The author(s) shown below used Federal funds provided by the U.S. Department of Justice and prepared the following final report:

Document Title:	**Automation of Local Police Functions, Summary of Findings: The Spectrum Justice System (SJS)**
Author(s):	**Office of Justice Systems Analysis, New York State Division of Criminal Justice Services**
Document No.:	**189028**
Date Received:	**08/03/2001**
Award Number:	**97-IJ-CX-K009**

STATE OF NEW YORK
George E. Pataki
Governor

Katherine N. Lapp
Director of Criminal Justice
and
Commissioner
Division of Criminal Justice Services

AUTOMATION OF LOCAL POLICE FUNCTIONS

Clyde A. DeWeese
Deputy Commissioner
Offices of Systems and Operations

—

Daniel M. Foro
Director
Office of Systems

SUMMARY OF FINDINGS:

THE SPECTRUM JUSTICE SYSTEM (SJS)

OFFICE OF SYSTEMS

Project Development Group
May 29, 2001

NEW YORK STATE DIVISION OF CRIMINAL JUSTICE SERVICES

SUMMARY OF FINDINGS

The New York State Spectrum Justice System Redesign

With the support of the National Institute of Justice (NIJ) and funding from an NIJ technology development grant, the New York State Division of Criminal Justice Services (DCJS) has undertaken an extensive redesign of the State's Spectrum Justice System (SJS), a widely used law enforcement records management system originally developed by DCJS technical staff in 1990. As a result, hundreds of law enforcement agencies in New York have begun to use a powerful new data management resource to improve the efficiency and effective operation of their departments. DCJS has initiated the deployment of the new Windows based application to the existing SJS customer base of approximately 280 law enforcement agencies throughout New York State.

Background

The Spectrum Justice System, or SJS, is one product of a major initiative which began nearly twenty years ago to assess the administration of criminal justice in New York State and identify elements of the criminal justice process where the introduction of standardization and automation would yield substantial improvement in the operation of individual agencies and the effectiveness of the system as a whole. It was clear from this assessment that the State's criminal justice system at that time was, in fact, not a system at all. Efforts by component agencies to improve their operations and make better use of information were conducted in relative isolation and the data systems they built left significant gaps in the range of information which would be vital to the effective coordination and administration of the State's criminal justice process. The existing patchwork of isolated manual and automated record systems made it essentially impossible to assemble timely, accurate and clearly defined statewide criminal justice data. Criminal justice administrators could not identify the weakest elements of the system, highlight the points at which criminal processing broke down, evaluate individual agency operations or plan for optimum use of available resources.

Following this initial, critical assessment of the State's criminal justice process, a broad range of detailed studies, focusing on the role of information, were conducted by teams of state and local criminal justice practitioners. One of the key recommendations produced by these studies pointed to the need for a criminal justice infrastructure capable of supporting an efficient data delivery system. The strategies proposed for accomplishing such an objective included the standardization of data elements and data forms, development of standard software for local criminal justice agencies, automation at both the state and local levels and creation of a communications network that would be capable of linking state and local information systems and facilitating the exchange of criminal justice data. In the years since these studies were conducted, a primary objective of the Division of Criminal Justice Services (DCJS) and its

Office of Systems has been to act upon those proposed strategies and develop products and technology initiatives which will improve the information systems of New York's state and local criminal justice agencies. Initiatives undertaken by DCJS have included standardization of criminal case processing, expanded automation of local agency functions and the automated transfer of criminal justice information. Standardized data collection forms and records management software, developed by DCJS and introduced more than ten years ago, have enabled criminal justice agencies in New York State to operate more effectively and communicate more efficiently among themselves. These products have also substantially improved the quality of criminal justice information and promoted the timely, complete and cost effective updating of State and federal criminal history repositories.

