

**H.B. 6950 – Oppose: Two Flawed Concepts**

**Government Administration and Elections Committee  
Testimony – March 9, 2015**

**Luther Weeks  
Luther@CTVotersCount.org  
334 Hollister Way West, Glastonbury, CT 06033**

Chairs and members of the Committee, my name is Luther Weeks. I am a Computer Scientist, and a Certified Moderator. Since 2007, I have lead citizen observation and independent reporting for fourteen (14) major post-election audits. I have personally observed ninety-nine (99) local audit counting sessions across Connecticut.

**Although well-intended, H.6950 would effectively eliminate post-election audits.**

H.B. 6950 combines two flawed concepts, similar to those contained in other flawed bills proposed this year.

**First, like S.B. 601, this bill attempts to prevent double voting for cross-endorsed candidates. It is intended to reduce work for officials in counting and accounting for multiple votes for cross-endorsed candidates. However, this bill would do little to reduce work for officials and have unintended, negative consequences, especially for voters.**

**My concerns are the same as those expressed in more detail in my testimony opposing S.B. 601: <http://CTVotersCount.org/CTVCdata/15/02/SB601CrossEndorsed20150213.pdf>**

- It fails to do what the title implies, “eliminate overvoting for a candidate”. It would require a more error prone process than we have today. It would make election officials jobs more, not less, challenging.
- Time savings, if any, would be minimal and offset by increased time explaining the problem to voters, replacing their ballots and added hand counting of more ballots
- This change will be unnecessary, with electronic election night reporting.

**Second, like S.B. 1042 this bill authorizes machine auditing. However, authorizing a somewhat less specified, less useful, less credible method.**

It would authorize auditing optical scanners by any method, including by an identical, even by the exact same scanner and memory card – Even worse than the technically unsound mechanism allowed under S.B. 1042.

**For more, see my testimony today, opposing S.B. 1042  
<http://CTVotersCount.org/CTVCdata/15/03/SB1042ElectronicAudit20150309.pdf>**

Several times in the past I have testified against similar bills, pointing out similar concerns. I encourage you to drop this bill as your predecessors have so wisely done.

Thank you.

**H.B. 6904 – Oppose: Same potential problems as S.B.1051**

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Luther@CTVotersCount.org  
334 Hollister Way West, Glastonbury, CT 06033**

Chairs and members of the Committee, my name is Luther Weeks. I am a Computer Scientist, and a Certified Moderator.

H.B. 6904 is intended to solve problems of our current system attributed to two elected registrars in one-hundred-sixty-nine (169) towns. Unfortunately, it would not solve many of the problems, would likely make more problems.

**As little more than a concept bill, it presumably would imply many of the same problems articulated in my testimony today opposing S.B.1051**

**I concur in many of the motivations for the law. In general problems that need addressing are:**

- In some large cities with full-time, well compensated registrars, for whatever reason they do not deliver professional results.
- In small towns registrars are not compensated sufficiently to learn and perform the overhead work required, even for a small number of voters. Many put in necessary extra hours. This also makes it difficult to attract competent individuals for such positions.
- In all municipalities, personal or political issues can arise between individual registrars – many are not publicized, while some result in negative effects on voters and voting
- Registrar is a highly political and patronage appointment in some municipalities.

Despite the problems, we should recognize that like all officials, the vast majority of election officials are of high integrity and the majority do an excellent or at least an acceptable job.

**Unfortunately H.B. 6904 would not solve many of the problems, would likely make more problems::**

- Appointing a single official by the municipal legislative body under the municipal clerk may make the position less political in some municipalities – in others it would remain political, exclusively under the dominant party, and would tend to make the municipal clerk position political as well. There would be fewer checks and balances. This could lead to more problems, including more severe problems.
- It would not sufficiently solve the problems of resources in small towns. One person working the same hours two people did would still not be sufficient. In any case, backup is necessary so a deputy or clerk would have to learn as much as a 2<sup>nd</sup> registrar today.
- It does not change the system enough - it is not worth the disruption for such a small possible benefit with accompanying risks and disruption.
- See my extended comments on S.B. 1051 for some of the detailed challenges and risks.

