

Election Audits and the Florida Law

Introduction.

After the close Presidential Election in 2000 and the controversy associated with Punch Card Voting System, the Florida Legislature required that the County Supervisors of Elections dispose of the Punch Card Voting Systems and change to Electronic Voting Systems. Supervisors in 41 of Florida's 67 counties were already using electronic systems where Paper Ballots are marked and verified by the Voter¹. The Paper Ballots are then run through machines which optically scan and tabulate the Voter's choices, these are called Marksense Systems. Supervisors in 11 counties chose to replace their Voting System with Marksense Systems. In spite of the history of proven reliability, accuracy, and low cost of the Marksense System in 41 of our counties, Supervisors in the other 15 counties, representing about 50% of all Floridians, choose Microsoft Windows based computers with Touch Screens for the Voters to make selections and to tabulate the vote. These systems were known to require more maintenance, i.e. to be more unreliable, and to require a high level of technical expertise¹. The unreliability of the Touch Screen Systems was reaffirmed after purchase and issues of "Secret Computer Software", "Computer Software Tampering", and the use of "Unapproved Computer Software" generated much controversy.

The Florida Legislature has now mandated that the 15 counties that choose Touch Screen Systems change to optically scanned Paper Ballots. And since Paper Ballots can be hand-counted to verify that the Electronic Voting Systems functioned properly, the Legislature also added audit provisions into the law.

Audits, when conducted properly, provide an independent verification that an enterprise is meeting "all" of its responsibilities to "all" stake-holders. For Elections, citizens, even those who do not vote, are the stake-holders.

The Audit Provisions.

The Canvassing Board is required to meet at a publicly advertised time and place and to randomly select one ballot choice, out of the many choices on the ballot, to be audited. The Canvassing Board will then randomly select at least 1% but not more than 2% of the precincts to have their ballots manually recounted. Members of the public may witness the random selections and the recount. A schedule over a narrow window of time for the audit and audit reports to occur is also provided.

Canvassing Board Members are usually:

- Supervisor of Elections
- County Court Judge
- County Commission Chair

Alternates are appointed if a member is also on the ballot.

Are the Audit Provisions Adequate?

Public witnesses and random selections are good; however the required number of elections and the required number of precincts to be audited is not sufficient to detect malfunctioning machines or to deter fraudulent actions. The

We need Changes!

**Audit all elections on the ballot.
Audit 10% of the precincts**

only arguments for such small numbers, is to minimize the cost of an audit and to ensure timely completion of the audits. Such small audit numbers will undermine Voters trust. One of the reasons the American Democracy has lasted so long is that Americans fundamentally do not trust their government. That is why we have division-of-powers in our Federal Constitution and why the "right to bear arms" in the second amendment was added. We should go the extra mile to raise Voters trust by auditing all the elections in the randomly selected precincts and we should audit at least 10% of all precincts as the State of Connecticut does.

Warning the following is not for the mathematically timid.

In a paper on "On Estimating the Size and Confidence of a Statistical Audit";

http://www.vote.caltech.edu/reports/RivestEtAl_SizeConfAudit_4-07.pdf

Javed A. Aslam, Northeastern University, and Raluca A. Popa and Ronald L. Rivest, MIT, developed a formula for determining the optimal audit size required for a given number of precincts, a given number of "corrupted precincts", a desired confidence level,.

The formula derived is: $U = [(n - (b - 1)) (1 - (1 - c)^{1/b})]$

Where U = Optimal number of sampled precincts

b = number of corrupted precincts

n = number of precincts

c = confidence level

A confidence level of 50% will give an even chance of detecting a corrupted machine and is large enough to deter most criminal behavior. For Pinellas County with 377 precincts the formula yields the results shown in the following table. The number audited (U) is for 1%, 2%, and 10% audit samples

Precincts (n)	Corrupted (b)	Confidence (c)	Audited (U)
377	56	0.50	4
377	34	0.50	7
377	7	0.50	38

The above formula assumes that all elections in the precinct are audited. If only one of twenty elections on a ballot is audited then the confidence level will be reduced by one twentieth to 0.025, an insignificant value if we want to deter criminal behavior.

What the calculations show (assuming that we audit all elections on a ballot, not just one) is that if 38 (10 %) of Pinellas County's precincts were audited there is an even chance of finding at least one corrupted precinct if only 7 are corrupted. If we audit only 4 (1%) of Pinellas' precincts then there could be as many as 56 corrupted precincts before we had an even chance of finding at least one. I believe that a 10% audit should be our goal. The value returned for improved Voter Confidence is worth the cost.

You may download a spreadsheet to determine audit requirements for other counties with different parameters at <http://www.JackKillingsworth.com/>.

¹ The Governor's Select Task Force on Election Procedures, Standards and Technology; March, 1, 2001