Department. These programs will be developed by the Department's internal technical staff. The objectives of the programs will be to build a file on the Department's central VAX computer(s) that conforms to the field specifications outlined. The Department will also be responsible for architecting the network infrastructure that will permit the transport of the constructed files to the desktop system(s). Once the files appear at the desktop processors, it will be the responsibility of the Comnetix system to delete all previously resident data files and replace them with the new files provided. (Note this means that every download data file must contain the full suite of data available for summary at the desktop.)

3 Records Management System - Crime Analysis

3.1 Occurrence File

3.1.1 File Sources in the Existing Operational System

File	Field Name	Use	Len	Type	Comments
OCC	apartment	no			
OCC	assigned to	√	4	long	
OCC	atom	√	2	word	
OCC	class comment	no			
OCC	current status	√	1	text	1=unfounded 2=charged 3=cleared otherwise 4=unsolved 5=continuing 6=N/A
OCC	damage value	√	4	long	
OCC	date last seen	no			
OCC	date last mod	no			
OCC	reported date	no			
OCC	district	√	1	text	to be provided by OP
OCC	zone	√	2	word	to be provided by OP
OCC	expiry date	no			if it is expired, OP will not provide the record
OCC	final status	√	1	text	0=not concluded 7=concluded
OCC	found value	no			
OCC	occurred from time	*	2	short	the average date and time between the occurred from and occurred to date and times is computed and provided by OP
OCC	occurred from date	*	?	date	see above, please specify format
OCC	how reported	no			
OCC	location code 1	no			
OCC	location code 2	no			
OCC	location type	no			
OCC	lost value	no			
OCC	occurrence number	√	8	text	
OCC	reassigned to	no			if this field has a value, it will be copied into the **assigned to** field by OP
OCC	record status	no			if the record is deleted, OP will not provide the data

OCC	recovered value	√	4	long	dollar value (i.e. no cents)
OCC	remarks	no			
OCC	repeat incident	√	1	text	Y=repeat; N=new
OCC	reported by	no			
OCC	seized value	√	4	long	dollar value (i.e. no cents)
OCC	stolen value	√	4	long	dollar value (i.e. no cents)
OCC	occurred to time	√			see **from time** above
OCC	occurred to date	√			see **from date** above
?	location	√	30	text	format as per the sample file already provided by OP
BMO	exact location	√	2	word	codes to be provided by OP
BMO	method of entry	√	2	word	codes to be provided by OP
BMO	point of entry	√	2	word	codes to be provided by OP
BMO	property taken	√	2	word	codes to be provided by OP
BMO	trademark	√	2	word	codes to be provided by OP
BMO	type of dwelling	√	2	word	codes to be provided by OP
GMO	how attacked	√	2	word	codes to be provided by OP
GMO	location at premise	√	2	word	codes to be provided by OP
GMO	means of attack	√	2	word	codes to be provided by OP
GMO	misc code 1	no			
GMO	misc code 2	no			
GMO	object of attack	√	2	word	codes to be provided by OP
GMO	type of premises	√	2	word	codes to be provided by OP
GMO	robbery code	√	2	word	codes to be provided by OP
GMO	trademark	√	2	word	codes to be provided by OP

3.1.2 Resulting Download File

Offset	Length	Type	File	Field Name
+0	8	text	OCC	case number
+8	2	word	OCC	occurrence date*
+10	2	word	OCC	occurrence time
+12	1	text	OCC	repeat incident
+13	1	text	OCC	district
+14	2	word	OCC	zone
+16	2	word	OCC	atom
+18	30	text	?	location
+48	4	long	computed	X UTM coordinate
+52	4	long	computed	Y UTM coordinate
+56	4	long	OCC	assigned to
+60	1	text	OCC	current status
+61	1	text	OCC	final status
+62	4	long	OCC	damage value
+66	4	long	OCC	recovered value
+70	4	long	OCC	seized value
+74	4	long	OCC	stolen value
+78	2	word	BMO	exact location
+80	2	word	BMO	method of entry
+82	2	word	BMO	point of entry
+84	2	word	BMO	property taken
+86	2	word	BMO	trademark
+88	2	word	BMO	type of dwelling
+90	2	word	GMO	how attacked
+92	2	word	GMO	location at premise
+94	2	word	GMO	means of attack
+96	2	word	GMO	object of attack
+98	2	word	GMO	type of premises
+100	2	word	GMO	robbery code
+102	2	word	GMO	trademark

* Note that the date specification is expected to be presented as a two byte unsigned binary value. It is to be expressed as the number of days after December 31, 1979. (The date selected is arbitrary.)

