Gold Standard Elections

An in depth look at the necessity and implementation of the accessibility, security, transparency, and verifiability needed to conduct Gold Standard Elections

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Gold Standard Elections
are Secure, Transparent, Verifiable and Accessible

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I. Summary

Voters' confidence in our elections is at an all-time low. Politicians, election officials, journalists and cybersecurity experts have raised significant concerns about the systems we use for voting. Even more importantly, voters have questions. Instead of answers, questions are often dismissed at best or met with hostility and lawfare at worst. Massive irregularities and inconsistent election results add to the tension. Because the current systems are not accessible, secure, transparent, and verifiable, no one can prove that a breach has not occurred. Voters are deprived of the right to know that their vote was counted, tabulated correctly, and was not diluted by fraudulent votes.

This constitutional republic will not survive if the sole mechanism of choosing representatives has lost credibility with its voters. Given that voters have a right to a trustworthy election system it is incumbent upon all of us to restore that trust.

Repairing the flaws in our election system is a nationwide team project. The authors' goal is to equip everyone with the information they need to implement systems which people can trust. The writing team consists of members from various regions of the United States. This is important because processes and capabilities can vary greatly across locales. It is also important because legislation and administrative rules differ from state to state, and even from county to county within the state. Hundreds of people and thousands of hours of work have granted the authors the clarity and information necessary to produce this document.

This paper offers solutions that transcend experience, politics, parties, and positions. It first proposes a framework for robust metrics, then it outlines the phases of our election process, each of which must achieve suitable standards. Finally, it delivers a roadmap which walks the reader through the crucial elements of sound elections and provides practical ways for the general public, legislators, and election officials to verify objectives have been achieved.

The authors have analyzed the phases of the election process, from voter registration and validation through tabulation and reporting. They identify four cornerstones of election integrity: **security, transparency, verifiability, and accessibility** and deliver compelling strategies to re-engineer these phases through the lens of the four cornerstones. Once refined, each phase, will improve in integrity, and the participants will find the process and the results to be trustworthy and secure. While the authors have established recommended solutions via their exhaustive research, each of the fifty states will implement the necessary modifications based on the context of their own unique laws and situations.

The recommendations herein must not be construed as legal advice. Each stakeholder or representative should seek to understand the legislative and functional framework in which they will implement changes to ensure they achieve the ultimate gold standard.

While this paper evaluates and offers proposals to improve the entire election infrastructure, it even more deeply probes whether hand-counting is a viable option to count ballots. The call for hand-counting of hand-marked paper ballots has become popular—but what does it really mean? Is it a reasonable solution? The authors thoroughly scrutinize this approach.

Consider that our country relied exclusively on hand-counting ballots for well over 150 years. The reader will learn that hand-counting of hand-marked paper ballots is absolutely a viable solution for today and is

the only method that may be conducted in a manner that is fully accessible, secure, transparent, and verifiable.

Election integrity reform advocates have demonstrated that such an approach is not only entirely possible, but also economical, secure, and transparent. While hand counting was conducted decades ago, it is still relevant. The authors even propose enhancements that will improve its mechanics. Counting hand-marked paper ballots manually has stood the test of time as the hallmark for transparency and accuracy. In fact, hand counting is frequently used to give validity to machine results. Returning to this proven practice will not only boost confidence in our elections but will also save counties and municipalities millions of dollars. Citizens, legislators and local decision-making audiences will all benefit from the reduced costs. *(See Appendix Exhibit 1 Cost Savings SD Machine vs Hand Count)*

While the authors are enthusiastic about their recommendations, absolute perfection—that is, no mistakes committed anywhere by anyone is unlikely. Rather, the objective is to make practical reforms to the currently opaque, complex process rendering it more reliable, trustworthy and simple. Thus, when irregularities do occur, election officials can readily detect and remedy them. Currently when mistakes or errors occur, they are limited in their ability to adequately correct them. The proposed reforms create an election system that is so robust in its security, transparency, verifiability, and accessibility as to enable workers to readily resolve potential issues.

Please note that convenience will not be listed among the most desirable attributes of the Gold Standard for elections; convenience should never be prioritized over security or transparency. “Easy to vote and hard to cheat” is a deceptive slogan that sells convenience over honesty. Every eligible elector must have access to cast their ballot. But we must also take care that we do not disenfranchise the many by making it overly easy for a few. Qualified electors deserve honest, not casual, votes. “Safe and secure” is another deceptive slogan which actually means that systems are unfortunately “safe from investigation and the legal discovery process” and “secure from review of key elements” such as audit reports or the computer programming.

Ultimately, the authors seek to dispel the myth that it is impossible to conduct elections in which people can have confidence. Elections must transcend personal views, politics, corruption, and demographics. They should instead be the great equalizer, in which each legal vote carries the same weight as another.

When election officials, state legislators, county employees, and concerned citizens unite to deploy solutions for the four phases of the election process, they in turn restore the peoples’ trust; the outcome will satisfy the four cornerstones of Gold Standard Elections, and the combined processes will be robust. To fully realize the potential each of the cornerstones embodies:

- All phases of the election process are open and transparent to the public with bipartisan and/or impartial participation and oversight
- Poll workers verify voters through proof of citizenship and photo ID
- Local election officials maintain up-to-date voter rolls
- Poll workers log and validate voters via paper poll books
- States return to one day voting in person at their precinct, except for UOCAVA (Uniformed and Overseas Citizens Absentee Voting Act) voters
- Laws minimize absentee and mail in voting

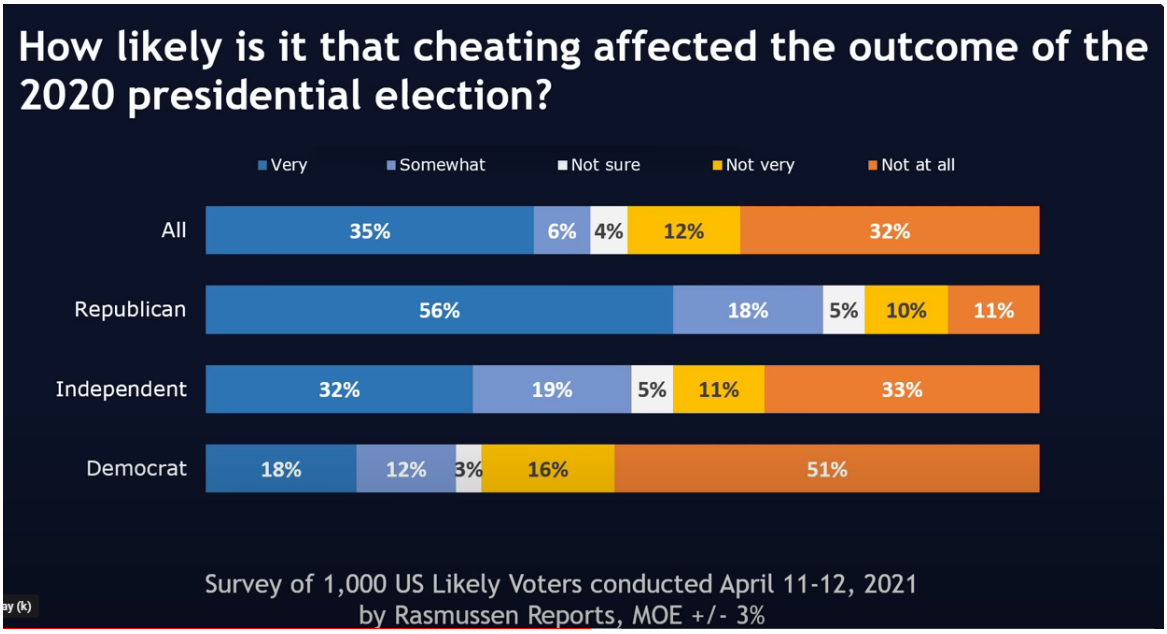
- Where possible, states institute 100% hand-counting of hand-marked ballots in public with bipartisan representation, with both recorded and livestream video capabilities
- Election results are publicly reported first to the precinct, then the county, then the state
- The public may gain access to election records 48 hours before any canvassing certification

II. Introduction/Background

Voters in America have lost trust in our electronic voting system. But it is not only they who have spoken out on this bipartisan issue. Candidates, legislators, members, and voters from both major national political parties have complained about irregularities, suspected fraud, and foreign intrusion when their candidate was not victorious in an election. Many of these questions have been justified.

From the perspective of voters, national polling data reflects this growing trend. A Rasmussen poll done in April/May 2023[1] shows that 62% of likely United States (US) voters believe that there was cheating in the 2020 and 2022 elections, and in Rasmussen polls conducted in September and November of 2023[2], 56% of likely voters in the US believe that cheating will affect the outcome of the next presidential election. Moreover, these polling results have been rising across all parties since the 2020 election. In a CNN poll conducted by SSRS in 2022[3], Americans said they lacked confidence that US elections reflected the will of the people. Forty eight percent of Americans said they think it is at least somewhat likely that, in the next few years, some individuals involved in the electoral process and elected officials will successfully overturn the results of a US election since their party did not win. Does such a conclusion, from almost half of those polled, suggest much confidence in the election process?

This chart below illustrates the Rasmussen poll from April '22 in the chart below-Figure 1



https://www.youtube.com/watch?v=-MfUif3sQgw&t=21s[1]

The impact of losing confidence in election results cannot be understated. When security, transparency, verifiability, and accessibility have been degraded, it is not a mystery why trust has been lost.

Could it now be time to review the rushed decision that occurred post Gore v Bush when the Help America Vote Act (HAVA)[4] was implemented? Did we as a nation really do the right thing? Clint Curtis, former computer programmer who wrote the first computer-based tabulation prototype and vote flipping algorithm, has doubts.[5]

Before 2004, cyber experts like Clint Curtis via testimony to Congress[5] and Avi Rubin[6] were warning about the vulnerabilities within our voting system and the very real possibility that parts or the whole could be compromised, with catastrophic consequences. While some legislators heard them and shared their concern, the overwhelming and ultimate response was to do little or nothing to eliminate these vulnerabilities. Years passed and the electronic infrastructure expanded.

For example, U.S. Senator Amy Klobuchar D-MN issued the following statement on reports that Russians hacked election infrastructure in 39 states on June 13, 2017:

> "Free and fair elections are the cornerstone of our democracy. It is clear that a foreign adversary attempted to undermine our election – and now we are learning that as many as 39 states may have been hit by Russian hackers. This is unacceptable. As Ranking Member of the Senate Rules Committee, I am renewing my call for a classified briefing for the Committee on the full extent of Russian interference in U.S. election systems. As much information as possible should also be made publicly available. We need to know exactly what happened to know how to best strengthen our election infrastructure and prevent it from ever happening again."[7]

Although she does not use this terminology, Senator Klobuchar refers to the possibility of election interference, if not stolen elections. Stolen elections come from strong motives.

Cyber experts across the nation who have invested the time to fully understand the election ecosystem agree that electronic voting machines are vulnerable to intrusion and manipulation by both domestic and foreign nefarious actors. In addition, basic industry standards such as upgrades to security patches and antivirus software are often not implemented. To compound this, computer systems are prone to incidences of random reboots, errors and malfunctions. The primary election equipment vendors, such as Dominion, Election Systems and Software (ES&S) and Hart InterCivic, are owned by closely held private equity companies whose identity is often unknown. Their systems as well as other third-party contractors not only lack transparency but also amount to centralized control over our election processes and data collection, tabulation, and transmission. To support this conclusion, Senator Klobuchar has also stated in an interview with Meet the Press on August 5th, 2018, "I am very concerned that you could have a hack that finally went through. You have 21 states that were hacked into, and they didn't find out about it for a year."[8] Meanwhile, local election officials, who are responsible for operating these voting machines and electronic equipment, have little to no technical experience or expertise to recognize simple mistakes or internal manipulation.

The entire election process is complex, messy, non-transparent, and no longer controlled at the local level. The administrative process and many of the ancillary processes have been mostly removed from local election officials whom voters are most likely to trust and have been outsourced to third party

vendors who are not subject to Freedom of Information requests. This creates a dynamic in which voters and local election officials are asked to trust multi-billion-dollar companies to record, track, count, and protect their vote. It is no wonder that confidence in the electronic voting systems is eroding and completely undermining the faith in the democratic process of our elections in a free Republic.

Can we truly say we are free if our vote is not counted accurately and is diluted by fraudulent and illegal votes? As the Federal Prosecution of Election Offenses, *Eighth Edition* states:

> Our constitutional system of representative government only works when the worth of honest ballots is not diluted by invalid ballots procured by corruption. As the Supreme Court stated in a case upholding federal convictions for ballot box stuffing: "Every voter in a federal …election, … whether he votes for a candidate with little chance of winning or for one with little chance of losing, has a right under the Constitution to have his vote fairly counted, without its being distorted by fraudulently cast votes." Anderson v. United States, 417 U.S. 211, 227 (1974). When the election process is corrupted, democracy is jeopardized. Accordingly, the effective prosecution of corruption of the election process is a significant federal law enforcement priority.[9]

Perhaps the only truly secure and transparent way to arrive at accurate election results that everyone can trust is to remove the electronic election machines, remove the electronic poll books, and return to hand-counted, hand-marked paper ballots that have not been diluted by fraudulent or illegal votes, many of which have historically come through the absentee process through the mail, unsecure drop boxes, and unverified signatures.

A modernized version of the hand-counting process is a necessary *part* of a solution that provides end-to-end trustworthy elections, but it is not the only component to consider. These components will be explored in Section IV.

III. *Current Situation*

We have already demonstrated a lack of security, transparency, verifiability, and accessibility in the current election process, which is a true "BLACK-BOX" operation with multiple physical components, phases and people involved. There are only four things we know for sure at the conclusion of an election, which in recent years has often been a drawn-out affair:

1. There was a voting period where ballots were cast
2. Some number of people cast votes
3. Winners were declared
4. The public lacks evidence to verify #1-3

In many states, there are existing laws that mandate that the counting of ballots shall be public. This high bar of transparency has been under assault since the introduction of electronic election machines into our election process.

