

Counting the Votes: Obstacles in the Road to Accurate Elections

September 9, 2009

BACKGROUND: The following papers on election-related topics were a product of a 2009 summer internship program of the El Paso County Clerk & Recorder's office. Extensive research and writing of these articles was performed by Brian Brown, under the direction of Robert Balink, El Paso County Clerk & Recorder, and with support of the election department staff. Brian served as an intern in the office from June through early September 2009. Brian was a 2007 graduate of Princeton University and in December 2007 also a graduate of the John Jay Institute for Faith, Society and Law, in Colorado Springs, Colorado. He then served at The Heritage Foundation in Washington, D.C. prior to becoming a summer intern at the El Paso County Clerk & Recorder's Office. Brian Brown is currently serving as a fellow at the El Pomar Foundation in Colorado Springs, Colorado.

Any politician will tell you that how you vote matters. Not what position you take, but how you actually cast your vote. In the United States' effort to modernize since the 2000 "hanging chad" election, proposed solutions have ranged from going all the way back to paper ballots, to switching to computer voting (DREs), to using paper ballots counted by machine ("optical scan"). The choice between them has been a hot-button issue for nine years running, and anyone who has an opinion has a strong opinion. Which system is the best way to make sure voting is fair, easy and secure?

The difficulty in answering this question is the number of goals that have to be met all at once.

- *Whatever system is chosen must be **accessible**. Everyone must be able to use it, regardless of location, education or disability; and their identity must remain anonymous so they cannot be bribed or blackmailed.*
- *The system must be **reliable**. Whatever technology involved must be trusted to produce accurate results, and allow for the mistakes that judges, officials and voters will inevitably make from time to time.*
- *It must be **efficient**. It must be able to process large numbers of voters without long waits in line, and count their votes quickly.*
- *And it must be **secure**. It must be able to resist attempts to tamper with or rig the election, and officials must be able to verify the results afterward.*

At present, none of the options is perfect, and any attempt to standardize one over the others draws fierce opposition. A quick look at the advantages and disadvantages of each system shows why.

Hand-Counted Paper

Paper ballots counted by hand are the oldest form of ballot still in use in the United States. On a paper ballot, a voter writes, checks or circles his choices; the ballot is later counted by election officials.

Strength: Security. Unlike technology-based voting equipment, paper ballots have little potential for mass inaccuracy. When a DRE goes wrong, it can go wrong with every vote it records. In 2000, DREs missed as many votes as the notorious “hanging chad” punch cards.¹ An estimated 1.5 million presidential votes that year disappeared because of voting equipment problems.²

In contrast, paper ballots were roughly tied with optical scan systems for the lowest rates of uncounted or spoiled ballots, at 1.8% for presidential votes and 3.3% for gubernatorial and senatorial votes.³ They are common particularly in small or rural precincts, where electronic voting equipment is more a hassle than a help.

Unlike some electronic equipment, paper ballots are verifiable. Humans physically write on the ballot, and other humans count what they write. An election judge or auditor can count through the same box of ballots and (allowing for occasionally missing a ballot) reach virtually the same result. This makes tampering with an election very difficult.

Weakness: Efficiency. However, paper ballots are unwieldy, making them difficult for large precincts. A small rural area with a few hundred people can use and count paper ballots with relative ease, but a Manhattan voting site with thousands of voters would have a tougher time (only 0.7% of voters used a paper ballot in 2004⁴). Counting all the votes by hand takes long enough (days in some cases) that the outcome of the election could actually be affected while the votes are being counted.

A Mixed Bag: Reliability and Accessibility. But a more pressing problem with paper ballots is human error, which can occur in three areas: voting, counting, and judging. Voters can of course make mistakes when filling out a handwritten ballot, by writing the wrong thing, in the wrong place, or in an illegible manner. Counters can make mistakes—this is inevitable when someone is counting hundreds or even thousands of lengthy, detailed ballots. Election judges overseeing the polling places can also make mistakes, up to and including giving out the wrong ballots (especially problematic in a primary). And while it is easy to preserve a voter’s anonymity on a paper ballot, there is often no solution for voters with certain disabilities.