3.1.3 Projected File Sizes

Number of years data	1.5
Records per year	120,000
Bytes per Record	104
Expected File Size	18,720,000

3.2 Person File

The records in this file enjoy a many to one relationship back to the single related occurrence records.

3.2.1 File Sources in the Existing Operational System

File	Field Name	Use	Len	Type	Comments
PD	case number	√	8	text	
PD	date last mod	no			
PD	hospital	no			
PD	injury	no			
PD	involvement codes	√	10	text flags	position 1 = classified position 2 = deferred action position 3 = harmful position 4 = juv charged position 5 = owner position 6 = complainant position 7 = suspect position 8 = victim position 9 = witness position 10 = charged OP will not provide records that are classified so as not to compromise its security
PD	part in crime prev	no			
PD	PRN	no			
PD	record status	no			OP will not provide the data if the data is inactive
PD	relation to victim	no			
PD	use of alcohol	no			
PD	use of drugs	no			
PD	victim crisis unit	no			
MNI	sex	√	1	text	M = male F = female
MNI	age	√	2	word	specified as the current age as at time of download

3.2.2 Resulting Download File

Offset	Length	Type	File	Field Name
+0	8	text	PD	case number
+8	10	text	PD	involvement codes
+18	1	text	MNI	sex
+19	1	byte	MNI	current age

3.2.3 Projected File Sizes

Number of years data	1.5
Records per year	300,000
Bytes per Record	20
Expected File Size	9,000,000

3.3 Classifications File

The records in this file enjoy a many to one relationship back to the single related occurrence records. It has no relationship to the Persons File.

3.3.1 File Sources in the Existing Operational System

File	Field Name	Use	Len	Type	Comments
CLS	atom	√	2	word	
CLS	case number	√	8	text	
CLS	class code	√	5	text	
CLS	actuals	√	2	word	
CLS	adult female	√	2	word	
CLS	adult male	√	2	word	
CLS	child female	√	2	word	
CLS	child male	√	2	word	
CLS	cleared by charge	√	2	word	
CLS	cleared otherwise	√	2	word	
CLS	informally disch	√	2	word	
CLS	juvenile female	√	2	word	
CLS	juvenile male	√	2	word	
CLS	unfounded	√	2	word	
CLS	date last mod	no			
CLS	record status	no			OP will not furnish the record if it is inactive
CLS	report date	no			
	occurred date	√	4	long	as computed by OP in the occurrence file
	occurred time	√	2	word	as computed by OP in the occurrence file
	district	√	1	text	from the occurrence file
	zone	√	2	word	from the occurrence file

3.3.2 Resulting Download File

Offset	Length	Type	File	Field Name
+0	8	text	CLS	case number
+8	5	text	CLS	class code
+13	1	text		district
+14	2	word		zone
+16	2	word	CLS	atom
+18	2	word		occurred date
+20	2	word		occurred time
+22	2	word	CLS	actuals
+24	2	word	CLS	cleared by charge
+26	2	word	CLS	cleared otherwise
+28	2	word	CLS	informally discharged
+30	2	word	CLS	unfounded
+32	2	word	CLS	adult female
+34	2	word	CLS	adult male
+36	2	word	CLS	juvenile female
+38	2	word	CLS	juvenile male
+40	2	word	CLS	child female
+42	2	word	CLS	child male

3.3.3 Projected File Sizes

Number of years data	1.5
Records per year	240,000
Bytes per Record	44
Expected File Size	15,840,000

4 Computer Aided Dispatch System - Resource Utilization

4.1 Resource Assignment File

The fields in the following descriptions are not found in any documentation from the Ottawa Police. Rather, they are idealized notions of the information which might be available within the Computer Aided Dispatch System currently in operation at the Ottawa Police. The requirement for this information stems directly from the comments of Deputy Chief Ford at our most recent meeting on February 26, 1991. Both the field names and their format must be carefully reviewed to ensure their validity. Corrections, as necessary, should be noted for the next revision of this document.

