Innovations in Election Administration 3
Election Signature Retrieval Systems

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Introduction by the Clearinghouse

This report is the third in our series on Innovations in Election Administration being published by the FEC's National Clearinghouse on Election Administration.

The purpose of this series is to acquaint State and local election officials with innovative election procedures and technologies that have been successfully implemented by their colleagues around the country.

Our reports on these innovations do not necessarily constitute an endorsement by the Federal Election Commission either of the procedures described or of the vendors or suppliers that might be listed within the report. Moreover, the views and opinions expressed in these reports are those of the author and are not necessarily shared by the Federal Election Commission or any division thereof.

We welcome you comments on these reports as well as any suggestions you may have for additional topics. You may mail these to us at:

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or else call us

toll free on 800/424-9530 or
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Productivity, the word so often heard in management in the '80s continues with us into the '90s. With shrinking budgets managers are constantly asked to do more with less. Many computer systems have delivered less than promised in the areas of reducing labor costs and processing times. With Signature Retrieval Systems promises seem to be fulfilled in the experiences of the majority of election jurisdictions nationwide that have chosen to install these systems.

The labor intensive, time consuming task of checking the validity of voter's signatures on petitions, candidate nominations, absent voters and mail ballot elections has become a very significant problem for elections administrators. As the popularity of voting by mail and the initiative process continues to grow the workload also has risen.

The increased workload has caused many jurisdictions to choose computers to aid in the verification of signatures. Leading the way were Pinellas, Orange and Dade Counties in Florida. These systems provide an image of the voter's signature on a computer monitor screen that is manually compared to a voter's signature on another document, eliminating the need to search through paper files or microfilm. Many agencies have found that without these systems they would not be able to meet the legal deadlines for verifying signatures because of the volume of work.

Some jurisdictions have reported a 300% improvement in productivity. Palm Beach County, Florida states that one person can check 1,200 signatures per day with their automated signature retrieval system (SRS). Under their manual process one person could check only 400 signatures per day. Manpower hours in this jurisdiction have been reduced overall by one third. Most agencies surveyed, like Monterey County in California, report significant savings in their absent voter and petition checking process with these systems.

Generally, the signature retrieval systems operate as follows. After a voter registration document is checked to make sure it is completed properly, the document is scanned, with a document scanner or video camera. Scanning, also called digitizing, is taking an electronic copy of a document or signature by converting it to a series of dots.

To associate the signature with the voter record, usually, it is necessary for the operator to enter data from the document before scanning. In other systems the operator enters data, on the same screen on which the image is displayed, as is true with the Los Angeles County, California system.

At time of scanning, the system allows the operator to examine and adjust the image before causing it to be stored on magnetic or optical disk. Several systems store the document on optical disk and the signature on magnetic disk. Doing this improves responses times for retrieving signatures that are required much more frequently,
than is the whole image of the document. Response time is the amount of time the computer requires to retrieve the requested information and display it on the screen.

Those jurisdictions that store the image on optical disk, do so to have a duplicate of their paper document and, in some cases, to eliminate microfilm. Some jurisdictions make a backup of the optical disk platter. The backup platter is stored in an off-site location, much as they do with backups of the magnetic data files. This can provide them with a means to recover should their facility be destroyed by fire or other disaster.

Once stored, the document or image can be retrieved and displayed on a computer screen. A person can use the displayed signature image to validate a signature on another document.

While most of the systems are used for petitions and absent voter processing, Sarasota County, Florida has extended the use of their hardware and software investment. They have implemented a separate system for tracking Loyalty Oaths, Appointments of Treasurer information and Treasurers reports for Candidates and PAC’s using their signature retrieval equipment.

The more sophisticated systems allow signature retrieval with the data entry functions for tasks such as checking petitions and returned absent voter ballots. In these cases, the operator can immediately update the petition or absent voter data base with the results of the signature check. With some systems, one checks the signature, makes a notation and then later enters the results of the check to the appropriate data base.

Signature retrieval system hardware can include the following: personal computer with monitor (screen), keyboard, mouse (pointer device), floppy disk and hard disk; backup tape unit; optical disk unit; document scanner or video camera; and a laser printer.

**Purpose and Approach of Report**

The purpose of this report is to help state and local election administrators, especially those jurisdictions without data processing staff, by providing a review and benefits assessment of the current state of signature digitization technology.

Agencies already using signature retrieval technology were surveyed and have willingly provided input to this article. We have consolidated and reported their experiences with these systems. This article shares their best ideas and cautions to those who come behind them.

It is important to clarify that this report is not evaluating or comparing systems currently offered in the marketplace. No endorsements of vendors or their systems are made or intended. Vendors providing these systems were usually a good source of information and referral.

Besides identifying agencies where the technology is currently being used, the report explains background, history, technology, benefits, costs and problems associated with signature retrieval systems in elections.

We contacted all the states and the territories to ask for referrals to jurisdictions where these systems are in use. We received replies from thirty five states.

When specific referrals were received from the state office, we sent a detailed thirteen page questionnaire to the local agency asking about their system and experiences associated with installation. Fifty agencies in ten states were sent the longer questionnaire. Twenty-two were returned by local jurisdictions from the states of Arizona, California, Florida, Georgia, New York, Oregon and Washington. Several sites, in Florida and California, were visited where these systems are working in production.

The information received was summarized to provide the information needed for this article. It
makes recommendations about what to look for should you be considering installation of a signature retrieval system, in your jurisdiction.

Definitions

The following definitions intend to clarify usage of terms used in this report.

**Signature Digitization** - is the function of scanning a signature or document to encode the image of a signature in a computer. The captured image is much like the image on a television screen. The image is stored on magnetic media, such as disks or tape, or on an optical storage device.

**Signature Retrieval** - this term, as used, includes digitizing, retrieving and displaying a document or signature on a screen or report.

**Signature Verification** - the process where a person compares a signature on a screen to a signature on another document.

**Automated Signature Verification** - the process where a computer compares a signature on one document to another signature on a data base. Currently installed signature retrieval systems cited in this article do not have this capability. In the opinion of the authors, we believe that it will be at least a decade before these systems are economically feasible.

The reason for the delay is two-fold: one, we don’t write our signature the same way each time we sign our name. This requires the computer to match things that are not the same. Second, making the comparison at speeds comparable to those being achieved with existing systems. This type of matching will require much faster computers with artificial intelligence.

**Image Compression and Expansion** - Images are a form of computer graphics representing the data in dots or pixels (picture elements). With the data scanned and displayed, measured in dots-per-inch, much of the image consists of “white space.” Most image scanning and retrieving systems use image compression to reduce the amount of magnetic or optical disk space required to store the image. Image compression also reduces the amount of data that must be transmitted from storage to be displayed thus improving response time for displaying an image.

