IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

JILL STEIN, et al., Plaintiffs, v. KATHY BOOCKVAR, in her official capacity as Secretary of the Commonwealth, and JONATHAN MARKS, in his official capacity as Commissioner of the Bureau of Commissions, Elections and Legislation, Defendants.	CIVIL ACTION No. 16-cv-6287(PD)

ORDER

AND NOW, this _____ day of _____, 20___, upon consideration of Defendants' Motion for Leave to File Sur-Reply in Opposition to Plaintiffs' Motion to Enforce the Settlement Agreement (the "Motion for Leave"), it is hereby ORDERED that the Motion for Leave is GRANTED.

IT IS FURTHER ORDERED that the Clerk shall docket the sur-reply attached as Exhibit A to the Motion for Leave, and that the sur-reply shall be deemed filed as of the date of this Order.

_____
Paul S. Diamond, J.

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

JILL STEIN, et al., Plaintiffs, v. KATHY BOOCKVAR, in her official capacity as Secretary of the Commonwealth, and JONATHAN MARKS, in his official capacity as Commissioner of the Bureau of Commissions, Elections and Legislation, Defendants.	CIVIL ACTION No. 16-cv-6287(PD)

DEFENDANTS' MOTION FOR LEAVE TO FILE SUR-REPLY IN OPPOSITION TO PLAINTIFFS' MOTION TO ENFORCE THE SETTLEMENT AGREEMENT

Defendants hereby move for leave to file a brief sur-reply, in the form attached as Exhibit A hereto, in opposition to Plaintiffs' Motion to Enforce the Settlement Agreement (ECF 112). In support of this motion, Defendants respectfully rely on their attached memorandum of law.

WHEREFORE, Defendants respectfully request that the Court grant Defendants leave to file the proposed sur-reply attached as Exhibit A.

HANGLEY ARONCHICK SEGAL PUDLIN & SCHILLER

By: */s/ Mark A. Aronchick*
Mark A. Aronchick
Robert A. Wiygul
Christina C. Matthias
One Logan Square, 27th Floor
Philadelphia, PA 19103
(215) 568-6200

TUCKER LAW GROUP
Joe H. Tucker
Dimitrios Mavroudis
1801 Market Street, Suite 2500
Philadelphia, PA 19103
(215) 875-0609

Counsel for Defendants

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JILL STEIN, et al., Plaintiffs, v. KATHY BOOCKVAR, in her official capacity as Secretary of the Commonwealth, and JONATHAN MARKS, in his official capacity as Commissioner of the Bureau of Commissions, Elections and Legislation, Defendants.	CIVIL ACTION No. 16-cv-6287(PD)

MEMORANDUM OF LAW IN SUPPORT OF DEFENDANTS' MOTION FOR LEAVE TO FILE SUR-REPLY IN OPPOSITION TO PLAINTIFFS' MOTION TO ENFORCE THE SETTLEMENT AGREEMENT

Defendants respectfully request leave to file a brief sur-reply, in the form attached as Exhibit A hereto, in opposition to Plaintiffs' Motion to Enforce the Settlement Agreement (ECF 112). The proposed sur-reply is limited to rebutting certain discrete arguments and factual misstatements that Plaintiffs made for the first time in their Reply Memorandum (ECF 133) (the "Reply"), and that Defendants have not yet had an opportunity to address:

- Plaintiffs' attempt to excuse their delay in filing suit by pointing to their desire to obtain videos of a pre-settlement ExpressVote XL examination. (Reply at 7-9.)
- Plaintiffs' false statement, with respect to their October 9, 2018 email, that "the ES&S ExpressVote" is "a different system" than the ExpressVote XL. (Reply at 9-10 n.2.)

- Plaintiffs' unfounded claim that Defendants somehow "sandbagged" Plaintiffs because Defendants did not tell Plaintiffs when they should file their Motion. (Reply at 11-12.)
- Plaintiffs' assertions that this Court could postpone decertification of the ExpressVote XL so that it would take effect prior to the November 2020 elections rather than immediately (which would not improve the situation), and that the Commonwealth could "provide all voters who wish to use a genuine voter-verifiable paper ballot the opportunity to do so" (which opportunity already exists under current Pennsylvania law). (Reply at 12-13.)

See, e.g., *Utica Mut. Ins. Co. v. Cincinnati Ins. Co.*, 361 F. Supp. 3d 451, 456 n.2 (E.D. Pa. 2019) (granting leave to file sur-reply addressing "new information" that opposing party had proffered for the first time in its reply brief and had not raised in its original motion). Defendants respectfully submit that the proposed sur-reply will help clarify the record upon which the Court will decide Plaintiffs' Motion.

For the foregoing reasons, Defendants respectfully request that their Motion be granted and that they be granted leave to file the proposed sur-reply attached as Exhibit A hereto.

Respectfully submitted,

HANGLEY ARONCHICK SEGAL PUDLIN & SCHILLER

By: */s/ Mark A. Aronchick*
Mark A. Aronchick
Robert A. Wiygul
Christina C. Matthias
One Logan Square, 27th Floor
Philadelphia, PA 19103
(215) 568-6200

TUCKER LAW GROUP
Joe H. Tucker
Dimitrios Mavroudis
1801 Market Street, Suite 2500
Philadelphia, PA 19103
(215) 875-0609

Counsel for Defendants

EXHIBIT A

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

JILL STEIN, et al., Plaintiffs, v. KATHY BOOCKVAR, in her official capacity as Secretary of the Commonwealth, and JONATHAN MARKS, in his official capacity as Commissioner of the Bureau of Commissions, Elections and Legislation, Defendants.	CIVIL ACTION No. 16-cv-6287(PD)

DEFENDANTS' [PROPOSED] SUR-REPLY IN OPPOSITION TO PLAINTIFFS' MOTION TO ENFORCE THE SETTLEMENT AGREEMENT

In their Reply Memorandum of Law in Further Support of Motion to Enforce the Settlement Agreement (the "Reply"), Plaintiffs largely rehash the arguments of their original Motion. Defendants addressed those arguments in their Response, and will not revisit them here. However, Plaintiffs also make a number of new arguments and factual misstatements, to which Defendants must respond.

According to Plaintiffs, it is *Defendants'* fault that Plaintiffs failed to object to the ExpressVote XL during the settlement process and delayed filing suit for a year. But Plaintiffs' attempt to point fingers fails. First, Plaintiffs complain that Defendants did not provide a video of a pre-settlement ExpressVote XL examination as quickly as Plaintiffs would have liked. *See* Reply at 7-9. The Settlement Agreement, however, does not require Defendants to give Plaintiffs any information about pre-settlement examinations or to provide videos of *any* examinations. *See* ECF 112-1, 5-14. Defendants provided the videos as a courtesy. Had

Plaintiffs believed that they needed examination videos to monitor the settlement, they surely would have included something to that effect in the Settlement Agreement. Moreover, Plaintiffs' own filings demonstrate that the video is irrelevant. Their Motion does not attach the video or refer to it, and their allegations deal entirely with issues that were public knowledge long before November 2018. In an article from May 13, 2018, for example, Jennifer Cohn complained about the ExpressVote's bar codes and its purported lack of a "paper ballot":

> [T]he ES&S ExpressVote Universal Voting System … generate[s] something that some vendors, election officials, and the media misleadingly call a "paper ballot." What they don't mention is that the "paper ballot" includes both text and a barcode, and the barcode (which humans can't read) is the only part of the ballot counted as your vote.

Jennifer Cohn, "States are flocking to by the new 'universal use' touchscreen ballot marking devices …," Exhibit 1 to attached Declaration of Christina C. Matthias.

Second, Plaintiffs try to wriggle out of their October 9, 2018 email by claiming that the email was not about the ExpressVote XL at all, but about something called the "ES&S ExpressVote," "which is a different system." Reply at 9-10 n.2. But there is no "different system" called the "ES&S ExpressVote." The ExpressVote XL, along with other devices with the "ExpressVote" moniker, is a component of a suite of products called the EVS 6.0.2.1 system, which is an updated version of the EVS 6.0.0.0 system. *See* ECF 123-1 at 10-11 ¶¶ 54-59. As of October 9, the Commonwealth had told Plaintiffs' counsel that Pennsylvania was considering the EVS 6.0.2.1, and it was public knowledge that the 6.0.2.1, like its predecessor the 6.0.0.0, included the ExpressVote XL. *See id.* ¶¶ 58-60; U.S. Election Assistance Commission Certification of EVS 6.0.0.0 dated July 2, 2018, Ex. 3 to Matthias Decl., at 2 (listing ExpressVote XL as component device); November 30, 2018 Certification Report for EVS 6.0.2.1, ECF 123-1 Ex. 1 at 1 ("The system presented for certification in Pennsylvania included

… the ExpressVote XL™ (ExpressVote XL) hybrid paper-based polling place voting device"); https://www.eac.gov/voting-equipment/evs-6021-modification/ (documentation for the EVS 6.0.2.1 dating back to September 2018 and including description of components). Moreoever, Plaintiffs' counsel's email links to a discussion of the ExpressVote system, which shows that the ExpressVote XL and other "ExpressVote" BMDs share the features that Plaintiffs complain about in their Motion. *See* Andrew Appel, "Serious design flaw in ESS 'ExpressVote' touchscreen …," Ex. 2 to Matthias Decl. Plaintiffs cannot avoid the fact that they have switched positions with respect to the ExpressVote XL.