DRE (Direct-Recording Electronic) with VVPT (Voter-Verifiable Paper Trail)

DRE machines seek to upgrade elections to meet modern needs. To vote on a DRE, a voter is given a unique PIN or smartcard, which he enters at the machine. He then casts his votes with a simple touchscreen computer. The DRE displays his choices so he can make any last changes, and he submits the ballot with the touch of a button.⁵

Strengths: Accessibility and Efficiency. DREs offer by far the most potential advantages, and have by far the most critics. The potential advantages are undisputed: DREs at their best can handle huge precincts, they can make counting exceptionally easy, they have features for voters with disabilities, they can display different ballots for different precincts or parties, and they can deliver the exact same results every time.

The potential downsides, on the other hand, spark hot debate. DRE voters in 2008 were 16% less likely than paper ballot voters to have their vote counted accurately.⁶ In addition, the American tradition of the secret ballot is also difficult to maintain on DREs

without compromising security. It is arguably an open question whether the high problem rate is due to mechanical error or mistakes made by election officials, but the net result either way is that DREs thus far have displayed an unexpectedly high rate of problems, and many voters and politicians have proven wary.⁷

Weakness: Security. Some also question whether DRE results are verifiable. Unlike paper ballots, machine votes cannot be recounted. This is why many states require a paper printout of every vote, which the voter can check before he leaves. However, not every state enforces such a requirement, and not every state requires that the printout be the official ballot (meaning the machine could still be wrong even if the printout is right).⁸

And of course, introducing computers into an election adds a plethora of possible problems. Tampering with the actual machines can be discouraged with the right security procedures (which again are not standardized nationwide), but there are easier ways to rig an election. Some machines are susceptible to homemade smartcards that allow voters to vote more than once.⁹ People can also edit the software, for example to make it record the right vote on the screen but the wrong vote on the actual paper, hoping the voter doesn't check.¹⁰ Some DREs can be checked for such tampering,¹¹ but others cannot, and not all states require such checks.¹²

Weakness: Reliability. And of course, there are technical risks. Sometimes votes are not recorded properly because the software interface was confusing.¹³ Other times machines break down or the paper jams, causing backups and long waits in line for the voters (some of whom give up and go home).¹⁴ And there are numerous cases in which hundreds or even thousands of votes mysteriously appeared, disappeared, or were changed.¹⁵ And sadly, things like decentralized programming that fight tampering also tend to increase technological problems (due either to the machines themselves or the local volunteers programming them).¹⁶

Many of these problems can be solved by the right legislation or a better machine; others perhaps cannot. At present, however, a number of high-profile states (including California, Florida, and Ohio) that had switched to DREs have largely stopped using them.¹⁷

Precinct Count Optical Scan (PCOS)

PCOS is a hybrid of paper ballots and electronics. It works much the same way as a standardized test (like the SAT). A voter is issued a preprinted paper ballot, and he fills in ovals next to his choices. He then inserts the ballot into an optical scan machine, which records his votes.

Strengths: Efficiency and Reliability. This method is increasingly popular with election officials; 34.9% of voters used optical scans in 2004 (compared to 29.5% in 2000).¹⁸ Part of the reason for its popularity is its accuracy; only 1.5% of PCOS votes for president were not counted in 2000.¹⁹ That rate is noticeably lower than the rate of mistakes for DREs, and similar to that of paper ballots. On this level PCOS shares some of the strengths of paper ballots. But unlike paper, PCOS votes are counted quickly and

easily, and the size of the precinct does not matter. In this respect, PCOS shares some of the strengths of DREs.

Strength: Security. Optical scanning also has the value of transparency. Unlike some DREs and paper ballots, the machine rejects the ballot if there are mistakes (like voting for two candidates), so voters can fix their mistakes and verify that their ballots were counted correctly.²⁰ This helps PCOS avoid much of the distrust many voters have for other forms of electronic voting.²¹ And since PCOS is still fundamentally a paper ballot with physical markings made by the voter, PCOS votes can be easily recounted and audited if necessary.²²

A Mixed Bag: Accessibility. Of course, while sharing some of the strengths of both paper ballots and DREs, PCOS also shares some of the weaknesses of both. Some technical difficulties, such as paper jams, can still plague election officials.²³ And while PCOS (like paper ballots) protects a voter's anonymity, it is difficult for some disabled voters to use it.