A simple explanation of compression and expansion is as follows. With compression, a blank line on a screen requiring eighty characters can be reduced to a few characters of a formula. Compression of an image occurs before storing it on a storage device.

Expansion happens after an image is read from storage and before the image is displayed on a screen or printed. It uses the mathematical formula to put the “white space” back in the blank line.

In most systems, compression is done with software, although some use special computer hardware boards that are usually faster and can provide greater compression of the image.

Background and Beginnings

**The Technology**

Signature retrieval systems go back to the earliest days of microfilm, which is an application of Document Image Management (DIM). Microfilm, beginning in the early 1970's, as a computer driven technology, was first used to address the needs of paper look-up tasks.

Signature retrieval systems use what is known in the computer industry as Document Image Processing (DIP). The DIP technology became possible in the 1920's with the transmission of pictures over trans-atlantic cable. Practical applications came during the 1960's space program.

Phillips, a Dutch company, invented the optical disk in 1969. The optical disk is used for storing the image of a document. The first Signature Retrieval System in a business application occurred in the early 1970's, in Sweden. When IBM's World Trade Corporation installed a sys-
tern used to verify checking account signatures for a banking system.

Signature retrieval technology became economically feasible with the arrival of personal computers, in the early 1980s. These systems combined personal computers with optical disks, document scanners and laser printers. This is the base technology for signature retrieval systems.

Online access was allowed to documents stored on an optical or magnetic disk to be retrieved via a computer terminal through its data base index. The laser printers provided excellent hard copy reproduction of the digitized data.

Automated signature verification will use Document Image Analysis (DIA). DIA includes extraction of lines and curves in images, classification of objects using boundary information, texture analysis and analysis of images for estimating the motion of objects. These are the processes a computer will need to use to compare one signature to another. For more information on these technologies, periodicals such as "OPTICAL INFORMATION SYSTEMS," can be very informative.

Development begins in Florida

Development and implementation of Signature Retrieval Systems for use in elections began, in Pinellas County, Florida, in 1986. Our survey shows that many counties in Florida have since installed these systems. Pinellas, Dade and Orange Counties have been the innovators and trailblazers in using these systems.

Petition signature checking requirements have been the impetus in many election agencies to install signature verification systems. Recent experiences with right-to-die petitions in the State of Washington suggest that legal deadlines could not have been met without such a system in place.

Majority of Systems are PC Based

Most of the systems seen by the authors have been Personal Computer (PC) based, although main frame and mini-computers may be used.

The scanning or digitizing of documents and/or the signatures, is done on a PC. Most systems display signatures or documents on a PC. Although, some systems use main frame and mini-computer terminals for displaying the information. Main frames and mini's are used primarily for storing the data, while compression and expansion of data usually occur on the PC.

Acceptance of Electronically Reproduced Images by the Courts

Generally, information from agencies returning the questionnaire has shown acceptability of electronically reproduced images have, yet, to be tested in the courts, in some states.

The State of Florida has passed enabling legislation that generally reads, “an electronically generated reproduction of an original voter registration . . . which reduction is certified by the supervisor of elections who is custodian of the record, is admissible as evidence in any judicial or administrative proceeding . . . with the same effect as the original voter registration record” (Witnesses, Records and Documents section 92.295).

Florida also allows destruction of the original master record cards, after microfilming, if they have been maintained digitally on electronic, magnetic or optic media. (Registration Office, Officers and Procedures section 98.412)

Other agencies, like San Diego County, California, Registrar of Voters have found that the California Government Code allows destruction of the uncancelled affidavits, after microfilming, while the Elections Code does not permit this. Their solution is that they have proposed legislation that will eliminate the difference between the two governing codes.

In informal discussions with Federal Election Commission National Clearinghouse and United States Department of Justice staff it was stated by the Justice Department staff that the original voter documents should be kept for at least twenty-
two months after a person last voted, as required with ballots and other election materials.

Some jurisdictions, with whom we have communicated, have a problem with the retention of canceled affidavits. They have indicated they do not plan to remove them from their paper files because it is too costly. If the documents are not removed, they will eventually become a problem to someone.

Many jurisdictions have shown they have savings, in filing of the original documents, by filing them in the order received. This eliminates the need for sorting and filing of documents. Agencies place them at the end of the file.

Description of Signature Retrieval Systems

The systems that are available range from signature retrieval system software only, for scanning and retrieving a document (you buy your own hardware), to complete election systems with hardware. Costs vary from a few thousand to a few million dollars. Specific costs reported by the agencies in the survey can be found in the appendix. The following is a brief description of some variations that are available.

Signature retrieval systems, that use optical disk and digitize the whole document, can be used to replace microfilm. Some advantages of optical disk are that it does not require developing and the images are available immediately. Optical disk also may be more environmentally friendly because of the elimination of the developing chemicals and process.

Turn Key System

Turn key systems are those that can provide both voter registration and signature retrieval module, in one package. Frequently, these systems also provide modules for absent voters, petitions, polling places, polling place workers, precincts or election districts, and candidate filing. These modules may all be included in one package or each can be purchased as a separate option to “customize” the system as needed by the jurisdiction.

Interfacing System

These systems usually provide signature retrieval only and are intended to interface with an existing voter registration system. These may require separate screens for displaying the voter data and signature. Again, depending on how the interface is accomplished it may appear to be a “seamless” system.

Software only

Some vendors are supplying software only, which has to be installed on the acquiring jurisdiction’s computer hardware. This can be an option if the jurisdiction has computer hardware or if the jurisdiction can buy the hardware at a lower price by receiving government discounts. If you decide to have new software written to fit your specific needs or if you are the first customer for new vendor software be aware as Collier County, Florida experienced that “little” things will come up and must be corrected by the vendor or programmer before the system is considered fully operational.

Equipment Required

The equipment or hardware varies widely from one signature retrieval system to another. Numerous computer and computer peripheral manufacturers are represented by the systems. Computers - There are many different manufacturer’s computers used. It is important that you buy a computer with enough memory to service the needs of your agency. Not enough memory or fast enough processing capabilities will result in slow retrieval times for signatures to be displayed on the computer screen. This results in staff waiting for the computer to provide the requested signature. Time is wasted resulting in lowered productivity and poor focus on the task. Ask the vendor to recommend hardware if you are buying software only. Consider requesting that equipment compatible to other
office computers you already have installed be provided. Be sure that your workload is clearly stated so the vendor can recommend the right equipment for your site.

Scanners or Video Cameras - This equipment is used to “scan” or digitize the document or signature. The scanner or camera converts the document to an electronic image that can be stored on magnetic or optical media. More scanners may be required, on a rent or lease basis, for conversion as was the case in Fulton County, Georgia and Amador County, California.

