# Preliminary Optical Scan Survey Results

New York State has voted exclusively on lever machines[1] for generations. Because we lack experience with any other voting systems, our local and state officials sometimes accept false or misleading information about precinct based optical scan systems from supporters of touchscreen/pushbutton style voting machines (DREs). Alarmist statements that ballot printing costs are high, that more scanners are required than is actually the case, or that scanner technology cannot satisfy HAVA compliance have been disseminated by vendors and some election officials in an effort to dissuade New York from purchasing what in practice is a reliable, mature, auditable and cost-effective voting system.

In fact, 46% of counties, 36% of precincts and 35% of voters used optical scan in the United States during the last election[2], and these systems have been performing very well for 20 years. If the statements made about optical scan by DRE proponents were true, many states would abandon their existing systems to replace it with something better. But almost no states who are currently using precinct based optical scanners are abandoning this technology at a moment when they could do so. State after state currently using optical scanners are planning to keep them or expand their usage[3] as they move towards full HAVA compliance in 2006.

In New York State, there seems to be a fundamental misunderstanding about how optical scan systems work in the real world. In order to improve understanding of optical scan voting, New Yorkers for Verified Voting is conducting a survey of states with many years of experience with this technology. Election officials from these states are able to describe their experience and give us realistic costs of acquisition, training and operation.

Our survey is still in progress, but the responses we have received so far show a wealth of positive experiences with optical scan systems. We've decided to publish this preliminary data in order to counter some of the inaccurate statements being made about this popular, robust voting technology.

## How We Conducted the Survey

We obtained a list of 865 counties in the United States which use precinct based optical scan systems. We requested by phone or email answers to a set of survey questions related to usage of their systems. This is a laborious process, as connecting with a knowledgeable person can take multiple contact attempts and lots of "phone tag". At the time of this writing, we have received responses from 9 states. Typically, respondents answered some, but not all, of the survey questions. In several cases, we got an email summarizing their experience with scanners rather than specific responses to our questions (some of these are reproduced here).

## Survey Questions Asked

We asked questions in the following categories:

- Typical Duration Times for Voters Using Paper Ballots and Optical Scanners
- Maintenance Costs and Lifetime of Optical Scanners
- Training Costs for Poll Workers and Voters
- Number of Ballots Printed Per Election
- Formula for Determining Required Number of Optical Scanners
- Procedures –Testing, Election Day Set Up, Close Down Procedures
- Poll worker and Voter Training

[1] With the exception of several precincts in Saratoga County which use DREs.
[2] Election Data Services, http://www.electiondataservices.com/VotingSummary2004_20040805.pdf.
[3] Michigan, Arizona, Okalahoma, South Dakota, North Dakota, Rhode Island, and West Virginia among others are going 100% optical scan in 2006.

# Typical Duration Times for Voters Using Paper Ballots and Optical Scanners

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|---|---|
| **Average time to fill out ballots in privacy booth** | |
| **Alabama** | Varies – usually no more than a minute. |
| **District of Columbia** | Rarely more than a minute or two. |
| **Florida** | A few minutes. |
| **Iowa** | A few seconds, depends upon lines. |
| **Minnesota** | Depends on election, from 15 seconds to several minutes. |
| **Oklahoma** | Depends – faster than touch screen – no scrolling. |
| **Average time to for scanner to scan ballots, per voter** | |
| **Alabama** | A few seconds. |
| **District of Columbia** | A few seconds. |
| **Florida** | A few seconds. |
| **Iowa** | 2 seconds. |
| **Minnesota** | Instantaneous. |
| **Oklahoma** | Insignificant. |
| **Do lines form waiting to use scanners** | |
| **Alabama** | No. |
| **District of Columbia** | Rarely – when several people walk up at once. |
| **Florida** | Rarely. |
| **Iowa** | No lines. |
| **Minnesota** | No, they form waiting to use booths and to register to vote. |
| **Oklahoma** | No lines. |
| **How long is the typical wait on line to use the scanner** | |
| **Alabama** | No line. |
| **District of Columbia** | None. |
| **Florida** | 5 seconds. |
| **Iowa** | None. |
| **Minnesota** | None. The scanner is not an encumbrance. |
| **Oklahoma** | None – couple seconds. |