**I recommend instead, a more comprehensive, deliberate approach:**

- A committee established, with everyone at the table, to comprehensively review reform proposals -- to balance the goals of workability, integrity, efficiency, and voter service.
- Full consideration of more comprehensive change such as regionalization, that could address the problems and also the limitations of the current town-by-town system.

Thank you.

**S.B. 1041 – Support – A stronger, more efficient, lower cost post-election audit**

**Government Administration and Elections Committee**

**Testimony – March 9, 2015**

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**334 Hollister Way West, Glastonbury, CT 06033**

Chairs and members of the Committee, my name is Luther Weeks. I am a Computer Scientist, and a Certified Moderator. For this bill, I am testifying for the Connecticut Citizen Election Audit.

At the 1<sup>st</sup> meeting of the GAE, a member remarked that this Committee gets involved in highly technical legislation. Post-election audits is one of those areas. There are academic papers, professors, businesses, and conferences substantially dedicated to post-election audits.

In 2007, just prior to statewide use of optical scanners, the General Assembly passed our current audit law, embodied in statute section 9-320f. Since that time the science of auditing has progressed substantially. We have also learned many valuable lessons in the shortcomings of our law and in its implementation.

I drafted S.B. 1041, based on the Citizen Audit's experience with Connecticut's post-election audits and considering the science of post-election auditing. The Citizen Audit has provided fourteen (14) independent observation reports of post-election audits since 2007. I have personally observed ninety-nine (99) local audit counting sessions.

My written testimony covers in detail the problems with our current law addressed by this bill, its features that strengthen the audits, and the potential of *publicly verifiable machine assisted audits*.

In past years, ROVAC has offered bills to reduce the costs of audits by 50%. This bill includes the major cost-saving items in those past ROVAC proposals, along with details that provide for a much stronger audit, with a relatively small increase in effort. In total this bill would save approximately 40% of the costs of current manual audits and provide the option of publicly verifiable machine assisted post-election audits, potentially offering a stronger audit and further savings.

The current law has many omissions that result in post-election audits which provide little basis for credibility in assessing the accuracy of our elections. For instance,

- There are critical aspects of audits that are not required to be public.
- There are public notice requirements, without a notice period, - even minutes would suffice.
- Critical details depend on procedures created by the SOTS which are inadequate, not followed, and not enforceable.
- There are no deadlines for required reports. In many cases, both local, and overall reports are years overdue. The latest official *election* report published is for November 2011.

The current law is based on assumptions that have proven incorrect, contradictory, and some that violate fundamental laws of computer science established by Allen Turing in the 1940's.

False assumptions include:

- Auditing some scanners indicates the accuracy of scanners not subject to random selection.
- Officials in Connecticut can be relied upon to count ballots and votes accurately.
- Only machines make errors, not people.
- Officials in Connecticut are always correct in claiming their manual counts in audits are highly inaccurate.
- In contrast, manual counts of votes and vote tallies made in the challenging conditions of election night are accurate.

Also refer to my written testimony opposing S.B 1042 and H.B. 6950 both of which would provide highly inadequate electronic audits.

Thank you.

## **Citizen Audit Reports Demonstrating Inadequacies in the Current Law and Its Execution**

Since 2007, the Connecticut Citizen Election Audit Coalition has organized observers and independently reported on fourteen (14) of Connecticut's post-election audits. In general:

- The law is inadequate to provide public verifiability and credibility
- Procedures are inadequate for a credible audit
- Procedures are not followed
- Official actions, errors, and omissions result in an audit that has little credibility

All of the reports of the Citizen Audit are available at: <http://ctelectionaudit.org/>

## **The Science of Effective, Credible Machine Audits**

The paper copied on the last page of this document, by three leading scientists in the field of election auditing, summarizes the requirements of trustworthy, credible, publicly verifiable machine assisted audits. The machine assisted audit option provided in this bill is based in part on their work.