Again, there are a large variety of manufacturer's and equipment. The scanners can vary from automatically fed flat-bed scanners, that can scan large documents at rates of one a second, to a hand held scanner that is used to scan a signature only. Its speed is dependent upon the manual dexterity of the operator.

Video camera scanning, while used, is the exception rather than the rule. The quality of the video image is comparable to that of scanners, but none have been seen that provide for automatic feeding of documents.

Mouse - Most of the systems have a mouse device that is used to identify the area to be scanned, if not an automated function. The mouse is also used to crop the signature image. The mouse can be used like an eraser to eliminate extraneous printing, near the signature, that may have been digitized into the image.

Monitors - High resolution graphics monitors give the best image display, providing the digitizing was done at a good resolution. Three hundred dots per inch is considered very adequate. Higher resolutions require more space and time to transmit. Color display terminals also can be easier for the operator to use by being able to highlight several conditions using different colors.

Optical Disks - The optical disks used are WORM (Write Once Read Many) type platters. The archival quality of the platters has not yet been proven, because of the time they have been available on the market, but it is expected to be comparable to microfilm. The optical disk, like the magnetic disk is easily duplicated for backup and retention purposes. Consider offsite, storage of a duplicate backup optical disk.

There are two primary sizes of optical disk platters, 12 inch and 5.25 diameters. The hardware for optical disks ranges from a small desk top unit holding one 5.25 platter; to a very large floor unit holding over fifty twelve-inch platters. The large units automatically retrieve platters, much like the old jukeboxes selected records.

While optical disks need to be handled with care, they are less vulnerable to handling than magnetic disks. The laser light used to write and read the data has a focal point just below the surface of the platter. Maricopa County, Arizona utilizes a large “Jukebox” like optical disk system that is also used for other departmental functions.

Magnetic Disks - Here we are addressing magnetic disks, usually, used with personal computers. All of the signature retrieval systems we encountered use non-removable hard disks to store voter data and signature images, storing the image on magnetic disk. The amount of data that can be stored on a hard disk is dependent on the size of the hard disk. At this time, the sizes range from a small, obsolete, 10 megabyte (MB or million bytes) drive to drives that will hold a gigabyte (1 billion bytes) of data. The flexible or “floppy,” removable, diskette is frequently used as backup or for temporary storage of images until they are edited and written to the hard disk.

Printers - Laser printers will provide the best reproduction of images. This type of printer is highly recommended for this application.

Backup Tape Units - These units are good for backing up large data files. A word of caution regarding these backup tape units. There is no standard for writing the data to the tape, so a tape created on one manufacturer’s machine is un-
likely of being read on a different manufacturer's machine. If your agency already has backup tape hardware for other systems, you may need to require the same type of unit, for compatibility.

Election's staff in Pima County, Arizona caution that you ensure adequate vendor software, and in some cases hardware support is available in your area from your selected supplier.

Materials required

The materials required for a signature retrieval system are the same as those for any computer system. Depending on the hardware, you will need paper, magnetic diskettes, magnetic tape cartridges, optical disk platters, printer ribbons and toner cartridges.

Furniture

Often overlooked in the acquisition of new equipment, is the need for furniture such as desks, work stations and tables on which to mount the equipment. Desks or work stations for data entry should have a height of approximately twenty-seven inches. There are devices that will allow you to adjust the height of the keyboard that can be placed on or mounted below a regular desk or table. You may have to experiment with locating the equipment, but a L-shaped pattern often works well. Chairs should be comfortable and easily adjusted as are the pneumatically controlled chairs.

Be aware of lighting, a window behind an operator can cause uncomfortable glare on a monitor screen, as can overhead lights. There are hoods and anti-glare screens that can be useful in reducing these problems.

Voter Registration Document

Many agencies have discovered that their old voter registration format presented ongoing problems for the signature retrieval system. Described below are some problems previously encountered and their resolution.

Document Format

Some agencies have redesigned their voter registration document using white paper with sharp black printing, to provide the greatest contrast for scanning. This accommodation to the computer system results in a pay back to the agency in a clear easily read image on the monitor screen, when comparison is required.

The reasons for the redesign are multiple, often old documents are in poor condition or have many different formats. Erie County in New York State found that double backing on the original registration forms resulted in scanner misfeeds.

Consistency in format of the document is also beneficial, especially if the signature is digitized and stored separately, from the document. When the whole document is going to be digitized and stored, minimizing printing and lines on the document will reduce the amount of storage space required for the “electronic” image.

When there are large blocks of printed information, such as instructions, on the voter registration form, it is possible with an electronic image to store the instructions, once only. Then you do not have to store it with every document on which it appears.

Signature Block

The signature block can be crucial. Ideally, the block should be one inch in height by at least three inches in length. Use a very light, horizontal line, about 1/2 inch shorter than the block width, centered in the block, on which the voter’s signature is to be written. This will allow digitizing the signature without picking up other printed material near the signature block. This provides a cleaner image requiring less disk storage space. Pasco County, Florida found during conversion that they had the following signature problems:

- [ ] Signatures requiring more space than allowed.
- [ ] Some signatures were too light.
- [ ] Sometimes there were no signatures.
Their solution was to send out “signature cards” to the electorate to obtain a signature acceptable for the project. Hillsborough County, Florida suggests collecting signatures at Presidential Elections using purpose designed precinct registers (white with no extraneous material encroaching on signature) and good black ink pens.

**Motor Voter**

Motor Voter, the registering of voters on a driver’s license application has been adopted in some states and is likely to be adopted in more. The format of the motor voter document can affect signature retrieval systems. For instance, the size and color of the document, or the size and location of the signature block may require, additional steps to separate the documents, before scanning. Equipment may have to be adjusted for each different document to allow for changes in color or location of the signature.

Elections administrators should be allowed to provide input for any proposed document changes to accommodate Motor Voter registration. An advantage of this program, according to officials in Clackamas County, Oregon is that the registration crunch before elections will be alleviated.

**Uses In Elections**

**Petition Signatures**

The primary use of signature retrieval systems are to check petition signatures to decide that the person signing a given petition is the same person who registered to vote. Prior to obtaining their system, Lee County, Florida had to “Alphabetize petitions and then pull each individual voter record to verify each signature. With this process 100 signatures were verified per hour. With digitization, 100 signatures can be verified in 20 minutes or approximately 220 signatures per hour.”

The computer can keep track of the number of valid signatures processed and to determine whether the signer meets residency requirements for the petition. Also whether the candidate, initiative, referendum of recall measure qualifies for the ballot.

**Absent Voter Signatures**

Comparison checks for validating absent voter applications or returned ballots. Mail ballot elections are more efficiently conducted with computerized signature retrieval.

