

Frequently Asked Questions (and Answers) on Electronic Voting and Voter-Verified Paper Records

Elections are the bedrock of our democracy, and verifiable election results are demanded by the American people. Republicans and Democrats understand this, which is why so many election reform bills have already been introduced in the House and Senate. The solution proposed by both parties involves requiring voter-verifiable paper records for all voting machines. One bill, Rep. Holt's H.R. 550, has pulled ahead of the pack and already has more than 165 bipartisan co-sponsors. Please support election integrity by becoming a co-sponsor of HR 550 today.

"Who supports voter-verified paper records?"
Answer: Page 2

"Would a paper audit trail actually help?"
Answer: Page 4

"How many states require a voter-verified paper record?"
Answer: Page 6

"If paperless machines worked in one election, can't we trust them in another?"
Answer: Page 7

"Are accessibility and auditability mutually exclusive?"
Answer: Page 9

"Aren't voting machines heavily tested?"
Answer: Page 12

"Are voter-verified paper ballots cost-effective?"
Answer: Page 14

"Why is HR 550 the best solution?"
Answer: Page 17

"Who supports voter-verified paper records?"

Answer: Voter-verified paper records enjoy a broad spectrum of support that includes many prominent Republicans. This short selection of quotations and anecdotes is intended to provide a sampling of how Republican leaders across America are some of the strongest advocates for voter-verified paper records.

Roll Call (Norman Ornstein):¹

- "At the same time, the biggest flaw out there is that the vast bulk of DREs have no paper trail, making nearly impossible any manual recount or the resolution of any dispute. Rep. Rush Holt (D-N.J.) has introduced a bill to force quick action to add the paper record to all these machines. It should be passed quickly by Congress."

US Senator John Ensign (R-NV):²

- "Voters must be assured that their votes will be accurate and will be counted properly. A paper trail provides just such an assurance."

Maryland (Robert L. Ehrlich, Jr., Governor (R)):³

- "It is my personal belief that the voters of Maryland should be allowed to vote a paper ballot or have a voter verification paper-trail to electronic voting as reassurance to voters that their votes are being accurately cast."

Nevada (Dean Heller, Secretary of State (R)):

- Secretary of State Dean Heller urged the Senate Finance Committee to pass SB501, which would allocate \$15 million to buy 4,400 machines with voter-verifiable paper trails. Heller said that without giving voters the option to review their ballot on paper, "it's garbage in, garbage out."⁴ "...[T]here are certain people within the election process who don't want that scrutiny on how elections are run.... Why elections directors so fight this process is just incredible to me."⁵

Washington (Sam Reed, Secretary of State (R)):⁶

- "We in the state of Washington have a responsibility to meet this federal mandate, but to do so cautiously. That's why I'm calling for strict safeguards and security around every electronic voting machine in this state. ... First, all electronic voting equipment must include a voter verifiable paper audit trail by 2006. This paper audit trail is essentially your hard-copy guarantee that your vote has been recorded as you intended."

Minnesota (Mary Kiffmeyer, Secretary of State (R)):⁷

- "Everyone in Minnesota votes on a paper ballot, and I think just about all of us agree that's the way it always should be. ... With new technologies, people with disabilities now can have what effectively amounts to a sophisticated "pen" to mark their ballots privately and independently, too. The new technologies really are quite marvelous — they preserve the standard paper ballot that we all want to keep, and they give everyone privacy, independence and accuracy."

U.S. Representative Tom Petri (R-WI):⁸

- "[F]or me it's a 'no brainer' that electronic voting machines should produce paper trails so that ballots can be counted by hand if necessary. Due to the importance of elections, we simply cannot be expected to take on faith any vote total that an election system displays on a computer screen."

Virginia (Fairfax County Republican Committee report on the November 2003 election):⁹

- “Based on its investigation, FCRC is offering recommendations and solutions to restore confidence in the vote. The primary recommendation: establish a local or state independent study – open to the public – to review software, hardware and failings associated with Fairfax County voting machines. Further, FCRC recommends that the Virginia General Assembly enact statutes that require: (1) a voter verified paper audit trail incorporated into all state-certified voting systems, and (2) that the voter verified paper ballots be compared – in a select number of polling places – to the vote totals recorded on the DRE.”

Free Congress Foundation (Jill Farrell, Director of Communications):¹⁰

- “Regardless of the ‘new and improved’ voting system your precinct may be using, it is vital that you and all of your neighbors demand a verifiable paper audit trail. Each vote absolutely must be verifiable.”

Evergreen Freedom Found., “A Blueprint for Change: Recommendations on Election Reform”:¹¹

- “Accountability and transparency is a vital element of a secure voting system. As part of this, we recommend that states audit a percentage of their voting machines after every election before the votes are certified. The machines should be randomly selected for audit to ensure the sample is representative. Election officials should compare the results of a manual count of ballots to the electronic results from the voting machines. ... We recommend that a voter-verified paper audit trail (VVPAT) is needed to verify the electronic records.”

Carter Baker Commission on Federal Election Reform:¹²

- “Congress should pass a law requiring that all voting machines be equipped with a voter-verifiable paper audit trail and, consistent with HAVA, be fully accessible to voters with disabilities.”

¹ Norman Ornstein, “Congress Must Act Now to Prevent ’04 Election Debacle,” March 17, 2004, Roll Call,, http://www.rollcall.com/pub/49_94/ornstein/4783-1.html; archive at <http://verifiedvoting.org/downloads/Ornstein%20-%20Congress%20Must%20Action%20Now%20-%20RollCall.pdf>.

² Senator Ensign statement in the US Senate, Feb., 2005, at <http://thomas.loc.gov/cgi-bin/query/F?r109:1:./temp/~r109pxTR0m:e53095>.

³ Governor’s Feb. 15, 2006 letter to Gilles Burger, Chair, State Board of Elections at <http://www.verifiedvotingfoundation.org/downloads/gillesburgerltr10.pdf>.