## **Errata in Current Version of the Bill:**

Several differences not intended in the original draft submitted or as transcribed by OLR

**Lines 52-55** -- should read:

municipal clerk or registrars of voters, held at the start of the local municipal audit counting session. In the case of central count absentee ballot locations or election day registration locations selected for audit, a single voting district will be randomly selected by the municipal clerk or registrars of voters for audit at the start of the local municipal audit.

**Lines 136-142** - Omitted some critical text. The paragraph should be:

(e) For the purposes of this section, a ballot that has not been properly completed will be deemed to be a ballot on which bubbles have been partially filled in that may or may not have been counted by the tabulator or [ (1) votes have been marked by the voter outside the vote targets, (2) ]votes have been marked by the voter using a manual marking device that cannot be read by the voting machine.[, or (3) in the judgment of the registrars of voters, the voter marked the ballot in such a manner that the voting machine may not have read the marks as votes cast.]

**Lines 165-170** -- should read:

(h) The municipal audit reports filed pursuant to subsection (d) of this section shall be open to public inspection and may be used as prima facie evidence of a discrepancy in any contest arising pursuant to chapter 149 or for any other cause of action arising from such election or primary until 30 days after such report is filed.

**Line 375** -- 'registrar' should be 'registrars'.

**Features of S.B. 1041 Which Save 50% of Costs and Support Past ROVAC Proposals**

(e.g. ROVAC bill S.B. 348, 2014): <http://cga.ct.gov/2014/TOB/s/pdf/2014SB-00348-R00-SB.pdf>

**Line 9** – Reduces the polling place districts selected for audit from 10% to 5%.

In 2007, the original bill proposed by Secretary Bysiewicz audited 20% of districts and all races. The GAE cut that to 10% and three races. Although this reduction to 5% is a significant cut, other provisions in this bill more than make up for the loss with a much stronger audit overall.

**Line 58-59** – Limits districts audited in a municipality to three.

This change has long been sought by ROVAC. It would shift the burden of audits from larger to smaller towns. Although we do not agree that it is a good idea or that it is fair, when combined with the reduction of selected districts from 10% to 5% it will have a small impact on the audit and on small towns. We have included it in the spirit of compromise.

**Lines (many)** – [manual] removed

**Lines 100-135** – Provides for an alternate “Independent Tabulation Process” i.e. machine audit.

For several years ROVAC has proposed a machine audit, especially since demonstrations of a commercial product in 2010 by the Clear Ballot Group, and subsequently by the SOTS Office/UConn of a prototype tool they have developed.

Proposals by ROVAC, the demonstrations, and reports created by the SOTS Office/UConn all showcased insufficient methods for machine auditing – insufficient to provide public verifiability and confidence. ROVAC has also suggested that auditing by a different scanner of the same model is sufficient – it is not.

We have codified minimum requirements to provide for publicly verifiable machine assisted audits, based on the scientific paper on the last page of this document.

Given the risks and lack of appreciation of the science demonstrated by officials and the need for public verifiability of any audit method, it is important that minimum requirements for machine assisted audits be included in the law.

We also note: That the proposed machine assisted audit will be a stronger audit since all contests on the ballot will be audited. A machine assisted audit will save local officials time and frustration. Yet, we do not know how much it would cost to purchase a commercial system license or to field the SOTS Office/UConn system.

Using electronic auditing is an option, and thus not mandated by this bill and should not be recognized as a cost in a fiscal note.

## **Features of S.B. 1041 Bill Which Will Strengthen the Audit**

Many of these features are oversights in the original law that common sense implies should have been included and should have been expected even though they are not included. These are of low or no cost.

Other changes are a small expansion in the coverage of the audit which will insure that essentially all ballots are subject to audit. Any ballots excluded from the audit provide an opportunity for fraud or for errors be undetected or covered up. We estimate that the total cost and effort of these changes amount to approximately 10% of the cost of the current audit. Thus given the savings of cutting polling place audits by 50% the total savings of this bill would be approximately 40% of the cost of the current audit.