Dallas County Election Judge since 2010, Beth Biesel, recently commented, "Oddly enough, the electronic tabulation machines are not held to the same gold standard as hand counting.**"**

In the current computer-based election systems, transparency requires at a minimum, public access to:

1. Logic and accuracy tests
2. Cast vote records
3. Ballot images
4. Log files
5. Source code review and validations

Unfortunately, these are not being made available to the public and even if they are, they have major issues including:

1. Logic and accuracy tests aren't robust enough to provide confidence that the machines are accurate, nor can they prove that they will always be accurate under operating conditions other than when in test mode.
2. Cast Vote Records (CVRs) can be manipulated.
3. Ballot images could be manipulated (and the cast vote records are recording data based on the ballot image, not the actual ballot).
4. Log files can be manipulated or turned off or limited to a very small size before being overwritten and don't always reflect activity.
5. Source code review is nearly non-existent because the primary vendors can avoid transparency through proprietary escape clauses. Additionally, so-called "changes" to the source code could occur via an update to the code via a "patch" or "trusted build" without full disclosure of what is being altered.

In short, we can't prove without a doubt that our election systems are secure and reliable. There is no third-party audit or enforcement to confirm that the equipment is running as certified.

As Rick Weible, a Computer Cyber Expert with 28 years of experience says, "Transparency is the inoculation to all conspiracy theories. When election officials make statements that they do not know what the ballot images or cast vote records are and they fail to release them for public inspection, all trust is immediately lost, and an immediate return to hand counting with public bi-partisan oversight is required."

Another major concern with our current election system is early voting, whether it be in person or via mail. Early voting poll data can potentially be modeled to predict not only turnout but potential results via sophisticated algorithms. If nefarious actors have access to the tabulator data via hacking or other methods (internal hidden modems/flash drives) they can "fine tune" algorithms to flip or weight votes in favor of a certain candidate. Professor Halderman demonstrates just how easy this is in a GA courtroom for the Curling vs. Raffensberger lawsuit.[10]

The cost and issue of recruiting ample and capable poll workers for the duration of early voting is also of concern. Cost benefit analysis of early voting centers should be assessed since total turnout may be lower than with one day of voting. A study in 2017 by the Heritage Foundation came to the conclusion that the disadvantages of early voting outweighed the advantages.[10] Regarding mail in and absentee voting, chain of custody issues abound and voters are reliant on subjective signature verification. A longer voting period gives potential bad actors more data and more time intervals to act. To secure our elections, it is recommended that early voting and absentee voting be minimized.

In summary, we have an election system that can be compromised at every stage of the process. Set aside the propagandized debate of the issue and consider the concerns if this was any other sector. Cyber experts across the nation and abroad say that there is no doubt that our electronic election system has been exposed to compromise for years and no one can prove that it has not been and there have been no remedies or solutions to these issues to date. Every electronic system is vulnerable, whether it is a major industry, large enterprise, banking systems, government entity, military operation, or small personal home computer system. How can we delegate our precious valuable vote, our voice, and the election of our leaders to a process that injects additional avenues for manipulation of our elections?

IV. Voter Distrust: Major concerns with the current election system

The following is a summary of the major vulnerabilities and attack surfaces leading to mistrust of electronic voting systems. While this list is not exhaustive, we will address many of these issues in our recommendations and solutions section to minimize their impact by recommending solutions that are secure, transparent, verifiable, and accessible. The role of election officials should be to assist the citizens in conducting *their* elections.

Overall Vulnerabilities

- Substantive procedural changes occur(ed) with no legislative oversight. For example, the Delaware Supreme Court ultimately found same day registration unconstitutional[12] and the Wisconsin Supreme Court declared absentee ballot drop boxes illegal.[13]
- Changes to the election law have compromised the safety of our elections (Early voting, mail in ballots, Ranked Choice Voting, drop boxes)
- Lack of transparency—denial of access to election records/reports and denial of record request fulfillment which fuels distrust. In South Carolina and South Dakota, for example, citizens were denied Cast Vote Records and audit logs.
- Federal agencies have access to county voting equipment via Albert Sensors which continually monitor activity; states are supposed to control their elections without the overreach of the federal government; Albert Sensors provide a door for vulnerability during the voting process.[14]
- Poor, non-existent and/or ineffective chain of custody resulting in missing ballots or equipment[15]
- Lack of or poor voter/signature verification[16]
- Inaccurate voter rolls with ineligible domiciles/electors; For example, the Wisconsin database of voters had 7.1M registrants despite the fact that the state only has 4M adults[17]
- Ballots in which voters can't verify their votes (where barcodes or QR codes are employed for tabulators to read to count ballots)
- Billion-dollar vendors have total control of our process; at present we must use:
    - Vendor paper to make our ballots
    - Vendor programs for the election day software
    - BMDs (Ballot Marking Devices) to print ballot codes that we can't confirm reflects our choices
    - Scanners to scan our ballots
    - Tabulators to tabulate all votes
    - Programmed USB sticks to compile votes for county

The bigger issue is that the citizens no longer have control of their election systems. If the citizens don't have control of their own elections the system should not be used. The role of Election Officials should be to ASSIST the CITIZENS IN OPERATING THEIR ELECTIONS.

Voting Machine Vulnerabilities

- IT experts are not allowed access to the source code in most states.[18]
- The source code is said to be 4M lines of code which seems excessive for the simple function of counting dots on a ballot.
- Most of our machines don't meet today's standards for corporate/government security; they are only certified to 2005 standards by the EAC-Election Assistance Commission[19];
    - Even 2021 Voluntary standards (VVSG 2.0) are not stringent enough. Older equipment is not being decertified when it does not align with the new standards, even when software companies no longer provide support, updates or security patches
- Networks and electronic systems can be manipulated by individuals with little expertise and would be undetectable to persons without these skills.
- Software security updates are not done on a regular basis leaving systems vulnerable; this is how many are deceived as software "updates" can be used to manipulate systems and avoid detection. These are often described as 'de minimis updates.'

While the above list is not exhaustive, we will address many of these issues with specific solutions to minimize their impact. A "Risk and Remediation Matrix" is provided in the Appendix, "Exhibit 2" with a more comprehensive list of potential risks and possible remedial alternatives to the current electronic election process.

V. The Gold Standard: Four Cornerstones of Safe Elections

The restoration of trust in our election system must be a priority and it must be earned. We do not command people to trust and expect them to obey. That is not how a constitutional republic works. Instead, we must conduct elections in a way that answers all questions and gives voters confidence that the election was conducted properly. This can be done through the adaptation of the Gold Standard. The Gold Standard is comprised of the four cornerstones principles for elections and each of the cornerstones is applied to each of the four pillars of the election process. The four pillars will be addressed in Section VII. We consider this to be the Gold Standard for elections, creating an environment which minimizes vulnerabilities and enables remedial action should a mistake occur.

Elections must be *secure* – The election ecosystem must not have any capability of being connected to vulnerable networks. Security also entails appropriate locks, seals, surveillance, inventory management, and tight chain of custody. Every phase of the process must be documented to demonstrates that all proper security protocols have been met. The transfer of election equipment and materials should be done by bipartisan teams kept under surveillance. Stringent protocols for access to election data and equipment should be followed.

Elections must be *transparent* – While voting must be done in private, every other part of the election process must be done in public. "In public" includes not only in full view of those present at the polling location, but public documentation must be produced in a way that the public can review the process at a later time. This includes video recordings and public posting with all security documents uploaded.

All phases and reports for elections should be fully observable by the citizens. These principles should be incorporated in state laws across the country. All ballot counting and tallying should be recorded, and the video should be stored as an election record on the county's website according to state law. Anyone, anytime, anywhere must be able to review the video of a particular race or of an entire election if they so choose so that the results of the elections can be easily verified no later than 48 hours after the polls close. No public information requests should be required to view the elections results.

Election*s* must *be verifiable* – Accuracy of the vote is of utmost importance. When voters can verify that the votes are correctly counted, this increases their confidence in the outcome. The chain of custody documentation must be timely, legitimate, and verified. Reconciliation of votes and voters must be done in a fully transparent way. Again, anyone, anytime, anywhere must be able to review the video of a particular race or of an entire election if they so choose so that the results of the elections can be easily confirmed or corrected no later than 48 hours after the polls close. Public Information Requests should *not* be required to view the elections results. Ideally, all this information should be free to the voters. If the cornerstones of accessibility, transparency, and security are met then citizens will be able to verify that the election was called correctly.

Elections must be accessible for all legal voters - Election laws must make provisions for ADA, military, and overseas voters to ensure accessibility for those who are unable to participate in person on election day, and special circumstance absentee voters in a way that mitigates security issues to every possible extent. As stated above, accessibility to reports by the public for auditing purposes is also of utmost importance, for example, voter rolls, poll books, chain of custody documentation, registration documentation just to name a few.

To meet the Gold Standard for elections, each of these cornerstones must be applied to each of the pillars of the election process—voter registration, voter validation, tabulation, election reporting. These four pillars will be covered in-depth below.

VI. Hand-counted, hand-marked ballot election system

The four cornerstones that determine the Gold Standard can be achieved with a hand-counted, hand-marked paper ballot election system. Hand-counting is the long-standing bedrock of trust for reliable elections. We need to return to the basics. A simple system that is local (precinct-based), in which the voter casts his vote in secret by hand-marking a paper ballot with bipartisan teams counting these ballots in public, is the most preferred solution. Doing so with a live video feed (only after the polls have closed) provides the ultimate transparency and accessibility.

This classic process with a few modern twists saves time and money and cements the confidence that our elections are accurate and trustworthy. In order for this paper balloting system to work It is critical that precinct sizes are small—no larger than 1,500 registrants. Turnout for most primaries is low, around 20-30%, and general elections around 50%. Even a major presidential election would expect no more than a 60-65% turnout. Given these numbers, hand-counting is realistically accomplished and would reduce costs dramatically in the long run.

Pros/cons of a hand-marked, hand-counted "paper ballot" system

Pros	Cons
Reduces the threat of connectivity of any kind—internet, cell, modem, etc.	Some people may prefer the machines
Less complex	May need to recruit more people as counting can be tedious if done for hours on end without breaks
Saves time—no prep, testing, programming, maintenance of machines	
Anyone can understand and verify the process.	
Allows citizens to count their votes, instead of private companies or the government counting their votes	
Removes an entire slate of uncontrolled vulnerabilities currently associated within our existing systems	
Hand-counting statutes require fewer updates due to technological changes	
Results easily audited/verified—totally transparent (can replay video)	
Removes the possibility of programming and reporting mistakes	
Gives power back to citizens and officials at the local level	
No interruptions to the voting process compared to electronic systems which are vulnerable to down machines, technical glitches, or power outages	
Counting can be done in same location votes are cast	
Complex user manuals and technicians not required	

Below we summarize our recommended methods, costs, materials, and results for hand-marked, hand-counted paper ballot tests that were conducted around the United States over the past year. There were many lessons learned and we are confident that the methods and procedures that we recommend will be enlightening and informative for election officials and voters alike.

Multiple tests were conducted to best understand how to optimize efficiency of the hand-counting process. Two major methods were investigated: 1) the hand count tally method using paper tally sheets, and 2) the "calculator method." This paper primarily focuses on the tally method. See *Exhibit 9 Summary of Test Findings* for a summary of the various tests conducted for both methods over the last year.

A. The Tally Method

for more detailed info see https://uscase.org/

The tally method described below was conducted with 4-person teams using mainly paper, pens, and people. Test volunteers were able to consistently count each race in 50 ballot batches in roughly 2 minutes. Further, a pilot test with a total of 250 ballots was conducted with 11 races and all were successfully counted in roughly 2 and a half hours. We estimate that if precincts are kept to a maximum of 1,500 registrants and turnout is approximately 65% or roughly 1,000 ballots, 3 teams could count the precinct in approximately 3 hours, including breaks. Total costs are far less than purchasing and maintaining the electronic voting systems. (*See Appendix Exhibit 1 SD Machine vs Hand Count*.) Most importantly, if the entire process is recorded, the people can fully observe, verify, and confirm that their vote count was legitimate.

Methodology

Each team consists of four people per station. The more people, the more stations, and the quicker one can count the ballots. For the room setup, comfort and space is key; having a large enough table for four people to sit on comfortable cushioned chairs, proper lighting, and a relatively quiet atmosphere helps enhance productivity. Teams should be kept as far apart as possible so that the talliers (persons who keep a tally of the votes) can clearly hear the callers (persons who call out the name of the vote recipient).

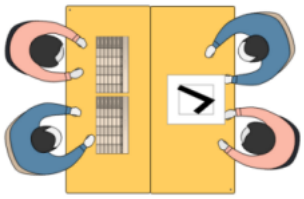
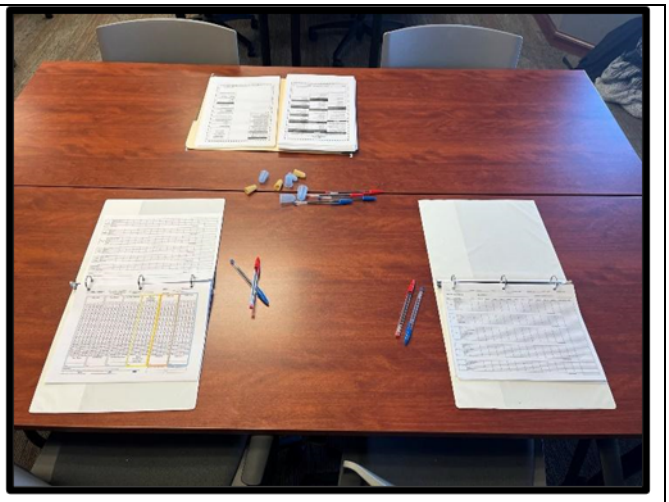


Image from *Missouri Elections: Return to Hand Counting* by Linda Rantz, Copyright Linda Rantz, Used with Permission, https://handcounting.com/eManual



Ideally there should be four election judges or clerks per table; 2 from each party. The callers- 2 representatives, one from each party review the ballots and take turns calling out the name of the winner of each race on the ballot.