⁴ Elizabeth White, “Proposal for New Las Vegas-Area Voting Machines Questioned,” May 2, 2005, Las Vegas Sun, at <http://www.lasvegassun.com/sunbin/stories/nevada/2005/may/02/050210864.html>.

⁵ Kathy Bushouse, “Printers Draw Fire and Praise,” February 2, 2004, South Florida Sun-Sentinel, archive at <http://votersunite.org/article.asp?id=1117>.

⁶ Sam Reed, Washington Secretary of State, “Electronic Voting Must Maintain Integrity in Elections,” Editorial, July 12, 2004, http://www.secstate.wa.gov/office/osos_news.aspx?i=ZK2jA2DCLm6RLSd%2bs42Leg%3d%3d

⁷ Mary Kiffmeyer, Minnesota Secretary of State, “It’s Time For Statewide Voter Equality,” December 21, 2004, Pioneer Press, <http://www.twincities.com/mld/twincities/news/editorial/10462524.htm>.

⁸ Tom Petri Press Release of June 9, 2005.

⁹ Operation Ballot Integrity: A Report by Fairfax County Republican Committee, January, 2004, at http://www.fairfaxco-gop.org/download/ballot_integrity.pdf.

¹⁰ Jill S. Farrell, “Pitfalls of Paperless Voting,” June 2, 2004, Free Congress Foundation, at <http://www.freecongress.org/commentaries/040602jf.asp>.

¹¹ “A BluePrint for Change: Recommendations on Election Reform to the States”, a publication of the Evergreen Freedom Foundation’s Voter Integrity Project, page 17, at <http://www.effwa.org/files/pdf/BP4C.pdf>.

¹² “Building Confidence in U.S. Elections; Report of the Commission on Federal Election Reform,” September 2005, p.25, <http://www.gao.gov/new.items/d05956.pdf>.

"Would a paper audit trail actually help?"

Answer: Absolutely. The following list provides documented examples of electronic voting machines adding or removing votes in real elections. In each of these cases, a permanent paper record of each vote would have saved votes that were otherwise lost by malfunctioning voting machines.

Votes LOST in Fairfax County, Virginia. November 2003. AVS WINVote.

“A number of machines apparently subtracted votes at random from Republican school board candidate Rita S. Thompson, who lost the election by a margin very close to the 1% of the votes that were subtracted. ...In the Virginia case it could not be proved which votes were switched and which were legitimate, so the existing flawed results were certified anyway.”¹

Votes LOST in Miami-Dade County, Florida. May 2005. ES&S iVotronic.

“Electronic voting machines tossed out hundreds of ballots during this month's special election on slot machines -- and elections workers have traced the same computer error to five other municipal elections in the past 12 months.”²

Votes LOST in Carteret County, North Carolina. November 2004. UniLect Patriot.

A memory limitation on the DRE control unit caused 4,438 votes to be permanently lost. If one candidate had not conceded, the state would have had to re-hold the Agriculture Commissioner's election.³

Votes LOST in three Pennsylvania counties. November 2004. UniLect Patriot.

Machine malfunctions and high undervote rates in Mercer, Greene, and Beaver counties led to a re-examination of the voting machines in Pennsylvania. The machine malfunctioned during the examination and was decertified in the state in April 2005. The Secretary of the Commonwealth stated that "these malfunctions help explain why there were more than 10,000 instances where a vote was not counted."⁴

Votes LOST in Berks County, Pennsylvania. May 2005. Danaher ELECTronic 1242.

Improper programming of voting machines resulted in 199 irretrievably lost votes, affecting the outcome of three different races.⁵

Votes LOST in San Diego County, California. March 2004. Diebold AccuVoteTS.

The number of people signed in differed from the number of ballots counted by the machine. The Diebold technician confirmed that votes had been lost.⁶

Votes ADDED in Miami-Dade County, Florida. November 2004. ES&S iVotronic.

Nearly 35% of the precincts showed discrepancies. Some may be sloppy accounting, others point to computer error or fraud. For example, Precinct 41 reported that 844 people signed in and the machines recorded 910 votes.⁷

Votes ADDED in Mecklenburg County, North Carolina. November 2004. MicroVote.

According to election-office data downloaded by the Observer, 102,109 people voted early or returned valid absentee ballots. But unofficial results show 106,064 people casting early and absentee votes for president.⁸

Votes ADDED in Bernalillo County, New Mexico. 2002 through 2004. Sequoia Edge.

County Clerk Mary Herrera acknowledged Monday that bogus votes have appeared in at least three elections. In one case, nearly **four thousand phantom votes were added** to just one race.⁹

Votes ADDED in Vanderburgh County, Indiana. November 2004. ES&S iVotronic.

In some precincts, the number of ballots cast was higher than the number of voters. For example, at the Knight 1 precinct in eastern Vanderburgh County, there were 25 more votes than the poll book said there should have been.¹⁰

¹ Jill S. Farrell, "Why E-Voting Still Is Not Enough," October 8, 2004, CNSNews.com Commentary. <http://www.cnsnews.com/ViewCommentary.asp?Page=%5CCommentary%5Carchive%5C200410%5CCOM20041008a.html>.

² Tere Figueras Negrete and Naoki Schwartz, "Voting Glitches Found in 6 Recent Elections," March 31, 2005, Miami Herald, <http://www.miami.com/mld/miamiherald/news/local/11271837.htm>.

³ David Morrill, "Unilect Vote Device Causes Uproar," November 24, 2004, Oakland Tribune, <http://www.votersunite.org/article.asp?id=3977>.

⁴ "PA Secretary of the Commonwealth Decertifies UniLect Patriot Voting System in Pennsylvania," Pennsylvania Department of State Press Release, April 7, 2005, <http://biz.yahoo.com/prnews/050407/phth059.html?.v=4>.

