



HAND-COUNTING VOTES IS IDEAL; BUT IN THE INTERIM, OPTICAL SCANNERS/TABULATORS COULD COUNT THE VOTE IF THE NECESSARY GUARDRAILS ARE IN PLACE

Executive Summary

Citizens across Tennessee have voiced loudly their concerns about the amount and types of technologies that are now involved in the state's election processes. On the heels of verified issues in other states in the 2020 election, and after talking with legislators and election officials, monitoring other audit processes across the nation and listening to citizens, our team is recommending that ballots be high-security paper and be hand-counted in precincts. Until that can be achieved, optical scanners/tabulators should be the vote counting and tallying technology of choice.

But there's a caveat. Other safeguards – such as removal of BMDs and DREs, implementation of stronger audits, aggressive work on the voter rolls, a Security Risk Evaluation of the machinery and the introduction of high-security paper ballots that uses the same security protocols as the U.S. Treasury's oversight of the country's money supply -- need to be in place surrounding the scanners to keep them honest. Think of them as guardrails.

Issue

With election technology being so uncertain these days, counting ballots by hand is a strong preference we're hearing from citizens/consumers. Until the county is ready to put that into motion, optical scanners can be a technology that has the propensity to be trustworthy as long as other security guardrails surround the machine.

Several steps need to be put in place. Scanners need to undergo a Security Risk Evaluation to ensure there is no nefarious technology contained therein. Voter rolls need to be aggressively tightened. High-security, hand-marked paper ballots need to be in place to allow citizens to check their vote in post-election audits in every Tennessee county. Ballot Marking Devices (BMDs) and Direct Recording Electronic voting machines (DREs) need to be removed from precincts. And complete, end-to-end, stronger audits need to be pursued. A new audit that checks on all county election commissions to ensure they're doing all they should for election integrity should be implemented.

If these caveats are implemented, it will be easier for citizens to accept some technology remaining in place.

Discussion

The presence of certain technologies in voting machines – some of which is not allowed by vendors to be checked by states/counties -- is of grave concern to the citizens of Tennessee who vote. We've heard citizen vocal concerns about this in all of our interactions and research.

In the new comprehensive voting system, we're recommending to legislators, election commissions, government election officials and citizens, we're advocating a large part of that technology be torn away to ensure greater election integrity in the process for voters. Yes, removing a good bit of technology will actually help better ensure the safety and security of our vote.

We'll get into this more, and we already have addressed much of this in other support documents, but moving from voting centers back to precinct voting and taking voter rolls completely offline during voting will eliminate the need for an internet connection that ties all voting centers together. Removing the Ballot Marking Devices (BMDs) from the voting process will do the same since BMDs are beginning to be proven as huge risks to voters because of their ability to be hacked. Also, studies have proven they do nothing to lessen the time it takes to vote on them. Moving back to hand-marked paper ballots will remove even more risky, costly, time-consuming technology.

Knowing that it will require a few steps to move to completely counting ballots by hand, we are of the mind **that optical scanners can be retained in the interim to count and tally votes**. Their lower cost than BMDs and other internet-able technology also makes them attractive as a way to count the vote and save money for now. [This combination of scanners and paper ballots have been endorsed by a number of election integrity groups, such as Citizens for Better Elections.](#)¹

However, after a year of talking with citizens, we know that the only way they will accept this change is **if guardrails are in place to keep scanners in check**. These safeguards include:

- If the machines undergo a Security Risk Evaluation to ensure there are no nefarious technology or other enhancements on these machines that can allow bad actors to hack in and change election results;
- If voter rolls are more aggressively tightened to ensure only valid, legal and live citizens who have applied to vote are on the rolls and able to vote;
- If the state puts high-security, hand-marked paper ballots in place in every county to ensure against errant paper ballots from finding their way into the election count and give every county a way to audit the election to ensure who is said to have won really won;
- If BMDs and DREs are removed from the process because of their vulnerabilities; and
- If stronger audits are added to the process to assess the local process from end-to-end and double check every county in the state to ensure they remain committed to election integrity.