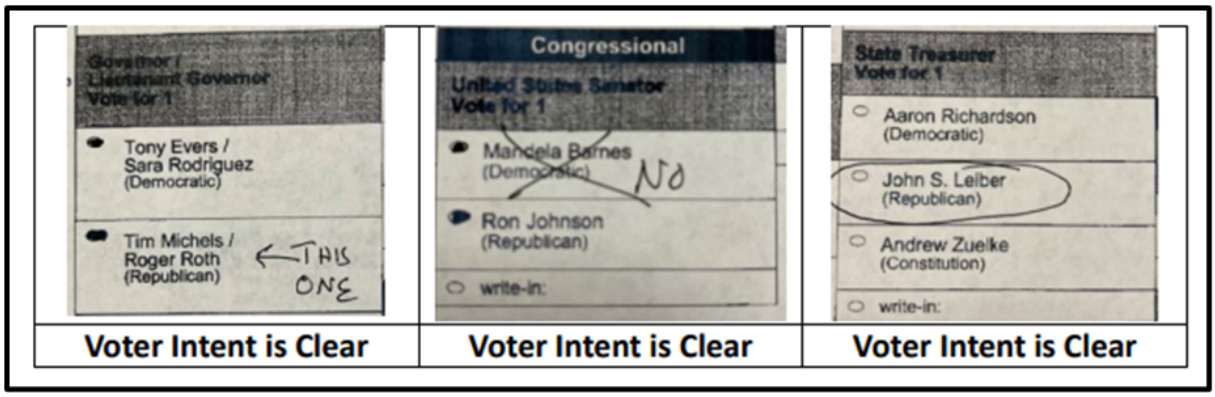
The other two election judges/election workers, from each party, will mark their tally sheets with a slash for the candidate receiving the vote.

Note: that it is recommended that each race is called separately. So, work through all the ballots for one race before moving to the next. This was the most efficient method.

Voter Intent is a big deal when assessing the actual vote on a ballot. Depending on state laws and rules, this is handled differently across the country.

An acceptable distinguishing mark for a vote can be defined in three ways – 1) a mark in the oval adjacent to the name; 2) a mark beside the name/referendum; or 3) a circled preference.

Here are some examples of voter intent the machines would miss.

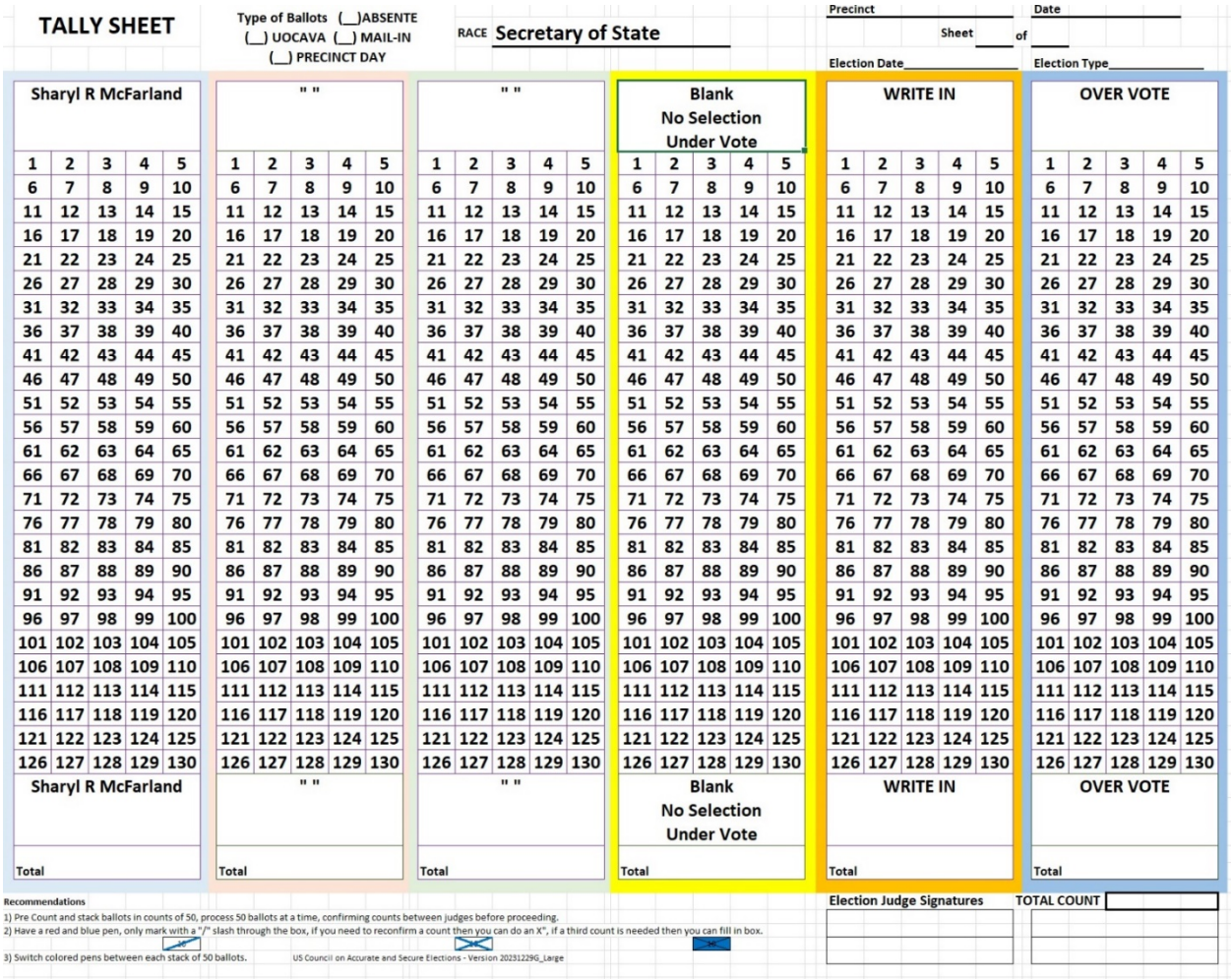


Tally Method Steps:

1) Fill out the election information, the seal number, and the judge/poll worker information in the "Official Election Results Workbook" (*see Appendix Exhibit 3*). *Note ballots should already be pre-sorted by precinct and perhaps ballot style*.

2) Count the number of ballots, in the container or box provided, stacking them in groups of 50, and then enter the total amount of ballots received in the "Official Election Results Workbook"; for an example of a completed worksheet, see *Appendix Exhibit 6 Example Totals Worksheet*

3) Enter the races and candidates in the excel spreadsheet provided (*Appendix Exhibit 4 Excel Spreadsheet to Generate Tally Sheets*) so that the tally sheets can be printed out prior to counting; note that there is a section for Under Vote (no vote was marked), Over Vote (too many votes were marked), and "Write in." For an example of a completed tally sheet, See *Appendix Exhibit 5 Treasurer Race for Dodge County WI 2022*



TALLY SHEET

Type of Ballots (__)ABSENTE (__) UOCAVA (__) MAIL-IN (__) PRECINCT DAY

RACE **Secretary of State**

Precinct _____ Sheet ___ of ___ Date _____

Election Date _____ Election Type _____

Sharyl R McFarland					" "					" "					Blank No Selection Under Vote					WRITE IN					OVER VOTE				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
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116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120
121	122	123	124	125	121	122	123	124	125	121	122	123	124	125	121	122	123	124	125	121	122	123	124	125	121	122	123	124	125
126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130
Sharyl R McFarland					" "					" "					Blank No Selection Under Vote					WRITE IN					OVER VOTE				
Total					Total					Total					Total					Total					Total				

Recommendations

1) Pre Count and stack ballots in counts of 50, process 50 ballots at a time, confirming counts between judges before proceeding.

2) Have a red and blue pen, only mark with a "/" slash through the box, if you need to reconfirm a count then you can do an "X", if a third count is needed then you can fill in box.

3) Switch colored pens between each stack of 50 ballots.

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Election Judge Signatures

TOTAL COUNT

4) Counting is conducted one race at a time. When the two judges review the ballots, on one side of the table, one will call out the office or issue and then the winner of the race and keep proceeding through all of the ballots for that race. The other two judges will put a slash mark on the Tally Sheet on the first available number for that candidate. They should both start with one particular color, say a blue pen for the first 50, then switch to another color, say for example a red pen for the next 50, and then continue to alternate blue/red color pens for each set of 50.

https://www.youtube.com/watch?v=Y2WCL1fcEus

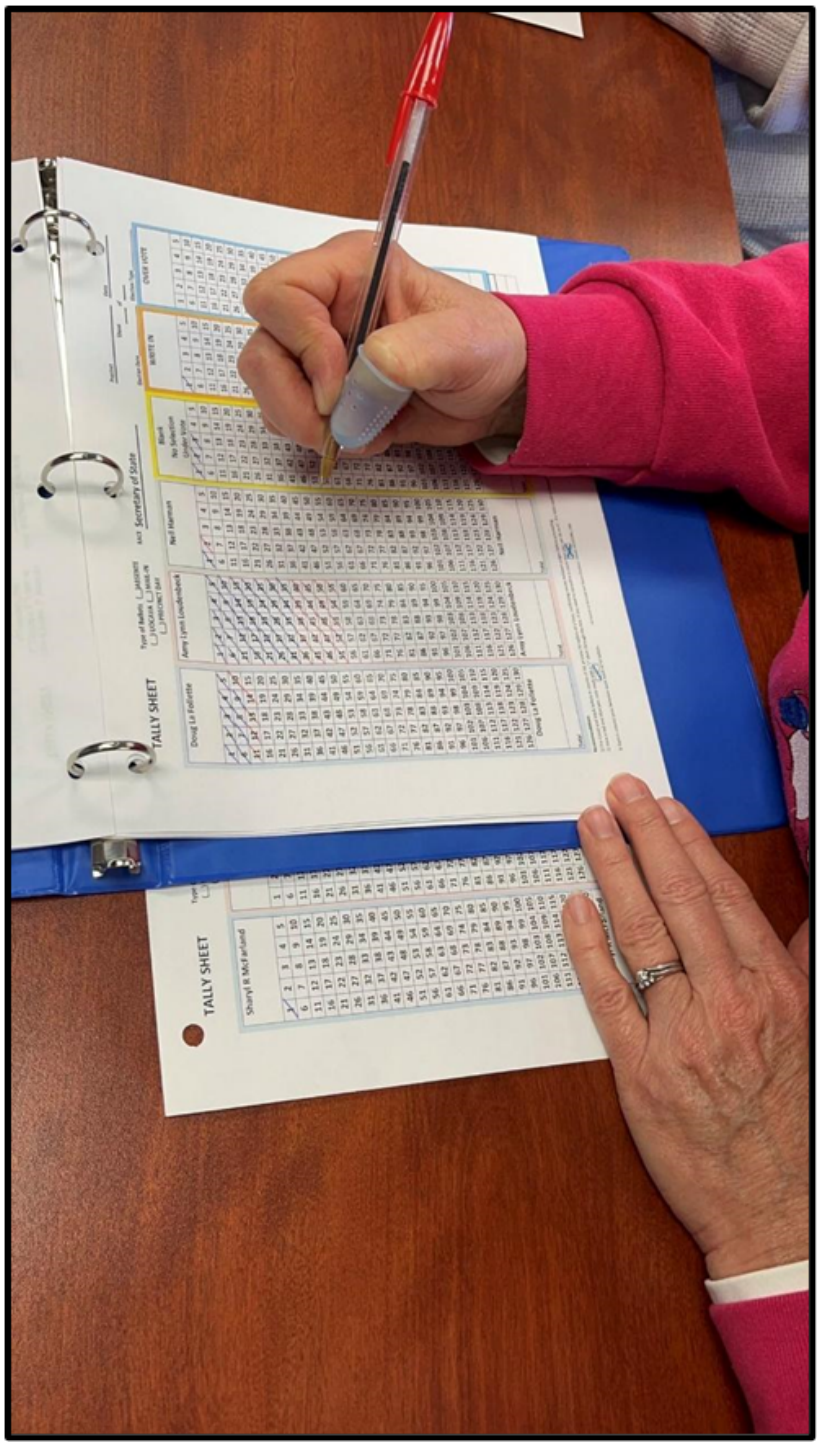
5) Once the first 50 ballots are reviewed and tallied, the judges with the Tally Sheets should compare numbers/totals. If there are any discrepancies, re-count the race from those ballots, then make any corrections as needed. Instead of using a slash mark, an X can be made through the current race tally that is being recounted. If a third count is needed for the same race, fill in the box completely with either color pen. Ink color choice for a third recount can be chosen by each team to enhance clarity in reporting.

Note: Multiple tally sheets may be needed per race. So, if the talliers start to run out of room on the sheet, ***both talliers*** should move to the next tally sheet. Totals will be reconciled across all sheets at the end of the counting for that race. Sheets should be numbered consecutively and consistently between talliers.

6) Once done with the counting of the ballots, write the totals for each race in the boxes at the bottom of the page for each Tally Sheet, then add the totals from the boxes of the Tally Sheet races together and then record grand totals on the “Official Election Results Workbook”.

7) For each race, start with a set of new Tally Sheets. Note: for ease of counting and to save time, have several copies of the tally sheet for each race based on the number of ballots you are counting sequentially placed in the binder with the “Official Results Worksheet” at the back of these sheets. This will allow the counters to move quickly from batch to batch and race to race. For races that require 2 tally sheets due to the number of candidates you can place them beside each other while tallying.

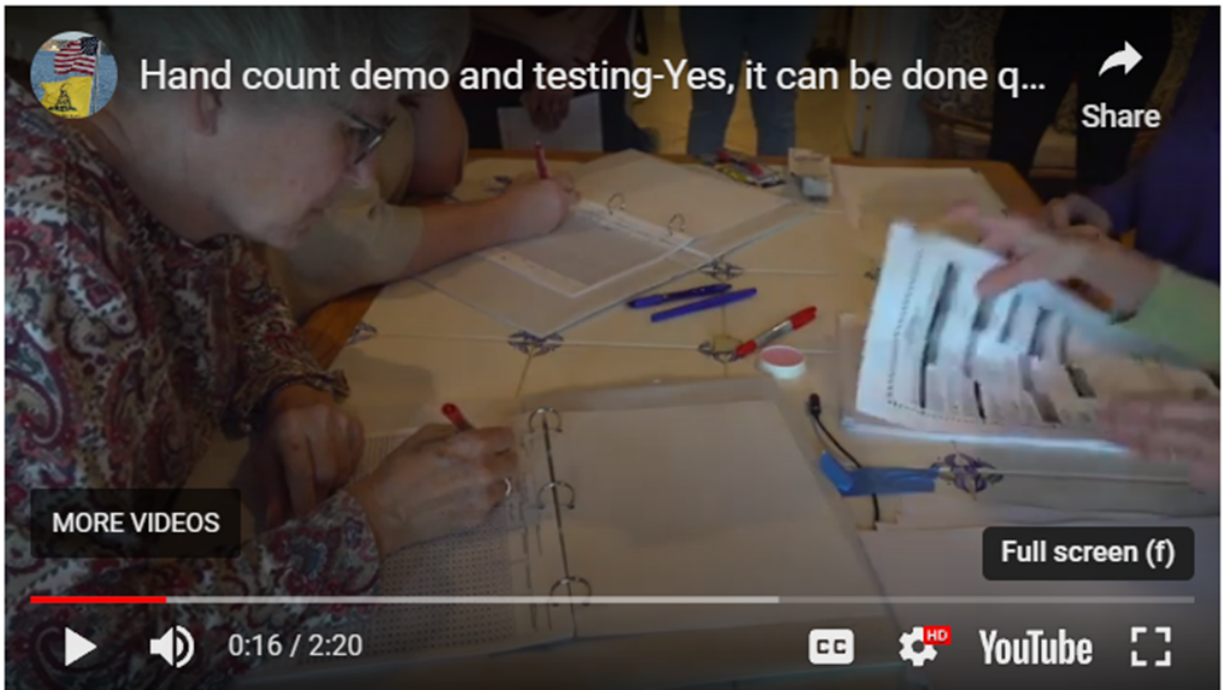
See Exhibit 5 Example Treasurer Race for Dodge County WI 2022 and Exhibit 6 Example Totals Sheet



8) Talliers and the poll clerk/judge sign the Tally Sheets and the "Official Election Results Workbook."