⁵ "Berks County May Ask People To Vote Again In Two Precincts", May 18, 2005, <http://www.centredaily.com/mld/centredaily/news/politics/11680418.htm> Archive at <http://www.votersunite.org/article.asp?id=5408>

⁶ Jeff McDonald and Luis Monteagudo Jr., "Poll Workers, Voters Cite Tied-Up Hotline, Poor Training, Confusion," March 7, 2004, Union Tribune, <http://www.signonsandiego.com/news/politics/20040307-9999-1n7vote.html>.

⁷ Noaki Schwartz and Jason Grotto, "Discrepancies Found in Votes, Signatures," May 7, 2005, Miami Herald, <http://www.miami.com/mld/miamiherald/news/local/11586356.htm?template=contentModules/printstory.jsp>; Jessica M. Walker, "Elections Discrepancies Found in 35 percent of Miami-Dade Precincts," May 06, 2005, Daily Business Review, http://www.dailybusinessreview.com/news.html?news_id=34733 (subscription only).

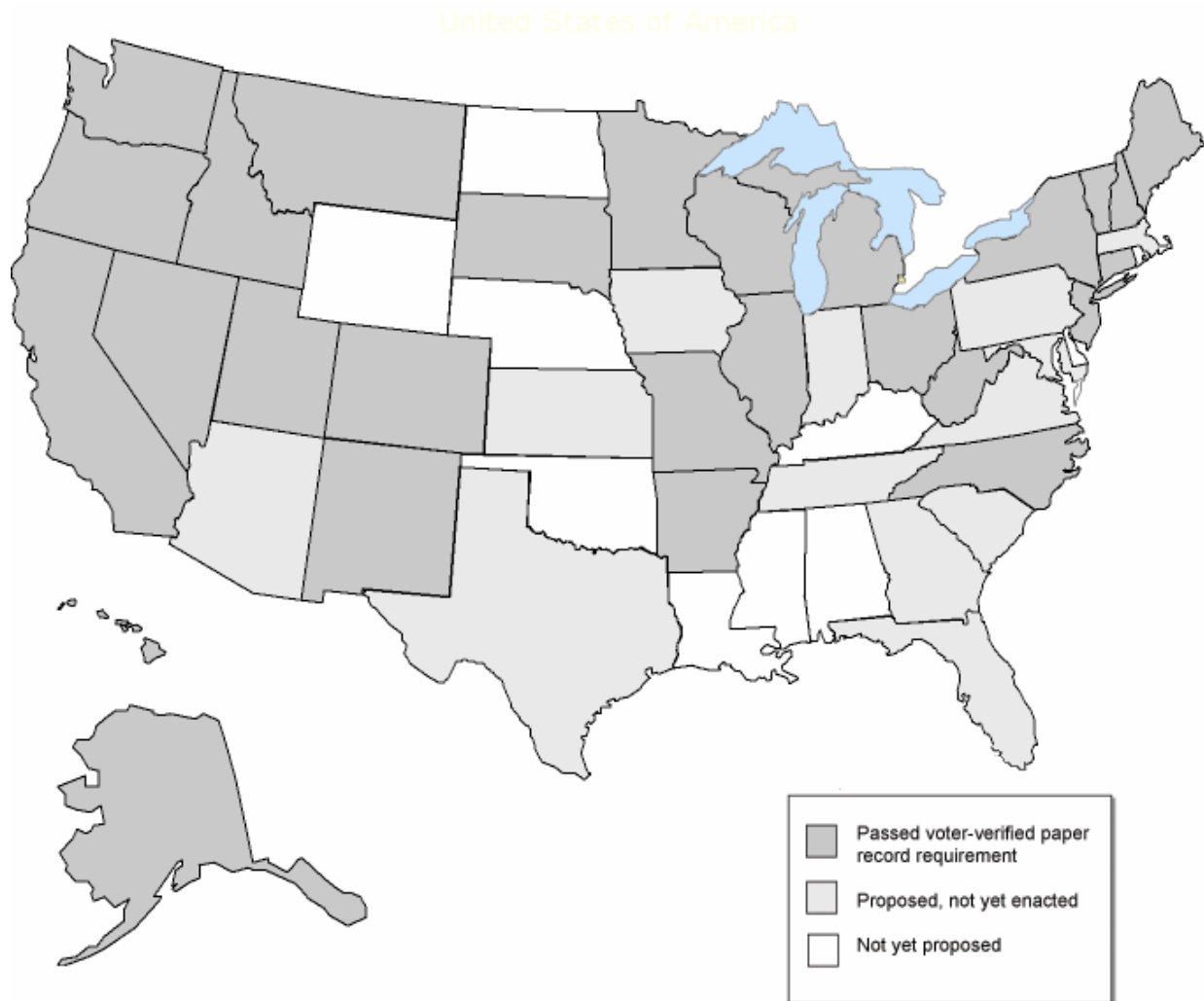
⁸ Richard Rubin and Carrie Levine, "County Retallies Early-Vote Results: Will Recount Affect Democratic Commission Sweep?" November 4, 2004, The Charlotte Observer, <http://www.charlotte.com/mld/charlotte/news/politics/10094165.htm>.

⁹ "County Clerk Say Phantom Votes Won't Be a Problem," October 26, 2004, KRQE Albuquerque, archive at <http://www.votersunite.org/article.asp?id=3421>.

¹⁰ John Martin, "Election Results Don't Add Up: Review Shows Discrepancies In Voting," November 23, 2004, Evansville Courier & Press, archive at <http://www.votersunite.org/article.asp?id=3953>.

"How many states require a voter-verified paper record?"

Answer: 40 states have either passed a paper record requirement, or are considering one.¹ Only 10 states have not yet proposed a statewide measure that would require voter-verifiable paper records. Of those, at least five have *purchased* voter-verified paper record systems statewide.²



¹ 26 states have voter-verified paper record requirements; 1 state has a mixed requirement (Arkansas – not all counties covered by the bill that was passed); 13 states plus the District of Columbia have introduced a VVPR requirement.

² NE, ND, OK, RI, WY.

"If paperless machines worked in one election, can't we trust them in another?"