System Description

One of the most significant and widely used software applications provided by DCJS to local law enforcement has been the Spectrum Justice System (SJS). SJS is a premier example of the system improvement strategy which was first articulated over a decade ago. In keeping with those early plans, the software was created from the work of a team of state technical staff and local law enforcement practitioners. It represents an innovative and comprehensive technology resource for local law enforcement which improves the efficiency of agency operations, provides faster access to agency data, automates the generation of management reports and increases the availability, timeliness, quality and accessibility of local data supplied to the State's criminal history repository. By automating the collection, management and storage of incident, arrest and warrant information, SJS has dramatically reduced the time and effort required to process arrests and perform routine administrative functions, and has created new opportunities for searching and analyzing local crime data. It has saved local law enforcement agencies the cost and effort of developing or purchasing their own records management systems and serves the larger goal of integrating state and local criminal justice information systems. SJS is currently used by approximately 280 police agencies in New York, or nearly half the State's law enforcement community.

SJS is made up of several interrelated components which collectively form an integrated information system. The SJS Incident Subsystem is used to capture incident data at the level of detail required for the New York State Standardized Incident Report and automates the reporting of this data to the Incident Based Reporting system. The Incident Subsystem collects and stores descriptive information for reported incidents, including incident date, location, complainant, and identification of victims, witnesses, affected property, weapons and missing persons. Features of the SJS Incident Subsystem include:

- ▸ Automatic tracking of all recorded incidents, linking a variety of data fields including incident types, defendants, locations, property and vehicle.
- ▸ Automated printing of the New York State Standardized Incident Report, as well as a Short Incident Report which can be useful for insurance investigation purposes or reports to the media.

- A caution indicator which alerts the investigating officers to individuals who may pose an immediate danger because of assaultive behavior, weapons possession or other reason.
- The capability to provide the New York State Incident Based Report (IBR) to DCJS on diskette, CD, or electronically.
- Generation of management reports for specific time periods, incident types, incident locations, property types, vehicle information and opened and closed incidents.
- Generation of an incident synopsis report, which summarizes recorded incidents by date and time and can be used as a substitute for the department's daily blotter.
- Association of incident data with a subsequent Arrest Report.
- Numerous inquiry capabilities including searches by incident number, case number, suspect information, property and vehicle information.

The SJS Arrest Subsystem is used to capture arrest data at the level of detail required for the New York State Standardized Arrest Report and automates the generation of DCJS and FBI arrest fingerprint cards and reports of arrest data for the Uniform Crime Reporting system. The Arrest Subsystem collects and stores detailed arrest information, including date, time and location; identification, description and release status of the defendant(s); arresting and assisting officers; weapons, if any were found; identification of victims and witnesses and arraignment date, time and court. Features of the Arrest Subsystem include:

- Integration with the Warrant and Incident Subsystem, eliminating duplicate data entry.
- Automated printing of the New York State Standardized Arrest Report.
- Enhancement of data quality and reduction of arrest processing time by printing fingerprint data on both the New York State and FBI fingerprint cards.
- Reduction of redundant data entry when processing multiple subjects for the same arrest event.
- Preparation of additional arrest reports, sorted by date, location, crime, names of defendants and arresting officer.
- The capability to provide the New York State Incident Based Report (IBR) to DCJS on diskette, CD, or electronically.
- Preparation of department reports listing arrest charges sorted by arrest date, offense date, charge code, crime category or defendant name.
- Preparation of a specialized report identifying weapons related arrest charges.
- The ability to run various searches in a matter of seconds.

The SJS Warrant Subsystem manages warrant caseloads and provides access to the New York State and federal wanted systems via the New York Statewide Police Information Network (NYSPIN) so that dual entry of warrant information is not necessary. The SJS Warrant Subsystem is integrated with the SJS Arrest and Incident Subsystems, eliminating redundant data entry, and uses the same structure as the DCJS manual Warrant Management System (WMS).