9) Follow your state's additional instructions for placing the materials in the secure box or container provided with a new seal that you would document for chain of custody reasons.

Expected timing: After several trials to optimize the process we found that it takes about 2 minutes to count each batch of 50 ballots. We were consistently able to count 250 ballots in roughly 2.5 hours with one team of 4 people. The following are some quick videos that demonstrates our method:



Click here to watch: https://youtu.be/sMf37ehFzgs

Materials:
It is recommended to have the following items:

1) Gel pens with at least 3 colors—have multiple pens on hand in case some run out of ink
2) 2 – 3 Ring Binders – 1" wide, per station (place tally sheets in binder)
3) Silicone fingertips mixed sizes, surgical gloves or SORTKWIK fingertip moistener to aid in flipping ballots or tally sheets
4) Pre-Printed Tally Sheets in Color
5) 2 Pre-Printed "Official Election Results Workbooks" – each for box and auditor
6) Cameras, laptops, and tripods to video record ballots and
7) overall workspace with comfortable chairs and large enough desk to fit the team.

Here is a helpful video that reviews all the materials:
https://www.youtube.com/watch?v=Ba6FYAxshYw&t=7s


BIC
Cristal
Xtra Smooth
BIC
Cristal
Xtra Smooth
MEDIUM

B. The Calculator Method-

For more detailed information on this method see handcountusa.com

While hand counting ballots with paper and pen on a Tally Sheet has been a longstanding, acceptable method for counting ballots, other methods have emerged that may also offer transparency, verifiability, security, and accuracy and allow every citizen to personally verify that their ballot is counted correctly.

One such method is the use of hand counting calculators that are limited to the functionality of adding one or subtracting one when the person doing the counting presses the button on the calculator. The calculator includes an LED display that shows the number of votes when the hand counting person presses the buttons associated with the vote selection.

The term “calculator” was chosen because of its similarity to traditional calculators which add, subtract, multiply, and divide. Both types of calculators have clear functionality. Clearly, the hand count calculator has much less functionality than a 4-function calculator. Like traditional calculators, an LED display shows the numbers when a plus one or minus one button is pushed. The hand count calculator does not need to be certified because it is not a voting system.

The two LED displays on the hand count calculators must be large enough so that every citizen can view and count the votes themselves from a video recording that would be posted on the county election department’s website the day after the election. The video recording is made by two high resolution cameras. Each of the two cameras are suspended above the calculator stations and the ballots so that the citizens may have 100% transparency and trust of the election results. One camera focuses solely on the ballot while the other focuses on the entire counting station. Room cameras are recommended but not required. The use of a video recording which documents and memorializes the counting process allows anyone, anytime, and anywhere to recount the entire election or a particular race for themselves. This level of transparency, verifiability, and security is exceptional. Minimizing the opportunity to cheat and/or maximizing the opportunity to correct an honest mistake with the video cameras increases vote count accuracy and, most importantly, TRUST in the election results.

After numerous tests and election simulations, the calculators offer a remarkable degree of scalability and efficiency. The throughput rate (man-hours per ballot or race) is impressive for many reasons. Each station or counting team only requires two people, leaving little to no wasted downtime during a counting session. Counting by pairs (candidates, under-votes, over-votes, propositions etc.) simplifies the process which allows the counting people to move through the selections faster. Pushing a

button seems to be faster than making a tally mark or dot on a piece of paper; however, the speed can be affected by external factors that are common to all methods (dexterity, distractions, endurance).

The hand count calculators offer an additional advantage to increasing transparency and verifiability and security by reconciling the vote count in two separate ways for each count run and each race. The ultimate reconciliation is with the camera recording for the public to view anytime, anywhere, at no cost to the individual viewer.

Any attempts to manipulate the vote on the video recording would be extremely difficult, almost impossible, and even if it could be done, the paper result would contradict the result, creating a need to recount. Any attempts to manipulate the vote result by the people pushing the calculator buttons would be detected during the reconciliation processes or by the video camera viewers. This allows any candidate or interested party to independently verify the election without the cost of a recount or the sometimes-difficult task of acquiring information from election officials. This will provide the maximum trust in our elections. Note that this method also requires fewer people than the tally method: two people rather than four people.

See Exhibit 11 – Video Demonstration of the Calculator Method

VII. The Four Phases of the Election Process: Recommendations to attain the Gold Standard

While we highlighted the method for hand-counting hand-marked ballots above, the election process has four phases. The four cornerstones of secure elections must be optimized for all of these phases to attain the gold standard for secure elections. Our recommended solutions below address each phase with specific recommendations. The four phases are:

1. Voter Registration: controls who and how many ballots are issued
2. Voter Validation: controls the legitimacy of ballots eligible for tabulation
3. Vote Tabulation: controls when/where/how the votes are counted
4. Election Night Results Reporting: controls what results are ultimately reported and certified in a timely manner.

A. Phase 1. Voter Registration

For voter registration to meet the four cornerstones of safe elections, we recommend the following:

SECURE: All states should withdraw from ERIC, BPro, or any third-party companies who claim to perform voter registration database maintenance, as these entities share data with NGOs or Non-Governmental Organizations. Responsibility for maintenance of or changes to the voter registration database should be internal to the county auditors or Boards of Elections only. The state-run system can be cross-referenced with the county's voter registration database. Voter registration should ONLY be done in-person at the county election office or by a Deputy Voter Registrar in person on a sworn affidavit application. It is nearly impossible to verify and secure a registration if other agencies like the Department of Motor Vehicles are allowed to connect and transfer data electronically with voter registration databases.

TRANSPARENT: All voter rolls must be free to the public and published online. Information that could be used for identity theft, such as social security numbers (SSN) must not be disclosed although registrant Date of Birth (DOB) and address must be included so that thorough and accurate voter roll analysis can be done by the public.

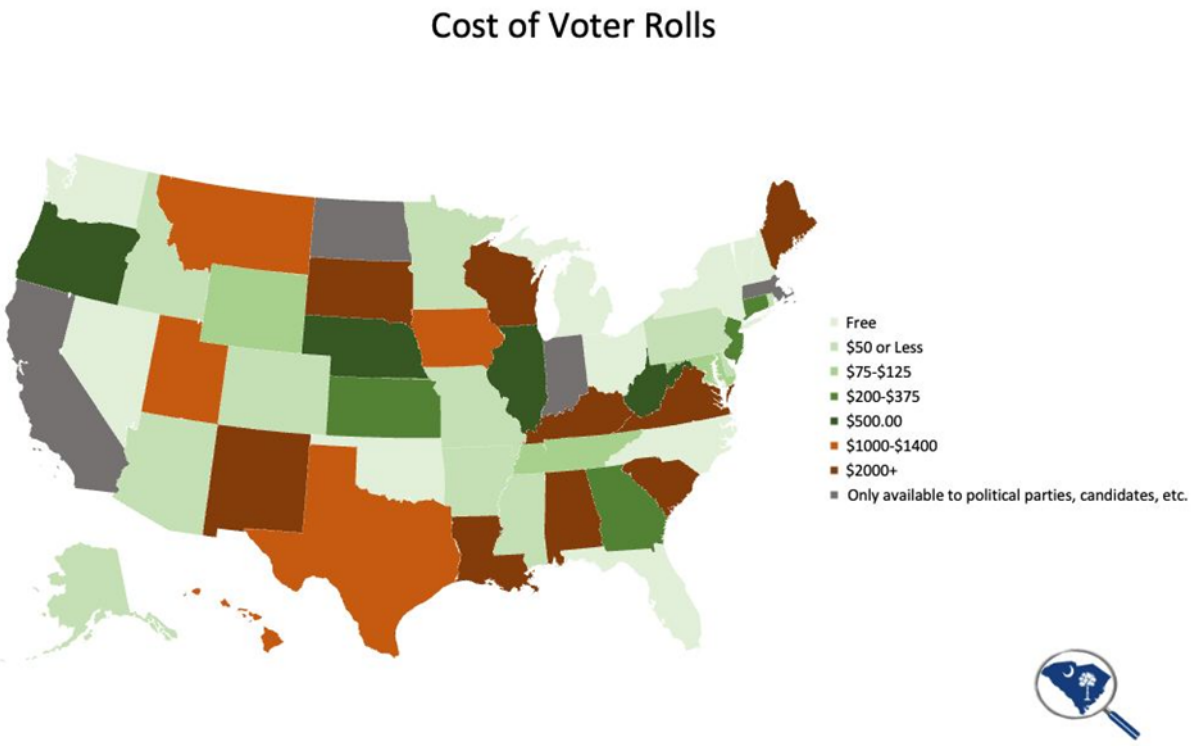
Department of Motor Vehicle data (after redacting Personal Identifying Information such as SSN) should also be made available to the public to show who has received new licenses or relinquished their old. States should require proof of citizenship (passport or birth certificate) when issuing state ID's or drivers' licenses. Non-citizens should be noted on state issued ID's and drivers' licenses so they can easily be blocked from registering in the voter registration database.

VERIFIABLE: Deceased people should be immediately removed from the rolls. Voters who are no longer residing in their original state of residence should be deleted from their original state's voter registration database. The legitimacy of the voter domicile should be confirmed. Voter registration cards signed by the registrant must be used as a validating component at the precinct level on election day. Every four years people should re-register or confirm their current address. In addition to the voter registration cards, a state issued ID or driver's license must be shown before the voter can vote.

All counties should share read-only versions of their voter rolls with other counties and the state. Programmatically, voter rolls can be easily cross-referenced among counties for duplicate entries.

Each County and Secretary of State budget should have adequate funding for verifying their voter registration databases with state intra-agency information as well as the Social Security Master Database and other state agencys' records such as the DMV. Things to check should include, but not be limited to, invalid addresses, date of registration prior to date of birth, registrations of citizens over the age of 90 or registrations well before eligibility. Database programs and queries to look for these anomalies may expedite this process. States should work with other states to check for duplicate voter names; they should share NCOA analysis and Social Security information.

ACCESSIBLE: Make voter rolls accessible to all people without charging a fee. (See the chart below for current costs to attain voter rolls by state). Any digital database must be READ-ONLY. It can only be created/updated by registration cards. Counties must publish their voter rolls in a common data format and central location so that all other counties, citizens, groups can access them. Proper data management practices should be employed, such as using a consistent method of assigning registration numbers. Election officials should partner with the public to help easily clean up any incorrect or improper registrants. For example, the state of Ohio does this. Here is their site.[20]



B. Phase 2. Voter Validation

For voter validation to meet the four cornerstones of safe elections, we recommend the following:

SECURE: Only eligible pre-registered voters should be allowed to vote on a regular ballot; all others may vote on a Provisional Ballot. Freezing the poll book lists 30 days before an election ensures the

integrity of the election by giving the County and/or Secretary of State time to confirm voter eligibility of all registrants.

To further ensure the security and integrity of the vote, felony legislation that mandates fines and jail time for people who knowingly vote fraudulently should be implemented. As a deterrent against this behavior, these fraudulent voters should be prohibited from voting for a significant period of time in future elections.

TRANSPARENT: Paper poll books must be used. The voter's name, Date of Birth (DOB), address, precinct number, ballot style, and voter unique identification number must be included in the poll book list. The voter names must be alphabetized and printed in the poll book with a place for the voter to sign their name once they are deemed qualified to vote. A place to designate other content must be included, such as Suspense*, Absentee Ballot, UOCAVA, or Early Voted. The voter must provide a valid photo ID which must be verified before the voter may vote. (*Suspense is a term used to describe a voter who must complete a change of address form before voting.)

At designated intervals of time, an image of the poll books should be taken and archived to document updates/changes to the poll book over time.

Ideally, in addition to using the paper poll books, clerks would hand write the names of the qualified voters in the "Voter Roster." The first and last name of the voter will be written in the "Vote Roster", as well as the precinct/ballot style number. Multiple copies of the Voter Roster must be kept. The poll books will be returned to the Elections Department after all the ballots have been counted in the precinct. These should be scanned and made available to the public.

The paper poll book must have an Omissions List Form to be used if an eligible, qualified voter is erroneously omitted from the poll book. The procedures for checking in this voter would be the same as for other qualified voters. A phone call to the County or the state elections office would provide confirmation on the eligibility of the voter in question. If the voter is ineligible to vote or has been removed or archived for legitimate reasons, they must re-register.

Voters that are not eligible to vote may vote on a provisional ballot. A separate Vote Roster will be used for the provisional voter.

VERIFIABLE: Hourly reconciliation of votes and voters must be done by matching the number of ballots with the number of names handwritten by the clerks. Posting the number of voters on the front door of the polling place may be done every 2 hours.

All poll books should be available at no charge to the public and public officials post-election.

ACCESSIBLE: All poll books should be available via public information request/FOIA Freedom of Information Act for free and must be printed in a way that makes it easy for the voter to sign or for the voter's guardian to sign. The signature line may be turned upside down so voters cannot read other voters' signatures.

C. Phase 3. Marking & Counting the Ballots

For Marking & Counting Systems to meet the four cornerstones of safe elections, we recommend the following:

SECURE: Deliver ballots under lock and seal with chain of custody form completed (this is especially important for early votes that are counted). If all ballots are counted at the precinct level, then chain of custody issues are minimized.

TRANSPARENT: After the polls are closed**,** all ballots will be viewed by bipartisan teams and the public and counted by several people, and the process will be video recorded for easy auditing; to include video surveillance of the entire room if feasible. Election results must be posted on the door at the precinct where the ballots were counted.