Finally, Plaintiffs contend that Defendants "sandbagged" Plaintiffs because Defendants did not tell Plaintiffs when they should file their Motion. Reply at 11-12. But nothing in the Settlement Agreement or the law requires Defendants to manage Plaintiffs' litigation strategy. Plaintiffs were well aware of the fact that elections were approaching and that Pennsylvania counties were purchasing voting machine systems. Indeed, in March 2019, Plaintiffs' expert wrote that "[s]ince many counties are looking to purchase machines, and their decisions might be better informed by public feedback, time is of the essence." Reply at 1. Moreover, Plaintiffs have already been subject to one finding of laches in this case; they should not have needed Defendants to explain to them that delaying their Motion could cause unnecessary harm.

As a fallback position, Plaintiffs now assert that this Court could postpone decertification of the ExpressVote XL until the November 2020 elections. *See* Reply at 12-13. But that would not improve the situation; as Defendants have shown, adoption of a new voting system will take years, not months. *See* J. Lynch Decl., ECF 123-2, ¶¶ 28-33. Alternatively, Plaintiffs suggest that the Commonwealth "provide all voters who wish to use a genuine voter-verifiable paper ballot the opportunity to do so." *See* Reply at 13. But there is no need for the Court to grant this

relief; it is already in place. Recently adopted amendments to the Elections Code provide that all voters may vote using mail-in ballots or absentee ballots, both of which are on paper. *See* Pennsylvania Election Code - Omnibus Amendments, Act of Oct. 31, 2019, P.L. 552, No. 77, Cl. 25, Article XIII-D (2019) (codified at 25 P.S. §§ 3150.11 *et seq*.) Accordingly, any voter who wishes to vote on paper may do so.

For the foregoing reasons and the reasons stated in their Response, Defendants respectfully request that the Court Deny Plaintiffs' Motion.

Respectfully submitted,

HANGLEY ARONCHICK SEGAL PUDLIN & SCHILLER

By: */s/ Mark A. Aronchick*
Mark A. Aronchick
Robert A. Wiygul
Christina C. Matthias
One Logan Square, 27th Floor
Philadelphia, PA 19103
(215) 568-6200

TUCKER LAW GROUP
Joe H. Tucker
Dimitrios Mavroudis
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IN THE UNITED STATES DISTRICT COURT
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JILL STEIN, et al., Plaintiffs, v. KATHY BOOCKVAR, in her official capacity as Secretary of the Commonwealth, and JONATHAN MARKS, in his official capacity as Commissioner of the Bureau of Commissions, Elections and Legislation, Defendants.	:	CIVIL ACTION No. 16-cv-6287(PD)

DECLARATION OF CHRISTINA C. MATTHIAS IN SUPPORT OF DEFENDANTS' SUR-REPLY IN OPPOSITION TO PLAINTIFFS' MOTION TO ENFORCE THE SETTLEMENT AGREEMENT

I, Christina C. Matthias, declare under the penalty of perjury pursuant to 28 U.S.C. § 1746 that:

1. I am an attorney at the law firm Hangley Aronchick Segal Pudlin & Schiller, counsel for Defendants in this action. I submit this Declaration in support of Defendants' Sur-Reply in Opposition to Plaintiffs' Motion to Enforce the Settlement Agreement.

2. Attached as Exhibit 1 hereto is a true and correct copy of an article by Jennifer Cohn dated May 13, 2018, which was downloaded from https://medium.com/@jennycohn1/states-are-flocking-to-buy-the-new-universal-use-touchscreen-ballot-markers-which-have-all-the-bb6708b9665c.

3. Attached as Exhibit 2 hereto is a true and correct copy of an article by Andrew Appel dated September 14, 2018, which was downloaded from https://freedom-to-tinker.com/2018/09/14/serious-design-flaw-in-ess-expressvote-touchscreen-permission-to-cheat/.

4. Attached as Exhibit 3 hereto is a true and correct copy of the United States Election Assistance Commission's Certificate of Conformance for the ES&S EVS 6.0.0.0 dated July 2, 2018.

I declare under penalty of perjury under the law of the United States of America that the foregoing is true and correct.

Executed on December 20, 2019.

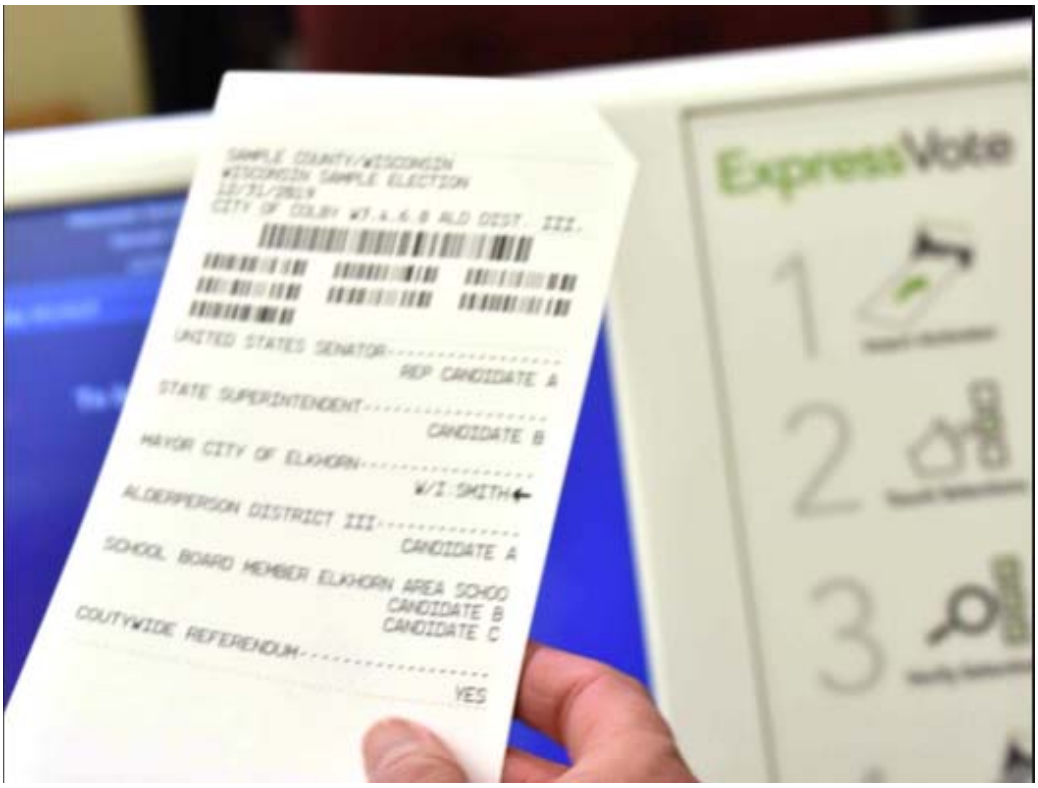
Christina C. Matthias

EXHIBIT 1

Jennifer Cohn Follow
Jul 8, 2018 • 20 min read

States are flocking to buy the new "universal use" touchscreen ballot marking devices, which have all the disadvantages of existing touchscreen voting machines, plus they print unverifiable BARCODES that are then counted as our votes!

By Jennifer Cohn, May 13, 2018



About fifteen years ago, in the wake of the 2000 "hanging chad" debacle, many states bought touchscreen voting machines, using the billions of dollars allocated to states under the Help America Vote Act of 2002. Quite a few of these machines are still in use today.

Touchscreen voting machines — with or without so-called Voter Verifiable Paper Audit Trails ("VVPATs") — have been a disaster for election integrity because voters cannot know if their vote as recorded **inside** the machine — where the actual counting occurs — matches their intention or even the wording on the VVPAT. (1) Thus, when election officials and others describe these paper printouts as "voter verifiable," they lull the country into a false sense of security because the VVPAT itself isn't actually counted as your vote.

Unlike hand marked paper ballots, VVPATs are counted only if included in a manual audit or manual recount. Given the dismal status of state recount and audit laws, this means that most VVPATs (unlike hand marked paper ballots) are never counted at all. (2)

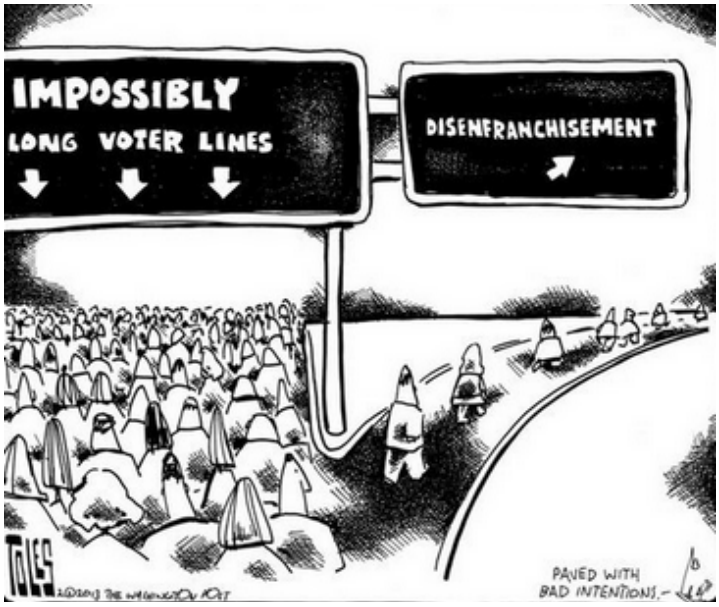
Even when VVPATs are used in hand recounts or manual audits, there is no way to know which VVPATs, if any, were actually reviewed for accuracy by the voters. Depending on the length of the lines and whether election officials provide instructions, voters may not review them at all. (3) Studies suggest that most voters won't notice discrepancies even if they undertake such review (which is unlikely) (3,4), and that they won't start over even if they find a problem (5).

It has also proven difficult to actually catch errors when reviewing VVPATs in a post-election recount or audit. A study conducted by CalTech/MIT found that "[o]ut of 108 elections that contained errors, … no errors were reported in the VVPAT audit." (Id.)