4.1.1 File Sources in the Existing Operational System

Field Name	Use	Len	Type	Comments
patrol unit number	√	4	text	
unit dispatch classification	√	1	text	P = primary unit B = backup unit
officers in unit	√	1	byte	1=single officer in unit 2=two officers in unit
city	√	1	text	V = Vanier O = Ottawa
district	√	1	text	to be provided by OP
zone	√	2	word	to be provided by OP
atom	√	2	word	
10-code	√	3	text	as per the 10-code system (refer to following list)
date	√	4	date	date reported
time	√	2	word	time reported
weekday	√	1	text	{N,M,T,W,R,F,S}
duration of hold	√	2	word	number of minutes lapsed from time call received to time call dispatched
duration enroute	√	2	word	number of minutes lapsed from time dispatch acknowledged to time at scene for this call
duration at scene	√	2	word	number of minutes lapsed from time at scene to time cleared scene

4.1.2 Resulting Download File

Offset	Length	Type	File	Field Name
+0	4	text		patrol unit number
+4	1	text		unit dispatch classification
+5	1	byte		officers in unit
+6	3	text		10-code
+9	1	text		district
+10	1	text		city
+11	2	word		zone
+13	2	word		atom
+15	4	date		reported date
+19	2	time		reported time
+21	1	text		weekday
+22	2	word		duration of hold
+24	2	word		duration enroute
+26	2	word		duration at scene

4.1.3 Projected File Sizes

Number of years data	1.5
Calls per year	200,000
Expected Records per Call	1.1
Bytes per Record	28
Expected File Size	9,240,000

4.1.4 Ten-Code System

•AFD	**All Assaults/Fights/Disturbances**
10-11A	Assaults - all other
10-11C	Assaults on Children (under 16)
10-11D	Domestic Disturbances
10-11F	Fights
10-11H	Assaults on Male By Spouse
10-11N	Noise Disturbances
10-11O	Other Disturbances
10-11W	Assaults on Female by Spouse
10-12	Drunkenness
10-13	Damage to Property
10-14	Animal Complaint
10-15	Suspicious Persons
10-15D	Drugs
10-15V	Suspicious Vehicles
10-17	Fire Alarm
10-17V	Vehicle Fire
10-22M	Missing Person
10-22P	Found Property
10-22T	Traffic Complaint or Point Duty
10-23	Indecent Exposure
10-24	Persons Using Firearms
10-25	Sick or Injured Persons
10-25M	Mental Persons
10-27	Drowning
10-27B	Boat/Marine Vehicle In Trouble
10-32	Obstruction -Towed Vehicle
•ALM	**Alarms**
10-34	Alarm Signal - Known Premise
10-34O	Alarm Signal - Other
10-35	Major Crime Alert
10-37	Theft - Shoplifting
10-37F	Fraud
10-39	Purse Snatching
10-40	Stolen Vehicle
10-40R	Stolen Vehicle Recovered

•B&E	**Break and Enter**
10-41C	Commercial Break In
10-41R	Residential Break In
10-42	Robbery With Violence
10-43	Sexual Assaults
10-44	Murder
10-45	Sudden Death/Fatal Accident
10-50	Traffic Accident
10-50F	Accident - Force Vehicle
10-50H	Accident - Hit and Run
10-50I	Accident - Injuries
10-50P	Accident - Property Damage
10-90	Bank Alarms
10-93	Roadblocks
10-94	Terrorist/Hostage/Abduction
10-100	Bomb Threats

- Identifies a code which represents a number of other codes of a similar nature - the purpose is to group these codes under a common code for the purposes of analysis (i.e. a group code for all Alarms - **ALM**, would result in an analytical capability against all alarms rather than just a single Alarm code).

4.2 User Interface

The user interface for this system must, first and foremost, be intuitive and simple to use for the occasional user. Special care and attention has been given in the design of this interface to the simplicity of the interface. This design is subtle, since it must address two conflicting requirements at once. First, the interface must be suitable to support the potentially complex data selection and summary requirements of the most senior police executives. Second, given the demands on the schedules of these executives, the system must be so intuitive that users that interact with the system only casually can immediately understand the techniques for achieving their required summaries through the user interface.

There have been functional decisions that are integral with the realization of this user interface. In projecting the potential usage of this system, the designers have considered that the typical user will wish to select a set of data records, then have the opportunity to examine the selected data in many different ways. The system design therefore separates the selection of data from the display of statistics on this selected data. This has the effect of permitting much faster summary of the data in various ways. For example, the user may wish to select all B&E calls for service last year. This selection is done as a discrete step, before the statistical summary of the data.

Once the data has been extracted, the user may wish to profile the data geographically, showing the district, zone or atoms with the highest concentrations of calls. Then, the user may wish to see histograms detailing the average time at scene for primary units in a certain district by time of day, or by day of the week, etc. Thus, many inquiries are supported (one at a time), once the desired data has been isolated. Therefore, it is important to segregate the selection of data from the portrayal of that selected data so that system performance may be optimized.