VERIFIABILE:

Video recording of counting provides an easy pathway to successful auditing and can be followed in real time as well. Enough counting teams must be hired to finish counting the ballots in 4 hours.

ACCESSIBILE: The public should have access to view the counting as long as they do not interfere with the process. We strongly encourage a live feed as well to ensure transparency. They must also have access to the video recording once it is available. The process is more trustworthy and may increase voter turnout. Ease and simplicity would also potentially reduce or minimize wait times.

1. BALLOT PRINTING:

SECURE: All ballots should be inventoried. Strong chain of custody procedures and documentation must be utilized, tracked, and monitored. The ballots could also be printed on paper employing reasonable anti-copy features such as watermarks, micro-letters, guilloches, UV ink, and integrated security holograms, etc.

TRANSPARENT: Ballots should be printed in such a way that they can be clearly seen by a video camera recording.

VERIFIABLE: Ballots should be sequentially numbered. Alpha-numeric serial numbers are not acceptable because they make audits much more difficult. Ballots will also be printed with the precinct and ballot style number. Ballots must be randomized for the voter to select the ballot of their choice.

ACCESSIBLE: All ballots should be printed in a format that is easily readable and easily marked by the voter. Visually impaired voters should have multiple options for assistance with marking the ballots via the election clerk, their driver, or a friend or family member.

2. EARLY VOTING (EV)

a. Voting in person:

SECURE: Ideally, we recommend one day for voting, however this goal may not currently be realistic for some. If early voting cannot be eliminated, it must be extremely limited to a single voting period, not to exceed 1 week and with no gap between early voting and election day. A reduced timeframe for early voting minimizes many potential avenues for manipulation and fraud: chain of custody lapses when delivering ballots to and from voting locations when ballot boxes overflow; intel about voter turn-out data which gets released to the public, revealing enough voter information to predict what the election results are at that point in time; and early tabulation of vote results opening windows of opportunity for election result leaks or vote manipulation, just to name a few.

TRANSPARENT: Early voting gives more time for a bad actor to act, and therefore, does not provide a benefit to transparency in our elections, especially when it is not precinct only. Limiting early voting to precincts only provides a modicum of transparency because decentralizing the vote location makes counting the votes more manageable.

VERIFIABLE: Multiple days of early voting make verifying vote results much more difficult for the same concerns listed above about increased potential vulnerabilities. It is recommended that Early Voting is limited to no more than a week; strict chain of custody documentation must be employed; tabulation must not begin until after the polls close on election night; and the early voting ballots must be counted at the same place in the same manner as election day ballots. Limiting early voting to precincts only provides ultimate verifiability because decentralizing the vote makes auditing much more manageable.

ACCESSIBLE: In person Early voting, if done, ideally should be limited to precinct-only voting where people don't have to travel far from their homes to vote. The locations must be the same as election day locations for maximum accessibility and familiarity. Voting at the County Seat or Board of Elections may also be considered as it minimizes chain of custody issues. Curbside voting is also always available as well throughout the voting period.

b. Voting by mail/drop box

SECURE: Voters must mail or deliver Absentee ballots packets directly to their County Election Offices and can be hand-counted like the "in person" ballots either at the county offices or sorted for counting at the precinct. Absentee ballots should be printed on sequentially numbered ballots in the same manner as election day ballots including precinct number and ballot style. Tracking and reconciliation is extremely important with absentee ballots to document the number of applications requested/sent/received and counted. It is also strongly recommended that either the County or the SOS has a web site for voters to track their ballots. After signatures on the outside of envelopes are verified, ballots would remain at the County under extreme surveillance and 24/7 in-person guards. Once the signatures are verified, the outside carrier envelope can be separated from the inner secrecy envelope. The secrecy envelope must also have a precinct number to facilitate sorting the unopened secrecy envelopes.

*Note that the envelope and ballot are separated to ensure anonymity. Signature verification should be done by the signature verification team without opening ballots. Ideally, only the counting team should be opening the ballots. To discourage tampering, it is recommended to position the verification signature line over the edge of the sealed flap of the secrecy envelope.

The ballots will be counted, once the signature is approved and sorted in the same manner as the election day ballots, ideally after the polls close.

In order to transport the unopened absentee ballots (with secrecy ballots), maximum chain of custody would consist of double lock/double seal with paper documentation which includes seal numbers. Sheriff deputy transfers and documentation should include proof that no changes were made to the seals/locks and people who sent/received/involved in transfer are noted. Detailed logs are to be kept at every step and reconciled. Any adjudication would be done by the appropriate election official under a camera and in full observation from the public.

When feasible, absentee ballots may be counted at one central location rather than delivered to individual precincts; they must however be separated and counted by precinct.

TRANSPARENT: People physically showing up to the polls maximizes transparency and makes it easier to verify ID, thus we recommend strictly limiting absentee voting to the following:

Disabled voters, women expecting to give birth within 3 weeks of election day, homebound/nursing home occupants, (UOCAVA) overseas military, out of county during the entire election (must provide an out of county address and the beginning and ending date of time expected to be out-of-jurisdiction location), confined to jail or involuntary civil commitment.

Documentation via a signed affidavit explaining why the individual cannot vote in person should b required, before a specified deadline for presentation of documentation. In addition, thirty days prior to election there should be a freeze of the registered voter database, with no new registrations allowed until post-election. Verification of the voter should be done both when absentee is requested and again when it is returned.

Following the election, all absentee ballots sent should be publicly available along with their serial number and precinct location. A public site must also track which of the absentee ballots were returned.

For auditing purposes, all absentee ballots requested, sent, received, voted, and counted will be available to the public at no charge via information requests.

It is recommended to print the precinct number and ballot style on the carrier (outside envelope) and the privacy envelope. Poll watchers must be allowed to be close enough to see the signatures. Video recording should be audible and easily visible, which can be tested and verified for visibility in advance.

VERIFIABLE: All absentee ballots must be accounted for by sequential numbers and reconciled with the public list before being sent out. A second verification must be done when the ballot is returned to ensure that the correct person has voted, and that the registration has not already been used. This verification must take place on election day.

Only trained teams will verify signatures under a video camera, and record for future auditing and verification by the public. Signature verification could be live streamed where feasible.

ACCESSIBLE: Absentee voting, when properly done, gives every legal citizen the opportunity to properly and legally cast a vote.

- NOTE: Some states are eliminating in-person voting in favor of mail-in precincts. We find that this is not equivalent in any way to an in-person precinct vote and creates multiple chain of custody issues.
- NOTE: Drop boxes that are unattended are strongly discouraged.

Important considerations for Early Voting via absentee ballots

We maintain that all forms of early and absentee voting introduce vulnerability into the election ecosystem.

If any voting is done which is not in person, the following procedures should be in place:

1. No absentee ballot requests should be automatically sent. They must be individually requested for each election
    a. The absentee ballot shall include an area with a valid excuse and shall be notarized or verified by a third party
    b. Voter's identity must be checked before ballot is sent
2. All absentee ballots must have sequential serial numbers
3. When an absentee ballot is sent, the County shall post the precinct and serial number of the ballot sent on their website.
4. All ballots must be sent in sequential order, or if any mistakes are made, that serial numbered ballot must be spoiled, just as a filled in ballot is when a mistake is made. This way, every ballot will be accounted for when tabulated.
5. When the absentee ballot is returned, the County website will be updated to note that ballot is no longer outstanding.
6. Absentee ballots shall be stored in a secure location when returned and not opened until the counting commences.
7. On election day, the published list of serial numbers and precincts shall be reconciled with the ballot envelopes before opening.
8. The voter's identity shall also be checked again to verify that the correct voter used that voter registration and that no one else has used that voter registration. The envelope shall remain sealed through this verification.
9. The envelopes shall be then given to a different team to remove the ballots from the envelopes and stacked.
10. The ballots shall then be given to a tabulation team and tabulated in the same manner as in-person ballots.

3. Other:

Provisional balloting: See Exhibit 7
ADA Voting: See Exhibit 8

D. Phase 4. Election Night Reporting

SECURE: All ballot counting is recorded on a camera, with one over the ballot and one over the counting station. The paper copies of vote result reports perhaps could be altered by a bad actor, however the video evidence of the vote results and counting processes would make that effort futile. Results may be called in to the County and to the State. Ballots and Batch Summary Sheets or Tally Sheets will be delivered to the County immediately after counting is complete. Election records will be secured in a locked location and stored within the county for 24 months after an election.

TRANSPARENT: Counting will not start until after the polls close. No vote results will be posted until after the polls close. Election day, in person early votes and absentee ballots will all be counted and reported after the polls close. No third-party entities may count or report the vote results. The vote results will immediately be posted on the front door of the polling place when counting is complete, as well as reported to proper election authorities. By posting the vote results on the door, the process is not only secure, but verifiable and accessible.

VERIFIABLE: Vote results reported by the county should match vote results reported by the state. Similarly, the sum of the precinct vote results should match the total that the county reports. The vote results shall be posted on the county and state website within 24 hours of completion of the count.

ACCESSIBLE: The vote results will immediately be posted on the front door of the polling place when counting is complete. All information should be posted within 24 hours on the state (Secretary of State/Election Commission) and/or County's website by the end of the next business day. The public may see all elections records at no charge as early as 2 days after the counting is complete.

VIII. Summary of Recommendations:

While the primary focus of this paper is to propose solutions and procedural recommendations for the physical process of voting and counting ballots, other goals of this document are to reduce the unnecessary complexity of the current system and minimize the potential for maladministration and fraud. Validity of the vote results depends upon overhauling the entire election system. The following is a summary list of the recommendations we provided above and believe are necessary to ensure a safe and secure election process.

- Clean voter rolls to include only legitimate, registered US Citizens (proof of ID and citizenship required)
- Voter rolls properly maintained by the counties so that the deceased and those who moved are removed in a timely fashion
- Voter rolls that are free to the public and available online
- Fixed voter registration – no additional registration updates $\geq$30 days before an election
- Paper poll books with option of a paper Voter Roster which is handwritten by the poll workers and accessible to the public via public information requests
- Hand-marked Paper Ballots, sequentially numbered and accounted for via strong chain of custody
- Ballots printed with anti-copy features and so they can be easily viewed via the camera
- Limited Absentee Ballots; Strict Signature Verification and strict tracking
- Limited Early Voting with no gap between Election Day and Early Voting
- ADA provisions and curbside available for those who need it
- Hand Counted (Hand-marked) Paper Ballots starting after polls close
- Vote Results posted on Precinct Door and called into County Elections Department
- Precinct only voting
- Bipartisan counting teams and public observation of the process
- Video Cameras on ballots and counting stations and additional room camera(s)
- Videos recorded and posted on County's website within 24 hours of polls closing
- Election Records available to the public within 2 days of polls closing
- Ongoing public education throughout the year of any changes in the voting process, registration deadlines, etc.

IX. Conclusions:

The four cornerstones of safe elections are security, transparency, verifiability, and accessibility. The current electronic voting system does not adequately meet these gold standard cornerstones. We have demonstrated that hand-counting hand-marked ballots can be done in a cost-effective way. Ballots can be counted in a timely manner and results reported before election day has ended. Counties and states can save millions of dollars. All phases of the election process were optimized to reflect the 4 major cornerstones of secure, transparent, verifiable, and accessible elections. Most importantly, people will regain trust in the election system due to the transparency and simplicity of this re-engineered process.

How can we properly and confidently transition to a new paradigm of voting?

To answer this question, the following elements must be strongly considered:

- Increase awareness/education of the method and demonstrate its simplicity
- "Train the trainer": Demonstrate the ease and simplicity and benefits of the system so that others can show their local communities and election officials how it can be done
- Solicit and equip team volunteers to assist in bringing this methodology to their counties
- Pass laws that allow for this to at least be conducted on a pilot program basis and once successful, expand this new process across the nation
- Provide support and training documentation to counties who seriously desire to change their current system and equip them with the knowledge, training, and resources they need to implement effectively

The time is now to make the change to a new paradigm of voting before we lose the confidence of the people, leading them to disengage from the voting process. Lack of trust is the worst reason for voter apathy.

We hope that you find this guide helpful, and we look forward to your feedback and questions.

At this critical moment in our nation's history, our hope is that you now can clearly see the pathway to an improved election process that everyone can trust. We encourage you to embrace the Gold Standard for Election Excellence.