**Nomination Signatures**

Candidate nominating papers are checked against the registration signatures.

**Polling Place Signatures**

Erie, Monroe and Niagara Counties, in New York, provide a roster with facsimile signatures printed next to the voters names for the polling places. When the voter votes on election day, it is then a simple process for the polling place workers to compare the voter’s signature to the printed facsimile.

**Agencies Using Systems**

During preparation of this paper we visited working installations of these systems in Pinellas and Dade Counties in Florida; and Los Angeles, San Diego and Placer Counties in California. Pinellas County was the first election agency to install an operational system. The pioneering efforts started in 1986, by Pinellas County was closely followed by Orange and Dade counties in Florida.

Twenty-three states have told us they either have none or are not aware of any signature systems in use, in their state. We were informed that Iowa, does not require signature comparison for any aspect of their voting process.

Since 1986, many jurisdictions have installed these systems across the United States. Many other Florida Counties have systems as well as jurisdictions in the States of Arizona, California, Georgia, Indiana, Nevada, New York, Oregon and Washington.
Most of the systems in use have been developed or acquired at the local level. Sometimes state officials are unaware of their existence.

Experience

Once the system is installed, all existing active voter registration documents must be scanned either wholly or in part to form the basis of the information that will be recalled during the signature checking process. Some systems have scanners that feed the document through the scanner station. Others have hand held scanners requiring a person to pass the scanner mechanism over the signature area of the voter document.

Many agencies have encountered a variety of difficulties at this stage. Over the years, formats of voter registration documents have changed the location of the signature on the document. Paper color can cause degradation of the scanned image, background color is picked up by the scanner. The digitizing of background causes more disk space to be used, than required for the signature only.

Additionally, over time the actual signature may have faded. This difficulty has been overcome by techniques such as photocopying the original document and enhancing the images on white paper before the signature or document is scanned into the system.

Fatigue of workers scanning the documents is another factor that must be considered when planning the document conversion. Fatigue results in errors on the file that will cause problems later. Based on recommendations, we suggest that workers be given a five minute rest break every hour. This is beyond their regular morning and afternoon breaks and lunch. This leaves about 6.5 productive hours in a normal eight hour work day for conversion. Placer County, California managers insisted that their staff take hourly breaks due to the repetitive nature of the conversion work in order to eliminate errors on the file. The conversion process of the initial scanning of existing documents is mentioned, most frequently, as the main problem area for installing signature retrieval systems.

Brevard County, Florida found that the capture process was difficult on the employees because of the repetition. Their solution was to schedule each employee for a limited time on the conversion task. They could spend more time but it was not mandatory.

Whenever possible, ensure that all necessary equipment is purchased and delivered according to your schedule. Niagara County, New York's conversion process was slowed by the delay in purchase of their in-house scanning equipment.

Misplaced, lost or unscannable documents have frequently been cited as problems, in document conversion. At least one jurisdiction sent new registration forms to electors to fill out, to complete the installation of their system. (Clackamas County, Oregon)

One county suggested having a detailed plan for the conversion effort and to check 100% of the images to make sure they have been identified with the correct voter. (San Diego County, California)

A couple of counties said they had documents with signatures that were too large or light to be digitized. One county reduced the large signatures on a copy machine before scanning. Darkening of light signatures was achieved using a copy machine. (Dade and Pasco Counties, Florida)

Another jurisdiction said the blue paper used for their voter registration document was picked up as background during the scanning. Other printing on the document was digitized with the signature. This problem could only be solved with a new form. (Pinellas County, Florida)

Mojave County in Arizona suggested that you make sure the system you select is compatible with your existing software and hardware.

Be prepared to expend effort and time to backup data and signatures on a regular basis. Backup
will probably have to be done outside normal business hours. (Fulton County, Georgia)

We have also learned some jurisdictions are considering updating the signatures from polling place rosters. (Hillsborough County, Florida)

Benefits

Signature retrieval systems save money and time. When large petitions with thousands or hundreds of thousands of signatures for a statewide petition are required to be processed, these systems can enable an agency to do this within the legal deadlines required by the state.

Signature retrieval systems are one of the most productive automated systems an election's administrator can install. Productivity improvements of 400% are reported, in checking petition signatures. Thurston County, Washington reports that they were able to reduce staff from four regularly assigned employees to a person working on the task three quarters of their time. Manhour savings resulted in 1440 hours per year.

What follows is a list of areas within your agency where the installation of a signature retrieval system can benefit the management and administration of the agency:

- Document or signature retrieval and processing speeds were reported which indicated improvements of two to four times over manual processes.
- Signatures are more accessible to staff when needed.
- Accuracy of updating the correct record when changes occur is enhanced.
- Space for record storage in ledgers or filing equipment is reduced. This frees up expensive office space for other uses. If paper retention is required, by law in your area, records can be stored in warehouse type facilities.
- Speed of processing during election peaks is improved.

- More ability to meet legal deadlines as the workload increases. In San Diego County, California, prior to system installation AV's took 1.1 minutes each to process. After installation .35 minutes was required for each document. Similarly, petitions went from 3.2 minutes down to 2.2 minutes.

- Transportation costs, packaging and processing of sending poll ledgers out to precincts can be eliminated by producing a laser printed signature on the precinct register. Monroe County, New York, with 350,000 registered voters, was relieved of pulling poll ledgers, packing and sending them out in hundreds of carrying cases to the polls. Delivery costs, telephone line and operator costs and key punching costs were eliminated. This resulted in savings equaling $50,000 per year.

- Computerized systems with terminals are easier to work with than heavy ledgers. Frequently with old paper files there are problems with dust, paper fleas, poor lighting all contributing to decreased staff efficiency and possible errors.

- Copies of computer files or optical disks can be made and stored offsite, providing better backup for the agencies records in case of fire or other disaster.

Based on our on-site interviews and questionnaires all jurisdictions have shown significant savings achieved by installing these systems. Some have reported labor savings that have the systems paying for themselves in one to three major elections.

Costs

Costs can range from about $5,000 for software alone to several million dollars for hardware, software and conversion of documents for a very large jurisdiction. Most vendors sell packages including hardware and software. They offer assistance with training, implementation and file conversion from paper or microfilm to the
computer. Allow for a certain amount of your time and that of key staff going into the selection, contract negotiation and installation of this equipment.

If you are wondering if your jurisdiction is large enough to justify the expense of this type of system, consider Amador County, California. Located in the foothills of the Sierras they have 17,000 voters and are in the process of converting to a signature retrieval system. They feel that already the system is extremely helpful. They have experienced what many others have regarding conversion problems and warn that you budget adequately, for staff for this effort.