Optical scanners can quickly count all paper ballots, from early voting to absentee voting to day of election voting. And they will greatly reduce the equipment and servicing cost at precincts. Only one scanner is needed per precinct, but a second scanner should be added as a backup should something happen to the first or its bin fills to the max with ballots and a new bin needs to be moved into place.

We've learned that the paper ballot we're recommending **can be handled by most every scanner/tabulator on the market** and be correctly counted. An advantage of the scanner/tabulator – and we've verified that Williamson County's current Dominion scanners can do this – is that **most allow for self-adjudication**.

Adjudication usually occurs in absentee voting when a ballot is deemed to have too few votes that could have been voted (under-vote), or too many votes for candidates in a particular race (over-vote). Or maybe there are marks on the ballot that cause the scanner/tabulator to not be able to figure out the correct vote. Since the voter is not there to tell the system his/her full voting intent, an adjudicator

¹ https://www.citizensforbetterelections.org/?page_id=211

looks at the ballot to divine the voter's intent and vote the ballot the way he/she possibly intended. But few, if any voter, wants some unknown, third person looking at his/her ballot to determine who the voter really voted for. Lots of opportunity for issues in that process. In absentee voting, this will be a fact of life.

But in early voting or election day voting, self-adjudication is a great service for voters. And most optical scanners can now do that. If the ballot is questionable, the scanner immediately spits it back out before counting, allowing the voter to step aside to a vote marking booth to correct or start over a new ballot before getting back in the line to slip their ballot into the optical scanner.

Why are BMDs bad and need to be removed leaving the optical scanner to count the votes?

Well, they're highly risky. The studies coming out concerning the risks of BMDs are stunning. We have separate documents that discuss the fallacies of BMDs, but here are a few of the deeply concerning issues our research has uncovered:

- [BMDs can be hacked, misconfigured or contain malware that alters the ballots or tallies](#);²
- [BMD touchscreens can be mis calibrated causing "vote flipping"](#);³
- [Studies prove only a small percentage of voters check BMD-generated ballots for errors](#);⁴
- [BMD accuracy cannot be confirmed by audit](#);⁵ and
- [BMDs have a lack of transparency, auditability and produce longer voting wait times](#).⁶

There are other concerns, but these research-based articles above confirm the risks of using BMDs. And with citizens – customers, if you will -- calling for less technology in their voting process, election officials and legislators need to heed what they – and the research – are saying. Both the [National Election Defense Coalition](#)⁷ and [Verified Voting](#)⁸ have strongly opposed the purchase and deployment of BMDs.

So, why the guardrails? Because optical scanners are still technology that run off software that we know can be hacked. That's why our recommendation is to ultimately hand count all ballots. In the meantime, if those safety valves are in place surrounding the scanners, indiscretions are far more limited and more likely to be caught if they occur.

A [Security Risk Evaluation](#) of all voting equipment used in an election, which we're recommending instead of a simple recertification of machines, will check the machinery for issues.

- Minimum Voting Standards Guidelines (MVSG) are mapped to Voluntary Voting System Guidelines (VMSG 2.0) standards and includes essential requirements established by the Election Assistance Commission (EAC) for the machine... such as paper ballots, no encryption, protection against any internet connections, etc.

² <https://www.stat.berkeley.edu/~stark/Preprints/bmd-p19.pdf>

³ <https://apnews.com/article/ae388fb69d14e5d3619128a591cdc0c4>

⁴ <https://jhalderm.com/pub/papers/bmd-verifiability-sp20.pdf>

⁵ <https://www.stat.berkeley.edu/~stark/Preprints/bmd-p19.pdf>

⁶ <https://www.electiondefense.org/ballot-marking-devices>

⁷ <https://www.electiondefense.org/ballot-marking-devices>

⁸ <https://verifiedvoting.org/statement-on-ballot-marking-devices-and-risk-limiting-audits/>

- A six-person bi-partisan team of IT, cybersecurity and internal controls evaluates the State Election Commission (SEC)-approved MVSG and asks vendors to self-analyze their machinery.
- The team audits the vendors information and ranks the vendors, stating which ones are adequate to be certified.
- Risks and their impact as well remediation plans are assessed and the SEC approves the best vendors.
- A report is issued and the team becomes an ongoing process, rotating team members.