X. Appendix

Exhibit 1 Cost Savings South Dakota Machine vs Hand Count-2024
Exhibit 2 Risk and Remediation Matrix
Exhibit 3 Official Election Resource Workbook
Exhibit 4 Excel Spreadsheets to Generate Tally sheets
Exhibit 5 Example (Treasurer Exhibit Race for Dodge County, WI 2022)
Exhibit 6 Example Totals Sheet
Exhibit 7 Provisional Ballots
Exhibit 8 ADA voting
Exhibit 9 Summary of Test findings
Exhibit 10 Estimate of Costs of Tally Method Hand-counting
Exhibit 11 Video demonstration of the Calculator Method /Estimated Costs

Exhibit 1 Cost Savings SD Machine vs Hand Count - 2024

SD Machine vs Hand Count - 2024

- South Dakota
  - Tabulators (central count, not precinct) 2017-2019 $3,170,155
  - Maintenance Est. 2019-2022 $ 934,800
  - Reporting (Laptop & Software Maint. Est.) 2019-2022 $2,336,000
  - **Total** **$6,440,955**

- Hand Count 2020 & 2022 Primary and General Elections

Year	Election	Ballots Cast	Precincts	Ave Ballots Precinct	250 Ballots Teams	Per Table	PrecSup	Total People	Time	Pay/Hr	Total Per Precint	Total Statewide Cost
2020	Pri	154342	667	232	1	4	1	5	3	$ 30.00	$ 450.00	$ 104,400.00
2020	Gen	427529	693	617	3	4	1	13	3	$ 30.00	$ 1,170.00	$ 721,890.00
2022	Pri	186896	679	276	2	4	1	9	2.5	$ 30.00	$ 675.00	$ 186,300.00
2022	Gen	354670	687	517	2	4	1	9	3	$ 30.00	$ 810.00	$ 418,770.00
											Hand Count Costs	**$ 1,431,360.00**
Live Feed Costs (Live Stream to YouTube Channel)												
Precincts	iPad Mini/Wifi/Cell		Cell Sub	Mini-Stand	Teams(2024)	Supplies (Pens, Fingers, Binders, Paper)						
693	$649		$ 60	$80	3		$ 15.00					**$1,671,516**
											Hand Count with Live Stream	**$ 3,102,876.00**

Exhibit 2 Electronic Voting System Risk & Mitigation Matrix
Here is a more comprehensive list of potential risks in the current electronic election process:

Area	Risk/Issue/concern	Can it be mitigated? Y/N/Maybe	Remediation
Voter Rolls/Registration	• DMV data sent to ERIC or other 3rd party vendors • Deceased and "moved out of state" voters not removed from voter rolls. • Non-Citizens included in voting process • States that use ERIC receive left wing funding and shares data with left leaning nonprofit organizations for vote targeting/ballot stuffing • Too many vendors/in-house support involved in data (adds complexity)	Maybe Y Y Y Y	Discontinue use of ERIC and analyze/clean rolls in house; Create a separation of databases (active, inactive, archived) Remove non-citizens/have stricter ID requirements to confirm citizenship Transparency and free access to voter rolls for validation Minimize the number of people/vendors with access to the data
Early Voting	• Gives information to potential nefarious actors as to the magnitude of data manipulation needed to overcome true election results	Y	Go to 1 day of voting and start the counting only after the polls are closed
Poll Books/Voter Validation	• Validation is not part of certification process • Connected to internet/network so risk of infiltration	Y Y	Go to 1 day voting and utilize paper poll books at the precincts on election day like they do in European countries
Voting -BMDs -Tabulators -E Pollbooks -Electionware	• Hacking risks – USB, Internet • No transparency re: voting & security processes, no access to slogs, poll tapes, audit log or CVRs • Vendor provided flash drives- could contain malware and be used to compromise "air gapped" systems	**N biggest RISK** Y/N	hand-marked, hand-counted, paper ballots best option Need CVRs, audit logs, poll tapes – free, ongoing access to this data. Note that these reports can be faked and

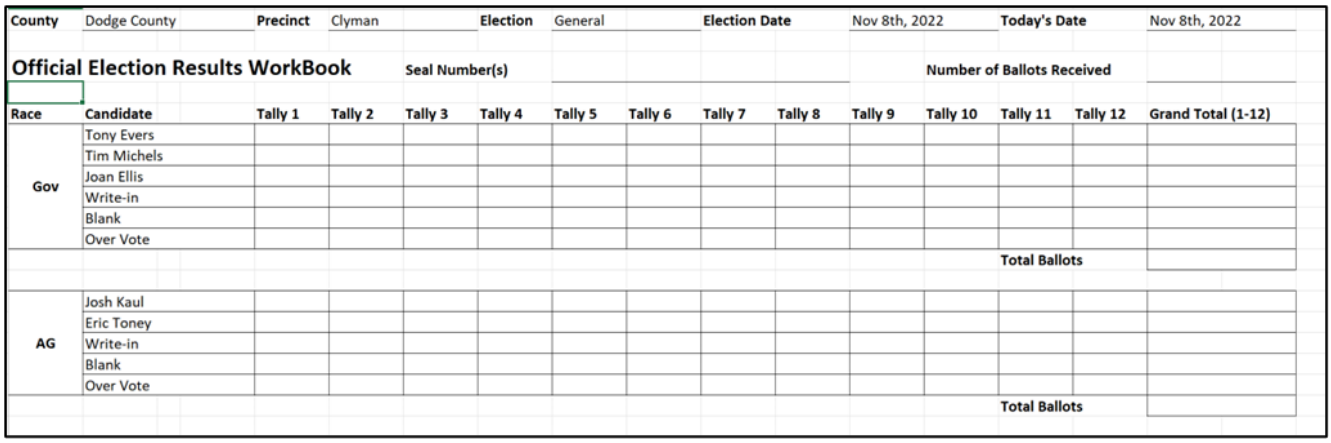
Area	Risk/Issue/concern	Can it be mitigated? Y/N/Maybe	Remediation
	• Poor chain of custody • Potential internet connectivity (Albert sensors) • Requires trust factor with corporations, federal gov and the state • Federal involvement is concerning	N Y Maybe	subverted which is why hand-counting, hand-marked ballots is ideal Transparency around election officials' USB hygiene practices, SOP (Standard Operating Procedure) for chain of custody, training and other election processes. Remove Albert Sensors & ANY network connectivity to election infrastructure. Allow for independent monitoring (note that can also create a false sense of security as manipulation can occur that independent monitoring can't capture) Detailed information on 3rd party vendor security architecture, secure SDLC (Systems Development Life Cycle), penetration testing results, certification reports, contracts. Build trust through greater transparency. Control of state elections should remain in state

Area	Risk/Issue/concern	Can it be mitigated? Y/N/Maybe	Remediation
Election Night Reporting	• Many Foreign (SCTYL) or closely held corporations involved	Y	This should be managed locally and never by a foreign-owned company; why is it so important to get this info to the media? If we hand count results will be completed at the end of the night and reported promptly.
Personnel	• Lack of technical training/IT/IS	Y	Get technical people on the county boards of elections & election commissions. Centralize training and ensure it is robust and consistent. Provide training manuals with operating procedures, etc.
Ancillary equipment	• Commercial off the shelf (COTS) components –foreign made	Y	Hand count paper Make sure scanners, printers, COTS (Commercial Off the Shelf components) are made in the USA.
Programming	• Mistakes or by design • Barcodes cannot be validated by voter	Not unless go to hand counted hand marked ballots	Secure SDLC (software development life cycle), full source code testing/review; ballot style reviews, check CVRs (Cast Vote Records) for L&A logic and accuracy tests; Risk limiting and hand count audits across all precincts. Note: Most citizens don't understand and cannot read source code so software should not be

Area	Risk/Issue/concern	Can it be mitigated? Y/N/Maybe	Remediation
			used as the primary means of voting Or best – move to hand marked, hand counted paper ballots.
Opaque corporations and third-party involvement	• Most states outsource elections to 3rd parties/corporations	Y Y	Can save money and reduce this risk with hand-marked, hand-counted paper ballots or improve transparency as described above and below.
Lack of participation by people/candidates who don't trust the system	• Need to enhance transparency so that people have less suspicion regarding the process	Y/N	Hand-marked, hand-counted paper ballots are the best solution. Full transparency from all vendors – financial, technical, and contractual.

As you can see from the above mitigation matrix, much of the risk can be reduced if not eliminated by moving to a true paper system of hand-marked, hand-counted ballots

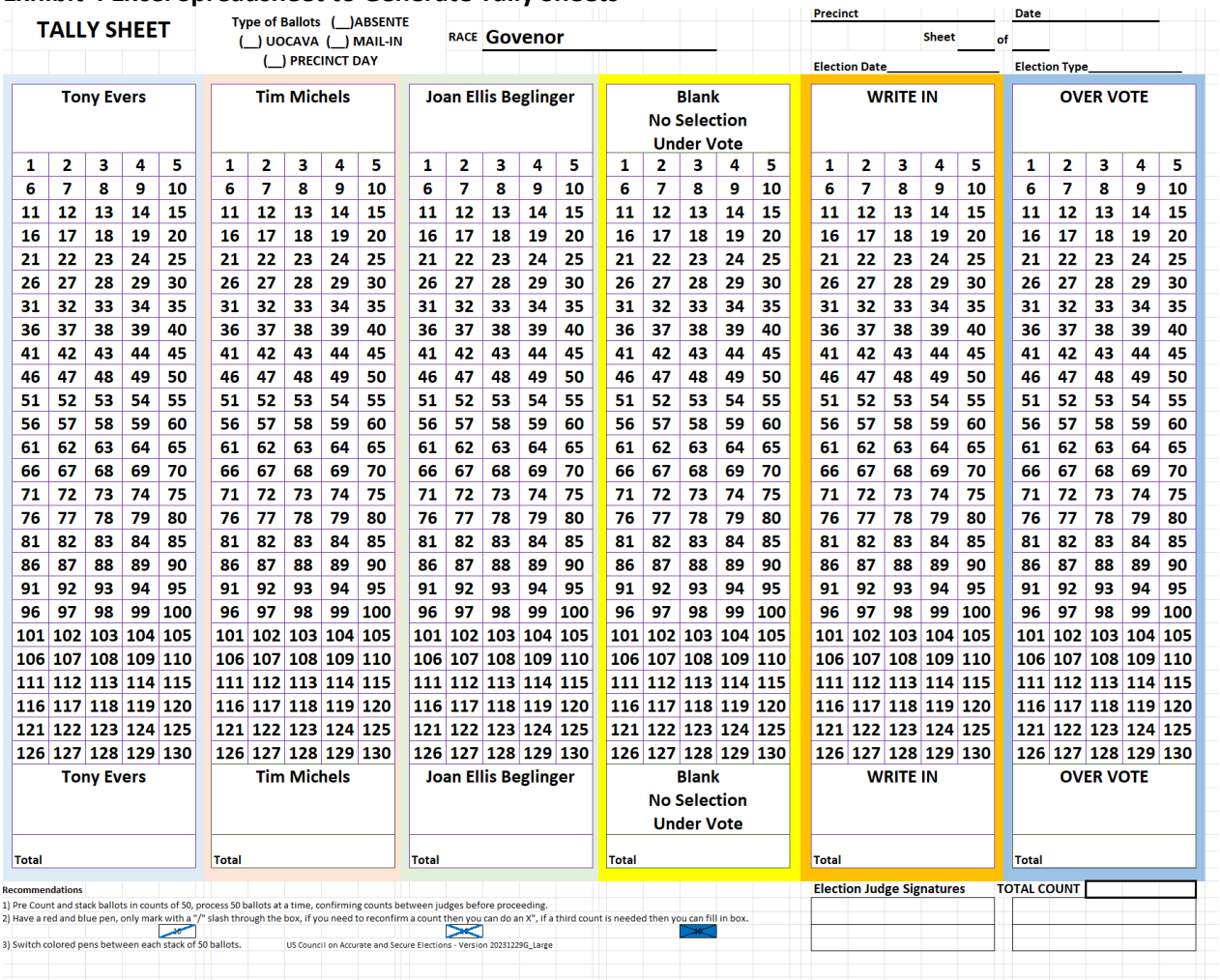
Exhibit 3 Official Results Workbook



County	Dodge County	Precinct	Clyman		Election	General		Election Date		Nov 8th, 2022		Today's Date		Nov 8th, 2022
Official Election Results WorkBook				Seal Number(s)							Number of Ballots Received			
Race	Candidate	Tally 1	Tally 2	Tally 3	Tally 4	Tally 5	Tally 6	Tally 7	Tally 8	Tally 9	Tally 10	Tally 11	Tally 12	Grand Total (1-12)
Gov	Tony Evers													
	Tim Michels													
	Joan Ellis													
	Write-in													
	Blank													
	Over Vote													
												Total Ballots		
AG	Josh Kaul													
	Eric Toney													
	Write-in													
	Blank													
	Over Vote													
												Total Ballots		

- https://img1.wsimg.com/blobby/go/a490ef07-664f-4244-b734-db8ab9a64e8d/downloads/USCASE_Master_OfficialElectionResultsWorkBook.xlsx?ver=1707086437480

Exhibit 4 Excel Spreadsheet to Generate Tally Sheets



TALLY SHEET

Type of Ballots (__)ABSENTE (__) UOCAVA (__) MAIL-IN (__) PRECINCT DAY

RACE **Govenor**

Precinct _____ Date _____

Sheet ___ of ___

Election Date_____ Election Type_____

Tony Evers					Tim Michels					Joan Ellis Beglinger					Blank No Selection Under Vote					WRITE IN					OVER VOTE				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15
16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20
21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25
26	27	28	29	30	26	27	28	29	30	26	27	28	29	30	26	27	28	29	30	26	27	28	29	30	26	27	28	29	30
31	32	33	34	35	31	32	33	34	35	31	32	33	34	35	31	32	33	34	35	31	32	33	34	35	31	32	33	34	35
36	37	38	39	40	36	37	38	39	40	36	37	38	39	40	36	37	38	39	40	36	37	38	39	40	36	37	38	39	40
41	42	43	44	45	41	42	43	44	45	41	42	43	44	45	41	42	43	44	45	41	42	43	44	45	41	42	43	44	45
46	47	48	49	50	46	47	48	49	50	46	47	48	49	50	46	47	48	49	50	46	47	48	49	50	46	47	48	49	50
51	52	53	54	55	51	52	53	54	55	51	52	53	54	55	51	52	53	54	55	51	52	53	54	55	51	52	53	54	55
56	57	58	59	60	56	57	58	59	60	56	57	58	59	60	56	57	58	59	60	56	57	58	59	60	56	57	58	59	60
61	62	63	64	65	61	62	63	64	65	61	62	63	64	65	61	62	63	64	65	61	62	63	64	65	61	62	63	64	65
66	67	68	69	70	66	67	68	69	70	66	67	68	69	70	66	67	68	69	70	66	67	68	69	70	66	67	68	69	70
71	72	73	74	75	71	72	73	74	75	71	72	73	74	75	71	72	73	74	75	71	72	73	74	75	71	72	73	74	75
76	77	78	79	80	76	77	78	79	80	76	77	78	79	80	76	77	78	79	80	76	77	78	79	80	76	77	78	79	80
81	82	83	84	85	81	82	83	84	85	81	82	83	84	85	81	82	83	84	85	81	82	83	84	85	81	82	83	84	85
86	87	88	89	90	86	87	88	89	90	86	87	88	89	90	86	87	88	89	90	86	87	88	89	90	86	87	88	89	90
91	92	93	94	95	91	92	93	94	95	91	92	93	94	95	91	92	93	94	95	91	92	93	94	95	91	92	93	94	95
96	97	98	99	100	96	97	98	99	100	96	97	98	99	100	96	97	98	99	100	96	97	98	99	100	96	97	98	99	100
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106	107	108	109	110	106	107	108	109	110	106	107	108	109	110	106	107	108	109	110	106	107	108	109	110	106	107	108	109	110
111	112	113	114	115	111	112	113	114	115	111	112	113	114	115	111	112	113	114	115	111	112	113	114	115	111	112	113	114	115
116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120
121	122	123	124	125	121	122	123	124	125	121	122	123	124	125	121	122	123	124	125	121	122	123	124	125	121	122	123	124	125
126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130
Tony Evers					Tim Michels					Joan Ellis Beglinger					Blank No Selection Under Vote					WRITE IN					OVER VOTE				
Total					Total					Total					Total					Total					Total				

Recommendations

1) Pre Count and stack ballots in counts of 50, process 50 ballots at a time, confirming counts between judges before proceeding.