In both the selection and display components of this system, the user will interact largely through a simple point and click interface. Wherever possible, the system will display options, rather than require the user to type a selection. The only typing in this interface design will be when the user is required to enter criteria values for the various fields to be used for selection of data records.

It is also a very important feature of this user interface that it informs the user constantly about its progress when the system is actively processing. This helps give the casual user a sense of confidence in the system. For example, when the system has been given the specifications for the selection of data records, it must proceed to execute the selection. This may take an arbitrary amount of time, depending on the total number of records being searched and the specificity of the criteria. During this processing phase, it is crucial that the user interface provide some intuitive indication of its progress through the local database of records. This is typically done in two ways: through the graphic use of a slide bar and the textual use of a literal percentage of records completed. Similarly, during the display phase, when the user has requested the display of a particular statistic, the system also will display status graphics and text to inform the user of the progress of the processing.

4.2.1 Data Record Selection for Statistical Summary

The user interface for this component of the system consists solely of a number of scrolling list boxes for each of the fields in the data record. The list boxes are intended to contain all the critical values specified by the user. For each field available in the CAD download file, the list box will be accompanied by a series of buttons and data field(s). The buttons will permit the addition, modification or deletion of criteria values for that field. The criteria values are used to determine which records should be included in the data extraction phase. Only those records whose values match the criteria specified will be extracted for later consideration in the display phase.

As an example, consider the 10-code field. When the selection panel is first presented, the list of 10-code's to be included in the data record selection will be empty. If the user does not select the 10-code(s) for evaluation, the system defaults to evaluating all records (as per previously selected criteria values) on the data base. However, the user may require only those records that pertain to calls for spousal assaults to be considered. In this case, the user would enter the appropriate 10-code values (10-11H and 10-11W) to the list box through the "Add" button. If a typing error were committed, the offending entry in the list box could be revised through the "Modify" button. Alternatively, the entry could be removed through the "Delete" button, and another entry could be added. The user

also has the option of selecting the desired 10-code value or multiple 10-code values through a single transaction from a list box of options.

Depending on the semantics of the field, the system will require either a list of atomic values or a list of ranges. The available fields are listed below, each with an indication of atomic or range values.

patrol unit number	atomic
unit dispatch classification	atomic
officers in unit	atomic
10-code	atomic
city	atomic
district	atomic
zone	atomic
atom	atomic
reported date	range
reported time	range
weekday	atomic
duration of hold	range
duration enroute	range
duration at scene	range

For each field, a maximum of eight critical values are to be accepted. For those fields that specify critical values as atomic values, a single data field will be used. For those fields that specify critical values as ranges, two data fields will be used. In every reasonable case, a list box of available values will be presented to assist the user in the determination of critical values. Specifically, every field listed above as having "atomic" critical values except the patrol unit number field will show list boxes.

Once the user has specified all the critical values for all the criteria fields, the actual extraction of records will be initiated by depressing the "Extract" button. Alternatively, the user may abandon the extraction by depressing the "Cancel" button.

Once the extraction is initiated, the system will display a modal dialog that shows a slider and a text field. The slider will graphically show how much of the raw data file has been processed for extraction. The corresponding text field will detail the percent of the raw data file that has been processed. The system will "understand" the proportion of the data file processed because it has knowledge of the total population of data records and it will maintain a count of the number of records processed. It is also expected

that a counter showing the number of processed records and the number of extracted records would be useful. However, in the interests of processing efficiency, these values would only be updated periodically, rather than for every record processed.

At the completion of the extraction process, the modal dialog will be eliminated, and a second panel will be displayed. This panel is to be employed by the user to design any report on the extracted data. It is important to understand that the system will retain the set of extracted records until instructed by the user to perform another extraction. Only the current extraction will be maintained by the system.

The system will allow the user to perform an extraction, or directly proceed to display statistics on a previously-extracted data set. Until such time as the user requests another extraction, the system will maintain its current extraction data set. This means that the executive can perform an extraction and display a number of statistics thereon. If the executive is interrupted, the system can be stopped and subsequently restarted without impacting the extraction data set.

4.2.2 Specification of Statistical Displays

This component of the system will be used most frequently by the executive. Once a set of raw data records have been extracted, the user will have the ability through this function to provide statistical summaries of the extracted data. Additional selectivity will be permitted through this function as well. As described above, this function will be accessible directly by the user without requiring execution of the data extraction directly prior. This function will be available any time an extraction data set is available. Therefore, the system can be stopped and restarted at any time without any consequent requirement for the user to reissued the data extraction.