**Lines 11-21** – Add central count absentee and Election Day Registration (EDR) ballots to the random selection.

### **Lines 30-33**

It is important that all ballots be subject to audit. Two classes of ballots currently exempt from the audit law are central count absentee ballots and EDR ballots. Selecting 5% of towns for those audits amounts to 9 towns. Each selected town would then draw only a single district to audit for both central count absentee and EDR. Most of those selected towns would likely only have EDR to count, without central count AB, about 1/3 would count both.

Absentee and EDR counting involves tabulators with the most complex programming, able to support all districts in each municipality. Correct function of polling place scanners provides little assurance that absentee and EDR tabulators are working without error or fraud.

Absentee votes are already a factor in deciding many contests. If EDR reaches the levels of 20% to 30% of the votes, as they have in other states, they will be a large factor in deciding contests. They need to be included in the audit.

Calculating costs exactly for this change is complex. Selecting 9 municipalities would be an increase of about 13% of the districts selected in the current audit, yet the number of ballots in each district would entail much less counting, currently 10% of a polling place district, perhaps rising over the years to 30%. The bottom line would be adding back well less than 10% of the cost of the current audit across the state.

**Lines 15-21** – Enhance notification requirements and provide remedies for errors in drawing lists

The current law requires that local audit counting sessions be public, yet contains no advance notice requirements. A registrar could post a notice on their office at 7:45am for an audit at 8:00am and meet the requirements of the current law. The Citizen Audit has several times called registrars almost daily to obtain the date and time of the audit, only to be told it was held the day before or was underway. This bill includes a three day notification requirement and a workable method of notifying interested members of the public in advance.

Also the Citizen Audit has shown that there are frequently significant errors in the list of districts in the random drawing. Such differences provide openings for fraud and error to go undetected or covered up, reducing the integrity and credibility of the audit. Creating a correct list is the joint responsibility of the Secretary of the State and all registrars. This bill would provide a workable remedy to restore the integrity of the audit, for any such errors in the drawing that are discovered.

**Line 33** – Include questions as well as offices in the random selection of offices

Questions are currently exempt from audit -- they are not exempt from error and fraud. This change would not add to the work of the audit, since the number of contests selected would remain at three. Actually, it would slightly reduce the effort for municipal elections, since those

often involve multi-vote races that take more effort to count than single-vote contests. (Because on average then, fewer, more demanding multi-vote races would be selected)

**Lines 35-44** – Simplifies contest drawing, making it by district, and by always by the municipal clerk

The current law is overly complex, based on choosing contests for audit after those mandated by Federal laws for Federal audit laws anticipated in 2007. No such laws were ever passed and are not anticipated in the foreseeable future.

Currently for even year elections, contests are selected statewide by the SOTS. This can be a problem, since town ballots and contests can vary in even years. Currently for odd year elections, contests are selected by municipal clerks.

This change would strengthen the audit. It would have all contests selected locally. It would codify selecting separately for each district, which some towns do now. The effect would be an audit with more coverage of a variety of contests – in even year elections, not just three contests statewide – in odd year elections different contests in each selected district in a town where more than one district was selected.

**Lines 44-45** – Only contested races included in the random drawing of races

Counting such races makes little sense, when uncontested races are selected for audit and officials must still count all those votes.

This would make the audit stronger, since for every uncontested race not audited, another contest will be audited.

**Lines 52-55 (Referring to text as in Errata above)** – All drawings in public as part of the local audit,

Currently drawing of contests must be conducted by the municipal clerk any time prior to the local counting session. These sessions are difficult for the public to observe, reducing credibility of the audit.

This change requires all drawings to be in public as part of the local audit counting session. For convenience, it also provides that the registrar as well as the municipal clerk can do the random selection.

**Lines 74-77** – Subjects most originally hand counted paper ballots to audit.

We have seen instances of large numbers of ballots hand counted on election night primarily because of pre-printed ballot shortages. For example, in November 2010, in addition to the widely publicized shortages in Bridgport, there were a handful of other towns with significant numbers of hand counted ballots. None of those were subjected to audit.

