



WITHOUT HAND-MARKED, HIGH SECURITY PAPER BALLOTS OUR SYSTEM IS HIGHLY SUSCEPTIBLE TO FALSE BALLOTS BEING INSERTED INTO THE COUNTING PROCESS

Executive Summary

The most sacred privilege Americans have is the ability to cast their vote. If that process fails to provide the voter with the ability to view their vote and assure it is counted as cast, the process is not secure and the privilege is moot. Because almost 70% of Tennessee counties don't have election equipment that produce paper ballots that are separate from vulnerable machine software and can be laid aside to be counted in a post-election audit of the electronic tally, and since current ballot marking devices, likewise are unsecure, plus have encrypted their scanning of ballots, almost all Tennessee voters are left defenseless. Hand-marked, high-security paper ballots are needed to overcome the risks of technology.

Issue

Currently, no voting machine company offers a paper ballot that comes from a completely separate vendor for voting on their machines. Current ballots also use QR codes or bar codes that encrypt the voters vote, yet are unable to be verified by the voter as correctly representing his vote as he marked it on the ballot. Other voting processes in many Tennessee counties feature machines that cast, count and store the vote without producing a voter verified paper audit trail.

In addition, without a unique identifier on every ballot that provides a traceable, finite number of ballots allowed into the system, it is possible for batches of votes to be removed and replaced. That was a loud source of concern from the 2020 election.

A secure, hand-marked paper ballot is critically needed to limit hackable technology in our voting process while ensuring that our elections are not out-sourced to either a vendor or some other third-party technician. Add in the unique identifier on the paper ballot and the voter is given the gift of the ability to follow his ballot through the voting process, ensuring his ballot was counted as cast.

Importantly, this process will ensure against false ballots from entering the counting system.

That will restore voter confidence in the county's/state's/nation's voting process.

Discussion

Next to the vulnerability of voting machines, this may be our single-most critical recommendation to return a greater amount of election integrity and confidence in our election process. With the implementation of all-mail-in ballot elections and the validated insertion of fake absentee ballots into the vote count in a number of states in 2020, the importance of a pristine, high-security ballot cannot be overstated.

It certainly is what citizens across Tennessee have been telling us they want for the past year.

[There is no question paper is, truly, state-of-the-art voting technology](#)¹. And high-security, hand-marked paper ballots are a huge solution to the problems we've seen in the 2020 election. If nothing else, implementing a more secure process of voting with a high secure paper ballot will be understood by citizens as a move that better reflects election integrity than our current technology-laden voting system.

Post-2020-election affidavits have indicated that irregularities/concerns could have been mitigated with a hand marked, secure paper ballot.

- Absentee/mail in ballots: Could be authenticated when returned
- All ballots would be finite, pre-printed prior to the election preventing ability to delete/replace votes.
- The hand-marked, secure ballot's unique identifier provides the ability for an enhanced risk limiting audit.
- This secure ballot would be separated from the tabulator vendor, avoiding one vendor control.
- This secure ballot would eliminate the need for any internet connectivity for any part of the process, the tabulator could/should be a 'dumb' tabulator.

[Paper ballots are also highly recommended by experts, many of whom have been pointing out the high risks of our current system which depends on technology and electronic ballots that has been proven to be susceptible to breach](#).² Not the least of these is J. Alex Halderman, professor of computer science and engineering at the University of Michigan and director of the Center for Security & Society Election Integrity. In 2018, he made a short, but dramatic presentation at the DefCon 26 meeting in Las Vegas where [he strongly advocated for paper ballots and risk limiting audits as a solution to the machine vulnerabilities he pointed out](#).³

He's been saying as such for more than a decade. Here's the video [introduction he produced in 2012 for UofM students for a class he titled "Securing Digital Democracy"](#)⁴ which focused on the great risk to Democracy these electronic machines pose. Here he is explaining that [a day-of-voting internet connection is not needed to hack votes](#).⁵ And here he is [testifying before Congress in 2017 about the vulnerabilities of our current electronic system and a better way forward](#).⁶

The paper stock used in elections is significant because it can affect how a vote is adjudicated and tabulated. [Paper can also tell the story of whether counterfeit ballots were used](#).⁷ The weight, thickness, security features of paper are all critical features of a secure ballot. Bleed-through can result on ballots with thinner paper stock. Ballot paper should be uniform, and its specifications should be prescribed. Ostensibly, ballots that do not meet the defined specifications should not be counted.

¹ <https://www.brookings.edu/blog/techtank/2019/08/14/why-paper-is-considered-state-of-the-art-voting-technology/>

² <https://www.theatlantic.com/magazine/archive/2017/12/guardian-of-the-vote/544155/>

³ <https://www.youtube.com/watch?v=4K0YZcbbzhc>

⁴ <https://www.youtube.com/watch?v=eXSF798qnCA>

⁵ <https://www.youtube.com/watch?v=4K0YZcbbzhc>

⁶ <https://www.youtube.com/watch?v=3qr67h54VO0>

⁷ <https://uncoverdc.com/2021/09/28/patrick-byrne-its-the-paper/>

In fact, Patrick Byrne, the founder of the America Project, has often highlighted the importance of the paper used in the Maricopa County Election. VoteSecur paper is the paper of choice for elections because it has the thickness, coating, and security features necessary to help ensure that one's vote is properly adjudicated. The security paper is part of Rolland, Inc's family of CheckSecur papers. The trademark for the paper was registered in August of 2018 and is listed under the name "VoteSecur."