Answer: That's a trick question! You can't confirm one way or another whether a paperless machine worked in any election, because it can't be independently audited. However, even if you could, one accurately counted race does not mean the next race will be accurately counted. Many programming errors, especially ballot programming errors, are completely undetectable and occur with disturbing frequency. And that's why random audits are necessary.

Background on Ballot Programming Errors

Ballot programming is done uniquely for each election, and involves setting up the ballot's appearance and determining how touches on the screen or marks on a ballot are recorded as votes.

Errors in ballot programming cause votes to be recorded incorrectly. Many such errors in the past have given candidates' votes to an opponent.

It is virtually impossible to detect a ballot programming error on an electronic voting machine, because there are no source documents to compare to the electronic tally. But so many ballot programming errors have been detected on paper-based systems that it is unreasonable to believe such errors do not also occur, and go undetected on paperless electronic voting systems.

In fact, there is one case when flawed ballot data on electronic voting machines caused a serious election miscount. It was detected only because optical scan ballots were also used in the election:

Texas. April 2002, Dallas County. A candidate for mayor was added to the ballot four days before the start of early voting, but the change in the ballot definition wasn't programmed into all 390 of the electronic voting machines until after early voting began. When the results from these machines were combined with the results from the optical scan machines, the error caused the tally software to improperly tally results in the mayor's race as well as 17 other races. Nearly 5,000 of the 18,000 ballots were improperly counted.

The following list gives a sampling of other ballot programming errors reported in the news:

- GAO Report, September 2005: “[R]eports documented how it might be possible to to alter the ballot definition files on one model of DRE so that the votes shown on the touch

screen for one candidate would actually be recorded and counted for a different candidate.”¹

- Arkansas. November 2004, Carroll County. Mis-programmed ballots skewed the results from the Justice of the Peace District 2 race.²
- Illinois. April 2003, Lake County. A ballot programming error failed to account for "no candidate" listings in some races on the ballot, and results were placed next to the names of the wrong candidates in four races. Correcting the problem changed several outcomes.³
- Kansas. August 2002. Clay County. The initial results showed that one candidate for commissioner had won, but a hand recount showed that his opponent had won by a landslide. In one ward, the computer had mistakenly reversed the totals.⁴
- North Carolina. November 2002, Wayne County. The machines skipped several thousand party-line votes, both Republican and Democrat. Correcting the error turned up 5,500 more votes and reversed the outcome of one state Representative race.⁵
- South Carolina. November 2002, York County. An error in the ballot programming caused votes for the South Carolina Commissioner of Agriculture to be uncounted.⁶
- Texas. March 2004, Lubbock County. The machines failed to count the votes for the Precinct 8 Democratic chairman race.⁷
- Texas. November 2002. Scurry County. A landslide victory for two commissioner candidates was recounted by hand. The opposing candidates actually won by large margins.⁸
- Wisconsin. November 2004, Medford. The machines weren't set up to read straight-party votes. About 600 of the 2,256 ballots cast were not counted.⁹

¹ “Building Confidence in U.S. Elections; Report of the Commission on Federal Election Reform,” September 2005, p.25, <http://www.gao.gov/new.items/d05956.pdf>.

² Anna Mathews, “Computer Glitch Blamed for Miscount in JP Voting,” November 10, 2004, Carroll County Star Tribune, archive at <http://www.votersunite.org/article.asp?id=3889>.

³ Susan Kuczka, “Returns are in: Software goofed — Lake County Tally Misled 15 Hopefuls,” April 4, 2003, ChicagoTribune, archive at http://www.truevotemd.org/doc_lake_county.asp.

⁴ “Aug. 6 Ballot Problems Alleged: Clay, Barton County Candidates Seek Review of Races,” August 22, 2002, The Associated Press, <http://www.ljworld.com/section/election02/story/103526>.

⁵ Wade Rawlins and Rob Christensen, “Winners May Be Losers,” November 12, 2002, The News and Observer.

⁶ Conversation with Wanda Hemphill, York County Elections Director, June 4, 2004. Original reference from *Black Box Voting*, Chapter 2, November 7, 2002, “Machine Glitch Keeps Votes From Being Counted.”

⁷ Brian Williams, “Software Blamed in Precinct 8 Democratic Chair Race Mixup,” March 11, 2004, Avalanche-Journal, http://www.lubbockonline.com/stories/031104/loc_031104030.shtml.

⁸ Conversation with Scurry County Elections Director, June 3, 2004. Original reference from *Black Box Voting*, Chapter 2, November 8, 2002; “Ballot Glitches Reverse Two Election Results.”

⁹ Jake Rigdon, “About 600 Medford Ballots Cast in November Ignored,” March 12, 2004, Marshfield News-Herald, <http://www.wisinfo.com/news Herald/mnhlocal/285285292773470.shtml>.

"Are accessibility and auditability mutually exclusive?"

Answer: No! Readily available, widely supported voting systems can provide a paper audit trail while safeguarding disabled voters' rights to cast a secret ballot. The following list provides examples of voting technologies that address both access and integrity concerns.

Electronic ballot markers can be used to fill out optical scan ballots, which are the most common voting technology in the United States. These systems look like touchscreen voting machines, but they record votes on paper records instead of internal memory. This kind of unit can have extensive accessibility features (audio interface, sip/puff input, multiple languages, etc.), and every vote can be verified before submission:

1. *Avante's* Optical Vote-Trakker¹ is a federally qualified, accessible, electronic ballot-marking system. It was the first system qualified to the FEC's 2002 voting standards.
2. *ES&S* markets the AutoMark electronic ballot marking system (developed by Vogue Election Systems). The AutoMark was tested successfully in Arizona's 2004 election, where a disabled voter who had just cast his first unassisted ballot remarked "My experience today is a story I will tell my grandkids many years from now."² The AutoMark is also being deployed in Alabama, California, Idaho, North Carolina, North Dakota, Rhode Island, South Dakota, Wyoming, and elsewhere.³
3. *Vote-PAD* The Voting-on-Paper Assistive Device, or Vote-PAD, is designed to be a low-tech, non-electronic aid to voters with visual or dexterity impairments. It offers the voter the option of using vision, touch, audio, or braille.⁴ With Vote-PAD, poll workers fit specially designed sleeves over paper ballots. Audio instructions guide visually impaired voters to bumps on the plastic next to each race. Holes in the sleeve corresponding to ovals on the ballot allow voters to mark the ballot with a pencil or pen without going outside the oval. Afterward, voters can run a specially designed LED wand over the ovals to verify their choices. The Vote-PAD, developed in close and continuing consultation with members of the disabilities community, has performed successfully for people with a wide range of disabilities including those with visual or dexterity impairments.⁵ Vote-PAD (Voting-on-Paper Assistive Device) has been approved by the Wisconsin State Elections Board for use with hand-counted, paper ballot. It has been purchased by Yolo County CA for use with optical scan ballots.⁶

Electronic voting machines with a voter-verifiable paper audit trail can also provide accessible and secure voting. Most major vendors already produce such units and others are working on methods of retrofitting existing machines with printers:

1. *Avante's* Vote-Trakker is an accessible, VVPB-equipped touchscreen that has been used successfully in five separate elections and the American Council of the Blind lists the Vote-Trakker as an accessible voting system.⁷
2. *Sequoia Voting Systems*, the country's third-largest election equipment manufacturer, produces a VVPAT-equipped AVC Edge. The unit was selected to be the uniform voting system in Nevada during the 2004 presidential election.⁸

For more information, please see:
<http://www.VerifiedVoting.org>
<http://www.VoteTrustUSA.org>
<http://www.VotersUnite.org>

3. *Diebold, ES&S, Hart InterCivic, Populex*, and other vendors all offer some form of auditable and accessible voting equipment. Other vendors are currently developing and testing VVPR modules.⁹

Disability Rights Advocates Push for Auditable, Accessible Elections

Barbara Silverstone, CEO of Lighthouse International, New York City's oldest and largest vision rehabilitation agency serving people who are blind and partially sighted, puts it best when she writes that the organization “sees no contradiction between accessible voting and verifiable voting for all Americans. We support both concepts in the interest of fair elections.”¹⁰

The following **disability advocacy organizations** have endorsed a **New York** election reform coalition statement asserting that “New voting machines should provide a 'voter-verifiable paper audit trail' and incorporate 'data-to-voice' technology to ensure full access by all”¹¹:

American Council of the Blind of New York, Inc., Center for Independence of the Disabled in New York (CIDNY), Disabilities Network of NYC, NY State Young Democrats Disability Issues Caucus, Westchester Council Of The Blind, Westchester Disabled on the Move, Inc.

The following **disability advocacy organizations** have endorsed a **New Jersey** election reform coalition statement asserting that “New voting machines should have a 'voter-verifiable paper audit trail' and 'data to voice' technology”¹²: Alliance For the Betterment of Citizens With Disabilities: Spina Bifida Association Tri-State Region, and the Monday Morning Project Networks of 16 different New Jersey counties.

The following **disability advocacy organizations** have endorsed a **Maryland** election reform effort calling for accessible voter-verified paper audit trails: American Council of the Blind for Maryland (ACBM): “As a voter verifiable paper audit trail would increase voter confidence, the American Council of the Blind of Maryland supports its adoption provided it is made accessible to voters who are blind, visually impaired, or otherwise disabled,” and the Maryland Association of Guide Dog Users, Inc. (MAGDUI).¹³

¹ Avante, “First True Pixel-Based Optical Mark-Sense Voting System Achieved 0% Error Rate In 1.5 Million Votes,” May 17, 2004, http://www.aitechnology.com/votetrakker2/Optical_Vote-Trakker_Press_Release.PDF.

² David Madrid, “Disabled Man Casts First Ballot on His Own,” November 4, 2004, *The Arizona Republic*.

³ AL: Elections Division, February 2006; CA: http://www.govtech.net/magazine/channel_story.php/97780;

ID: <http://automarkts.com/Documents/AutomarkIdaho5292005.pdf>; NC:

<http://www.co.durham.nc.us/BOCC/Minutes/2006/1-23-06-RS.pdf>; ND:

http://automarkts.com/Documents/ATS_NorthDakota.pdf; RI: Elections Division, February 2006; SD:

http://www.sdsos.gov/Voting_Machine_Supplier.htm.; WY: <http://soswy.state.wy.us/election/V-Systems.pdf>.

⁴ Pokey Anderson, “Accessibility for All Voters – Has it Arrived?”

http://www.votetrustusa.org/index.php?option=com_content&task=view&id=802&Itemid=51

⁵ Kim Zetter, “Vote-PAD Rocks The Disabled Vote”, *Wired News*, January 19, 2006,

http://www.wired.com/news/technology/0,70036-0.html?tw=wn_tophead_4

⁶ Yolo County, California Chooses the Vote-PAD, Vote-PAD Press Release, <http://www.vote-pad.us/Media/YoloCountyPurchase.htm>.

⁷ American Council of the Blind, “Accessible Voting Fact Sheet,” archive at

<http://web.archive.org/web/20020816072511/http://acb.org/washington/accessible-fact02.html>.

⁸ “Sequoia Voting Systems Selected To Provide Uniform Statewide Electronic Voting System For Nevada,” Sequoia

Voting Systems Press Release, <http://www.sequoiavote.com/article.php?id=55>.

⁹ “Accessible & Verifiable Voting Technology: Overview,”

<http://www.verifiedvotingfoundation.org/article.php?id=6113>.

¹⁰ Barbara Silverstone, Chief Executive Officer, Lighthouse International, “A Verifiable, Accessible Vote” (Letter to the Editor), NY Times, June 11, 2004.

¹¹ Statement available at <http://www.nypirg.org/goodgov/hava/machines/default.html>.

¹² Statement available at http://www.njappleseed.org/Downloads/Making_Votes_Count04.pdf.

¹³ Quote from Bob Kerr, President, Southern Maryland chapter of ACBM, statement available at http://truevotemd.org/images/stories/PDFs/Press_Releases/2004-12-07_press_release.pdf.