The SJS Warrant Subsystem collects and stores critical data for each warrant in the system, including subject identifiers and description, warrant type and unique number, court information and the subject's release status and any appropriate special warnings for law enforcement. Features of the SJS Warrant Subsystem include:

- The ability to assign and track warrants by officer.
- The capability to print active warrants by suspect name, street address, court of jurisdiction and Hot Sheet.
- A caution indicator which alerts the investigating officers to subjects who may pose an immediate danger because of assaultive behavior, weapons possession or other reason.
- The capability to search thousands of records, by name, a.k.a., street or social security number, in a matter of seconds.
- Generation of voluntary surrender letters for minor crimes, making better use of an investigator's time.
- The ability to track probation officers, known associates, lawyers and relatives by name, address and phone numbers for each subject.
- Storage of field information from previous investigations for use with current or future investigations.
- An address history file which can track an unlimited number of previous addresses for a subject individual.
- The capability to track NYSID and FBI identification numbers.

Initial SJS Redesign: Updating the System Infrastructure

To provide a foundation for realizing the long-term vision for SJS, the initial phase of the redesign strategy involved upgrading existing SJS functions to a current state-of-the-art system that includes the introduction of a graphical user interface (GUI), a SQL-compliant relational database and an open client-server architecture. These initial enhancements allowed patrol and investigative personnel to rapidly enter and retrieve information, update incident and arrest data to an agency database on a real time basis and process criminal offenders quickly so that officers can return to the street much sooner than would otherwise be possible.

The primary objectives of the initial redesign of SJS were as follows:

- To move the current system software from a DOS environment to a 32-bit Windows operating environment.
- To move from a single screen 80 character input to a standard Windows graphical user interface.
- To move from a DOS Btrieve data file management system to a more robust Oracle relational database management system.
- To move from the current, limited operating environment to a more efficient, scalable, multi-user operating environment.

- To provide the capability to generate management reports on incidents, arrests and warrants processed by an individual department.
- To provide a Year 2000 compliant system.

System features introduced with the redesign of SJS also included:

- Enhanced system security features
- Scalability that allows the system to be used by law enforcement agencies of any size
- Improved search capabilities
- Ad hoc searching and report production
- The capability to add other interfaces which will enable data sharing among user agencies
- Spell checking and word wrap
- An interface to the new web-based DCJS Secure Services (a secure extranet information service easily accessed from a personal computer through use of a standard web browser, which offers name or identification number searching, criminal history inquiry capability, a link to the New York State Sex Offender Registry, and the ability to track criminal and civil fingerprint transactions.)

The redesigned Spectrum Justice System features a Windows graphical user interface, based on the Outlook paradigm, for the creation and modification of records. SJS allows authorized users to enter, modify, delete and search for incident, arrest, and warrant information for a specific agency or agency identifier. SJS also allows authorized system users to search information entered by multiple agencies. Access to SJS is controlled by a system administrator and users seeking to log on to the system are required to provide a user name and password and to identify his or her agency by NCIC originating agency code (ORI).

The Incident function is the foundation for all subsequent activities of the redesigned SJS. When an incident is reported, the incident information, including date, time, location, victim(s), complainant(s), associated persons and property descriptions, is entered and stored in the system. Each incident entered remains open until disposed of through an arrest or the investigation is terminated. Generally, arrests and warrants are initiated for suspects identified with an incident and the information for arrests and warrants relates primarily to the preceding incident. When an arrest is made or a warrant is issued, and no incident information exists in the system, an incident record is created for the arrest or warrant event, using the minimum required incident information. The system can also be used in emergency operations to record the dispatch of law enforcement and non-law-enforcement response teams. For non-law enforcement dispatch, the user can enter non-law enforcement incident types in order to capture the incident and associated information. The user has the ability to generate management reports relevant to incident, arrest and warrant information by specifying the exact report criteria. These criteria can then be used to define the scope of the report.

Continuation of the SJS Redesign: Development of Expanded System Functionality

The first phase of the SJS redesign project was considered the base for subsequent system enhancements and integration with other local, state and federal criminal justice systems. The goal of DCJS for improvement in subsequent design phases was to build upon this base by systematically adding functionality and components to the new SJS product and by expanding the linkages between the new product and other criminal justice systems at both the state and local levels. Police agencies are being called upon to collect more types of data and to respond to new criminal justice policy initiatives. To function effectively, police systems must be capable of supporting these new and evolving public safety initiatives.