[But what was found in the Maricopa audit was that ten different paper stocks were used in voting.](#)⁸

Several of the papers did not follow the legally prescribed 80lb stock weight but were, in fact, much lighter stock:

"Ten different papers have been found. Several of these paper stocks include paper with the weight from 20 lbs. to 30 lbs. when generally the accepted best practice for voting is to utilize ballot stock of 80 lbs. or higher.

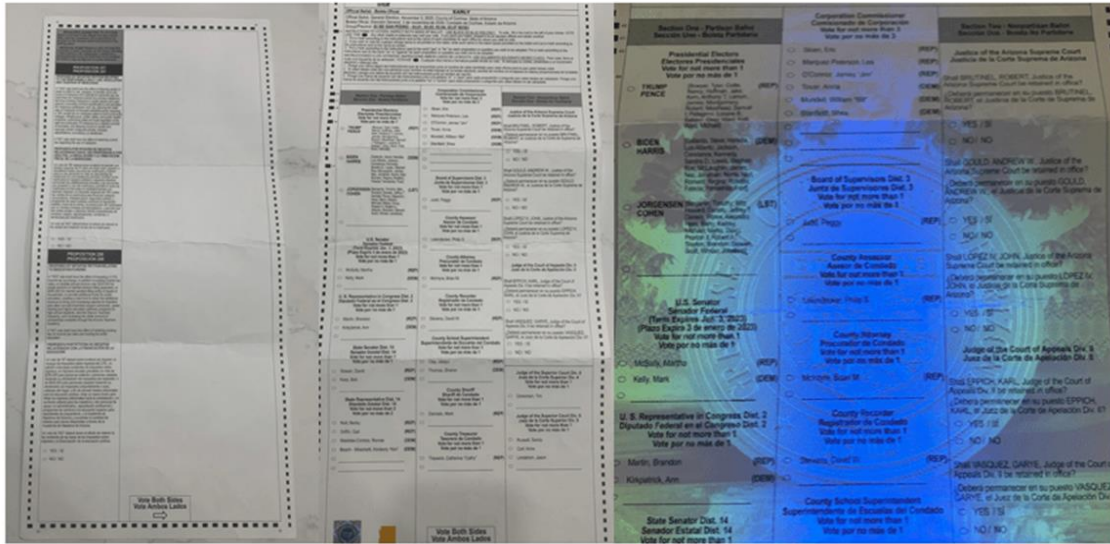
Without a doubt, without an intense adherence to paper standards for ballots, fake ballots can be – and will be -- inserted into the voting process.

A critical part of our recommended new, comprehensive, more secure voting model therefore is the **use of high security voter-/hand-marked paper ballots that feature the same security standards as that used by U.S. Treasury to prevent counterfeiting.**

- This ballot contains numerous 'gates' that prevent counterfeiting, provides a randomized sequence that ensures a finite number of ballots issued per election, and each ballot has a QR code with a unique identifier for each voter to be able to check that their vote has been counted as cast. Some 'gates' are covert, others obvious.
- In addition, separating the paper vendor from the tabulator vendors provides another layer of security that prevents one vendor controlling the process of marking, producing a ballot, and tabulation. Finally, this paper ballot option has been estimated to be 20% of equipment cost with less hardware storage, no operating systems to update, less expensive IT administrative costs, and the 18–24-month turnover costs of machine shelf life.
- Estimates to cost: .25 per ballot plus .07 local print cost.
- This ballot was **not** solicited by a vendor to Election Officials. In fact, Representative Mark Finchem, AZ, approached a firm that specializes in Specific Authentication Services and worked to develop a prototype that has been embraced by 7 States with another 38 currently under review.
- Main features of the ballot include:
 - Randomized ID, watermark UV light-reactive paper;
 - Embedded ballot holograms of translucent mylar;
 - Microprinting of words, images in the hologram; and
 - A randomized ID only the voter knows... that will help him/her track his/her votes throughout its progression... assuring the voter his/her vote was counted as he/she intended.

⁸ <https://uncoverdc.com/2021/06/12/the-ballot-integrity-project/>

Below is a photo on the left of the back and front of a ballot. On the right is what is seen when UV light is shown on the paper of his new high security ballot... a number of watermarks and holograms.



Then, below you can see the secure micro printing that appears in certain places on the ballot, as well as a better photo of the translucent ballot holograms. Finally at the bottom left is the QR Code that citizens can use to be transported to a secure website where their unique ballot ID number is revealed for them to follow the ballot's path through counting.