## Maintenance Costs and Lifetime of Optical Scanners

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|---|---|
| **How long have optical scanners been used?** | |
| **Alabama** | Most since 1980's – some early 1980's |
| **District of Columbia** | Since 2002 |
| **Florida** | Since mid 1990's |
| **Iowa** | Six years |
| **Minnesota** | 4 years. Ramsey County has used optical scan since 1987. |
| **Oklahoma** | Since 1990 |
| **What is the anticipated life expectancy of the scanners in use?** | |
| **Alabama** | 10 to 20 years |
| **District of Columbia** | 10 years |
| **Florida** | 10 years |
| **Iowa** | 12+ years |
| **Minnesota** | 10 years |
| **Oklahoma** | 15 years or more |
| **What is the failure rate of scanners as a percentage of the total?** | |
| **Alabama** | No failures and only minor repairs. |
| **District of Columbia** | None. |
| **Florida** | Unknown – not reported. |
| **Iowa** | None with precinct based scanners. |
| **Minnesota** | .03% per election. |
| **Oklahoma** | 1 of 3,000 |
| **How much is budgeted for maintenance cost of scanners?** | |
| **Alabama** | No separate budget line, but vendor contract by counties – fee unknown. |
| **District of Columbia** | No special budget line – routine. |
| **Florida** | Varies by county. |
| **Iowa** | Less than mechanical lever machines. |
| **Minnesota** | ~$125 per year |
| **Oklahoma** | Routine. |

## Training Costs

| What are approximate Poll worker training costs? | |
|---|---|
| **Alabama** | Vendor provides as per county contracts. |
| **District of Columbia** | Unknown. |
| **Florida** | No state data. |
| **Iowa** | About same as with mechanical lever machines. |
| **Minnesota** | ~$45.00/election judge/year |
| **Oklahoma** | None. |
| **What are approximate Voter training costs?** | |
| **Alabama** | ES&S provides as per county contracts. |
| **District of Columbia** | Unknown – machines available for trial at several locations before election. |
| **Florida** | No state data. |
| **Iowa** | Nothing special. |
| **Minnesota** | ~$.01/voter/year |
| **Oklahoma** | None. |

## Number of Ballots Printed Per Election

| How many ballots are printed (as a percentage of registered voters)? | |
|---|---|
| **Alabama** | Varies – largest number of ballots cast over last four elections plus margin as determined by county. |
| **District of Columbia** | 110% |
| **Florida** | 110% |
| **Iowa** | 100% |
| **Minnesota** | 118% for Federal General Elections (Local General Elections and primaries varies by expected turnout) |
| **Oklahoma** | 90% |

## Formula for Determining Required Number of Optical Scanners

| How do you determine the required number of scanners? | |
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| **Alabama** | One precinct counter for each 2400 registered voters/precinct. |
| **District of Columbia** | One scanner per polling place. |
| **Florida** | There is no statewide formula. Counties decide. |
| **Iowa** | One scanner per polling place. |
| **Minnesota** | One per polling location. |
| **Oklahoma** | One scanner per polling place. |

## Election Day Procedures

| **How long does it take to prepare a polling place on Election Day?** | |
|---|---|
| **Alabama** | About one hour – few minutes for scanners. |
| **District of Columbia** | Varies by size – never more than 1.5 hours. |
| **Florida** | No more than an hour. |
| **Iowa** | Less than one hour. |
| **Minnesota** | 1 hour. |
| **Oklahoma** | Not sure – a few minutes. |
| **What procedure is followed if a scanner fails during an election?** | |
| **Alabama** | Seal and continue paper ballots in alternate storage. Some precincts have more than one device and may use that alternative. |
| **District of Columbia** | Scanner can be swapped or ballots isolated. |
| **Florida** | Counties determine. May use alternate scanner, save ballots, or destroy ballot and switch to DRE. |
| **Iowa** | Deliver a substitute –no delay as paper ballots are then collected and scanned by poll workers. |
| **Minnesota** | Try to resolve issue over the phone, then replace scanner by election staff if necessary. |
| **Oklahoma** | Secure ballots and continue to vote. |

## Close Down Procedures

| **Please describe ballot handling procedures at end of day** | |
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| **Alabama** | Witness, seal, and hold locally. Deliver memory module and printout to central location. |
| **Florida** | Paper ballots are retained by precinct until 90 days after election certification. |
| **Minnesota** | Write ins are separated and sealed, voted ballots are sealed and stored for 22 months |
| **What procedures are used to move ballots to central storage?** | |
| **Alabama** | If not counted centrally they are held locally for a period of 90 days unless challenged. |
| **District of Columbia** | Bonded carrier. |
| **Florida** | Physical delivery of memory module by certified poll workers. |
| **Iowa** | Sheriff's posse member stores data box in bag and carries to central office. |
| **Minnesota** | They are brought in by the election judges. |
| **Oklahoma** | Poll workers deliver along with the memory module from the scanner. Oklahoma does not send the data from the polls via telecomm – only the memory modules delivered by certified poll workers. |