Plan for additional costs, for the conversion effort, because it may be necessary to bring in more workers and to work regular staff overtime. You also may use more supplies at this time than in normal production.

The following chart details some of the costs experienced by some of the jurisdictions responding to the survey. Keep in mind that some agencies implemented more extensive systems than others, as a result costs varied widely. The information is offered so that you may “ballpark” your potential costs if you decide to install this type of system in your agency.

### Implementation Strategies

The State of New York, State Board of Elections has developed regulations that New York counties must follow when acquiring a signature retrieval system. This is the only state we know of where this is currently being done.

Dade County, Florida elections officials suggest that you visit jurisdictions of the same size as yours, having the same legal requirements, who have their scanning equipment in place before making a purchase. San Diego County, California suggests that you allocate one day for each visit. Also, visit the site without the vendor.

We are not going to attempt to tell you how to prepare and evaluate a Request for Proposal or other instrument for a bid. The requirements for this process vary widely from one jurisdiction to another. We do suggest that you have a written agreement, approved by your legal counsel.

When you begin your acquisition process you should consider the following when preparing the agreement or contract specifications.

- How often is whole document needed? (Usually not very often. It probably does not need to be stored in the computer.)

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<td>$34,313</td>
<td>$146,313</td>
<td>$.76</td>
</tr>
<tr>
<td>Palm Beach Co., FL</td>
<td>414,000</td>
<td>$65,000</td>
<td>$40,000</td>
<td>$105,000</td>
<td>$.26</td>
</tr>
<tr>
<td>Monroe Co, NY</td>
<td>350,000</td>
<td>$400,000</td>
<td>$75,000</td>
<td>$475,000</td>
<td>$1.36</td>
</tr>
<tr>
<td>Clackamas Co, OR</td>
<td>150,000</td>
<td>$58,000</td>
<td>$6,500</td>
<td>$64,500</td>
<td>$.43</td>
</tr>
</tbody>
</table>
- Are signatures required at polling places? (If so, can you use a report on which the signature has been printed by the system?)
- Do the courts accept documents or signatures reproduced from digitized data? (You should check this with your legal counsel.)
- Know your processing volumes so you can predict what type of response times you will need to accomplish your work.

  - When and how many of your documents come in at specific times? (Most usually come in at busy election times).
  - How many different signature checking functions are required to be done, simultaneously? (Petitions, Absent Voters)
  - Will you need to digitize and retrieve signatures at the same time? (You may need to enter a voter registration document, while checking signatures for candidate filing.)

- Identify any hardware and software you may currently have so compatibility can be determined.
- Decide if you need to have backup or extra computer hardware. How seriously would you be affected by an equipment breakdown? How long will it take to get equipment repaired or replaced should part of your system breakdown during a peak election process?
- Include a comprehensive conversion plan with time schedules. (You may need additional equipment, workers, a fall back or contingency plan and expect problems.)
- Develop acceptance testing criteria for the system. Include it in your specifications or agreement, before you buy, so the vendors will know what you expect the system to be capable of performing.
- Visit or talk with election administrators who have signature retrieval systems in operation. Their experience can be very helpful.
- Allow yourself enough time to install the system and to convert your data in an orderly manner. Consider installing the system at a slow processing time.
- Require that training be provided to several of your staff, specify numbers.

  Once a decision to buy a system has been made. Require a solid, written agreement for the installation of the system and conversion of the data.

  The vendor usually provides training in the use of the system as part of the contract. Manuals for the ongoing operation of the system also should be required.

  Facility modifications to install electrical, phone lines, air conditioning and space need to be determined. They should be completed before the arrival of the equipment. Allow space for staff, equipment servicing and supply storage when deciding needs for the equipment.

  The contract should specify when the equipment hardware and software will be delivered. Who will setup the equipment? Who will install software you currently own? Who will work on the conversion? How will the new system work with any system you already have?

  The criteria making up the final acceptance and sign off for the new system should be part of the contract. The vendor will know what to expect ahead of time. Consider making partial payments for the equipment throughout the installation process with final payment contingent upon the system working to your satisfaction.

  Decide what equipment and software service level is needed. Your level of service may need to change depending on when you are conducting an election and when you are not. On-site service requiring a technician to arrive on-site after a short specified period after placing a call, is the top level of service. Other service options may require you to bring the equipment to the vendor's location. Quickness of response plus on-site customer engineers probably will be the most expensive service agreement you can have. Put service
level requirements in your agreement. Ask for what you need and negotiate with the vendor for what best serves your agency.

**Conclusions**

Many jurisdictions are maintaining a duplicate copy of the voter registration document on microfilm or microfiche. Some jurisdictions are already using optical disk, for the duplicate copy of the voter document.

We believe, the trend in the future will be to store the voter document image on optical disk. The advantages being, the image does not need chemicals to develop. The image can be immediately available. Data could be keyed from the document image, confirming the image is readable. It also may be possible to scan the image and encode data for the voter data base.

Signature retrieval systems, as with all systems, have problems associated with implementation. Murphy’s Law seems always to apply. Based upon our findings the rewards the systems can provide are well worth the effort.
Appendix 1

Election Signature
Retrieval System
Jurisdiction Contacts
ARIZONA

MARICOPA COUNTY - 1,100,000 Registered Voters
   Maricopa County Department of Elections
   Mr. Glenn Humbert
   Assistant Director - Data Systems
   111 South Third Avenue
   Phoenix, AZ 85003-2223
   602 506-1552

MOHAVE COUNTY - 55,000 Registered Voters
   Mohave County
   Mr. Claus Behrens
   Registration Supervisor
   P.O. Box 70
   Kingman, AZ 86401
   602 753-3470

PIMA COUNTY - 384,000 Registered Voters
   Pima County Recorder
   Mr. Jay Miller
   Information System Coordinator
   115 North Church Street
   Tucson, AZ 85701-1199
   602 740-8151

CALIFORNIA

AMADOR COUNTY - 17,000 Registered Voters
   County of Amador County Clerk-Recorder
   Mr. Sheldon D. Johnson
   County Clerk-Recorder
   108 Court Street
   Jackson, CA 95642
   209 223-6464
LOS ANGELES COUNTY - 3,300,000 Registered Voters
County of Los Angeles Registrar-Recorder/County Clerk
Mr. Micheal Petrucello
Assistant Registrar-Recorder, Technical Services
P.O. Box 30450
Los Angeles, CA 90030
213 725-5666

SAN DIEGO COUNTY - 1,200,000 Registered Voters
County of San Diego Registrar of Voters
Ms. Ingrid Gonzales
Assistant Registrar of Voters
5201-I Ruffin Road
San Diego, CA 92123
619 694-3402