"Aren't voting machines heavily tested?"

Answer: America currently has a patchwork of inadequate and inconsistent testing regimes. In the words of Dr. Michael I. Shamos in testimony before the Environment, Technology, and Standards Subcommittee of the U.S. House of Representatives' Committee on Science on June 24, 2004:³

*"I am here today to offer my opinion that the system we have for testing and certifying voting equipment in this country **is not only broken, but is virtually nonexistent.**"*

Here's a look at just how broken the testing system is in America today:

Step One — "Federal Certification"

The misnomer "federal certification" is applied to the testing of voting systems against voluntary federal standards. NO government entity does any testing, and the systems that pass this process are not certified for use in any state. Vendors enter into a confidential agreement with an Independent Testing Authority (ITA) approved by the National Association of State Election Directors. The ITA tests the voting system design to ensure that it meets Federal Voting System Standards (FVSS). The vendor pays the ITA. All information about the process and results is confidential— hidden even from election officials.⁴

If the system is approved by the ITA, it receives a "NASED number" and is added to a list of "qualified" voting systems. However, Dr. Shamos says the Federal Voting System Standards (FVSS) are incomplete and out of date. He points out that the ITAs do not even test for viruses. Some voting machines meet the most recent (2002) standards. But many meet only 1990 standards, which were developed before the introduction of the Windows operating system used by many of the "qualified" systems.

The GAO Report of September 2005 confirmed that testing is inadequate. It said, in part, that "most of the systems with weak security controls identified earlier in this report . . . had previously been certified by [NASED] after testing by an [ITA]. Security experts and others point to this as an indication that both the standards and the testing program are not rigorous enough with respect to security. . . . malicious code could be present in a system and evade testing as long as the triggering commands were not entered . . . One [ITA] official stated that its 'testing does not guarantee that voting systems are secure and reliable.'"⁵

³ Testimony of Dr. M. I. Shamos, (emphasis added) Co-Director, Institute for eCommerce at Carnegie Mellon University, <http://www.house.gov/science/hearings/ets04/jun24/shamos.pdf>. Shamos has served as an examiner of, and consultant on, electronic voting systems to PA, NV, TX and DE.

⁴ "National Association of State Election Directors General Overview for Getting a Voting System Qualified," page 5, <http://www.nased.org/ITA%20Information/NASEDITAProcess.pdf>.

⁵ FN for GAO Report: "Federal Efforts to Improve Security and Reliability of Electronic Voting Systems Are Under Way, but Key Activities Need to Be Completed," Government Accountability Office September 2005, pp. 34 - 36.

Step Two — State Certification

States check a voting system's function for specific state needs, such as the ability to rotate candidates on the ballot or handle straight-party voting. Since they trust the qualifying process, most states do nothing to ensure that the equipment meets FVSS standards. They do not check software for viruses or malicious code, nor examine its security features. Indeed, vendor concerns about trade secrets generally prevent officials from inspecting those internal workings. Because states trust the broken qualification process, Dr. Shamos says: "We are less safe in 2004 than we were 20 years ago."

At a Voting Systems Testing Summit held in December 2005 in California, security expert Dr. Aviel Rubin reports: "...an examiner from Pennsylvania [Shamos] wanted to know how come so many systems that passed the ITA testing still had serious security and even operational flaws. The [lone ITA] representative... replied that they were only required to test against the standard. When pressed about whether or not the ITAs would fail a system if a serious flaw was found, the reply was that a memo would be written, but that the system would still pass. *The company tasked with certifying machines for elections in the United States would still pass them, even if a serious flaw was found, as long as the machine did not violate any aspects of the standard.*"⁶

Step Three — Local Pre-Election Testing

Each machine should be tested for Logic & Accuracy before every election, but may not be. "The machines may work according to specification but if they have not been loaded with the appropriate set of ballot styles to be used in a polling place they will be completely ineffective," says Shamos.

Pre-election testing should ensure that software was set up to accurately count the specific ballots for that election. Most election administrators receive no training in software or hardware testing, yet they must test software and how it works on the mechanical devices on which it is installed. They are the only ones who test a crucial function of the system — the ballot setup which turns voter actions into electronic data. Yet most of them are completely unqualified to perform this testing, and often they have failed to detect errors

Counties with DREs have too many machines to test them all thoroughly before an election, and they generally don't have time to do so. According to Computer Professionals for Social Responsibility: "This results in logic and accuracy tests that are smaller yet, to the point where the test is testing for little besides a stuck button or a completely nonfunctional DRE."⁷

⁶ "Dirty Little Secrets of Voting System Testing Labs," December 16, 2005, by Aviel Rubin, PhD, archive at http://www.votetrustusa.org/index.php?option=com_content&task=view&id=595&Itemid=26

⁷ "CPSR Comments on the California Touch Screen Task Force Report," August 1, 2003, Computer Professionals For Social Responsibility, <http://www.cpsr.org/issues/vote-catouchscreen.html>.

"Are voter-verified paper ballots cost-effective?"

Answer: Yes! Acquisition and operating cost comparisons show the most auditable and accessible choices may also be the most cost-effective—not only to purchase, but to use and maintain.

A voter-verified paper ballot (VVPB) does not have to mean expensive printer retrofits. A VVPB system may be achieved by retaining an existing paper-based optical scan ballot system, or replacing any DRE, lever, or punch-card system with optical scan, and supplementing with one accessible ballot-marking device per precinct. Because fewer machines (2) are needed per polling place than with DRE systems (6 or more), the acquisition cost is significantly lower.