Meanwhile, jurisdictions that use touchscreen voting machines generally have **longer lines** than those that count hand marked paper ballots on optical scanners. (6) This is especially true during peak voting hours because many people can hand mark their ballots at the same time, whereas with touchscreen voting machines, you are limited by the number of machines distributed to the polling place.(7) "Only one optical scanner is required in each polling place to serve the same number of voters as ten to twelve electronic voting machines." (8) Optical

scanners are also less expensive than touchscreens, which means localities can buy more machines. (9)

Long lines are not merely inconvenient. They can also **disenfranchise** voters who are unable to wait due to health issues, old age, or work and family commitments.



On a related point, if equipment doesn't work at all—due to a "denial-of-service" attack or unintentional "glitch"—the potential for voter disenfranchisement is much greater with touchscreen voting machines than with hand marked paper ballots counted on optical scanners (where electronic failures stop only the counting, not the actual voting). In 2008, voters in Horry County, South Carolina were forced to "vote" on "**scraps of paper**" when "human error" caused the touchscreen voting machines to malfunction in 80% of the county's precincts in 2008. (10) "State Election Commission spokesperson Chris Whitmire was widely quoted as telling people to vote on '**paper towels**' if necessary." (11) In 2016, "Improperly coded memory cards" led 3/4 of all the machines in Washington County, Utah to break down. Poll sites offered backup paper ballots — "until some of them **ran out** and told voters to come back later." (12)

Fortunately, most touchscreen voting machines have finally reached the end of their lives, and Congress has recently allocated more than $300 million to help

states "upgrade." (13) Unfortunately, rather than upgrade to hand marked paper ballots, many localities are embracing yet another supposedly "verifiable" but not really verifiable touchscreen device: **touchscreen ballot markers.**

Touchscreen ballot markers have been used for years to assist voters with disabilities. But in the past few years, vendors have marketed them for universal use. The two most popular "universal" touchscreen ballot markers are the **ES&S ExpressVote Universal Voting System** and the **Dominion ImageCast Democracy Suite.**

ES&S **Dominion**

These touchscreen ballot markers generate something that some vendors, election officials, and the media misleadingly call a "paper ballot."

What they don't mention is that the "paper ballot" includes both text and a **barcode**, and the barcode (which humans can't read) is the only part of the ballot counted as your vote. This specific concern was highlighted by **Computer Science Professor Duncan Buell** (University of South Carolina) in a Voting Technologies Task Force report submitted to the South Carolina League of Women Voters:

> "The new ES&S voting machine, the ExpressVote, has major problems, beginning

> with the fact that the voter cannot verify the ballot information that will be counted by examining the ballot... The voter may think that s/he is seeing a list of names that will be counted, but it is the barcode, not the list, that is read by the scanner that counts the vote." (14)

As explained by a recent p**anel of election security security experts**, this is problematic because barcodes present an opportunity for hackers:

> "[B]arcodes on ballots...could give hackers a chance to rewrite results in ways that could not be traceable..." (15)

Thus, when the Georgia legislature recently considered a bill that would have allowed the state to replace its paperless touchscreens with these touchscreen

ballot markers, **Computer Science Professor Richard A. DeMillo** (Georgia Institute of Technology) spoke out against it:

> Despite the recent fascination with electronic ballot markers that print bar codes for scanning ballots, bar codes have no place in Georgia's election system. They introduce a whole new class of vulnerabilities. (16)

As Professor DeMillo explained to CBS46 news in Atlanta, "The difficulty with that [barcodes on ballots] is that you and I can't read barcodes." (*Id.*) If a hacker got to the barcode, DeMillo says they could manipulate the counting: "For example, telling the barcode reader to flip votes on demand or at a certain time." (*Id.*)

But even without the barcodes, as explained by Verified Voting, ballot marking systems "require programming, servicing and software licensing fees. They are also susceptible to breakdown and hacking." (17)

Moreover, similar to touchscreen voting systems, **touchscreen ballot marking systems cost more than twice as much as optical scan systems**. (18) Thus, for the same economic, logistical, and common sense reasons discussed above as to touchscreen voting machines, touchscreen ballot marking systems are more likely than optical scan systems to cause **long lines** and potentially disenfranchise voters. After Maryland tried the ES&S ExpressVote in 2016, "all but one county opposed widespread use" because they took voters longer to use than hand marked paper ballots:

> "[V]oters took far longer to vote using the [ExpressVote] ballot marking device than to

> mark a paper ballot by hand. This caused lines of people waiting to use the ballot marking device..." — Rebecca Wilson, Chief Election Judge, Prince George's County Precinct 17–01, Maryland (19)

In recent testimony, Verified Voting agreed that touchscreen ballot markers would likely cause longer lines than hand marked paper ballots counted on optical scanners. (20)

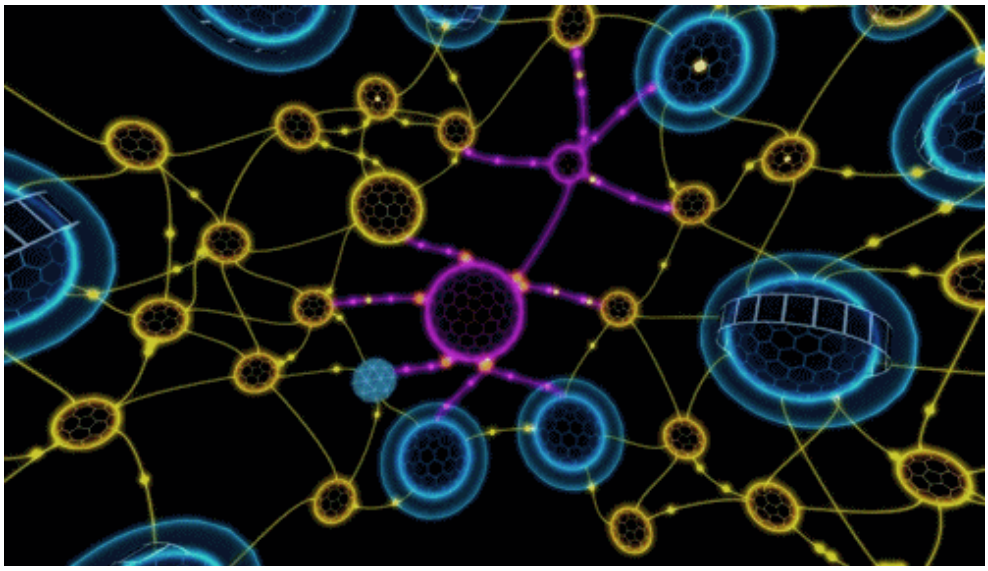
Making matters worse, the particular optical scanner that comes with the ES&S ExpressVote — the DS200 — was recently discovered to include **cellular modems.** (21) According to **Computer Science Professor Andrew Appel** (Princeton), the cellular modems in the DS200 scanners make it easy for a "man-in-the-middle" hacker to alter votes. (22)

And that's not all. The New York Times recently published an explosive piece on ES&S, which revealed that the vendor has sold systems with **remote access software.** (23) "Voting machine vendor ES&S offered a remote access option in 2006 and in 2011, according to *The New York Times*." (24) In 2017, ES&S signed a ten year contract with the state of Michigan, which also referenced a "remote access" option. (25) When confronted by reporters, however, ES&S claimed that the remote access option in the Michigan contract pertained only to "print on demand" devices used to print blank ballots. (26)

A Florida Department of State report shows that Dominion has also sold systems with "remote access" software. (27) When asked to explain, Dominion said it "does not remote into any Florida customer site," and that "this is not a method by which we provide customer service." (28) As of 2009, its ballot markers apparently came "equipped with a convenient **slotted hole** that allows anyone to stuff ballots directly into the locked ballot box." (29) They also reportedly came "equipped with **USB ports"** that could "facilitate network, internet and wireless access." (30)

Alarmingly, the ES&S and Dominion touchscreen ballot markers are starting to spread throughout the country like a virus. Quick searches on Google and Twitter reveal that counties in Wisconsin, Texas, Louisiana, Kentucky, West Virginia, Tennessee, New Jersey, Indiana, and Arkansas have already purchased the ExpressVote. And Colorado uses the ImageCast for election-day voting. Georgia Secretary of State Brian Kemp is also enamored of the ExpressVote, and

Pennsylvania appears poised to choose it as the state's new voting system in the next few weeks. That is, unless we can stop this train wreck ourselves.



Unfortunately, the Election Assistance Commission ("EAC") has not, and most likely will not, lift a finger to discourage the spread of these touchscreen ballot markers. On the contrary, it has already certified both the ExpressVote and the ImageCast systems. (31) This is not surprising. In 2006, the National Institute of Standards and Technology recommended that the EAC **not** certify further purchases of paperless touchscreen voting machines, but the recommendation was **rebuffed**. (32)

Meanwhile, the recently appointed EAC chairman, Thomas Hicks, has lulled the public and perhaps some election officials into a false sense of security by spreading the myth that voting machines can't be hacked because they don't connect to the internet. (33) In reality, computer science experts agree that all voting machines can be attacked through the internet (and otherwise) — even if they do not directly connect to it and lack remote access software, cellular modems and USB drives — because (among other reasons) they all receive programming before each election from centralized computers that often do connect to the internet. (34) We must therefore strive to **minimize** our use of

electronic election equipment, not **double up** on it with the addition of unnecessary touchscreen ballot markers.

You can check whether your own county and state use the ES&S ExpressVote or Dominion ImageCast systems with the tool linked here, although I'm not sure how often this tool is updated. https://www.verifiedvoting.org/verifier/ Thus, it would be best to contact your state and county election boards directly to see if they use or plan to use these systems. Don't panic if your county has already bought the ExpressVote or ImageCast. The question is whether they plan to use these touchscreen ballot markers for all voters (which would be irresponsible) or limit their use to voters who are unable to hand mark their ballots (appropriate).