## Testing Procedures

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| **How is testing done?** | |
| **Alabama** | Not more than 14 days prior – again at closing of polling, prior to certifying result. |
| **District of Columbia** | Vendor's test stack. |
| **Florida** | By counties. |
| **Iowa** | Run tape and sign. |
| **Minnesota** | A test deck is run through a ballot counter and then the results are compared to the pre-audited result. |
| **Oklahoma** | Each one with 100 marked ballots. |
| **Is testing done at a central location or in each precinct?** | |
| **Alabama** | Precinct. |
| **District of Columbia** | Central location. |
| **Iowa** | At storage facility. |
| **Minnesota** | Testing is done by each city. |
| **Oklahoma** | Precinct. |
| **Are test decks pre-printed by vendor or filled out by local election workers?** | |
| **Alabama** | Either. |
| **District of Columbia** | Vendor. |
| **Florida** | Pre-printed. |
| **Iowa** | Vendor. |
| **Minnesota** | Filled out by local workers. |
| **Oklahoma** | Precinct. |
| **If done by local election workers, how long does it take to complete test decks?** | |
| **Alabama** | Less than 5 minutes. |
| **Minnesota** | Depends on the ballot, but always between 5 minutes and 30 minutes. |
| **Oklahoma** | Varies by locale. |
| **How long does it take to run test decks through the scanners?** | |
| **Alabama** | Less than 5 minutes. |
| **District of Columbia** | Several minutes per scanner. |
| **Florida** | Several minutes. |
| **Minnesota** | One machine can be completely tested within 30 minutes. |
| **Oklahoma** | A few minutes. |

## Poll Worker and Voter Training

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| **How easy or difficult is training for poll workers?** | |
| **Alabama** | Very easy and no complaints. |
| **District of Columbia** | Some are resistant. |
| **Iowa** | They love it! |
| **Minnesota** | 2 hours, every other year. |
| **Oklahoma** | No difficulty. |
| **Average age of poll workers?** | |
| **Alabama** | Unknown, but many retired and older. |
| **District of Columbia** | Unknown – most over 50. |
| **Florida** | Tend to be older people. |
| **Iowa** | ~65 |
| **Minnesota** | Between 45 and 65, depending on the municipality. |
| **Oklahoma** | Mostly mature women – exact unknown. |
| **Do older poll workers have difficulty learning or using scanners?** | |
| **Alabama** | None. No recollection of problems with the transition from lever machines. Older workers still remark about preferring scanners. |
| **District of Columbia** | No, problems are mainly with procedures. |
| **Florida** | None reported. |
| **Iowa** | None. |
| **Minnesota** | No. |
| **Oklahoma** | No. |
| **How easy or difficult is training for voters?** | |
| **Alabama** | Very easy. |
| **District of Columbia** | No problems reported – some chronic marking errors. |
| **Iowa** | Easier than any known alternative. |
| **Minnesota** | Relatively easy, voters only need to be instructed to fill in the target. |
| **Oklahoma** | Voters find intuitive. |

## Email Responses

In some cases, respondents did not complete the survey questions but simply sent an email with their thoughts on their usage of paper ballots and optical scanners. Following are two.

## Michigan Email Response

Date: Tue, 26 Apr 2005 09:56:11 -0400

Thank you for your email. I'm happy to discuss Michigan's experience with optical scan. We have chosen optical scan as our statewide voting system.

We have qualified three vendors (ES&S, Diebold and Sequoia) to sell equipment in Michigan. Each county chooses a vendor for the entire county.

We chose to go with optical scan for many of the reasons you discuss. We have concerns about paper trail and Michigan has had good experiences with optical scan systems for more than a decade. Michigan is a heavy recount state and we find that optical scan ballots are quite compatible with recounts. We are not opponents of DRE systems. We simply feel that optical scan is a better choice for our state.

We have not yet chosen a disability system, but we are looking closely at Automark and similar technologies.

It is true that optical scan ballots are a cost that DRE equipment does not have and the cost can be substantial. It is my strong sense, however, that the initial investment in DRE equipment and it's ongoing costs (optical scan equipment can easily last 15-20 years; I would be surprised if the same is true of DRE) more than even out the total costs of ownership. Storage of DRE equipment requires much more space and environmental considerations than optical scan.

