The Need for Robust Pre-Election Testing

Many state and local election officials believe their election equipment is accurate and reliable because they think it has passed a rigorous testing and certification process before it is used in an election.

However, not only is the process completely inadequate, the many malfunctions, miscounts, and other failures of fully certified electronic election equipment have proven that the process cannot be trusted. [1]

It has become clear that local election administrators must ensure the accuracy and reliability of their own equipment through robust pre-election testing.

Words from Experts about the Testing and Certification Process

The folly of trusting the current testing and certification process is made abundantly clear in the testimony of Dr. Michael I. Shamos before the Environment, Technology, and Standards Subcommittee of the U.S. House of Representatives' Committee on Science on June 24, 2004.[2]

> 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.**
>
> It must be re-created from scratch or we will never restore public confidence in elections.

It is noteworthy that the remarks of Dr. Shamos reflect the consensus of the experts at the hearing:

- Carolyn Coggins, Director of ITA Services at one of the independent labs approved by National Association of State Election Directors (NASED) for testing voting equipment;
- Dr. Hratch G. Semerjian, Acting Director of the National Institute of Standards and Technology (NIST); and
- Thomas R. Wilkey, Former Executive Director of the New York State Board Of Elections and Chair of the NASED Voting Systems Board.

Examples of the Importance of Pre-Election Testing

The following examples show a few of the many election miscounts that might have been prevented by rigorous pre-election testing. Note that these errors were detected because paper ballots were available to check the machines' accuracy. It is likely that similar errors have occurred on e-voting machines without being detected.

California. March 2004, San Diego County. Optical scan machines miscounted 2,821 votes in the Democratic presidential race and the Republican U.S. Senate seat.[3]

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[1] **Myth Breakers: Facts about Electronic Elections.** April, 2005. by Ellen Theisen. http://www.votersunite.org/MB2.pdf

[2] **Testimony of Michael I. Shamos before the Environment, Technology, and Standards Subcommittee of the U.S. House of Representatives' Committee on Science.** June 24, 2004. (highlighting added) http://www.house.gov/science/hearings/ets04/jun24/shamos.pdf
Dr. Shamos is the Co-Director of the Institute for eCommerce at Carnegie Mellon University. He has served as an examiner of electronic voting systems and consultant on electronic voting to Pennsylvania, Nevada, and Delaware. He is a strong proponent of paperless systems.

[3] **New electronic scanners miscounted some county votes.** NC Times April 7, 2004; By: Gig Conaughton. http://www.nctimes.com/articles/2004/04/08/news/top_stories/22_27_394_7_04.txt

Illinois. April 2003, Lake County. A 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.[4]

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.[5]

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.[6]

Texas. November 2002. Scurry County. A landslide victory for two commissioner candidates was recounted by hand. The opposing candidates actually won by large margins.[7]

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.[8]

How Can Pre-Election Testing be Improved?

Pre-election testing is not only a test of the hardware to make sure it is running properly, it is also a test of the software. This testing is essential to ensuring that the software is counting and tallying test ballots correctly.

Election administrators rarely use a professional software test plan for their pre-election testing; thus the test results provide no assurance of the accuracy of the programming. For example, if the test ballots give the same number of votes to several candidates in a specific race (as they often do), there is no way to tell if the software is assigning one candidate's votes to another.

While it is time-consuming to enter votes by hand on every e-voting machine, adequately testing paperless equipment is even more important since programming errors cannot be detected any other way. As previous elections have shown, entering votes on e-voting machines is also the only way to discover malfunctions in the screen display and operation.

A professional software tester from Wisconsin has developed guidelines for creating test decks to use with any election system. This document is an excellent resource for anyone charged with pre-election testing. It explains how to fully exercise the software in order to have a maximum chance of detecting errors.[9]

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[4] **Returns are in: Software goofed — Lake County tally misled 15 hopefuls.** (reproduced) Chicago Tribune; April 4, 2003; By Susan Kuczka, Tribune staff reporter. http://www.truevotemd.org/doc_lake_county.asp

[5] **Aug. 6 ballot problems alleged: Clay, Barton county candidates seek review of races.** Lawrence Journal-World. August 22, 2002. The Associated Press. http://www.ljworld.com/section/election02/story/103526

[6] **Winners' may be losers.** The News and Observer; November 12, 2002; By Wade Rawlins and Rob Christensen. Reproduced at: http://66.102.7.104/search?q=cache:iy0f4rgd7oMJ:www.ncdot.org/news/dailyclips/2002-11-12zz.html+%22%27Winners%27+may+be+losers%22+wayne&hl=en

[7] 06/03/04. Conversation with Scurry County Elections Director. Original reference was from *Black Box Voting,* Chapter 2. Houston Chronicle, 8 November 2002; "Ballot glitches reverse two election results"

[8] **About 600 Medford ballots cast in November ignored.** Marshfield News-Herald. March 12, 2004. By Jake Rigdon. http://www.wisinfo.com/newsherald/mnhlocal/285285292773470.shtml

[9] http://www.washburnresearch.org/archive/20050512/GuidelinesForCreatingTestBallots-200505.pdf