When discussing election equipment with state and local election officials, your message should be clear. Please tell them:

- No to touchscreen voting machines
- No to touchscreen ballot markers (except for voters who are unable to hand mark)
- No to barcodes on ballots
- Yes to hand marked paper ballots.

Please convey this same message to your Members of Congress as well.

It might also help to give them examples of jurisdictions that are getting it right. Minnesota, Massachusetts, North Dakota, New Mexico, and New Hampshire use hand marked paper ballots throughout the state (although with the exception of New Mexico, they lack laws requiring meaningful post-election audits, a problem plaguing almost every state in the nation). (35) So does Virginia, which recently decertified touchscreen voting machines in favor of hand marked paper ballots counted on optical scanners. (36) Missouri lawmakers have introduced legislation — currently pending in the state senate — requiring hand marked paper ballots counted on optical scanners as well. (37)

Thus, there is hope. We must not allow profit-motivated vendors and complicit election officials to snuff it out with half-truths and outright lies about the supposed "verifiability," "security," and non-existent "cost saving" features of touchscreen ballot markers and barcodes on ballots.

Updates.

7/18/18

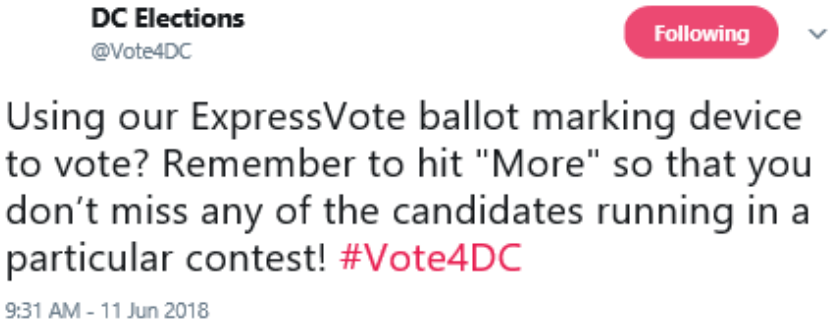
I forgot to mention that vendors and their minions will sometimes try to fool people with the claim that hand marked paper ballots must be "verified" too. But in reality, "voter verification" refers to the need for voters to review the paper printout from a touchscreen voting machine or touchscreen ballot marker to confirm that the touchscreen hasn't flipped their selections. This is not an issue with hand marked paper ballots because they are software independent!

Vendors will also sometimes to try to fool people with the claim that hand marked paper ballots have a higher error rate than paper printouts from touchscreens. But there are no studies to support this. And explained by Professor Stark (UC Berkeley) who invented post-election Risk Limiting Audits, "[t]he percentage of truly ambiguously hand-marked ballots is microscopic, as statewide recounts in Minnesota have shown. With rare exceptions, voter intent is usually quite clear to

humans reading ballots. Examples:
http://minnesota.publicradio.org/features/2008/11/19_challenged_ballots/round1/;
http://minnesota.publicradio.org/features/2008/11/19_challenged_ballots/"

7/12/18

Here is another recently reported problem with the ExpressVote. If you don't hit the "More" button, you apparently won't see all the candidates!



In addition, Sedgwick County, Kansas recently reported that ExpressVote touchscreen barcode ballot markers have a "**design flaw**" that caused problems in the special election to fill Mike Pompeo's seat!

- https://www.kansas.com/news/politics-government/election/article144065034.html [referencing "design flaw" with the County's new touchscreens];
- https://www.sedgwickcounty.org/media/36389/17-0005.pdf ["Sedgwick County, Kansas … is seeking a firm or firms to provide one or more Electronic Poll Books," which "must be compatible with the ExpressVote Voting machines that the county will be using for elections beginning in 2017."]

6/13/18

This **10-minute video** by election integrity advocate Lulu Friesdat — who is also an Emmy award winning documentarian — includes footage showing that voters typically do **not** review VVPATs. It also includes a discussion with Computer Science Professor Richard DeMillo (Georgia Tech) about the security concerns regarding barcodes on ballots from touchscreen ballot markers like the ExpressVote and ImageCast. The video is a "must watch" for anyone interested in election security.
https://www.facebook.com/NowThisPolitics/videos/2085885331442946/

On a related point, even without the barcodes, the "summary cards" from touchscreen ballot markers like the ES&S ExpressVote and Dominion ImageCast are extremely problematic. Looking at the "summary card" mock-up below, without a cheat sheet, would you notice if a few of your selections were **deleted**? Also, note how there is no reference to party affiliation. Again, without a cheat sheet, would you expect most voters to remember the last names of who they selected for judge, clerk, Tax Commissioner, etc.? Would you remember the content of each and every Constitutional Amendment or Proposition as cursorily described in the summary card?

Remarkably, these "summary cards" have **not** been subjected to **human usability studies**! In fact, the EAC advisory board recently **voted down** a proposed resolution by UC Berkeley Professor of Statistics Philip Stark to withhold certification unless and until such studies are conducted. (38)

One of the "no" votes came from Jim Dickson whose organization has accepted donations from Diebold, which was acquired by ES&S in 2009. (39) (When Diebold dissolved in 2010, its assets were divided between ES&S and Dominion Voting.)

Another important ' ınd's state elections administrator. Ms. L he state's purchase of paperless Diebold vere "able to remotely upload, dc administrator privileges. Results c g votes from precincts." (40) Wh)06 to switch to paper ballots, LaMo ·polling books. (41) The e-polling books **allowed herself to**

appear in Diebold [redacted] later censured by the governor. (Id.)

If this sounds familiar, you may be thinking of Georgia's former Secretary of State Cathy Cox who similarly appeared in Diebold promotional materials after signing a $54 million contract with the company in 2002.

DIEBOLD COVER GIRL COX
Outgoing Georgia Secretary of State, Cathy Cox (D) as featured on Diebold's publicity brochure.

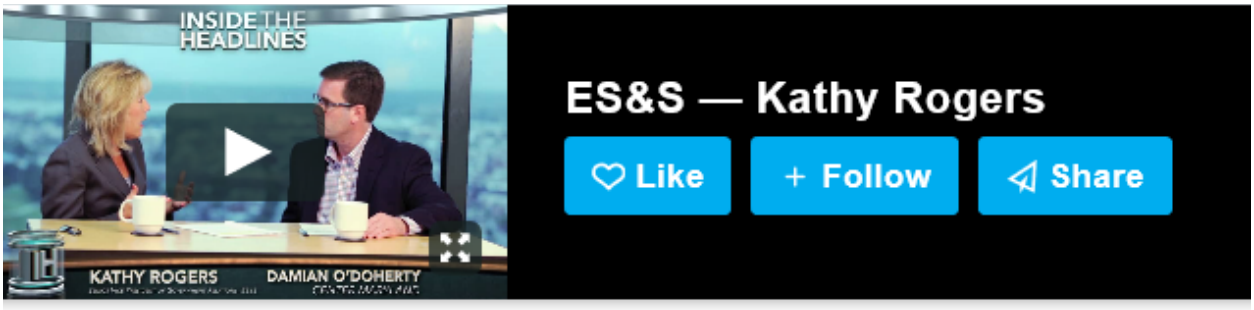
Cox's former election director, **Kathy Rogers**, likewise raised eyebrows when she moved to Diebold after presiding over Georgia's deployment of Diebold's paperless machines and defeating a paper trail bill. (42) Cox moved to ES&S when it acquired Diebold in 2009. Her online bio states that she was responsible for implementing Georgia's paperless voting machines in 2002.

This tenacious trio — Cox, Rogers, and LaMone — has consistently defended touchscreen voting machines, disregarding the grave concerns raised again and again by independent IT experts:

> Maryland's Linda Lamone, [and] Georgia's Kathy Rogers and Cathy Cox ... were among the state election officials who consistently blasted computer scientists for our criticism of their beloved touch screens. These people behaved as if they were the vendors whose products were being attacked, when in fact they were

> customers who had been sold inadequate products. I could easily imagine what motivated them. The DRE voting machines unquestionably made elections much easier to administer. They conveyed an element of progress as well. Officials who brought in these machines could feel proud about keeping pace with the "state of the art." (43)

Alarmingly, Rogers is now encouraging counties throughout the United States to replace their aging touchscreen voting machines with the touchscreen barcode ballot markers from ES&S, i.e., the ExpressVote. Here is a link to a video of her promoting the ExpressVote in Maryland. https://vimeo.com/97866270



ES&S — Kathy Rogers

4 years ago | More

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Maryland fell for the pitch. Despite grave concerns expressed by Maryland's Department of Information Technology, the state deployed the ExpressVote for

universal use during early voting in 2016. (45) ES&S declared Maryland's use of the ExpressVote to be a huge success. (46)

But the Maryland Elections Board was so **unimpressed** that it decided to limit the use of the ExpressVote — originally leased by the state for universal use — to voters who are unable to hand mark their ballots. (47) In fact, "**all but one [Maryland] county opposed widespread use [of the ExpressVote machines]**" because (among other reasons) they took voters longer to use than hand marked ballots! (48)

Although many individual counties throughout the U.S. have fallen for the Expressvote, Maryland's decision to ditch the ExpressVote means that no state is currently committed to the ExpressVote for universal **statewide** use. Rogers hopes to make Georgia the first — just as Georgia was the first to deploy touchscreen voting machines statewide in 2002. Earlier this year, she persuaded state legislators to include language in a voting system bill that would have allowed touchscreen barcode systems like the ExpressVote. The bill sailed through the Georgia senate and failed in the state House only after on-the-ground activists caught wind of the problematic language and protested. Rogers has nonetheless won over Georgia's current Secretary of State, Brian Kemp, who has already test piloted the system. It is therefore up to concerned Georgia voters to sound the alarm and demand that the newly established Georgia Voting Commission reject touchscreen barcode balot markers once and for all.