Also in recent elections, mostly primary elections, several towns opted to save money in scanner programming and avoiding auditing by not using scanners and holding hand count elections only elections.

Hand counted ballots are not exempt for error and fraud. They should be eligible for audit.

This change makes hand counted ballots, when there are over twenty in a district, subject to audit.

**Line 77** – Immediate transmission of local audit reports.

An oversight in the current law was neglecting to specify a deadline for submitting local audit reports to the SOTS. 24 or 48 hours would be sufficient, yet since the law requires the SOTS in turn to submit them ‘immediately’ to UConn, we specified the same for registrars.

Current without that clause, frequently reports are not sent to the SOTS for at least months, likely many past reports are still outstanding for years. We know this because we have frequently asked both the SOTS Office and UConn for some of those reports and they confirmed they had not received them. See the post-election audit reports at <http://ctelectionaudit.org>

**Line 81-82 – Completion of mandated reports by UConn within 180 days**

An oversight in the current law was neglecting to specify a deadline for UConn to complete required audit reports after every election and primary. The audits are intended to discover problems with our scanners - one would hope such reports would be in time to a) resolve any problems discovered in time for subsequent elections b) Before the ballots involved are destroyed, and c) while the staff and contract at UConn are still available.

Unfortunately, that oversight has left the public without those official reports. Looking at UConn's web site: <https://voter.engr.uconn.edu/voter/reports/> and the SOTS web site: <http://voter.engr.uconn.edu/voter/ct-sots/> We see that since November 2011 there has only been one post-election audit report completed out of six major audits since that time. In addition the report of the August 2008 primary has yet to be completed (in that audit Secretary Bysiewicz tripled the size of the audit to assure the scanners were ready for the Presidential election, - unfortunately after all that work on the part of local officials a timely report was never posted).

**Lines 100-135 – Machine assisted audit option**

Machine assisted auditing as provided in this bill would save effort for local officials and make a more credible, accurate audit while also auditing the entire ballot, not just three contests.

The last page of this document reprints a summary of the science of machine assisted auditing and also what would not work. The proposed machine assisted audit is based on that science.

Luther Weeks, a computer scientist, long a supporter and catalyst for machine auditing reviewed the methods proposed in this bill with Dr. Shvartsman of UConn. Dr. Shvartsman agreed that the SOTS Office/UConn system could easily be modified to support the text of this law (A couple of days of programming and testing – the system already creates the data required, it just needs to retain it briefly and export it.).

Similarly Luther Weeks reviewed the requirements with Larry Moore, founder of the Clear Ballot Group, creator of the leading commercially available system. Mr. Moore confirmed that the Clear Ballot system supports this audit method.

It is entirely optional, so should not result in required costs in a financial note to the bill. Some towns may choose to purchase or lease a commercial system at their option. The SOTS Office/UConn might find a way to provide a limited number of systems for a low cost for the use of local officials. In any case, there is no required expenditure by the State, no unfunded mandate. This the bill should remain as a net cost reduction of about 40% of the costs of the current law!

**Lines 136-142 (Referring to text as in Errata above) Correcting the definition of a discrepancy to match the intent of the audit and the actual function of optical scanners.**

The current law, written in 2007, did not take into account an accurate understanding of the function of the AccuVoteOS optical scanners. This clause has caused confusion on the part of election officials.

The scanner is designed to only read marks within ovals. Using suitable marking instruments the scanner is designed to read any mark covering 16% or more of an oval. In practice almost any mark, no matter how small within an oval is counted. Thus the audit should only be concerned

with evaluating scanners on the basis of marks within ovals, and expect scanners might have counted any mark, and expect scanners to count ovals that are clearly over 16% filled it. Our text is a simplified, high level version of that expectation.

**Lines 144 – Manual count required for discrepancies**

The current text in effect requires a machine recount, if the machines are found to be inaccurate. When the law was written in 2007 a recanvass was a manual count. Since that time, via regulation, Secretary Bysiewicz changed the recanvass to a machine count. This change returns the law to the original intent.