An additional benefit of the unique ID is that it will ensure a ballot is not counted more than once and it will be exceedingly helpful in the enhanced risk limiting audit we are proposing.



- Translucent Ballot Hologram
- Lower left-hand corner
- Special Wavelength Responsive

UV Light

Regular Light

Secure MICRO PRINT

UV Magnification 3



- **QR Code** is UNIQUE to every ballot. Only the VOTER knows their ballot ID #
- You TRACK YOUR ballot through the entire system to insure YOUR ballot is counted
- Election officials cannot connect the ballot with the voter



Official Ballot - Boleta Oficial
 Official Ballot, General Election, November 3, 2020
 Boleta Oficial, Elección General, 3 de noviembre de 2020
 Group/Precinct: 03 BE SAN PEDRO - 03.01



Your unique ballot ID is: YT4SKN6G

Cost Effective
Ballot Security
Voter Privacy Protected
Public Record Protection

Trust...But Verify

Support BALLOT INTEGRITY
Support VOTER INTEGRITY
Support ELECTION INTEGRITY

How much will this cost?
That's right, 25¢ per ballot



By making every ballot image available to everybody, all the time, we come close to making the forensic audit obsolete....

This is the type of ballot we are strongly recommending for use in Tennessee in every ballot... early voting, absentee and election day voting.

Importantly, these high security ballots can easily go through optical tabulators for self-adjudication. Ballots are ordered with secure spoilage ballot consideration. In the event of a spoiled ballot, the original is killed in the system with the new ballot attached and placed in the adjudicated box.

The ID number will ensure ballots can't be counted more than once and will be invaluable in the post-election mandatory Ballot-Polling Risk Limiting Audit we're recommending.

Another benefit to hand-marked ballots is that they allow for the removal of the Ballot Marking Devices (BMDs) that are proving to be equally risky in the voting process.

The studies emerging concerning the risks of BMDs are stunning. Here are a few of the issues our research has uncovered:

- [BMDs can be hacked, misconfigured or contain malware that alters the ballots or tallies](#),⁹
- [BMD touchscreens can be mis-calibrated causing "vote flipping"](#),¹⁰
- [Studies prove only a small percentage of voters check BMD-generated ballots for errors](#),¹¹
- [BMD accuracy cannot be confirmed by audit](#),¹² and
- [BMDs have a lack of transparency, auditability and produce longer voting wait times](#)¹³.

There are other issues, but these confirm the risks of using BMDs and with citizens 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](#)¹⁴ and [Verified Voting](#)¹⁵ have strongly opposed the purchase and deployment of BMDs.

Some legislators are concerned about the cost of going to this solution, however the option that the Tennessee Voters for Election Integrity is proposing – moving to hand-marked paper ballots that are read by optical scanners – is actually much cheaper than other more elaborate voting systems. [The National Election Defense Coalition agrees.](#)¹⁶

[According to Pew, optical scanners that read paper ballots cost around \\$5,000, but only one -two scanners are needed per polling location in addition to the cost of the paper ballot at an estimated \\$0.35](#)

⁹ <https://www.stat.berkeley.edu/~stark/Preprints/bmd-p19.pdf>

¹⁰ <https://apnews.com/article/ae388fb69d14e5d3619128a591cdc0c4>

¹¹ <https://jhalderm.com/pub/papers/bmd-verifiability-sp20.pdf>

¹² <https://www.stat.berkeley.edu/~stark/Preprints/bmd-p19.pdf>

¹³ <https://www.electiondefense.org/ballot-marking-devices>

¹⁴ <https://www.electiondefense.org/ballot-marking-devices>

¹⁵ <https://verifiedvoting.org/statement-on-ballot-marking-devices-and-risk-limiting-audits/>

¹⁶ <https://www.electiondefense.org/ballot-marking-devices>

[to \\$0.65 each.](#)¹⁷ Finchem's ballot has been estimated to cost \$0.25 per 3million which can be reduced substantially with both the increased order in the State.

Voters have very little confidence in electronic machines. For centuries Americans have safely and securely cast a hand marked paper ballot. Both the ability to use technology that increases the security of each ballot and allows the voter the opportunity to validate their vote is as counted as cast.

Recommendation

[The only way to build back any confidence that citizens may have in their voting system is for BMDs and DREs to be quickly phased out and counties institute a high-security, hand-marked paper ballot to be counted on optical tabulators.](#)¹⁸

Conclusion

Citizens deserve to know that their vote is secure. They have no confidence in the current technology, the lack of transparency of the process, and the inability to determine that their vote was counted as cast. Americans voted by hand though a Civil War, two World Wars, and multiple natural disasters/events. This is a secure doable process that ensures that Election Integrity is a priority in Tennessee.

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¹⁷ <https://tennesseestar.com/2018/08/22/republicans-in-state-senate-did-not-support-bill-to-secure-tennessee-voting-machines-with-paper-ballot-audit-trail/>

¹⁸ <https://www.theatlantic.com/magazine/archive/2017/12/guardian-of-the-vote/544155/>