The user interface allows the executive to request any of a wide variety of reports on the extraction data set. Each requested report will be displayed within a new window, created by the system expressly for the requested report. If at any point, the hardware memory is inadequate to support further windows, the system will issue a warning and refuse to process the report request. The user will then be expected to close one or more existing report windows prior to reissuing the report request.

The specification of a report requirement includes the following components:

- The first component is the definition of a dependant variable which is to be calculated by the system. This will be a count of calls, the sum of times (hold, enroute or at scene times), or the average time (hold, enroute or at scene times). In keeping with the simple, point and click philosophy, a list box of these statistics will be displayed, permitting the user to make a selection through simple manipulation of the mouse. The selection of a dependant variable is compulsory;

- The second component is the definition of the independent variable. This is the "axis" of the analysis. It is the field which is to be used to distribute the selected statistic. For example, if the dependant variable were the number of calls, the independent variable might be the district. In this case, a different count of the number of calls would be kept for each district. As above, the point and click philosophy dictates that the system provide the list of suitable fields. The user will then be able to select any one of the fields as the independent variable. The designation of an independent variable is compulsory;

- The third component is the optional definition of any restrictive criteria that would drive the selection of a subset of the extracted data records. Through this feature, the user will be able to perform analyses of selective aspects of the extraction data set. As described in the previous section, the user will be able to enter a number of critical values for any of the fields. Unlike previously described, however, the system will not initialize the list boxes of critical values to be empty. Rather, the system will load the list boxes with the criteria used for the extraction. The user will then be empowered to further restrict the criteria if required;

- The final component of the user interface for the statistical display is the button, labelled "Display", which is used to trigger the generation of the resulting display. Alternatively, the "Cancel" button will conclude the display specification window without executing a display. If a display is requested, the system will create a new window, specifically to hold the results of the requested display.

4.2.3 Manipulation of Statistical Displays

Once the data sets have been extracted, and the statistical display has been specified, the user will be confronted with the results of the requested display.

Depending on the independent variable, the system will have a number of display modalities available to it. At a minimum, a bar chart and a pie chart will be available. However, if the independent variable is geographically based, a density coloured area map will also be available. For example, if the user requests the average on scene time broken down by district, the system will be able to show a pie chart or bar chart of the relative averages within district, or it will show a map of the various districts.

Whenever density coloured maps are used, the system will determine the colour of each area displayed according to the value of the dependant variable. It will take the range between the largest and the smallest observed value and segregate it linearly into four different ranges. Areas that fall into each range will be coloured differently. The areas with the highest observed value range will be coloured red. The areas with the lowest observed value range will be coloured green. The areas with observed values in the intervening ranges will be coloured in suitable gradations of colour between green and red.

The user interface will allow the user to switch the display modality within any display window among the three different modalities (pie, bar and map). The selection is made by depressing the "Pie", "Bar" or "Map" buttons within the window itself.

The statistical results will be displayed within a dedicated, separate window. Each such window will contain a number of components, as described below:

- The first component will be a large rectangular area which shows the pie chart, bar chart or map, as requested by the user;

- The second component will be a series of buttons that permit the user to change the type of display in the rectangular area;

- The third component will be a list box that shows the found occurrences of the independent variable. It will be complemented by a set of data

fields that will be used to display the computed value of the dependant variable for any selected value of the independent variable. If the user selects a value in the list box, the system will populate the set of data fields for the dependant variable. It will also highlight the selected area in the rectangular area. On the other hand, if the user selects an area in the rectangular area, the system will determine which area has been selected, and highlight the corresponding entry in the list box. As above, the observed statistics for the dependant variable will be shown in the data fields.

4.3 Additional Menu Bar Features

There is a "**Print**" item in the menu bar. This will permit the printing of the contents of any window. Thus, the user will be able to take a snapshot of any window at will. If the window being printed is one of the display windows, then the user will probably wish to also print out the contents of the data extraction and display specification windows. Without these windows, the relevance of the displayed data may not be clear.

There is also an "**Import**" item in the menu bar. This will signal to the system that the underlying raw database has been revised. Note that it is assumed that the database file will be fully replaced during the upload process. The processing of the import request will require the system to perform a number of housekeeping functions. For example, if a current data extraction file exists, it will be cleared. Further, any current windows will be deleted.