Bio

Background: Jennifer Cohn is an attorney and election integrity advocate in the San Francisco Bay Area who graduated from UCLA and Hastings College of the Law. As an attorney, her areas of practice included insurance coverage and appellate law. She practiced law for more than twenty years, including seven years as a partner with Nielsen Haley & Abbott, LLP in Marin County, California. Since 2016, she has devoted her professional efforts full time toward investigating our

insecure election system and potential solutions. She can be contacted through her Twitter account, @jennycohn1.

End Notes

1. https://nyvv.org/reports/VVPAT_PB.pdf

- **Direct recording electronic voting machines are UN-VERIFIABLE and UN-AUDITABLE. With DREs, votes are recorded and counted electronically and cannot be directly observed.**

  Paper trails are only partial correctives designed for the paperless touch screen machines already purchased in some places. Computer scientist Dr. Rebecca Mercuri has said, "Any programmer can write code that displays one thing on a screen, records something else, and prints yet another result."[4]

  In addition, a study done in Nevada showed that only 31% of voters actually compared the audit trail to the screen upon which they voted.[5]

2 https://thinkprogress.org/how-easy-would-it-be-to-rig-the-next-election-819326cbbbd/ ["'Most states never look at the paper,' Bernhard said in their CCC presentation. 'You have a great way to defend against an attack, but you never use it.'"]

https://medium.com/@jennycohn1/it-is-difficult-to-get-a-hand-recount-in-the-u-s-even-when-voting-machines-use-paper-ballots-3a9b65feea60 [compilation of sources re: the difficulty of obtaining meaningful hand audits and hand recounts in the U.S.]

3. https://arstechnica.com/information-technology/2007/04/congress-finally-considers-aggressive-e-voting-overhaul/ [Las Vegas survey found that "fewer than 40 percent of voters actually checked the paper record of their vote before leaving the polling place."]

https://nyvv.org/reports/VVPAT_PB.pdf ["In addition, a study done in Nevada showed that only 31% of voters actually compared the audit trail to the screen upon which they voted."]

4. http://chil.rice.edu/research/pdf/EverettDissertation.pdf, pp. 2–3 [a Rice University study of voting machine "review screens" showed that "**over 60% of**

voters do not notice if their votes as shown on the review screen are different than how they were selected. Entire races can be added or removed from ballots and voter's candidate selections can be flipped and the majority of users do not notice."]

5. https://dspace.mit.edu/bitstream/handle/1721.1/96553/vtp_wp16.pdf?sequence=1, p. 10 [Professor Ted Selker of MIT reports that, "In watching 500 voters casting ballots, **I saw less than one in 10 people who, when they were told they had a problem with their ballot, were actually willing to take a new ballot and vote again**."]

http://www.ted.selker.com/documents/resumefiles/VTP%20PDF%20docs/vtp_wp28.pdf [It has also proven difficult to catch errors when reviewing VVPATs in a post-election recount or audit. A study conducted by CalTech/MIT found that "[o]ut of 108 elections that contained errors, … no errors were reported in the VVPAT audit."]

6. http://news.mit.edu/2013/3-questions-charles-stewart-voting-systems-united-states-0206.

https://arxiv.org/ftp/arxiv/papers/0810/0810.5577.pdf [Academic paper: "Touchscreen voting machines cause long lines and disenfranchise voters"]

http://www.votersunite.org/info/infopacket-banninge-ballots.pd [f"Voting on paper ballots helps to prevent long lines, since voters don't have to wait for an available machine before they can mark their ballots."]

7. https://arxiv.org/ftp/arxiv/papers/0810/0810.5577.pdf [Academic paper: "Touchscreen voting machines cause long lines and disenfranchise voters"]

https://en.wikipedia.org/wiki/Optical_scan_voting_system#Benefits_of_optical_scan_voting_machines [Using hand marked paper ballots counted on optical scanners "allows many more people to simultaneously vote than would be the case with fully computerized voting."]

8.http://www.votersunite.org/info/infopacket-banninge-ballots.pdf ["Only one optical scanner is required in each polling place to serve the same number of voters as ten to twelve electronic voting machines."]

9. https://theboard.blogs.nytimes.com/2007/11/29/say-no-to-computerized-voting-machines/ ["Optical scans are also far less expensive than touchscreens. That means localities can buy more machines, keeping lines at the polls shorter."]

10. http://www.cnn.com/2008/POLITICS/01/19/south.carolina.gop/index.html

11. http://votetrust.verifiedvoting.org/index.php?option=com_content&task=blogcategory&id=63&Itemid=143 ["State Election Commission spokesperson Chris Whitmire was widely quoted as telling people to vote on 'paper towels' if necessary."]

12. https://www.thespectrum.com/story/news/2016/11/08/election-machine-problems-early-washington-county/93470912/?hootPostID=884417d80befb56efe41e9f9dd4005e5 ["Improperly coded memory cards" led 3/4 of all the machines in Washington County, Utah to break down. Poll sites offered backup paper ballots — "until some of them ran out and told voters to come back later."]

https://news.vice.com/en_us/article/vby4da/voting-machines-are-broken-at-every-polling-place-in-one-utah-county ["Election officials scrambled to issue paper ballots in some locations, which quickly ran out, according to reports online. Paper ballots were not offered in other locations, such as St. George and Hurricane, local newspaper The Spectrum reported."]

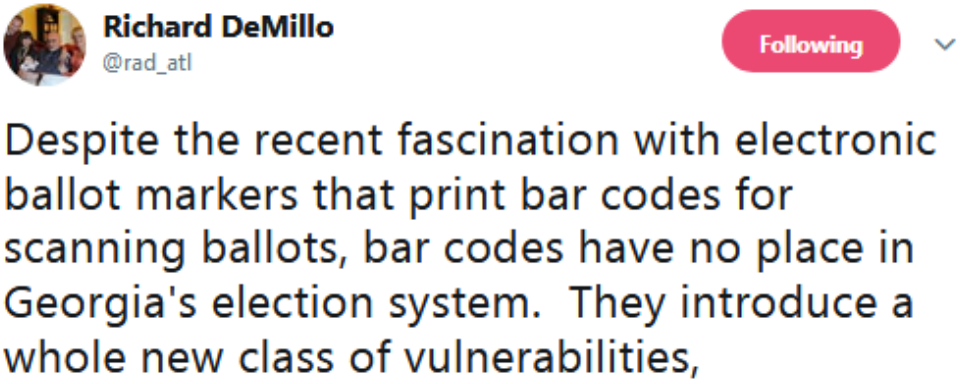
13. https://www.washingtonpost.com/opinions/america-is-still-unprepared-for-a-russian-attack-on-our-elections/2018/04/22/70dbe500-4279-11e8-ad8f-27a8c409298b_story.html?utm_term=.301d341f5aa8

14. http://clemsonarea.sc.lwvnet.org/files/TaskForceReauthorization.pdf …

15. https://www.washingtontimes.com/news/2017/sep/12/voting-machines-can-be-hacked-without-evidence-com/

No such thing as an un-hackable voting machine
President Trump's Voting Integrity Commission unexpectedly revealed important evidence suggesting that a return to…www.americanthinker.com

16. https://twitter.com/search?q=DeMillo%20barcodes&src=typd [Professor Richard DeMillo of Georgia Tech: "Despite the recent fascination with electronic ballot markers that print bar codes for scanning ballots, bar codes have no place in Georgia's election system. They introduce a whole new class of vulnerabilities."]



http://www.cbs46.com/story/37681997/bill-to-update-georgias-voting-machines-runs-into-resistance [Professor DeMillo interview with CBS46 News in Atlanta, Georgia]

17. https://www.verifiedvoting.org/testimony-of-verified-voting-to-the-georgia-house-of-representatives-11302017/ ["Additionally, these systems would also require programming, servicing and software licensing fees. **They are also susceptible to breakdown and hacking"]**

18. https://www.electiondefense.org/vote-no-on-sb-403/

"Over 70% of the country votes on paper ballots are marked directly by the voter with a pen that costs less than a dollar," said Ben Ptashnik, executive director of the National Election Defense Coalition. "While it is essential to provide accessible ballot marking devices for voters that may require assistance, it's ludicrous to require the use of a $3000 computer device for all voters to do the same job as a pen. Kemp's plan would cost Georgia taxpayers over $100 million, while testimony before the legislature shows that Georgia can purchase a new voting system with voter-marked paper ballots and assistive ballot marking devices for disabled voters for approximately $30 million."

https://www.verifiedvoting.org/testimony-of-verified-voting-to-the-georgia-house-of-representatives-11302017/

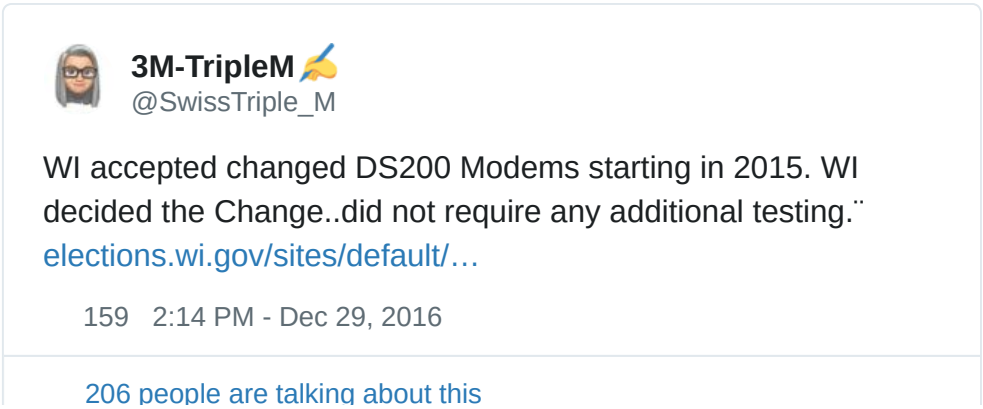
In contrast, the system trialed in Rockdale, (which requires all voters to use a computerized device to mark their ballots) requires purchasing multiple ballot marking devices for each polling location, escalating the cost considerably. It has been estimated that new voting machines for the entire state based on the Rockdale model would cost over $100 million. Additionally, these systems would also require programming, servicing and software licensing fees. They are also susceptible to breakdown and hacking

If Georgia were to adopt a voter-marked paper ballot and ballot scanning system, like those used in most of the country, it would cost considerably less. Based on a projection of 3,000 polling locations in Georgia, we estimate new equipment for the state would cost around the $ 30,000,000 mark. This is based on prices quoted to the state of Michigan3 which recently purchased new ballot scan tabulators.