FLORIDA

BREVARD COUNTY - 193,000 Registered Voters
Brevard County, Supervisor of Elections
Ms. Shirley P. Baccus
Supervisor of Elections
P.O. Box 1119
Titusville, FL 32781-1119
407 264-5005

COLLIER COUNTY - 75,000 Registered Voters
Collier County, Supervisor of Elections
Ms. Mary W. Morgan
Supervisor of Elections
Collier Government Center
3301 Tamiami Trail East
Naples, FL 33962-4971
813 774-8450
DADE COUNTY - 600,000 Registered Voters
Dade County Elections Department
Mr. David C. Leahy
Supervisor of Elections
111 NW 1 Street, Suite 1910
Miami, FL 33128
305 375-3150

HILLSBOROUGH COUNTY - 294,000 Registered Voters
Hillsborough County, Supervisor of Elections
Mr. Chuck Smith
Elections Operations Manager
419 Pierce Street, Room 195
Tampa, FL 33602
813 272-5850

LEE COUNTY - 159,000 Registered Voters
Lee County, Supervisor of Elections
Mr. Bernie R. Feliciano
Deputy Registrar
P.O. Box 2545
Ft. Meyers, FL 33902
813 335-2594

PALM BEACH COUNTY - 415,000 Registered Voters
Palm Beach County, Supervisor of Elections
Ms. Jackie Winchester
Supervisor of Elections
301 North Olive Avenue, Room 105
West Palm Beach, FL 33401
407 355-2650

PASCO COUNTY - 149,000 Registered Voters
Pasco County, Supervisor of Elections
Mr. Kurt S. Browning
Supervisor of Elections
705 East Live Oak Avenue, Room 212
Dade City, FL 33525
904 521-4302
PINELLAS COUNTY - 435,000 Registered Voters
Pinellas County, Supervisor of Elections
Ms. Dorothy Walker Ruggles
Supervisor of Elections
315 Court Street, Room 117
Clearwater, FL 34616-5190
813 462-3551

SARASOTA COUNTY - 166,000 Registered Voters
Sarasota County, Supervisor of Elections
Mr. E. Michael Berrios
Network Administrator
P.O. Box 4194
100 South Washington Boulevard
Sarasota, FL 34230-4194
813 951-5300

GEORGIA

FULTON COUNTY - 308,000 Registered Voters
Fulton County, Department of Registration and Elections
Mr. John P. Sullivan
Chief, Registration Division
141 Pryor Street SW, Suite 4085
Atlanta, GA 30303-3450
404 730-7072

NEW YORK

ERIE COUNTY - 500,000 Registered Voters
Erie County Board of Elections
Mr. Dan Gregorio
Deputy Commissioner
134 West Eagle Street
Buffalo, NY 14202
716 858-7780
MONROE COUNTY - 350,000 Registered Voters
Monroe County Board of Elections
Ms. M. Betsy Relin / Mr. Ronald J. Starkweather
Commissioners of Elections
39 West Main Street, Room 106
Rochester, NY 14614
716 428-5884

NIAGARA COUNTY - 102,000 Registered Voters
Niagara County Board of Elections
Ms. Lucille L. Britt / Mr. Douglas O. Jayne
Commissioners of Elections
59 Park Avenue
Lockport, NY 14094
716 439-6137

OREGON

CLACKAMAS COUNTY - 150,000 Registered Voters
Clackamas County Elections Division
Mr. Ben Marberry
Elections Manager
835 Portland Avenue
Gladstone, OR 97027-2195
503 655-8510

WASHINGTON

THURSTON COUNTY - 80,000 Registered Voters
Thurston County
Ms. Sheryl Moss
Director of Elections
2000 Lakeridge Drive SW
Olympia, WA 98501
206 786-5408
Appendix 2

Election Signature Retrieval System Vendors
Arthur Anderson  
1345 Avenue of the Americas  
New York, NY 10100  
212 708-4000

Business Records Corporation  
Mr. Ed Charbonneau  
1001 Eastshore Highway  
Berkeley, CA 94710  
510 527-5150

Datavision Corporation  
Mr. Bob Brisco  
72 Hosmer Place  
Post Office Box 664  
Marlboro, MA 01752  
508 480-0404

DIMS  
Mr. John Hice, President  
2350 East Main Street,  
Suite 202  
Ventura, CA 90003  
805 653-1990

Fidlar & Chambers  
Mr. Larry Lawrence/Mr. Bob Diveley  
501 Goodlette Road North  
Bldg G, Suite 15  
Naples, FL 33940  
813 263-5055

Filenet Inc.  
Mr. Brian Schlosser/Mr. Ron Baxter  
6621 North Scottsdale Road  
Scottsdale, AZ 85253  
602 951-8814
Genesys Data Technologies, Inc.
Mr. Robert Clark 301 785-0661
11350 McCormick Road
Hunt Valley, MD 21030
800 767-4384

IBM
Mr. David L. Wilson
3109 Martin Luther King Boulevard
Tampa, FL 33607
813 872-2140

and

150 State Street
Rochester, NY 14614
716 726-8152

Identitech, Inc.
Mr. Bob Riley 407 462-2112
1333 Gateway Drive
Mail Stop 1022
Melbourne, FL 32901

Image Business Systems
Mr. David LaCarta, Ms. Diane DeCarlo, Mr. Jim Hendrickson
417 Fifth Avenue
New York, NY 10016
212 696-2500

National Time Sharing
Dr. Charles DeWald, 716 297-0553
Mr. Bruce Cowe, 716 692-2274
1342 Military Road
Niagara Falls, NY 14304
PI Technology Inc.
Mr. Arun Sinha
5775 East Los Angeles Avenue
Suite 103
Simi Valley, CA 93063
805 582-0775

Signaware Inc.
Mr. John St. Clair
300 South Duncan Avenue
Suite 275
Clearwater, FL 34615
813 461-4211
fax 813 449-9713
800 637-6564

SQN Peripherals, Inc.
Mr. Joe Uhland
65 Indel Avenue
Post Office Box 423
Rancocas, NJ 08073
609 261-5500

Systemhouse Inc.
Mr. Bill Devitt, Vice President and General Manager
Mr. Al Lavell, Director, Marketing and Sales
Cerritos Town Center
12750 Center Court Drive, 7th Floor
Cerritos, CA 90701
213 860-3635

Votec
Mr. John Medcalf, San Diego  619 674-5532
Ms. Darlene Van Dam, Los Angeles  818 348-3907
21625 Yucatan Avenue
Woodland Hills, CA 91364
800 827-0435
Appendix 3