Plans for Future SJS Functionality

Continuation of the SJS redesign will target several new public policy mandates, including New York State's Sex Offender and Domestic Violence laws. In addition, further development of SJS focuses on collecting new types of image and geographic data. These new data forms provide better investigative tools to the detective, allow the police to respond to crime more quickly and efficiently and improve the effectiveness of police administrators in assigning resources and measuring results.

Linkages to databases and systems at state and local levels enhance the entire public safety community's information base. With the development of these additional linkages, data that remained at the local level indefinitely, or was unacceptably delayed in its transmission to state repositories, will be exchanged rapidly and efficiently.

Critical to implementing new modes of data collection and to exchanging that data as well as the more traditional set of textual data is the development of an electronic components interface. This interface will be based on a set of New York State standards and specifications. This standardized interface will give SJS, and therefore all police agencies using SJS, a means to integrate image data collection hardware into the system and a means to transmit that image data, along with its corresponding text data, to other external systems.

Specifically, the interface would integrate livescan, cardscan, mugshot and photo systems with more conventional police records and booking systems. While the redesigned SJS will furnish police agencies with a scalable, state-of-the art method to capture text data, further development work will build on that foundation, adding the ability to electronically capture, store, search, and transmit image data. Not only will the image data provide more complete records, but also police will be able to incorporate these fingerprint images, palm prints, mugshots, photos of scars, marks, and tattoos, graffiti images and signatures into their arsenal of information tools. Ready access to such information is invaluable to police agencies, enhancing their efforts to prevent, detect, and solve crimes. Transmitting this information to state and, eventually to federal, repositories increases the value of these repositories as well, supplying central databases that can service the entire criminal justice community.

<u>Live Scan/Card Scan Interface:</u> Development of this interface will provide the SJS user with the ability to integrate arrest booking data with fingerprint and/or mugshot images for electronic transmission to DCJS. This feature will give each SJS user the capability to function as an on-line booking site and become a Store and Forward contributor, thus expediting the identification process and the updating of DCJS criminal records. The Live Scan/Card Scan interface will dramatically improve the delivery of criminal history information. Rapsheet responses to identification input, which presently can be delayed in the mail for several days, will be made to the SJS user in a matter of hours. It also gives the arresting agency the opportunity to quickly update arrest information to the FBI's database.

<u>Crime Mapping Interface:</u> As described previously, the data collected in SJS includes information on incidents and arrests, including the associated location information. These types of data are useful for law enforcement administrators involved in crime analysis, resource allocation and patrol deployment, both spatially and temporally.

DCJS has developed a New York State Crime Mapping system through contracts with the Vera Institute and MapInfo Consulting Services. The planned SJS Crime Mapping interface will take SJS incident and arrest data, along with location information, and export it to the New York State Crime Mapping system. The New York State Crime Mapping system will then allow for the manipulation of the captured SJS data, both at the individual agency level and regionally. New York's Crime Mapping capabilities are intended for use by all New York State law enforcement agencies with access to the system provided through a secure, web-based intranet known as DCJS Secure Services.

Through the Crime Mapping interface, the SJS user will be able to greatly increase the value of the data collected. It will allow the user to programmatically create a data extract, ship the data to a central computer and then review incident patterns within a single jurisdiction or across multiple jurisdictions and develop strategies to target crime on a systematic basis.

<u>Sex Offender Registry Module:</u> This module will provide SJS users with the ability to collect data on known sex offenders within their jurisdiction. The interface with the New York State Sex Offender Registry will enable officers in the field to directly review offender information. It will also assist with sex crime investigations. In the event a known offender resides within the jurisdiction, valuable information is stored to assist with future investigations which may involve the offender.

<u>Domestic Violence Module:</u> This module will allow SJS users to collect the data required for the timely printing of the New York State Domestic Incident Report. It will provide tracking and statistical information for law enforcement agencies, allowing them to assist with the development of prevention strategies. It will also interface with order of protection systems currently in use in New York State.