19. http://www.gaverifiedvoting.org/pdf/v-state-voting-systems/2017-Statement-Supervising-Elections-PBOS-Rebecca-Wilson-Maryland.pdf …

20. https://www.verifiedvoting.org/testimony-of-verified-voting-to-the-georgia-house-of-representatives-11302017/

21.https://www.democraticunderground.com/12512657652



22. https://freedom-to-tinker.com/2018/02/22/are-voting-machine-modems-truly-divorced-from-the-internet/ … …

23. https://www.nytimes.com/2018/02/21/magazine/the-myth-of-the-hacker-proof-voting-machine.html

24. https://www.csoonline.com/article/3267625/security/want-to-hack-a-voting-machine-hack-the-voting-machine-vendor-first.html ["Voting machine vendor ES&S offered a remote access option in 2006 and in 2011, according to *The New York Times*."]

25. Id.

26. Id.

27. https://www.csoonline.com/article/3267625/security/want-to-hack-a-voting-machine-hack-the-voting-machine-vendor-first.html

28. Id.

29. https://radyananda.wordpress.com/2009/06/08/ballot-stuffing-holes-illegal-usb-ports-add-to-sequoia-dominion-voting-system-flaws/

30. Id.

31. https://www.essvote.com/blog/31

http://www.dominionvoting.com/products

32. https://freedom-to-tinker.com/2006/12/01/nist-recommends-not-certifying-paperless-voting-machines/

http://www.washingtonpost.com/wp-dyn/content/article/2006/12/04/AR2006120401290.html

33. https://www.c-span.org/video/?c4668571/alex-halderman-voting-system [transcription below]

34. Id; see also https://www.youtube.com/watch?v=AD3qqBfU0no [transcription below]

https://www.youtube.com/watch?v=AD3qqBfU0no [video of Computer Science Professor Alex Halderman's July 2017 Congressional debriefing: "Somehow, before the election, the machines have to receive their programming: who's on the ballot. And this comes from a computer called an Election Management System. Often, these Election Management System computers are connected to the internet. And if the Election Management System computer is targeted by attackers and infected, that infection can spread to the memory cards that are going to program all of the voting machines in that entire area."]

See also https://freedom-to-tinker.com/2016/09/20/which-voting-machines-can-be-hacked-through-the-internet/ [Article by Computer Science Professor Andrew Appel (Princeton)]

See also https://medium.com/@jennycohn1/all-voting-machines-can-be-hacked-including-through-the-internet-8d054645e860 [article compiling sources on this subject]

35. https://cdn.americanprogress.org/content/uploads/2018/02/21105338/020118_ElectionSecurity-report11.pdf#page=31

36. https://www.washingtonpost.com/local/virginia-politics/virginia-scraps-touch-screen-voting-machines-as-election-for-governor-looms/2017/09/08/e266ead6-94fe-11e7-89fa-bb822a46da5b_story.html?utm_term=.3e47b98368f2

37. https://kmox.radio.com/articles/push-paper-ballots-progresses-missouri-general-assembly

38. file:///C:/Users/je :rosoftEdge_8wekyb3d8bbwe/Temp :/erbatim_2018–04–24.pdf

Missouri's Coalition for Transparent and Secure Elections

Missouri's Coalition for Transparent and Secure Elections. 791 likes. Without elections that are impervious to...

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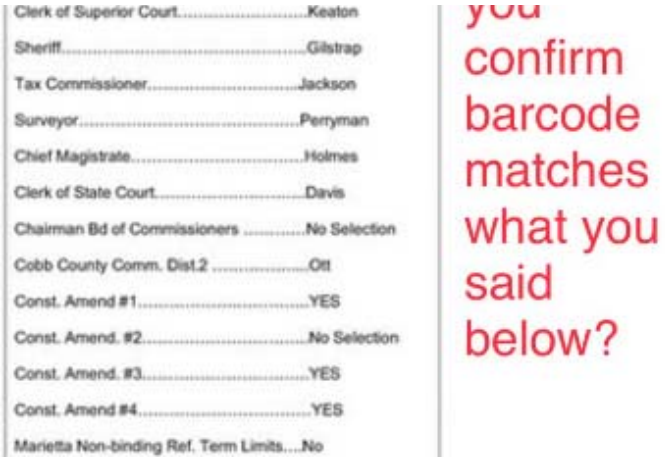


39. https://www.huffingtonpost.com/brad-friedman/blind-disabled-voters-fin_b_43450.html …

40. http://articles.baltimoresun.com/2004-01-30/news/0401300080_1_voting-machines-wertheimer-diebold [“Md. testers cast a vote: Election boxes easy to mess with”];

http://articles.baltimoresun.com/2004-08-27/news/0408270076_1_computer-experts-diebold-machines [“She isn’t worried about machines, top state elections official testifies”];

http://www.votersunite.org/info/evenaremotechance.htm …

41. https://www.nytimes.com/2006/03/23/opinion/common-sense-in-maryland.html [In 2006, “Maryland’s House of Delegates” overrode LaMone and “voted 137-to-0 to drop its [Diebold] machines and switch to paper ballots.”];

https://thevotingnews.com/antitrust-not-enough-md-paper-ballots-on-hold-nm-sos-mismanaged-say-former-employees/ [The Voting News, a Service of Verified Voting: “Then [Maryland] Governor Ehrlich allocated $28.5 million for optical-scanners in March 2006. But State Election Chief Linda Lamone spent the money

on Diebold electronic poll books instead, causing nothing but problems for judges when the poll books malfunctioned. LaMone was later censured by the next Governor O'Malley for allowing Diebold to use her picture and endorsement in sales literature featuring the poll books."].

http://www.washingtonpost.com/wp-dyn/content/article/2007/06/27/AR2007062702828.html ["Elections Chief Stars in Diebold promotion"].

42. https://voterga.org/history/ ["In January of 2006, Rep. Harry Geisinger introduced HB790, which … proposed to … "Provide a voter verifiable permanent paper record as the official ballot of votes recorded for each voter," but "the Committee voted against it after Elections Director, Kathy Rogers, adamantly opposed it."]

https://electionlawblog.org/?p=6874

"Voting machine maker to hire former Georgia elections director"

Posted on December 23, 2006 9:26 am by **Dan Tokaji**

The AP has this report on Diebold's hiring of Kathy Rogers, who resigned as director of Georgia's election division on November 30, to serve as "a liaison between Diebold and elections officials nationwide."

43. https://archive.org/stream/gov.gpo.fdsys.CHRG-108hhrg97366/CHRG-108hhrg97366_djvu.txt … … [LaMone, Cox, and Rogers testify in favor of paperless voting in 2004]

https://books.google.com/books?id=qI2Duiv0go4C&pg=PT132&lpg=PT132&dq=%22Linda+LaMone%22+%22Kathy+Rogers%22+%22Cathy+Cox%22&source=bl&ots=YPZcJ_VWei&sig=l2m_tnPFLQrCRUkLDG7i_KFqTQY&hl=en&sa=X&ved=0ahUKEwjWhq335L3bAh

Vnh1QKHdv2BxIQ6AEIKTAA#v=onepage&q=%22Linda%20LaMone%22%20%22Kathy%20Rogers%22%20%22Cathy%20Cox%22&f=false …

44. https://www.dorchesterbanner.com/business/marylands-new-voting-system-used-in-recent-elections/ …

45. https://thevotingnews.com/elections-chief-rejects-delay-in-launching-new-voting-system-baltimore-sun/ …

https://frederickcountymd.gov/DocumentCenter/View/284880 … … …

46. https://www.essvote.com/blog/76

47. https://nfb.org/blog/vonb-blog/victory-voters-maryland-and-perhaps-beyond …

48. http://www.gaverifiedvoting.org/pdf/v-state-voting-systems/2017-Statement-Supervising-Elections-PBOS-Rebecca-Wilson-Maryland.pdf …

EXHIBIT 2

Serious design flaw in ESS ExpressVote touchscreen: "permission to cheat"

SEPTEMBER 14, 2018 BY ANDREW APPEL

Kansas, Delaware, and New Jersey are in the process of purchasing voting machines with a serious design flaw, and they should reconsider while there is still time!

Over the past 15 years, almost all the states have moved away from paperless touchscreen voting systems (DREs) to optical-scan paper ballots. They've done so because if a paperless touchscreen is hacked to give fraudulent results, there's no way to know and no way to correct; but if an optical scanner were hacked to give fraudulent results, the fraud could be detected by a random audit *of the paper ballots that the voters actually marked*, and corrected by a recount of those paper ballots.