This will go much further in checking for equipment issues than the current process overseen by the EAC and the SEC and should more fully satisfy citizens.

Voter rolls have issues as well and should be subjected to much more scrutiny to clean up any concerns that are lingering.

- A Minimum Voter Registration Software Standards are developed and the systems checked for functionality to ensure data integrity and proactive monitoring. Other checks include:
 - Data logic checks as SOPs to detect invalid and/or bad data.
 - Fraud Detection and Pattern Analysis to assist with proactive roll cleanup.
 - Ensure Robust List Maintenance Artifacts:
 - Voter roll refining reporting of summaries and line-item details for minimum two-year record retention.
- To ensure greater responsibility is taken, the local election commission employee affirming voting approval status of each new voter must sign/attest to roll accuracy.

If the state removes the BMDs and DREs and puts hand-marked paper ballots in place in every county -- which is one of the most crucial components of our recommendations -- then this will be a huge step to help surround and neutralize the optical scanner. And we're talking high-security paper ballots with the same security standards as that used by the U.S. Treasury to prevent counterfeiting such as:

- Watermarks on UV light-reactive paper;
- Embedded ballot holograms of translucent mylar;
- Microprinting of words, images in the hologram;
- A unique, randomized ID on every ballot to ensure ballots aren't counted more than once;
- Having these ballots in every county will ensure the state can audit the entire Tennessee vote, which it can't do now.

Finally, if stronger audits are added to the process which can check over the local election from end-to-end and double check every county in the state, that could cover the rear end of the scanners. One well-known national election expert, [J. Alex Halderman, University of Michigan professor of computer science and engineering as well as the director of the Center for Computer Security & Society Election Integrity, has been advocating for strong audits and paper ballots for years.](#)⁹

The three audits we're suggesting include:

- The Mandatory, Post-Election Audit, where a new, fresh team of counters check into the precinct immediately at the close of voting and count all ballots in that precinct. The count is

⁹ <https://www.youtube.com/watch?v=4K0YZcbbzhc>

streamed live and videotaped for citizens to witness. The ballot count becomes the mandatory audit and the results are reported immediately to the Elections Office.

- The second audit is what we call The People's Audit. The day after the election, the Williamson County Election Commission posts all ballot images online. Additionally, they post key election documents and poll officer forms, as well as the locked, pre-election voter list so citizens could do their own audit of the election from top to bottom.
- The third audit, an Operational Audit, is new and will ensure that county election commissions across the state will be doing all they are supposed to be doing year-in and year-out to ensure election integrity when the spotlight is not on. This audit would be done in every county every five years.

In putting all these steps into place, much of the questionable, risky technology can be safely removed from the voting process and make results more trustworthy and help begin to restore consumer trust in the state's election system.

Recommendation

We highly recommend technologies be removed from the election process in Tennessee and that ballots ultimately be counted in precincts by hand. In the interim, optical scanners/tabulators can be used to count and tally the vote. The caveat, though, is that appropriate guardrails – such as a Security Risk Evaluation and greater voter roll scrutiny are done, BMDs/DREs are removed, high-security hand-marked paper ballots are returned on which voters can vote and two critical audits are expanded and implemented. These steps will surround the scanner/tabulator and should neutralize any risk the scanner may pose.

Conclusion

With the issues that have been revealed following the 2020 election, changes need to be made in the voting process within Williamson County and counties across the state. Making the changes such as counting the ballots by hand and, in the meantime, retaining optical scanners as the only machinery used to count and tally the vote, will go far in ensuring greater election integrity and the gradual return of citizen confidence in Tennessee's election process.

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