Summary of Questionnaire Responses — Jurisdictions Using Signature Retrieval Systems
<table>
<thead>
<tr>
<th>Jurisdiction Using Signature Retrieval Systems as of March 1, 1992</th>
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<tbody>
<tr>
<td><strong>State</strong></td>
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<tr>
<td>Jurisdiction</td>
</tr>
<tr>
<td>MAY USE AS CONTACT</td>
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<tr>
<td>Registered Voters</td>
</tr>
<tr>
<td>Polling Places</td>
</tr>
<tr>
<td>Elections Per Year</td>
</tr>
<tr>
<td>Absentee Voters in Major Election</td>
</tr>
<tr>
<td>Enabling Legislation Required</td>
</tr>
<tr>
<td>Courts Accept Digitized Facsimiles</td>
</tr>
</tbody>
</table>

**Voter Registration Document**

- **Size of Document:** 8" x 5" 5" x 8" 5" x 8" 8" x 5" 8" x 5" 8" x 5"
- **Color Type/Color:** Blue & Red/White Black/White Blue/White Black & Red/White Black & Red/White
- **Documents Sent to Polling Place:** NO NO NO NO NO NO
- **Documents Received by Batch:** BY VOTER NAME BY VOTER NAME
- **Documents Received by Date:** 104,000 12,000 12,000 3,600 1,000,000 431,000
- **Peaks by Date Before Election Day:** 60,000 6,000 12,000 1,650 240,000 156,000
- **Percent of Documents:** 30-60% 25% 25% 25% 25% 25%
- **Signature Checked in 1990:** NO NO NO NO NO NO
- **Signatures on Absent Voter Ballots:** 0 0 0 0 0 0
- **Concurrent Signature Checks Required:** YES YES YES YES YES YES

**System Features**

- **Digitize Whole Form or Signature:** YES NO YES NO YES YES
- **Simultaneous Scanning & Retrieving:** YES YES YES YES YES YES
- **Signature Image Stored on Optical Disk & Film:** YES YES YES YES YES YES
- **Average Bytes to Store Signature:** 50,000 3,000 3,000 2,500 5,000 2,500
- **Disks Space Required for Signatures:** 500 100 100 100 100 100
- **Backup Media for Signatures:** 320 GB 100 GB 100 GB 100 GB 100 GB 100 GB
- **All Signature Images Online:** YES YES YES YES YES YES
- **All Documents Online:** YES YES YES YES YES YES
- **Scanned per Minute:** 50 50 50 50 50 50
- **Seconds to Retrieve Signature:** 8 8 8 8 8 8
- **Printed on Voter Lists:** NO NO NO NO NO NO
- **Other Forms Scanned and Retrieved:** NONE NONE NONE NONE NONE NONE

**System Development and Implemented**

- **Decided to Implement:** 1990
- **System First Operational:** 1990
- **Developed System In-House:** YES
- **Turnkey System Acquired:** NO
- **Developed with System Integrator:** NO

**Business Records:**

- 1988
- 1989
- 1990
- 1990
- 1990
- 1990
- 1990
- 1990
- 1990
- 1990
<table>
<thead>
<tr>
<th>JURISDICTIONS USING SIGNATURE RETRIEVAL SYSTEMS AS OF MARCH 1, 1992</th>
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</thead>
<tbody>
<tr>
<td><strong>STATE</strong></td>
</tr>
<tr>
<td><strong>JURISDICTION</strong></td>
</tr>
<tr>
<td>SYSTEM DEVELOPED AND IMPLEMENTED - continued</td>
</tr>
<tr>
<td>VENDOR PROVIDED HARDWARE &amp; SOFTWARE</td>
</tr>
<tr>
<td>VENDOR PROVIDED TRAINING</td>
</tr>
<tr>
<td>TIME REQUIRED TO TRAIN NEW WORKER</td>
</tr>
<tr>
<td>WRITTEN INSTRUCTIONS PROVIDED BY</td>
</tr>
<tr>
<td>CONVERSION EFFORT</td>
</tr>
<tr>
<td>DOCUMENT USED FOR INITIAL CONVERSION</td>
</tr>
<tr>
<td>NUMBER OF DOCUMENTS CONVERTED</td>
</tr>
<tr>
<td>SCANNING WORKSTATIONS USED</td>
</tr>
<tr>
<td>HOURS PER DAY</td>
</tr>
<tr>
<td>TIME REQUIRED TO COMPLETE CONVERSION</td>
</tr>
<tr>
<td>ESTIMATED SYSTEM COSTS</td>
</tr>
<tr>
<td>APPROXIMATE COST OF SYSTEM</td>
</tr>
<tr>
<td>APPROXIMATE COST OF CONVERSION</td>
</tr>
<tr>
<td>SAVINGS</td>
</tr>
<tr>
<td>LABOR CUT 60%</td>
</tr>
<tr>
<td>SYSTEM HARDWARE MAINFRAME, MINI OR FILE SERVER</td>
</tr>
<tr>
<td>WORKSTATIONS</td>
</tr>
<tr>
<td>SCANNER OR CAMERA</td>
</tr>
<tr>
<td>PRINTER</td>
</tr>
<tr>
<td>IMAGE COMPRESSION</td>
</tr>
<tr>
<td>OPTICAL DISK</td>
</tr>
<tr>
<td>OCR OR BAR CODE SCANNER</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>JURISDICTIONS USING SIGNATURE RETRIEVAL SYSTEMS AS OF MARCH 1, 1992</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>STATE</strong></td>
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<tr>
<td><strong>JURISDICTION</strong></td>
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<tr>
<td>MAY USE AS CONTACT</td>
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<tr>
<td>REGISTERED VOTERS</td>
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<td>POLLING PLACES</td>
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<td>ELECTIONS PER YEAR</td>
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<td>ABSENTEE VOTERS IN MAJOR ELECTION</td>
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<tr>
<td>ENABLING LEGISLATION REQUIRED</td>
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<tr>
<td>COURTS ACCEPTED DIGITIZED FACIMILES</td>
</tr>
</tbody>
</table>

**VOTER REGISTRATION DOCUMENT**

| SIZE OF DOCUMENT | 5 1/2" x 8 1/2" | 8 1/2" x 5 1/2" | 8 1/2" x 5 1/2" | 8 1/2" x 5 1/2" | 8 1/2" x 5 1/2" | 8 1/2" x 5 1/2" |
| COLOR (TYPE/PAPER) | GREEN/YELLOW | BLACK/WHITE | BLUE/WHITE | BLACK/WHITE | BLACK/WHITE | BLACK/WHITE |
| DOCUMENTS SENT TO POLLING PLACE | NO | NO | NO | NO | NO | NO |
| ORIGINAL RETAINED | BY VOTER NAME | BY VOTER NAME | BY VOTER NAME | BY VOTER NAME | BY VOTER NAME | BY VOTER NAME |
| DOCUMENTS RECEIVED - EVEN YEARS | 13,200 | 15,500 | 100,000 | 60,000 | 32,000 | 22,000 |
| - ODD YEARS | 9,000 | 9,000 | 43,000 | 15,000 | 15,000 | 15,000 |
| PEAK LOAD - DAYS BEFORE ELECTION | 30-60 | 30-60 | 45-30 | 30-60 | 30 | 30-60 |
| PERCENT OF DOCUMENTS | 30-40% | 30-40% | 16% | 16-33% | 50% | 15-20% |