**Lines 277-280 – Accounting for write-ins, compensating for known scanner error**

A known AccuVoteOS scanner error can easily cause write-in votes to go uncounted. The scanner frequently fails to properly separate some write-in votes to the write-in bin for manual counting on election night. Current election closing procedures will not uncover such errors.

The recognition of the seriousness of this error was surfaced in the most recent post-election audit, due to the Citizen Audit observation, and the diligence of one of the volunteer observers.

This change protects against that flaw, such that all write-in marks are accounted for. Checking with experts across the country, there was no easier procedure proposed or known.

**Lines 287-289 – Increasing period after elections when tabulators and memory cards must be sealed.**

If problems are discovered in an audit, tabulators and memory cards need to be evaluated for errors or fraud. Yet, tabulators must be available for subsequent elections, maintenance, etc. Ironically, the current law allows memory cards and scanners to be unsealed one day before the audit begins.

**Lines 292-303 -- Sealing of ballots and their retention**

There is a major oversight in the current law and an omission in technical changes made later to account for the replacement of lever machines with scanners.

There is no recognition in the law that the tabulator voting involves paper ballots that must be preserved. The interpretation of the current law is that ballots only need to be sealed for 14 days after the election, just like scanners. Ironically, that is one day before the audits begin.

Citizen Audit observations indicate that frequently, ballots are unsealed before local audit counting sessions. Any lack of ballot security or the chain-of-custody completely erodes confidence in the audits and in election integrity. Unlike scanners, there is little hurry to unseal ballots and many reasons to keep them sealed.

This bill would require ballots to remain sealed as long as they are needed for audit, and for subsequent audit investigations. Some towns may be required to purchase a few more ballot containers to accommodate the additional ballots under seal (space for retaining the ballots is required today, in any case).

**Lines 359-366 – Treat absentee ballots like polling place ballots**

This change requires absentee ballots and EDR ballots to be sealed in the same manner as polling place election-day ballots. It also shifts their retention to be with the other ballots kept by the registrars, rather than absentee ballots with the municipal clerk. For polling place counted absentee ballots it will have the effect of their being sealed in the same containers as other ballots with the more security, especially while they are in the polling place and on their way to town hall.

## **OP-ED CTNewsJunkie | End Exemptions to Post-Election Audits**

by Luther Weeks | Oct 15, 2014

When auditing town expense accounts, would it make sense to exempt some departments? When inspecting trucks, would it make sense to exempt school buses? When inspecting restaurants, would it make sense to exempt diners? Any exemption is an opening for errors to go undetected and an opportunity for fraud.

Equally it doesn't make sense that the Connecticut's post-election audit law exempts all votes on questions, election day registration, originally hand-counted ballots and absentee ballots from our post-election audit. Election integrity and public confidence demand that all ballots be subject to random selection for audit. Exempt ballots already determine many elections, while the number and percentage of exempt ballots is growing.

Currently about 9 percent of ballots are absentee ballots, many elections and primaries are decided by much lower margins than 9 percent. If the State enacts early voting, following other states those numbers will almost certainly rise to over 30 percent within a few years. Compare that to the race for governor in 2010, which was officially decided by about 0.6 percent—more than triple the 2000 vote margin necessary for a recanvass. Since Connecticut recently initiated Election Day registration, we can anticipate those votes to reach 10 percent of votes in a few years, which will further add to the totals exempt from the audit.

In 2010, the audit counted over 23,000 ballots from Bridgeport for the governor's race. We found many counting and accounting errors, especially with emergency paper ballots that were counted by hand on election night. Less known is that a handful of other towns also had similar numbers of emergency hand-counted ballots in 2010. There are hand-counted ballots in every election – all of these are currently exempt from the post-election audits.

Officials in many states hand-count votes accurately in audits, using uniform, proven and effective counting methods. In Connecticut, many municipalities use ad hoc, inadequate methods to manually count ballots. Even under the ideal planned conditions of audits, many officials argue that they cannot count ballots accurately by hand and attribute almost all differences large and small, to their own errors. Many towns manually count large numbers of ballots at the end of a demanding seventeen-hour-plus election day, when there is no expectation, planning, staff, or training to count large numbers of ballots by hand on election night. How many voters are aware that many towns now avoid scanners and hand-count all votes in some primaries? Yet, we have no audit to assess how accurate these manual-counts are.