2) Have a red and blue pen, only mark with a "/" slash through the box, if you need to reconfirm a count then you can do an X", if a third count is needed then you can fill in box.

3) Switch colored pens between each stack of 50 ballots.

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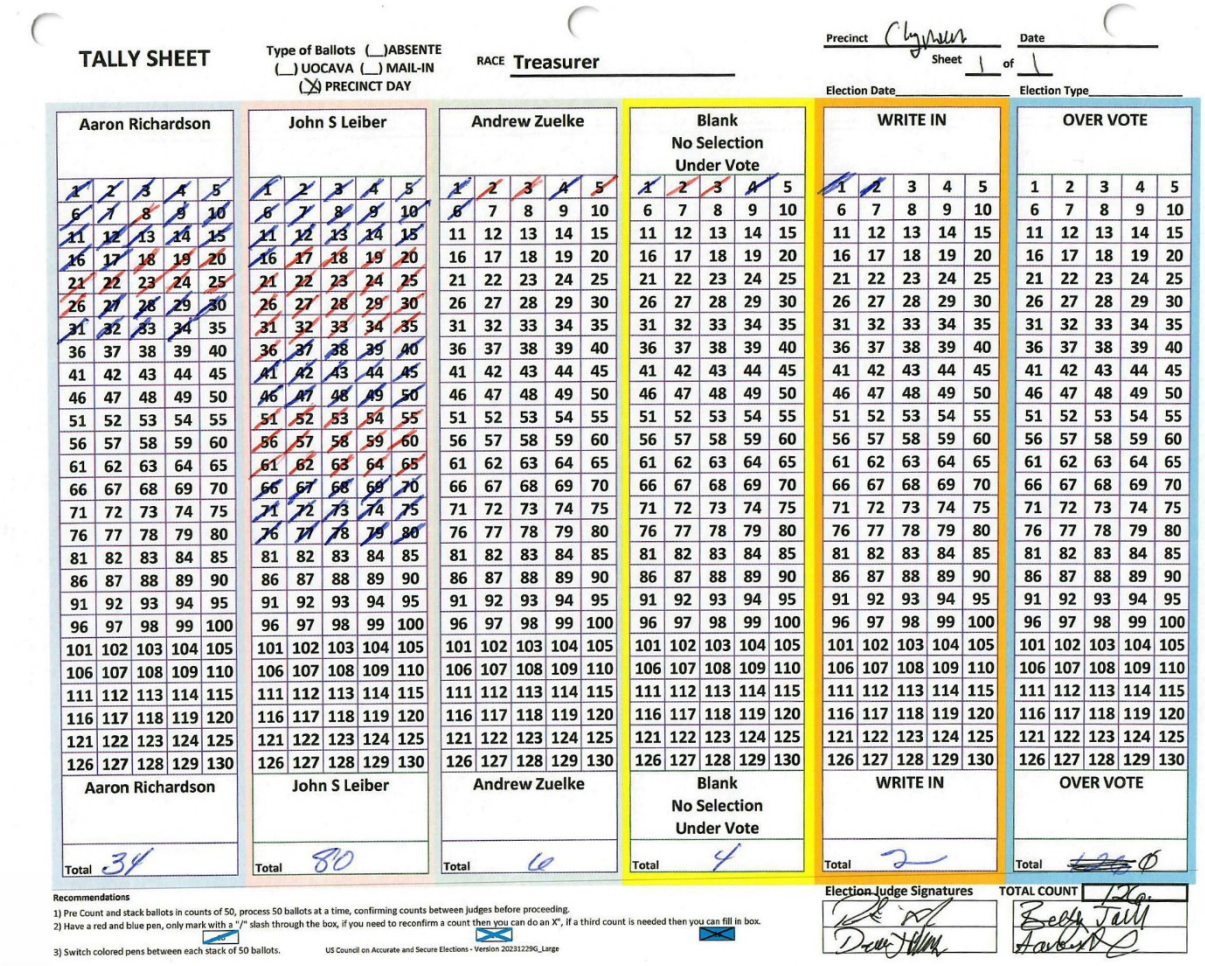
Election Judge Signatures

TOTAL COUNT

— (Clyman WI 2022 General Election Example in https://img1.wsimg.com/blobby/go/a490ef07-664f-4244-b734-db8ab9a64e8d/downloads/USCASE_HAVA_Top_Down_Tally_20231229_RaceTopan.xlsx?ver=1706929587932**Excel) https://img1.wsimg.com/blobby/go/a490ef07-664f-4244-b734-db8ab9a64e8d/downloads/USCASE_HAVA_Top_Down_Tally_20231229_RaceTopan.xlsx?ver=1706929587932**

Exhibit 5 Example (Treasurer Race for Dodge County WI 2022)



TALLY SHEET

Type of Ballots (__)ABSENTE (__) UOCAVA (__) MAIL-IN (X) PRECINCT DAY

RACE Treasurer

Precinct Clyman Date

Sheet 1 of 1

Election Date Election Type

Aaron Richardson					John S Leiber					Andrew Zuelke					Blank No Selection Under Vote					WRITE IN					OVER VOTE				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15
16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20
21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25
26	27	28	29	30	26	27	28	29	30	26	27	28	29	30	26	27	28	29	30	26	27	28	29	30	26	27	28	29	30
31	32	33	34	35	31	32	33	34	35	31	32	33	34	35	31	32	33	34	35	31	32	33	34	35	31	32	33	34	35
36	37	38	39	40	36	37	38	39	40	36	37	38	39	40	36	37	38	39	40	36	37	38	39	40	36	37	38	39	40
41	42	43	44	45	41	42	43	44	45	41	42	43	44	45	41	42	43	44	45	41	42	43	44	45	41	42	43	44	45
46	47	48	49	50	46	47	48	49	50	46	47	48	49	50	46	47	48	49	50	46	47	48	49	50	46	47	48	49	50
51	52	53	54	55	51	52	53	54	55	51	52	53	54	55	51	52	53	54	55	51	52	53	54	55	51	52	53	54	55
56	57	58	59	60	56	57	58	59	60	56	57	58	59	60	56	57	58	59	60	56	57	58	59	60	56	57	58	59	60
61	62	63	64	65	61	62	63	64	65	61	62	63	64	65	61	62	63	64	65	61	62	63	64	65	61	62	63	64	65
66	67	68	69	70	66	67	68	69	70	66	67	68	69	70	66	67	68	69	70	66	67	68	69	70	66	67	68	69	70
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81	82	83	84	85	81	82	83	84	85	81	82	83	84	85	81	82	83	84	85	81	82	83	84	85	81	82	83	84	85
86	87	88	89	90	86	87	88	89	90	86	87	88	89	90	86	87	88	89	90	86	87	88	89	90	86	87	88	89	90
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96	97	98	99	100	96	97	98	99	100	96	97	98	99	100	96	97	98	99	100	96	97	98	99	100	96	97	98	99	100
101	102	103	104	105	101	102	103	104	105	101	102	103	104	105	101	102	103	104	105	101	102	103	104	105	101	102	103	104	105
106	107	108	109	110	106	107	108	109	110	106	107	108	109	110	106	107	108	109	110	106	107	108	109	110	106	107	108	109	110
111	112	113	114	115	111	112	113	114	115	111	112	113	114	115	111	112	113	114	115	111	112	113	114	115	111	112	113	114	115
116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120	116	117	118	119	120
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126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130	126	127	128	129	130
Aaron Richardson					John S Leiber					Andrew Zuelke					Blank No Selection Under Vote					WRITE IN					OVER VOTE				
Total 34					Total 80					Total 6					Total 4					Total 2					Total ~~126~~ 0				

Recommendations

1) Pre Count and stack ballots in counts of 50, process 50 ballots at a time, confirming counts between judges before proceeding.

2) Have a red and blue pen, only mark with a "/" slash through the box, if you need to reconfirm a count then you can do an X", if a third count is needed then you can fill in box.

3) Switch colored pens between each stack of 50 ballots.

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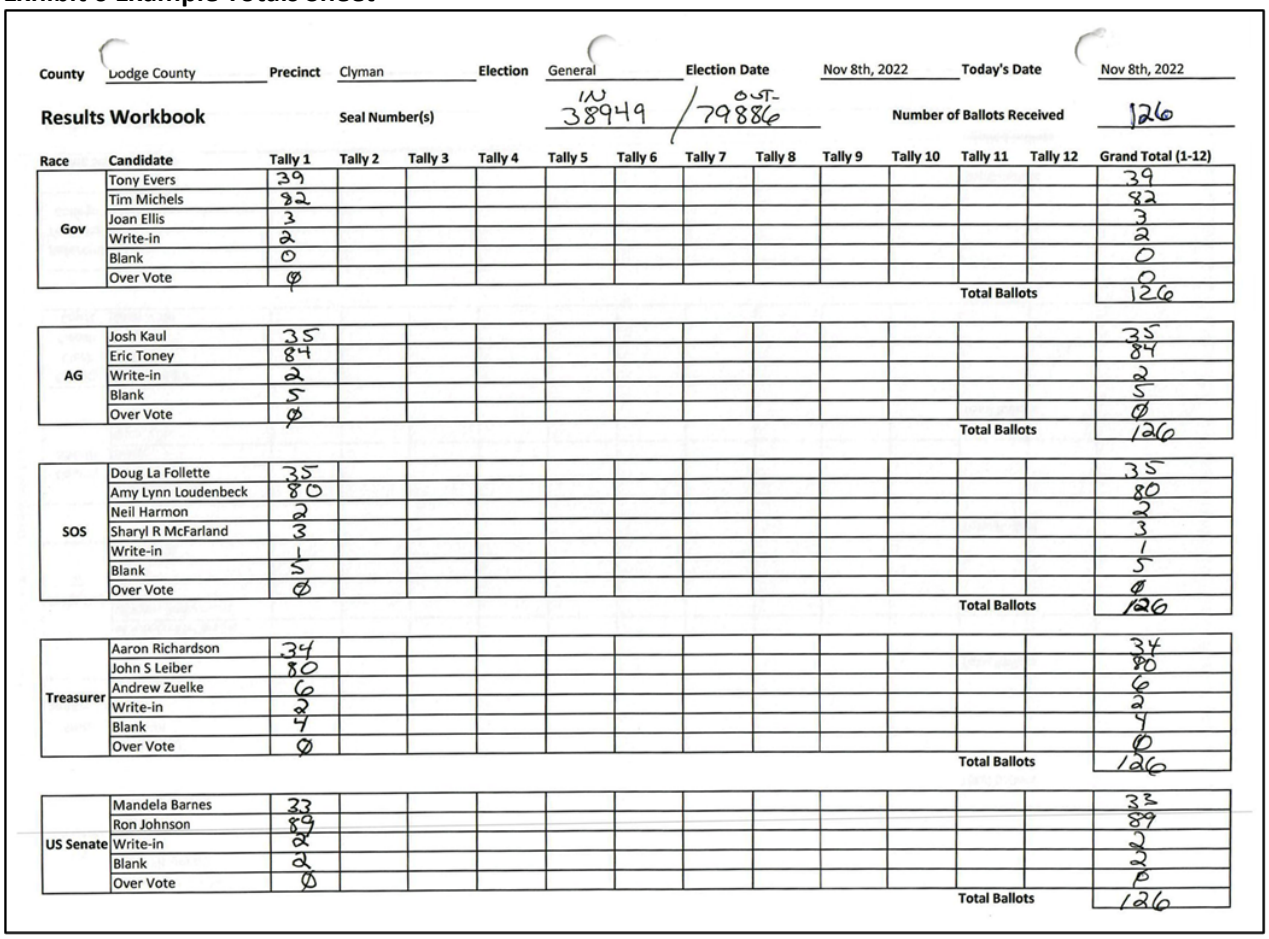
Election Judge Signatures

TOTAL COUNT 120

Exhibit 6 Example Totals Sheet



County: Dodge County | Precinct: Clyman | Election: General | Election Date: Nov 8th, 2022 | Today's Date: Nov 8th, 2022

Results Workbook | Seal Number(s): IN 38949 / OUT- 79886 | Number of Ballots Received: 126

Race	Candidate	Tally 1	Tally 2	Tally 3	Tally 4	Tally 5	Tally 6	Tally 7	Tally 8	Tally 9	Tally 10	Tally 11	Tally 12	Grand Total (1-12)
Gov	Tony Evers	39												39
	Tim Michels	82												82
	Joan Ellis	3												3
	Write-in	2												2
	Blank	0												0
	Over Vote	Ø												0
												Total Ballots		126
AG	Josh Kaul	35												35
	Eric Toney	84												84
	Write-in	2												2
	Blank	5												5
	Over Vote	Ø												Ø
												Total Ballots		126
SOS	Doug La Follette	35												35
	Amy Lynn Loudenbeck	80												80
	Neil Harmon	2												2
	Sharyl R McFarland	3												3
	Write-in	1												1
	Blank	5												5
	Over Vote	Ø												Ø
												Total Ballots		126
Treasurer	Aaron Richardson	34												34
	John S Leiber	80												80
	Andrew Zuelke	6												6
	Write-in	2												2
	Blank	4												4
	Over Vote	Ø												Ø
												Total Ballots		126
US Senate	Mandela Barnes	33												33
	Ron Johnson	89												89
	Write-in	2												2
	Blank	2												2
	Over Vote	Ø												Ø
												Total Ballots		126

Exhibit 7 Provisional Ballots

A provisional ballot is used to record a vote when there are questions about a voter's eligibility, and these must be resolved before the vote can be counted. A provisional ballot is issued when the voter's name doesn't appear on the rolls, their eligibility cannot be verified, the voter lacks proper photo ID, or their information is outdated or incorrect.

If this is the case, adjudication should be done in public, or the voter should be contacted to cure their ballot. If the state conducts ballot hearings after election day, these should be videorecorded, and the public can observe. Provisional ballots should be reported and reconciled as a separate category on the state website by county and precinct

Exhibit 8 ADA Voting

The ADA requires state and local governments and their election officials to ensure that people with disabilities have a full and equal opportunity to vote in all elections. This includes federal, state, and local elections. And it includes all parts of voting, like voter registration, selecting a location for polling places, and voting, whether on election day or during an early or absentee voting process. Registration may require a special administrator or assistance to register. All county offices and agencies who provide voter registration forms must provide this support.