Optical-scan ballots marked by the voters are the most straightforward way to make sure that the computers are not manipulating the vote. Second-best, in my opinion, is the use of a *ballot-marking device* (BMD), where the voter uses a touchscreen to choose candidates, then the touchscreen prints out an optical-scan ballot that the voter can then deposit in a ballot box or into an optical scanner. Why is this second-best? Because (1) most voters are not very good at inspecting their computer-marked ballot carefully, so hacked BMDs could change some choices and the voter might not notice, or might notice and think it's the voter's own error; and (2) the dispute-resolution mechanism is unclear; pollworkers can't tell if it's the machine's fault or your fault; at best you raise your hand and get a new ballot, try again, and this time the machine "knows" not to cheat.

Third best is "DRE with paper trail", where the paper ballot prints out behind glass; the voter can inspect it, but it can be difficult and discouraging to read a long ballot behind glass, and there's pressure just to press the "accept" button and get on with it. With hand-marked optical-scan ballots there's much less pressure to hurry: you're not holding up the line at the voting machine, you're sitting at one of the many cheap cardboard privacy screens with a pen and a piece of paper, and you don't approach the optical scanner until you're satisfied with your ballot. That's why states (such as North Carolina) that had previously permitted "DRE with paper trail" moved last year to all optical-scan.

Now there's an even worse option than "DRE with paper trail;" I call it "press this button if it's OK for the machine to cheat" option. The country's biggest vendor of voting machines, ES&S, has a line of voting machines called ExpressVote. Some of these are optical scanners (which are fine), and others are "combination" machines, basically a ballot-marking device and an optical scanner all rolled into one.

This video shows a demonstration of ExpressVote all-in-one touchscreens purchased by Johnson County, Kansas. The voter brings a blank ballot to the machine, inserts it into a slot, chooses candidates. Then the machine prints those choices onto the blank ballot and spits it out for the voter to inspect. If the voter is satisfied, she inserts it back into the slot, where it is counted (and dropped into a sealed ballot box for possible recount or audit).

So far this seems OK, except that the process is a bit cumbersome and not completely intuitive (watch the video for yourself). It still suffers from the problems I describe above: voter may not carefully review all the choices, especially in down-ballot races; counties need to buy a lot more voting machines, because voters occupy the machine for a long time (in contrast to op-scan ballots, where they occupy a cheap cardboard privacy screen).

But here's the amazingly bad feature: "The version that we have has an option for both ways," [Johnson County Election Commissioner Ronnie] Metsker said. "We instruct the voters to print their ballots so that they can review their paper ballots, but they're not required to do so. If they want to press the button 'cast ballot,' it will cast the ballot, but if they do so they are doing so with full knowledge that they will not see their ballot card, it will instead be cast, scanned, tabulated and dropped in the secure ballot container at the backside of the machine." [**TYT Investigates, article by Jennifer Cohn**, September 6, 2018]

Now it's easy for a hacked machine to cheat undetectably! All the fraudulent vote-counting program has to do is wait until the voter chooses between "cast ballot without inspecting" and "inspect ballot before casting". If the latter, then don't cheat *on this ballot.* If the former, then change votes how it likes, and print those fraudulent votes on the paper ballot, *knowing that the voter has already given up the right to look at it.*

Johnson County should not have bought these machines; if they're going to use them, they *must* insist that ES&S disable this "permission to cheat" feature.

Union County New Jersey and the entire state of Delaware are (to the best of my knowledge) in the process of purchasing ExpressVote XL machines, which are like the touchscreens shown in the video but with a much larger screen that can show the whole ballot at once. New Jersey and Delaware *should not buy these machines.* If they insist on buying them, they *must* disable the "permission to cheat" feature.

Of course, if the permission-to-cheat feature is disabled, that reverts to the cumbersome process shown in the video: (1) receive your bar-code card and blank ballot from the election worker; (2) insert the blank ballot card into the machine; (3) insert the bar-code card into the machine; (4) make choices on the screen; (5) press the "done" button; (6) wait for the paper ballot to be ejected; (7) compare the choices listed on the ballot with the ones you made on the screen; (8) put the ballot back into the machine.

Wouldn't it be better to use conventional optical-scan balloting, as most states do? (1) receive your optical-scan ballot from the election worker; (2) fill in the ovals with a pen, behind a privacy screen; (3) bring your ballot to the optical scanner; (4) feed your ballot into the optical scanner.

I thank Professor Philip Stark (interviewed in the TYT article cited above) for bringing this to my attention.

FILED UNDER: OTHER TOPICS TAGGED WITH: VOTING SYSTEMS

Comments

Jill M says:
September 15, 2018 at 11:49 am

This authors basic lack of research and understanding about how these machines work combined with a serious absense of facts will undoubtedly sway all 10 of his readers to think there something wrong with these devices when in fact there's not. Election officials using these machines and others conduct significant testing before and after elections to make sure the results are accurate, an ssential fact that this type of fake news false narrative brand of journalism always fails to mention. Next time do your homework.

Kat Smith says:
September 15, 2018 at 1:20 pm

Who are you? And why should we believe you? This article is articulate and persuasive. Hand-marked paper ballots (which are then scanned and saved) are the easiest and most secure method of voting.

Ima Voter says:
September 16, 2018 at 1:53 am

Oh, pleeease Jill.. Get a clue. Or get another job and stop working for ES&S. This author is an esteemed computer scientist and he knows a hell of a lot more than you. What "election officials" do this so-called significant testing you allege is being done? Some little lady in a courthouse in Topeka? I'm sure she will have a prayer of a chance to find and defeat malware or other attacks from Russia's top cyber spies or for that matter a good domestic hacker. Cybersecurity is real and the best way to protect our elections are with paper ballots hand-marked by the voter, and risk limiting audits of our elections.

DSN says:
September 18, 2018 at 2:38 pm

Dr Appel clearly needs to do more homework on how these machines work. I'm only seeing 114 peer reviewed publications on various areas of Computer Science, including voting machine security.

https://dblp.uni-trier.de/pers/hd/a/Appel:Andrew_W=

Ima Voter says:
September 16, 2018 at 1:54 am

Oh, and Jill…. learn to spell.

- **2010:** J F M A M J J A S O N D
- **2009:** J F M A M J J A S O N D
- **2008:** J F M A M J J A S O N D
- **2007:** J F M A M J J A S O N D
- **2006:** J F M A M J J A S O N D
- **2005:** J F M A M J J A S O N D
- **2004:** J F M A M J J A S O N D
- **2003:** J F M A M J J A S O N D
- **2002:** J F M A M J J A S O N D

author log in

Harvie Branscomb says:
September 19, 2018 at 10:16 am

The article is being generous to the Express Vote design. In reality, both options leave the software with a way to cheat. When the voter prints the bar coded selections-only card, the machine knows when this took place, and the machine also knows when the card is reinserted back into the machine. So it can know how long the voter spent reading the card – if any time at all. So it still can know when to cheat. To solve this, a separate scanner such as a DS-200 must be used. That's the scanner that can read a hand marked ballot – the best solution.

Notice that unlike a full face ballot, the Express Vote card doesn't have room for a ballot issue text. Instead it will indicate only "Initiative 23A yes" or similar. Most voters will not be familiar with these short titles and will not be able to verify them. And it is the unintelligible barcodes that actually contain the votes. If the voter had a guide to the ballot questions at the time and actually verified the printed text, it would still require a post-election ballot level risk limiting comparison audit to be sure the machine did not missprint the bar codes.

And there is another problem. Because the ExpressVote card doesn't resemble an absentee ballot, whichever format is rare will become a risk for ballot identification and loss of voter privacy.

Yes I agree with the author, voter hand marked ballots are far more desirable for an evidence based election. They reveal when the voter failed to understand, made a mistake or had a minor physical disability and always offer an alternative means of expression and human interpretation. Hand marked ballots are naturally verified. Machine marked ballots are unlikely to be verified when onscreen verification had already been completed.

Harvie Branscomb says:
September 19, 2018 at 5:23 pm

I didn't explain in my above comment that the two cheats aren't the same. If the voter never touches the paper, the machine can vote on paper as it likes if this isn't somehow prevented by excellent testing. Of course excellent and extensive testing in election conditions would be a remedy.

In case the voter touches paper but doesn't take time to verify, the voter intent is committed to in printing but the machine can learn to anticipate which vote patterns (including gestures while onscreen marking) are not likely to be verified and then cheat in the future by choosing carefully which ballot card to interfere with. Tabulation RLA would discover most instances of regular cheats that would change an outcome, but only if the RLA is well executed. Cheats executed only in cases where the voter likely will not verify are more sophisticated and can escape the audit net.
Also it should be clarified whether the ExpressVote can modify or update the voter intent representation on the card, in which case the guided cheating on an already printed card is easier.

When BMD like Express Vote are prevalent, remediation of such potential cheats may require deliberate in-election testing or rewards given to voters for discovery and also of course serious follow-up when discrepancies are encountered. A voter mark to indicate completion of verification on paper would be a very good initial step leading to closing of this risk.

Harvie Branscomb says:
September 19, 2018 at 5:39 pm

Thanks to everyone who is helping to address the thorny issue of ballot images on Ballot Marking Device (BMD) screens that deserve verification not just before – but after – they are printed on paper and are expected to be treated by a tabulation RLA as paper ballots representing verified intent. I think things need to be done to motivate that verification, and to inform the audit when we know something about how much verification was done.

John says:
September 22, 2018 at 11:57 pm

The scanner could in principle record the number of seconds between printing of the ballot and scanning of the ballot along with each ballot image. Of course, this also requires trusting the software and hardware, which is the problem we're trying to solve…

EXHIBIT 3

United States Election Assistance Commission

Certificate of Conformance

ES&S EVS 6.0.0.0

The voting system identified on this certificate has been evaluated at an accredited voting system testing laboratory for conformance to the *Voluntary Voting System Guidelines Version 1.0 (VVSG 1.0)* . Components evaluated for this certification are detailed in the attached Scope of Certification document. This certificate applies only to the specific version and release of the product in its evaluated configuration. The evaluation has been verified by the EAC in accordance with the provisions of the EAC *Voting System Testing and Certification Program Manual* and the conclusions of the testing laboratory in the test report are consistent with the evidence adduced. This certificate is not an endorsement of the product by any agency of the U.S. Government and no warranty of the product is either expressed or implied.