In November 2012 officials in one town investigated a difference and determined that polling place officials mistakenly read 151 ballots into a scanner a second time. Despite checks that could have caught the error before certification, the discrepancy was not detected until the audit. In another town, a similar error was made in the central count of absentee votes. It was discovered by citizens reviewing election records and resulted in reversing the official result on a highly charged question. How common are such errors? We will never know until we stop exempting absentee ballots and questions from the audit.

The good news is that we do not have to spend more to increase confidence in our elections. Connecticut is one of twenty states with hand-count audits. Our existing audit, at 10 percent of polling places, seems among the strongest. A small state needs to audit more to achieve the same confidence as a large state. This is because the statistical confidence of an audit, just like the confidence of a poll, is more dependent on the number of units counted than on the percent of the votes or voters in the election. We can reduce that 10 percent, even counting fewer total ballots, and gain confidence by subjecting all ballots to audit, while using efficient, proven counting methods.

*Luther Weeks is executive director of the Connecticut Citizen Election Audit.*

**Machine Retabulation is not Auditing**

Mark Lindeman, Ronald L. Rivest\*, and Philip B. Stark

24 March 2013

- A **post-election vote tabulation audit** checks election results by manually inspecting some voter-verified records (usually paper ballots). A well-designed audit can produce strong evidence that election outcomes are correct—and can correct incorrect outcomes.
- The principle of **evidence-based elections** says that an election should provide convincing evidence that election outcomes are correct. True audits allow observers to see directly how well the voting system performed, which can provide such evidence.
- Some claim that election results can be checked by **machine retabulation**, in which ballots are rescanned on other equipment. Machine retabulation may happen to catch some errors, but it is not really an audit. Machine retabulation relies on the false assumption that two machines can't *both* be wrong.
- Some claim that retabulation adequately checks the voting system because it is “independent” of the voting system. But a retabulation system could be misconfigured in the same way as the voting system, could misinterpret some ballots in the same way, or could be subverted to cause it to report the same incorrect results. Two unaudited machine counts are not necessarily better than one.
- Some claim that retabulation can adequately check the voting system results provided that the two sets of vote counts match in sufficient detail. This is like claiming that if two expense reports list the same expenses, both must be right and there is no reason to look at any receipts.
- Some claim that retabulation itself can be “audited” by comparing ballot images produced by the retabulation system with the system's interpretation of those images. At best, this tests internal consistency: whether two parts of the retabulation system agree with each other. It does not test whether the system correctly interpreted the ballots. At worst, a subverted retabulation system could pass this test, yet misreport *every* vote. This is not an audit. It cannot confirm that the election outcome is correct.
- A well-designed retabulation system can help in a **machine-assisted audit**. In a machine-assisted audit, the retabulation system produces an interpretation of votes on each ballot (a Cast Vote Record, or CVR) that can be matched with that ballot. The CVRs are exported from the retabulation system. Observers verify that these exported CVRs produce the same electoral outcome (winners, etc.) as the voting system. Then observers compare a random sample of actual ballots against the corresponding CVRs. *This comparison is between actual ballots and CVRs, not between digital images of ballots and CVRs.* A machine-assisted audit can produce strong evidence that election outcomes are correct. Retabulation cannot, even if the CVRs are checked against the digital images of the ballots.
- There is currently no way to audit votes cast online, and there is little prospect for the foreseeable future. Despite claims about “military grade encryption,” Internet voting does not create a durable, voter-verifiable record against which the results can be checked. While votes cast on the Internet could be retabulated, they cannot be audited. Both NIST and the Department of Homeland Security agree that secure online voting does not currently exist, and—if it is possible at all—is a long way off.

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\* Viterbi Professor of Electrical Engineering and Computer Science, MIT  
Professor, Department of Statistics, University of California, Berkeley