PCOS has some unique weaknesses as well, and can lose votes in other ways. For example, since the vote is made by filling out an oval rather than writing a name or pressing a button, the machine can sometimes think a little dirt on the ballot is a vote. In a more recent problem, newer PCOS machines have replaced the SAT-style machines with scanners and vote-reading software that makes them susceptible to some of the same tampering and technical problems as DREs.²⁴ While PCOS has thus far been a reliable method of recording votes, changes such as this one may affect its accuracy rate. It is too early to tell.

¹ Paul Herrnson, Richard G. Niemi, Scott Richman, "Characteristics of Optical Scan and DRE Voting Equipment: What Features Should Be Tested?" (Center for American Politics and Citizenship: 2001), p. 1, at http://www.capc.umd.edu/rpts/MD_EVote_HerrnsonNiemi.pdf

² Caltech-MIT Voting Technology Project, "Voting: What Is, What Could Be" (California Institute of Technology and The Massachusetts Institute of Technology: July 2001), p. 21 at <http://vote.caltech.edu/drupal/node/10>

³ *Ibid.*, p. 21

⁴ Commission on Federal Electoral Reform, "Building Confidence in U.S. Elections" (September 2005), p. 27, at www.american.edu/iacfer/report/full_report.pdf.

⁵ Tadayoshi Kohno, Adam Stubblefield, Aviel D. Rubin, Dan S. Wallach, "Analysis of an Electronic Voting System" (Johns Hopkins University Information Security Institute: 23 July 2009), p. 3, at <http://avirubin.com/vote.pdf>

⁶ Thad E. Hall, "Electronic Elections in a Politicized Polity" (California Institute of Technology and The Massachusetts Institute of Technology: June 2009), p. 7, at http://vote.caltech.edu/drupal/files/working_paper/WP_76.pdf?emc=lm&m=227694&l=28&v=733510

⁷ Pew Center for the States, "Back to Paper: A Case Study" (February 2008), p. 8, at http://www.pewcenteronthestates.org/report_detail.aspx?id=35628

⁸ The Brennan Center for Justice Voting Technology Assessment Project, "The Machinery of Democracy: Voting System Security, Accessibility, Usability, and Cost" (The Brennan Center for Justice: 2006), p. 27, at http://brennan.3cdn.net/cb325689a9bbe2930e_0am6b09p4.pdf

⁹ Kohno et al, "Analysis of an Electronic Voting System," p. 4

-
- ¹⁰ Brennan Center, “The Machinery of Democracy,” p. 18
- ¹¹ John Gardner, Interview by author of El Paso County Information Systems Manager (Colorado Springs, CO: 1 September 2009)
- ¹² Brennan Center, “The Machinery of Democracy,” p. 18
- ¹³ Pew Center for the States, “Back to Paper: A Case Study,” p. 7
- ¹⁴ *Ibid.*, p. 19
- ¹⁵ *Ibid.*, p. 4
- ¹⁶ Brennan Center, “The Machinery of Democracy,” p. 19
- ¹⁷ Pew Center for the States, “Back to Paper: A Case Study,” p. 1
- ¹⁸ Commission on Federal Electoral Reform, “Building Confidence in U.S. Elections,” p. 27
- ¹⁹ Caltech-MIT Voting Technology Project, “Voting: What Is, What Could Be,” p. 21
- ²⁰ Brennan Center, “The Machinery of Democracy,” p. 3
- ²¹ Caltech-MIT Voting Technology Project, “Voting: What Is, What Could Be,” p. 19
- ²² Commission on Federal Electoral Reform, “Building Confidence in U.S. Elections,” p. 25
- ²³ Caltech-MIT Voting Technology Project, “Voting: What Is, What Could Be,” p. 22
- ²⁴ John Gardner, Interview by author