The SJS Redesign Project Management Team and the SJS User Advisory Group have worked together to identify opportunities for enhancing the functionality of SJS in the future. The interfaces which are envisioned for future development efforts include the following:

District Attorney System Interface: An interface to a district attorney case management system would provide SJS users with the ability to transmit arrest booking information directly to local district attorneys' offices. On-line receipt of this data would allow district attorneys to review and prepare for cases in a more timely manner, schedule staff more efficiently and expedite the preparation of required case documents. The DCJS plan would be to develop the interface with the Automated Legal Documents System (ALDS), a case management application which has been developed by DCJS technical staff and currently installed in eight prosecutor's offices in the state. DCJS will also provide SJS specifications and files to district attorneys' offices which use case management systems other than ALDS.

Real Time Mobile Interface: Development of this interface would allow for remote data collection on a real time basis. The officer in the patrol car would have the capability to capture data in a laptop computer and either carry the laptop to the station or carry a floppy diskette with data into the office. This collection of data in the field would improve the timeliness and accuracy of data. Real time data collection ensures that both the officer and command staff have the most up-to-date information on criminal activity. DCJS would work with a vendor to prototype different means to transmit data using off-the-shelf technology. The intent would be to test and implement solutions using differing levels of sophistication. This approach would allow DCJS to provide customers with the remote capability at affordable prices.

Probation System Interface: This addition to the SJS software would create an interface to the New York State Probation Management System currently being deployed in the state. The purpose of the interface would be to provide arrest and incident data to probation officials to minimize the amount of duplicate data entry and reduce the chance of data entry errors.

SJS Beyond New York State

The development approach taken in the SJS redesign project offers a level of portability not generally seen with law enforcement records management systems. The choice of Visual Basic and Oracle recognizes the advantage of using industry standard development platforms. Not only can it scale to different computing platforms, but the software selected is in wide use, thus making it easy to locate trained developers. Records management systems using either proprietary or obscure software do not easily lend themselves to this level of portability. In addition, Visual Basic and Oracle have a wide suite of available off-the-shelf applications which further improve the ability of agencies to customize the product to local needs and practices. Most other records management products require extensive licensing and related costs which are not needed with the redesigned SJS product.

Technology Supporting the Redesigned SJS

The redesigned Spectrum Justice System includes a modern Graphical User Interface (GUI) and an SQL-compliant relational database using modern object-oriented and open-architecture techniques. This infrastructure establishes a solid foundation upon which to build future enhancements and information exchange capabilities. Rather than remaining a set of stand-alone systems that have no effective access outside their own data sets, SJS can evolve to a set of federated, distributed databases in which information can be shared, whenever it is needed, without compromising the autonomy of individual databases and owning organizations.

Windows-based GUI's have been a standard for several years because of their simplicity of use for interacting with a computer-based system, their establishment of a common "look and feel" for different applications and their support for running multiple user tasks simultaneously. A user who is already familiar with Microsoft Windows-based applications should readily recognize and be able to use the interface elements and controls of SJS. This will increase the efficiency of users interacting with the SJS, reduce the requirements for training personnel on using SJS and provide a foundation for integrating additional software functionality in the future.

To maximize the efficiency of the user, the GUI includes devices that reduce both time and errors in the data entry process. Such devices include:

- default values (e.g., date, NY, local law enforcement agency number)
- drop-down lists instead of text-entry boxes for fixed items (e.g. types of weapons, states)
- groups of check boxes for limited values for a data item (e.g. male/female, yes/no)
- pattern matching, type ahead feature (e.g. charge codes)

Several commercial-off-the-shelf (COTS) software add-ins to the GUI are included in SJS. A Report Writer helps the user generate professional, high quality reports. Spell Check and Word Wrap features are added for free-form entry of text. Future enhancements will include a Spreadsheet Package and a Charting Package.

The GUI for SJS incorporates a comprehensive help facility that provides the user with detailed assistance on all aspects of using the SJS interface. This includes;

- detailed descriptions of all menu items and their functions
- detailed descriptions of dialog boxes and the data controls contained in them
- explanations regarding the use of any commercial add-in software components
- instructions on how to initiate events in SJS

In addition, context sensitive help is provided at any point in the program through the use of the standard Windows help key. Help packages will also be available from COTS add-ins.