Long term, these systems typically have **lower operating costs**—despite the ongoing printing of ballots. When Michigan adopted optical scan as their uniform statewide voting system, they cited cost savings, greater ease of use for election officials and voters, a physical tangible ballot that can be **verified** by the voter before it is cast, ability to accommodate unanticipated voter traffic with little or no notice by erecting simple additional voting stations, and a tangible audit trail to resolve disputes over accuracy of the system. A key point: the **more balloting methods** in operation in a county, the **greater the administrative burden and cost** at the county level.⁸

Florida's Miami-Dade County has learned that DRE systems incorporate many hidden costs – so much so that they are currently considering scrapping their \$24.5 million investment in DREs in favor of the more cost-effective and reliable optical scan voting system.⁹ Wyoming's Secretary of State noted his concern in a letter to his legislature about the many **hidden costs** he had learned were involved with obtaining new electronic systems¹⁰. And Maryland's Governor was stunned to see initial DRE purchase costs balloon 78% over estimate, and annual maintenance costs skyrocket over 1000% (yes, one thousand) in just four years.¹¹

If jurisdictions must use DREs, the least-costly way to get voter-verified paper ballots is to obtain DRE + printer at the same time, negotiating a contract that either offers the printer for **free** (as in San Diego County, CA) or "*better than free*" (Ohio's Secretary of State obtained a lower bid for DRE + Printer than the original bid for paperless DRE!). HAVA funds can be used.

If a printer retrofit is necessary in counties already using DREs, legislation such as the "**Voter Confidence and Increased Accessibility Act**" (**HR 550**) will make the gap funding available.

A final note: no matter what the cost of the voter-verified paper ballot, it is lower by far than the cost of an unverifiable election in which votes were irretrievably lost for want of a VVPB.

⁸ Source: http://www.michigan.gov/documents/Uniform_Voting_System_2_71046_7.doc

⁹ Source: Miami Herald, May 26, 2005: <http://www.verifiedvotingfoundation.org/article.php?id=5808>

¹⁰ Source: October 15, 2003 letter: <http://sos.wy.state.wy.us/press/HavaFunds.pdf>, page 3

¹¹ Source: February 15, 2006 letter, <http://www.verifiedvotingfoundation.org/downloads/gillesburgerltr10.pdf>

SAMPLE ACQUISITION COSTS

NORTH CAROLINA¹² has 2,752 regular precincts, 128 early voting precincts: 2880 total. There are 5,519,992 registered voters in the state's 100 counties. Current equipment breakdown:

Optical scan (OS)	DRE	Punchcard	Lever	Paper
1265 precincts	1219 precincts	222 precincts	29 precincts	17 precincts

- Optical Scan precincts need one ballot-marking device (BMD) to assist voters with disabilities/different language abilities (HAVA requirement) @ **\$5,000 per precinct.**
- Precincts converting to Optical Scan need one (1) optical scanner(for 2500 voters) @ \$4,700 + one (1) ballot marking device@ \$5,000 = **\$9,700 per precinct**
- Precincts converting to DRE systems would need to purchase one (1) DRE with VVPB for each 250 voters @ \$3,000/ea. (quantity varies with # of voters)

Total Cost for Optical Scan + ballot marking device statewide:	\$20,550,500
Total Cost to replace all systems with DRE + printer statewide:	<u>\$66,240,000</u>
Estimated cost savings OS + BMD versus DRE + Printer:	\$45,689,500

MARYLAND¹³ decided to purchase DREs statewide in 2001. The estimated cost: \$36,890,000. The actual cost as financed by the State Treasurer was \$65,564,674: an almost **78% increase** from the original cost estimate. (To replace with accessible optical scan equipment today: ~ \$18,000,000.)

NEW YORK¹⁴ recently passed a voter-verified paper record requirement, and will replace its lever machines statewide. The cost for DREs is significantly higher due to the state's full-face ballot requirement (approximately \$8,000/ea). Each lever machine must be replaced with at least one DRE (for a minimum of about 3 machines per polling place, up to 8 or more), but with optical scan, each polling place would need only one scanner and one ballot-marking device.

Estimated cost to obtain DRE + VVPB printer statewide:	\$230,470,000
Estimated cost to obtain OS + BMD statewide:	<u>\$114,423,640</u>
Estimated Cost Savings OS + BMD versus DRE + printer:	\$116,049,360

CONNECTICUT¹⁵ recently passed a voter-verified paper record requirement. The state seeks to replace its lever machines. An acquisition cost comparison shows significant cost savings for an optical scan (OS) + ballot-marking device (BMD) option versus a DRE + VVPR printer option.

Estimated cost to obtain DRE + VVPB printer statewide:	\$47,427,000
Estimated cost to obtain OS + BMD statewide:	<u>\$24,098,000</u>
Estimated Cost Savings OS + BMD versus DRE + printer:	\$19,371,000

¹² Source: <http://www.ncvoter.net/affordable.html> July 2005

¹³ Source: February 15, 2006 letter, <http://www.verifiedvotingfoundation.org/downloads/gillesburgerltr10.pdf>

¹⁴ Source: <http://nyvv.org/reports/AcquisitionCostDREvOptScanNYS.pdf> March 2005

¹⁵ Source: http://verifiedvoting.org/downloads/CT_Cost-analysis-model.pdf March 2005

SAMPLE OPERATING COSTS

NORTH CAROLINA¹⁶ - The following chart compares annual operating expenses for 2004 in three counties. One uses optical scan, the other uses electronic voting machines (direct recording electronic, or DRE). Data is available for several prior years also. The ratio of costs per voter in these counties remains comparable for each year of operation.

County	Voting System	2004 Registered Voters	2004 Bd of Elections Annual Expenditures	2004 Cost per voter
Wake	Optical Scan	460,821	\$1,455,458	\$3.041
Mecklenburg	DRE	470,849	\$2,400,533	\$5.098

If Mecklenburg County used OS instead of DREs, annual savings would be \$917,359. Upgrading Mecklenburg County to the optical scan/ballot marking solution would cost approximately \$1,840,000. Investing in optical scan would pay for itself in two years.

FLORIDA¹⁷ – Comparing annual expenditures in a DRE county versus an optical scan county shows significantly higher **per-voter operating costs** for DREs.