Curbside voting and special equipment and access (parking, ramps) to the polling places must be available to the disabled. ADA-compliant machines should be available as well and easily navigable withing the polling place.

Here is the checklist for polling places.

https://archive.ada.gov/votingchecklist.htm

https://archive.ada.gov/ada_voting/voting_solutions_ta/polling_place_solutions.htm

Exhibit 9 Summary of Test Findings

There are two methods that were evaluated—a tally method and a calculator method. An explanation of each method is provided below with a summary of the test results to date.

Summary: Counting per ballot versus per race with the tally method.

Test Description	Variable tested	Results	Comments
Tally sheet hand-count method—2 caller 2 talliers	Left to right marking Count one ballot at a time; we tested 50 ballots at a time with 11 races	This took about 50 minutes	Loud noise and distractions as well as learning curve
Hand count Tally Sheet method	Count each race at a time as opposed to one ballot; same 50 ballots 11 races	22 minutes for 11 races	This was quicker
			Tips: Utilize binder 3-hole punch for ease of flipping tally sheets Use fingertip moistener pads or rubber fingertips Table area must be large enough to accommodate 6 stacks/piles of paper (2 stacks of ballot sized 11x14 paper for callers, 2 stacks each for talliers (preferably also 11x14) Tally sheets with color help with concentration and focus vs B&W
Tested top to bottom tally sheet versus left to right	Layout of tally sheet	Talliers preferred top down	Count ballots and pre-label all races; use gel pens of 2 different colors;

Test Description	Variable tested	Results	Comments
Felt tip markers vs pens Try dotting and slashing with marker vs pen	Type of pen	Talliers preferred gel pen	
Tested using rubber fingertips, surgical gloves and sticky goop to turn the pages	Each caller had their own preference		Have all available for callers Callers also prefer pausing after an infrequent call—write in, over, under
Tested times and productivity of the top-down tally sheet	Call varying races with different numbers of candidates	Actual times ranged from 1:25 to 2minutes	It is beneficial to agree up front on how to shorten the names to call them out. Teams thought that using a second color for the recount was better and so it was suggested to start say with blue and recount in red. Then when you get to the next 50 ballots you can switch to red and recount blue. Overall, they didn't prefer blue or black and wondered if they could do say purple and green as colors that would pop more There is a tradeoff between productivity and accuracy and there seemed to be a nice cadence pace at around 1:45-2 minutes. If you go faster, it may lead to fatigue or inaccuracies. If it goes too fast it can create anxiety. For more info and a video demo: https://www.scsafeelections.org/updates/notes-from-our-hand-count-workshop/

Test of Tally Method-USCASE.org- 4 person teams 2 callers, 2 talliers; see details in the appendix

Test Description	Variable tested	Results	Comments
Sort candidates for each race count in stacks of 25	Batches grouped in stacks of 25. Total of 126 ballots	15 minutes for 6 items/races; 12 minutes 5 items and 7 items	one democrat and one republican were responsible for reviewing the ballots and calling out one race at a time, for all of the ballots before proceeding to the next race, both election judges would review and agree on the winner, and make decisions about ballot issues together, for

Test Description	Variable tested	Results	Comments
			example voter intent issues, while the other side of the table, had one democrat and one republican with their own tally sheets in binders, where they would record the vote called out for each race and each candidate, with a "/'.
	Count per race in batches of 50 for a total of 126 ballots	7-10 minutes per race	
	Count per race in batches of 50 for a total of 126 ballots	7-8 minutes per race	
	Count per race in batches of 50 for a total of 386 ballots	21-24 minutes per race	
Virtual Hand-count test	Counted per race in batches of 50 ballots 11 races in total	Averaged approximately 1:30minutes per batch and roughly 9-10 minutes per race We finished the 11 races and all 250 ballots in roughly 2 ½ hours	Comments: Pause if a different category is mentioned which is not common, ex: Write in, Over vote, Under vote Inflection and pitch are extremely important. Use a different pitch when announcing one name or category versus another. Choose and agree on a first or last name that is shorter to reduce time. Write that under the formal name before you start. Determine which way you will slant the tally in the box based on whether you are left or right-handed Move empty columns on the sheet to the right to minimize hand eye movement Don't forget to switch pen colors every 50 ballots

Test Description	Variable tested	Results	Comments
			Races where one candidate dominates are quicker to count. Use commands such as “Start,” “match,” “Switch pens,” “Last Ballot” to save time and for the whole team to hear. Minimize any causal talking; stay focused on the counting. Take a break at least every hour to hour and a half.

Conclusions from above: top-down as opposed to left to right tally sheets were most productive and had the best times. We can count 50 ballots per race in less than 2 minutes.

Summary of Calculator method test findings– conducted in Texas

Test Description	Variable tested	Results	Comments
Push button custom made "calculator" that has 4 buttons on each one. 2 people, 1 dem and 1 rep review and press what is called. I caller which can rotate	250 ballots, 21 races, 42 candidates, batch of 50 each for 5 stations, 10 people	On average, 250 ballots in 1 hour with the variables listed in column 2	Electricity needed; not required to be certified in TX; counting in pairs; 2 reconciliation methods; pairs within a race are counted – not the entire ballot; no paper trail for how the tally was achieved but the camera video would show it; correcting a mistake is very easy – just push the red button; training was easy in the numerous simulations done in TX; set-up is simple after a couple of practices
	2 cameras per stations; one over the ballots, one over each station; a room camera would be ideal	Video can be recorded and live streamed where feasible or recorded only and posted on the County website the next day or the Party's website.	Each ballot can be seen and recounted without expensive recounts; no poll watchers needed; mistakes can be found easily by replaying the video; manipulating the video would be astronomically mathematically impracticable, but if done, the fraudulent result would conflict with the paper result, so a recount would be done immediately

Exhibit 10 – Estimate of Costs of Tally Method Hand-counting

Here are the costs for the materials necessary for the count. A cost analysis for South Dakota comparing the ongoing costs of an electronic system versus a hand count system is provided in Exhibit 1.

General Cost Estimates for Hand-counting

Assumptions:

- Precinct size must be kept to maximum of 1,500
- Maximum turnout for largest general elections is approximately 65%
- Typical productivity including breaks is about 100 ballots per hour per 4-person team

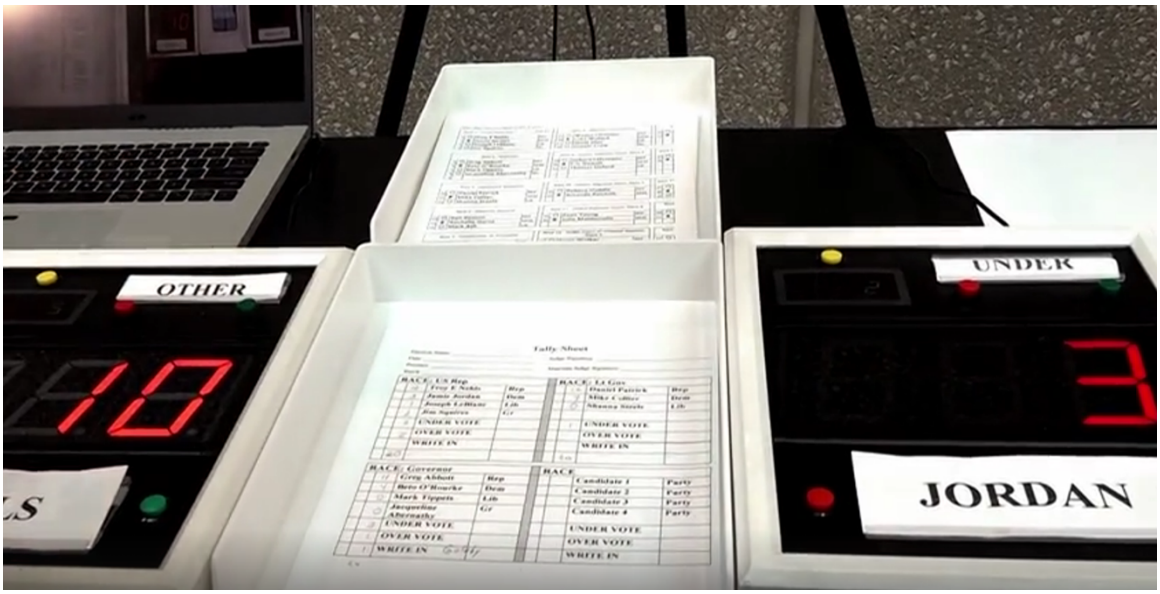
Item	Per unit cost	#items needed for 1500 elector precinct 3 teams	Total cost 3 teams	Upfront cost for added transparency 3 teams
People/workers	$30/hour 3 hours	13 3 teams of 4 plus supervisor	$1,170.00	
BIC Cristal Xtra Smooth Ballpoint Pen, Medium Point (1.0mm) 10 for $1.57 on Amazon	$1.57 for 10		2.00	
Tally sheets	500 sheets of 28lb paper =$21		$21.00	
Binders 1 inch	$2.50 for 2	3	$7.50	
Tripod for overhead mount of camera(s) for video (with clamp)	$80	3		$240
Camera for video of counting/ballot	Android (refurbished) A12 $105	3		$315
Laptop for live feed (optional)	$500	3		$1500
Total ongoing			$1,200.50	
Total upfront investment				$2010

iPhone/Android holder – https://www.sweetwater.com/store/detail/CompLightKit--joby-compact-light-kit
Android - (Walmart) - https://www.walmart.com/ip/SAMSUNG-Galaxy-A12-A125U-32GB-GSM-CDMA-Unlocked-Android-Smartphone-US-Version-Black/883787164?wmlspartner=wlpa&selectedSellerId=101016675

Optional for ballot handling: Fingertip moistener or surgical gloves etc.- optional Lee Sortkwik™ Fingertip Moistener,50% Recycled, 0.63 Oz, Pink, Pack Of 3 $6.77; Swingline Rubber Fingertips, Medium, Size 11-1/2, Finger Cots, 12 Pack (54035) $3.79

Exhibit 11 – Video Demonstration of the Calculator Method

Here is a video of Clint Curtis explaining the method in detail.



Click here to watch: https://rumble.com/embed/v4cgd0q/?pub=10a4fb

Estimate of Retail Pricing for Calculator Method

One Counting Station – 2 people

2 Calculators - $50 x 2 = $100
2 Paper Trays - $15 x 2 - $30
2 Samsung Android A12 - $100 x 2 = $200
1 Tripod with 2 Selfie Sticks - $50-$80
Power Block - $15
Clapper Cards on card stock – depends upon how many pairs of candidates and bulk pricing
Batch Totals Sheets - depends upon how many pairs of candidates and bulk pricing
Pens - $1.57 for 10
1 Laptop per precinct or location- $500
Router - $28
Power Cables for A12s - $6 x 2 = $12
Manpower – 2 per counting station – pay scale determined by County

Approximate total retail pricing for each counting station = $500. Does not include personnel costs. Does not include the laptop.

XI. Notes

1- April 20,2023- Rasmussen Most Voters Suspect Fraud "A majority of voters suspect recent elections have been affected by cheating, and believe officials are ignoring the problem." https://www.rasmussenreports.com/public_content/politics/biden_administration/election_integrity_most_voters_suspect_fraud

2 – Nov 17, 2023 – " The latest Rasmussen Reports national telephone and online survey finds that 56% of Likely U.S. voters believe cheating is likely to affect the outcome of the next presidential election," - https://www.rasmussenreports.com/public_content/politics/biden_administration/election_integrity_56_say_cheating_likely_in_2024

3- July 21, 2022-CNN Poll: Americans' confidence in elections has faded since January 6 https://www.cnn.com/2022/07/21/politics/cnn-poll-elections

4- Help America Vote Act of 2002 https://www.eac.gov/sites/default/files/eac_assets/1/6/HAVA41.PDF

5- Clint Curtis Congressional testimony on the allegation that he was asked to write a program for a touchscreen voting machine that would make it possible to change the results of an election undetectably https://www.youtube.com/watch?v=1uvB1x8Gb_s

6- Avi Rubin on how to hack a voting machine https://www.youtube.com/watch?v=HvJQ4FK-jE0

7- June 13, 2017, Klobuchar Statement on Reports that Russians Hacked Election Infrastructure in 39 States

8- August 5, 2018, Meet the Press Amy Klobuchar https://www.youtube.com/watch?v=9wtUxqqLh6U

9- Federal Prosecution of Election Offenses, Eighth Edition Source: https://www.justice.gov/crt/title-52-voting-and-elections-subtitle-i-and-ii (4)

10- January 25, 2024, Gateway Pundit: Full Scope of Dominion ICX Hack in Federal Court is FAR Worse than Just the BIC Pen Hack – With Transcript https://www.thegatewaypundit.com/2024/01/breaking-professor-election-expert-j-halderman-hacks-dominion/

11- October 18, 2017 (Heritage Foundation 2017-Early Voting Disadvantages seem to Outweigh Benefits)

12- October 7, 2022-Delaware Supreme Court Finds Vote by mail, same-day registration unconstitutional https://www.delawareonline.com/story/news/politics/2022/10/07/delaware-vote-by-mail-ruled-unconstitutional-by-state-supreme-court/69547603007/

13- July 8, 2022, Wisconsin Supreme court declares absentee ballot drop boxes are illegal https://wisconsinexaminer.com/2022/07/08/Wisconsin-supreme-court-declares-absentee-ballot-drop-boxes-are-illegal/

14- Albert Sensors: Front Door to Sensitive Election Data? By Patrick Colbeck- https://letsfixstuff.org/2022/12/albert-sensors-front-door-to-sensitive-election-data/

15- Whistleblower provide video of PA election evidence being destroyed- https://www.americanlibertyreportnews.com/articles/whistleblower-provides-video-of-pa-election-evidence-being-destroyed/

16- November 11, 2020, newsobserver.com- North Carolina doesn't verify voter signature on mail-in ballots- https://www.newsobserver.com/news/politics-government/election/article247083467.html

17- Evidence presentation for the Wisconsin 2020 Election- https://rumble.com/vulh4k-evidence-presentation-for-the-wisconsin-2020-election.html
18- Vulnerabilities of the ES&S DS200 Tabulator- https://www.uncoverdc.com/2021/08/03/vulnerabilities-of-the-ess-ds200-vote-tabulator/
19- EAC VVSG 1.0 (2005) standards https://www.eac.gov/vvsg-10-2005
20-Ohio Voter Files download Page https://www6.ohiosos.gov/ords/f?p=VOTERFTP:HOME:

XII. **Acknowledgements**

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