Relational database approaches result in database structures that are easier to understand, maintain and expand. They also eliminate functional dependencies in the data that can lead to problems such as redundant storage of information. SQL compliance has standardized data access and storage, providing significant flexibility in data accessibility. For SJS, an SQL-compliant relational database structure allows the expansion and interfacing of the system to a variety of other data repositories, ranging from digital mugshot systems to other records management databases. This relational database is configured for use with the Oracle RDBMS to improve information gathering and access. The database is normalized and has an efficient structure to support information and storage needs. Oracle is designed to support a client-server architecture and supports multiple-user configurations. Oracle 8 supports work-groups with a network environment and with peer-to-peer topologies. Personal Oracle will support a single-user/single-client workstation environment.

SJS includes an "open" software and client-server network architecture to establish a foundation for future enhancements. The open software architecture will enable future software to be readily integrated with the SJS and provide network architecture and interface protocols that will readily enable SJS to add future interfaces to external and third-party systems. Client-server networking provides the means for information sharing at many different levels. Combined with an SQL-compliant database management system, information sharing becomes a highly powerful tool for law enforcement.

The basis for the SJS open network architecture is a three tier client-server architecture approach using Microsoft Transaction Server (MTS). Three tiered architectures are often called server-centric because they enable application logic to run on servers instead of on clients. The networking protocol to be used between client and server applications will be TCP/IP. In three tiered architectures, presentation (GUI), application logic and data components are separated into distinct units. Presentation components manage SJS user interaction and make requests for application services by calling middle-tiered components. SJS application components will perform business logic and make requests to the Oracle SQL-compliant relational database. Three tiered architecture offers broad benefits, such as enhanced scalability, security and application logic reuse.

MTS is an important feature of the Microsoft Windows NT operating system that simplifies the development and deployment of server-centric applications built using Microsoft Component Object Model (COM) technologies. In MTS applications, application logic components run under the control of MTS on servers and are invoked by presentation components running on clients. MTS completely separates the three tiered infrastructure from presentation and application logic. Developers can generate the application logic components of their programs as COM-enabled dynamic-link libraries (DLL's) that run on middle-tired servers under the control of MTS. When client-based presentation components call server-based application components, the Distributed Component Object Model (DCOM) run time will route the requests to MTS automatically. MTS benefits include enhanced scalability, automatic data integrity protection, improved database and application performance, support for common databases, simplified client

management and simplified data sharing between components.

The independence of application logic from presentation and data offers many benefits. SJS developers are using a powerful development tool, Visual Basic 6.0, to develop and reuse SJS application components. In addition, embedded COTS tools will be used to provide SJS with added flexibility. SJS application components can share database connections which lowers the number of total sessions that the Oracle database server must support and improves performance.

Hardware Requirements for the Redesigned SJS

The following scenarios are the minimum **recommended** hardware requirements when using the Windows version of SJS.

STANDALONE CONFIGURATION

Windows NT 4.0 workstation SP 6a
Pentium III 800 MHZ
512 Mb RAM
18.0 Gigabyte Hard Drive
2 Mb Video Card
17" Monitor
Uninterruptible Power Source (UPS)
System Backup Device

NETWORK CONFIGURATION
Two-Tiered architectures

Server:

Windows NT 4.0 Server SP 6a
Pentium III 800 MHZ
512 Mb RAM
18.0 Gigabyte SCSI Hard Drive
10/100 Ethernet NIC card
Uninterruptible Power Source (UPS)
System Backup Device

Client:

*Windows 98 2nd edition or Windows NT 4.0 workstation SP 6a
Pentium III 800 MHZ
256 Mb RAM
18.0 Gigabyte Hard Drive
2 Mb Video Card
10/100 Ethernet NIC card
17" Monitor

*We have experienced problems with the MS Intellimouse (mouse) on Windows 98 machines. If you are using the MS Intellimouse, with Windows 98 machines, please replace it.

Windows SJS requires users with Local Area Networks to install the Windows NT operating system.