County	Voting System	Avg Registered Voters (02-04)	Avg Supv of Elections Annual Expenditures	Avg 2002-2004 Cost per voter
Manatee	Optical Scan	182,399	\$1,379,405	\$7.56
Sarasota	DRE	232,360	\$2,883,658	\$12.41

“There would have been real savings if Sarasota County had ... thrown away the DREs in April 2004 and spent \$600,000 to buy Optical Scanners for the entire county. The Supervisor of Elections said that paper ballots were expensive. Manatee bought paper ballots for \$0.20 each. For 100,000 voters this amounts to \$20,000, a trivial sum compared to the estimate [adjusted for ratio of voters] of \$1,100,000 that the DREs annually cost Sarasota over Optical Scanners.”

MARYLAND¹⁸ saw DRE annual **maintenance costs skyrocket over 1100%**. The original budgeted annual cost: \$858,000. Amount requested for upcoming fiscal year: \$9,528,597.

NEW YORK¹⁹ - A dramatic difference in projected **storage costs** of DRE machines versus OS.

Full-face DREs

- Weigh over 200 pounds and take up 28 cubic feet when stored; cannot be stacked
- One or more DREs are required to replace each lever machine.

Optical Scanners / Ballot Markers

- Weigh 19-39 pounds and take up less than 4 cubic feet per device; can be stacked.
- One scanner and ballot marker is needed per polling place, except in largest precincts.

¹⁶ Source: <http://www.ncvoter.net>

¹⁷ Source: <http://www.votersunite.org/info/costcomparisonaddendum.asp>

¹⁸ Source: February 15, 2006 letter, <http://www.verifiedvotingfoundation.org/downloads/gillesburgerltr10.pdf>

¹⁹ Source: <http://nyvv.org/reports/ComparingAnnualCosts%20DREvPBOS.pdf>

"Why is HR 550 the best solution?"

Answer: Because of its narrow scope, its realistic goals, and its strong bipartisan support, it has the best chance of passage in time to protect the accuracy, integrity and security of the vote count in the 2006 elections and beyond. H.R. 550 addresses one issue – the need for independent auditability of the vote count, and for a certain number of random audits in every state as a check on the results -- and addresses it in a comprehensive, but realistic manner, with a 2006 deadline. There are a number of other paper trail bills on the table, some introduced by Republicans and some by Democrats. In the House, only one, H.R. 550, has strong bipartisan support, with more than 165 bipartisan cosponsors, including the Republican Chairman of the Government Reform Committee.

H.R. 550 – Off to a very strong start

Rep. Holt introduced the Voter Confidence and Increased Accessibility Act (H.R. 550) on February 2, 2005 with 50 original bipartisan cosponsors. In two weeks it had more than 100, and today it has more than 165.

H.R. 550 – The “Gold Standard” in verifiability legislation

Read what Bob Kibrick, Legislative Analyst for VerifiedVoting.org, has to say about H.R. 550, which requires a voter-verified paper record for every vote cast, a percentage of random audits in each state, and requires that “the entire process of voter verification and vote casting [be] accessible to the voter”:

“H.R. 550, the "**Voter Confidence and Increased Accessibility Act of 2005**" was introduced on February 2, 2005 by Rep. Rush Holt of New Jersey. . . . This is an updated and expanded version of a similar bill (H.R. 2239) that Rep. Holt introduced in the previous session. *This bill is the "gold standard" of Verified Voting bills.*
VerifiedVoting.org supports H.R.550 in the strongest possible terms and encourages all members of the House to become cosponsors.”

Alternatives offered by Republican Members are not strong enough

Read what Bob Kibrick has to say about Rep. Jim Gibbon’s (R-NV) **Voting Integrity and Verification Act of 2005** (H.R. 704):

H.R. 704 is “significantly more limited in scope than H.R. 550 . . .”; it does “establish an effective [voter-verified paper record] VVPR requirement and mandate that the VVPR is the ballot of record in the case of any audits or recounts” . . . it does “not, however, establish any requirement for mandatory manual audits in randomly-selected precincts, nor . . . establish any funding to implement VVPRs.”

And what he has to say about Rep. Steve King's (R-IA) **Know Your Vote Counts Act of 2005** (H.R. 278):

“H.R. 278 is significantly weaker than H.R. 550 . . . While H.R. 278 would establish a requirement for voter-verified paper records (VVPRs), it fails to make those VVPRs the ballot of record in any recount or audit. *In the case of a discrepancy between the VVPRs and the electronic records, the King bill does not require the VVPR to take precedence, and for this reason it is fatally flawed.* Neither does it require any mandatory manual audits of the VVPRs in randomly-selected precincts, nor does it provide any funding to implement VVPRs.

Alternatives offered by Democratic Members -- in part, perhaps, because they cover many other important election reform topics -- do not contain sufficiently rigorous paper record language; they also lack bi-partisan support.

This is what Verified Voting's Legislative Analyst has to say about **The Voting Opportunity and Technology Enhancement Rights Act of 2005** (H.R. 533) , an omnibus election reform bill that covers many important election reform topics in addition to the topic of electronic voting security:

“Section 5 of this bill is derived from Section 4 of S.17. *Unfortunately, the voter-verified ballot provisions of this bill, like its Senate counterpart, are fatally flawed. Unless and until the flaws in Section 5 are corrected or removed, VerifiedVoting.org cannot support H.R.533.*”

And this is what he had to say about the **Count Every Vote Act of 2005** (H.R. 939), an omnibus election reform bill that also covers many important election reform topics in addition to the topic of electronic voting security, and requires voting systems to offer paper records that “shall be available for visual, audio and pictorial inspection and verification”:

This bill has “good requirements for VVPRs and recounts, but also new requirements for audio and pictorial-based methods for verifying VVPRs that will be difficult to meet by the specified deadlines and would limit the options, such as optical scan with ballot marking devices, available for meeting the needs of voters with disabilities.”

**For more information on HR 550 and other legislation, please see:
<http://www.VerifiedVoting.org/legis>
and
<http://www.VoteTrustUSA.org/legislation/housebillsanalysis.htm>**