**SIGNATURES CHECKED IN 1990**

| VOTER ONLY | 107 | 22,294 | 111,000 | 25,500 | 5,760 | 25,800 |
| COLLECTIVE | 1,944 | 722 | 2,000 | 15,000 | 2,361 | 2,081 |
| OTHERS | 1,572 | 0 | 0 | 0 | 0 | 0 |
| REFERENDUM PETITIONS | 4,586 | 35,527 | 65,000 | 3,000 | 42,935 | 1,215 |
| AT POLLING PLACES | N/A | N/A | 234,700 | 234,700 | 111,854 |
| RANDOM SAMPLING ALLOWED | YES | YES | YES | YES | YES | YES |

**SIGNATURES CHECKED IN 1990**

| NAME & SIGNATURE | NO | YES | NO | YES | NO | YES |
| SIGNATURE ONLY | YES | YES | YES | YES | YES | YES |
| SIGNATURE IN DEVELOPMENT | NO | NO | NO | NO | NO | NO |
| SIGNATURE ON OPTICAL DISK | NO | YES | NO | YES | NO | YES |
| SIGNATURE IMAGE STORED ON MICROFILM & FICHE | NO | YES | NO | YES | NO | YES |
| AVERAGE Bytes TO STORE - SIGNATURE | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 |
| DISK SPACE REQUIRED FOR SIGNATURES | N/A | N/A | 204 | N/A | N/A | N/A |
| BACKUP MEDIA FOR SIGNATURES | N/A | N/A | 204 | N/A | N/A | N/A |
| ALL SIGNATURE IMAGES ONLINE | NO | NO | NO | NO | NO | NO |
| SCANNED PER MINUTE - SIGNATURES | 4 | 12 | 1 | 1 | 2 | 2 |
| SECONDS TO RETRIEVE - A SIGNATURE | 3-5 | 1.5 SEC | 25 | 10 SEC | 15-20 SEC | 15-20 SEC |
| SIGNATURES PRINTED ON VOTER LIST | NO | NO | NO | NO | NO | NO |

**SYSTEM DEVELOPED AND IMPLEMENTED**

<p>| DEVELOPED SYSTEM IN-HOUSE | NO | NO | YES | YES | YES | YES |
| TURNKEY SYSTEM ACQUIRED | NO | NO | NO | NO | NO | NO |
| DEVELOPED WITH SYSTEM INTEGRATOR | IDENTITY, INC. | NO | SIGNATURE | NO | DATAVISION CORP | NO |</p>
<table>
<thead>
<tr>
<th>JURISDICTIONS USING SIGNATURE RETRIEVAL SYSTEMS AS OF MARCH 1, 1992</th>
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<tr>
<td>VENDOR PROVIDED TRAINING</td>
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<tr>
<td>TIME REQUIRED TO TRAIN NEW WORKER</td>
</tr>
<tr>
<td>WRITTEN INSTRUCTIONS PROVIDED BY VENDOR &amp; STAFF</td>
</tr>
<tr>
<td>CONVERSION EFFORT</td>
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<tr>
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</tr>
<tr>
<td>IMAGE COMPRESSION</td>
</tr>
<tr>
<td>OPTICAL DISK</td>
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<tr>
<td>OCR OR BAR CODE SCANNER</td>
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<tr>
<td>Jurisdiction</td>
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<tr>
<td>--------------</td>
</tr>
<tr>
<td>May Use As Contact</td>
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<tr>
<td>Registered Voters</td>
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<td>Polling Places</td>
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<tr>
<td>Elections Per Year</td>
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<tr>
<td>Absentee Voters in Major Election</td>
</tr>
<tr>
<td>Enabling Legislation Required</td>
</tr>
<tr>
<td>Courts Accept Digitized Facilities</td>
</tr>
</tbody>
</table>

**Voter Registration Document**
- **Size of Document**: 8 1/2" x 11" on both sides of 80# stock
- **Color (Type/Paper)**: Green/Sue

**Document Sent to Polling Place**
- **Digitize**: Yes
- **Original Retained**: Yes

**Documents Received - Even Years**
- **Odd Years**: 30,000

**Peak Load - Days Before Election Day**
- **PERCENT OF DOCUMENTS**: 25%

**Signatures Checked in 1990**
- **Verify Name or Signature**: Yes
- **Absent Voter Ballot Applications**: 0
- **Returned Absent Voter Ballots**: 0
- **Candidate Nominations**: 12,000
- **Recall Petitions**: 2,500
- **Initiative Petitions**: 1,650

**Concurrent Signature Checks Required**
- **Yes**: Yes

**System Features**
- **Integrated with Voter Registration**: Yes
- **Digitize Whole Form or Signature**: Yes
- **Simultaneous Scanning & Retrieving**: Yes
- **Signature Image Stored On**: Magnetic Disk
- **Document Image Stored On**: Microfilm
- **Average Bytes to Store - Signature**: 5,000
- **Disk Space Required for Signatures**: 620 MB
- **Backup Media for Signatures**: Magnetic Tape
- **All Signature Images Online**: Yes
- **All Document Images Online**: Yes
- **Scanned Per Minute - Signatures**: 1/2 - 1
- **Signatures Printed On Voter Lists**: None

**System Developed and Implemented**
- **Decision to Implement**: 1986
- **System First Operational**: 1987
- **Developed System In-House**: Yes
- **Developed With System Integrator**: IBM
JURISDICTIONS USING SIGNATURE RETRIEVAL SYSTEMS AS OF MARCH 1, 1992

<table>
<thead>
<tr>
<th>STATE</th>
<th>JURISDICTION</th>
<th>FLORIDA</th>
<th>FLORIDA</th>
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<tr>
<td></td>
<td>PASCO COUNTY</td>
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<td>---</td>
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<tr>
<td></td>
<td>VENDOR PROVIDED TRAINING</td>
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<td>---</td>
<td>YES</td>
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</tr>
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SYSTEM HARDWARE

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</tbody>
</table>
For information about other Innovations in Election Administration contact

National Clearinghouse on Election Administration
Federal Election Commission
999 E. Street, N.W.
Washington, D.C. 20463

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Direct    202/219-3670
FAX       202/219-3880