It's also worth mentioning that no DRE system can handle Absentee Ballots, so most DRE states use optical scan for AV processing. Therefore, DRE systems do not eliminate the cost of ballots.

As part of our contract negotiations with optical scan vendors, we negotiated ceilings on the cost of producing ballots. The website below provides comparisons of ballot costs for our three vendors. Election officials can negotiate lower prices if they are able to do so. We also "encouraged" vendors to open up the printing process to as many printers as possible for the purpose of allowing market forces to drive down the price.

We have considerable other information available on our website that you might find helpful:

http://www.michigan.gov/sos/0,1607,7-127-1633_11619_27151-91711--,00.html

Please let me know if I can provide you with any additional information.

Timothy M. Hanson
Director, Program Development Division
Michigan Bureau of Elections

## North Dakota Email Response

Date: Thu, 21 Apr 2005 17:43:35 -0500

North Dakota made the decision to stay with paper ballots read by optical scanners for several reasons that I will detail below. We are confident in our decision because it was reached by way of consensus among state election officials, local election officials, advocacy groups, political parties, and other interested parties.

* Prior to HAVA, 48 of the state's 53 counties used some form of optical scan technology for ballot tabulation. This meant that most of us are comfortable in knowing how to cast a vote. The difference now, since we are using precinct optical scanners rather than central scanners, is that voters are notified by the tabulation equipment if they have made an error in voting and are offered the chance to spoil their present ballot and vote a replacement ballot. We were a little concerned that voters might be intimidated by this "second chance voting" feature, but we are pleased that voters have been thankful in knowing that their vote for a certain office will not count if the ballot is cast as is. For example, it used to be that all the votes on the political party portion of ballot were not counted on nearly 20% of the ballots cast in Primary Elections because the voters failed to follow the instructions directing them not to cross vote between the parties. Last June, election workers across the state heard people say that they never knew that those votes weren't counted if they voted for people from different political parties and they were glad to now have the chance to make their votes count. Some people fail to read instructions even when they are printed several times on the ballot.

* Certainly a DRE is much better at making sure that voters cannot over vote, cross vote, or any of the other common voting errors, yet we needed to evaluate the cost of all of the voting equipment. In order to provide DRE's for every voter, we would need to spend far more money on equipment than we are receiving from HAVA payments. The ballots from a polling location serving 1000 voters can be tabulated by one precinct optical scan at a cost of around $5,000, but that same precinct using DRE's would require five machines at a cost of no less than $15,000. And that is before any VVPT device would be added.

* Another factor taken into consideration was that many of the state's senior citizen population said that they would not go to the polls to vote if they had to vote on a "computer," which is what they think of the DRE machines. Based on this reaction by a large portion of our population, we were led to believe that absentee voting would increase dramatically. Being that paper ballots would be needed for absentee voters, our counties would still be hit with the cost of printing many paper ballots and this would add even greater costs to elections.

* North Dakota was not immune to the concerns that a ballot cast on a DRE would not leave a physical ballot for a paper trail. This fear may have developed from people who are not aware of all of the facts, nonetheless it is still something that made people wonder if they could trust the system.

The cost of establishing confidence in DRE's in a state used to optical scan technology could not be determined.

* The AutoMARK has been far and away the voting system of choice for all those who cannot complete their ballots by hand. Time and time again the people in our state with disabilities have said how much they like the fact that they are given the same ballot as someone who can fill out their ballot without the assistance of a machine. And the fact that a ballot marked by the AutoMARK can be reinserted into the AutoMARK for audio verification of votes recorded gives tremendous confidence to blind voters who cannot rely on their sight for verification. Many individuals who are blind are anxiously waiting for June 2006 so that they can vote independently for the first time in their lives.

* It is our opinion that voting with DRE's could only be lower in cost if everyone voted using the machine. Printing the first paper ballot for a precinct is the most expensive ballot of all. The cost per ballot is only decreased by quantity. Since there will always be voters who will choose to vote absentee, a jurisdiction will need to print paper ballots for every election. Therefore, where would any savings be found especially when it is considered that additional equipment would be needed to tabulate absentee ballots.

I apologize that I have not given hard concrete numbers for you to crunch, but I hope my thoughts will be helpful in your deliberations. Our system works in ND, but we realize that it would not necessarily be the best for every other state in these United States. I hope your process goes well.

Jim Silrum, Deputy Secretary of State