Product Name: EVS

Model or Version: 6.0.0.0

Name of VSTL: SLI Compliance

EAC Certification Number: ESSEVS6000

Date Issued: July 2, 2018

Executive Director
U.S. Election Assistance Commission

Scope of Certification Attached

Manufacturer: *Election Systems & Software*
System Name: *EVS 6.0.0.0*
Certificate: *ESSEVS6000*

Laboratory: *SLI Compliance*
Standard: *VVSG 1.0 (2005)*
Date: *July 2, 2018*

Scope of Certification

This document describes the scope of the validation and certification of the system defined above. Any use, configuration changes, revision changes, additions or subtractions from the described system are not included in this evaluation.

Significance of EAC Certification

An EAC certification is an official recognition that a voting system (in a specific configuration or configurations) has been tested to and has met an identified set of Federal voting system standards. An EAC certification is **not**:

- An endorsement of a Manufacturer, voting system, or any of the system's components.
- A Federal warranty of the voting system or any of its components.
- A determination that a voting system, when fielded, will be operated in a manner that meets all HAVA requirements.
- A substitute for State or local certification and testing.
- A determination that the system is ready for use in an election.
- A determination that any particular component of a certified system is itself certified for use outside the certified configuration.

Representation of EAC Certification

Manufacturers may not represent or imply that a voting system is certified unless it has received a Certificate of Conformance for that system. Statements regarding EAC certification in brochures, on Web sites, on displays, and in advertising/sales literature must be made solely in reference to specific systems. Any action by a Manufacturer to suggest EAC endorsement of its product or organization is strictly prohibited and may result in a Manufacturer's suspension or other action pursuant to Federal civil and criminal law.

System Overview

The ES&S EVS 6.0.0.0 voting system is composed of software applications, central count location devices and polling place devices with accompanying firmware, and COTS hardware and software.

Electionware®

Electionware election management software is an end-to-end election management software application that provides election definition creation, ballot formation, equipment configuration, result consolidation, adjudication and report creation. Electionware is composed of five software groups: Define, Design, Deliver, Results and Manage.

ExpressVote XL™

ExpressVote XL is a hybrid paper-based polling place voting device that provides a full-face touchscreen vote capture that incorporates the printing of the voter's selections as a cast vote record, and tabulation scanning into a single unit.

ExpressTouch®

ExpressTouch Electronic Universal Voting System (ExpressTouch) is a DRE voting system which supports electronic vote capture for all individuals at the polling place.

ExpressVote® Hardware 1.0

ExpressVote Universal Voting System Hardware 1.0 (ExpressVote HW1.0) is a hybrid paper-based polling place voting device that provides touch screen vote capture that incorporates the printing of the voter's selections as a cast vote record, to be scanned for tabulation in any one of the ES&S precinct or central scanners.

ExpressVote® Hardware 2.1

ExpressVote Universal Voting System Hardware 2.1 (ExpressVote HW2.1) is a hybrid paper-based polling place voting device that provides touch screen vote capture that incorporates the printing of the voter's selections as a cast vote record, and tabulation scanning into a single unit. ExpressVote HW2.1 is capable of operating in either marker or tabulator mode, depending on the configurable mode that is selected in Electionware.

There are two separate versions of the ExpressVote hardware version 2.1: 2.1.0.0 and version 2.1.2.0 (6.4 & 6.8). Please note that all future references to ExpressVote HW 2.1 as used throughout the document refers to both hardware versions.

DS200®

DS200 is a polling place paper-based voting system, specifically a digital scanner and tabulator that simultaneously scans the front and back of a paper ballot and/or vote summary card in any of four orientations for conversion of voter selection marks to electronic Cast Vote Records (CVR).

DS450®

DS450 is a central scanner and tabulator that simultaneously scans the front and back of a paper ballot and/or vote summary card in any of four orientations for conversion of voter selection marks to electronic Cast Vote Records (CVR).

DS850®

DS850 is a central scanner and tabulator that simultaneously scans the front and back of a paper ballot and/or vote summary card in any of four orientations for conversion of voter selection marks to electronic Cast Vote Records (CVR).

Event Log Service (ELS)

ELS monitors and logs users' interactions with the Election Management System. Events that happen when a connection to the database is not available are logged to the Windows Operating System log through the ELS.

Removable Media Service (RMS)

RMS is a utility that runs in the background of the Windows operating system. RMS reads specific information from any attached USB devices so that ES&S applications such as Electionware can use that information for media validation purposes.

Configurations

Within the scope of the ES&S EVS 6.0.0.0 voting system, three unique configurations are supported, in order to accommodate limitations of components with the ES&S EVS 6.0.0.0 voting system.

Configuration A

ES&S EVS 6.0.0.0: Test Configuration A encompasses all functionality of the voting system with the exceptions noted below. This configuration is comprised of the entire suite of voting system products.

- Electionware
- ExpressVote Marker (HW 1.0)
- ExpressVote Marker/Tabulator (HW 2.1)
- ExpressVote XL
- ExpressTouch
- DS200
- DS450
- DS850

Configuration B

- Electionware
- ExpressVote Marker (HW 1.0)
- ExpressVote Marker/Tabulator (HW 2.1)
- DS200
- DS450
- DS850

Configuration C

- Electionware
- ExpressVote XL

Mark Definition

ES&S' declared level mark recognition for the DS200, DS450 and DS850 is a mark across the oval that is 0.02" long x 0.03" wide at any direction.

Tested Marking Devices

Bic Grip Roller Pen

Language Capability

EVS 6.0.0.0 supports English, Spanish, Chinese (Cantonese), Korean, Japanese, Hindi, Bengali, Vietnamese, Tagalog, Creole, Russian, and French. Configuration C also supports Punjabi and Gujarati.

Proprietary Components Included

This section provides information describing the components and revision level of the primary components included in this Certification.

System Component	Software or Firmware Version	Hardware Version	Model	Comments
Electionware	5.0.0.0			
ES&S Event Log Service	1.6.0.0			
Removable Media Service	1.5.0.0			
ExpressVote HW 1.0	1.5.0.0	1.0		Paper-based vote capture and selection device
ExpressVote Previewer (1.0)	1.5.0.0			
ExpressVote HW 2.1	2.4.0.0	2.1.0.0 2.1.2.0		Hybrid paper-based vote capture and selection device and precinct count tabulator
ExpressVote Previewer (2.1)	2.4.0.0			
DS200	2.17.0.0	1.2.1, 1.2.3, 1.3		Precinct Count Tabulator
DS450	3.1.0.0	1.0		Central Count Scanner and Tabulator
DS850	3.1.0.0	1.0		Central Count Scanner and Tabulator
ExpressVote XL	1.0.0.0	1.0		Hybrid full-faced paper-based vote capture and selection device and precinct count tabulator
ExpressTouch	1.0.0.0	1.0		DRE
ExpressVote Rolling Kiosk		1.0	98-00049	Portable Voting Booth
Voting Booth		N/A	98-00051	Stationary Voting Booth
ExpressVote Single Table		N/A	87033	Voting Table for One Unit
ExpressVote Double Table		N/A	87032	Voting Table for Two Units
ADA Table		N/A	87031	Voting Table for One Unit
DS200 Ballot Box		1.0	98-00009	Collapsible Ballot Box
DS200 Ballot Box		1.2, 1.3, 1.4, 1.5	57521	Plastic ballot box
DS200 Ballot Box		1.0, 1.1, 1.2	76245	Metal ballot box
DS200 Tote Bin		1.0	00074	Tote Bin Ballot Box
DS450 Cart		N/A	3002	

System Component	Software or Firmware Version	Hardware Version	Model	Comments
DS850 Cart		N/A	6823	
Universal Voting Console		1.0	98-00077	Detachable ADA support peripheral
Tabletop Easel		N/A	14040	
ExpressTouch Voting Booth		N/A	98-00081	Stationary Voting Booth
SecureSetup	2.0.0.1			Proprietary Hardening Script

COTS Software

Manufacturer	Application	Version
Microsoft Corporation	Server 2008	R2 w/ SP1 (64-bit)
Microsoft Corporation	Windows 7 Professional	SP1 (64-bit)
Microsoft Corporation	WSUS Microsoft Windows Offline Update Utility	11.1.1
Symantec	Endpoint Protection	14.0.1 (64-bit)
Symantec	Symantec Endpoint Protection Intelligent Updater (File-Based Protection)	20180116-002-core3sdsv5i64.exe
Symantec	Symantec Endpoint Protection Intelligent Updater (Network-Based Protection)	20180115-040-IPS_IU_SEP_14RU1.exe
Symantec	Symantec Endpoint Protection Intelligent Updater (Behavior-Based Protection)	20180108-003-SONAR_IU_SEP.exe
Cerebrus	Cerebrus FTP Server – Enterprise	9.0.3.1 (64-bit)
Adobe	Acrobat	XI
Microsoft Corporation	Visual C++ Redistributable	vc_redist.x86.exe (32-bit)
RSA Security	RSA BSAFE Crypto-C ME for Windows 32-bit	4.1
OpenSSL	OpenSSL	2.0.12
OpenSSL	OpenSSL	2.0.16
OpenSSL	OpenSSL	1.02d
OpenSSL	OpenSSL	1.02h
OpenSSL	OpenSSL	1.02k

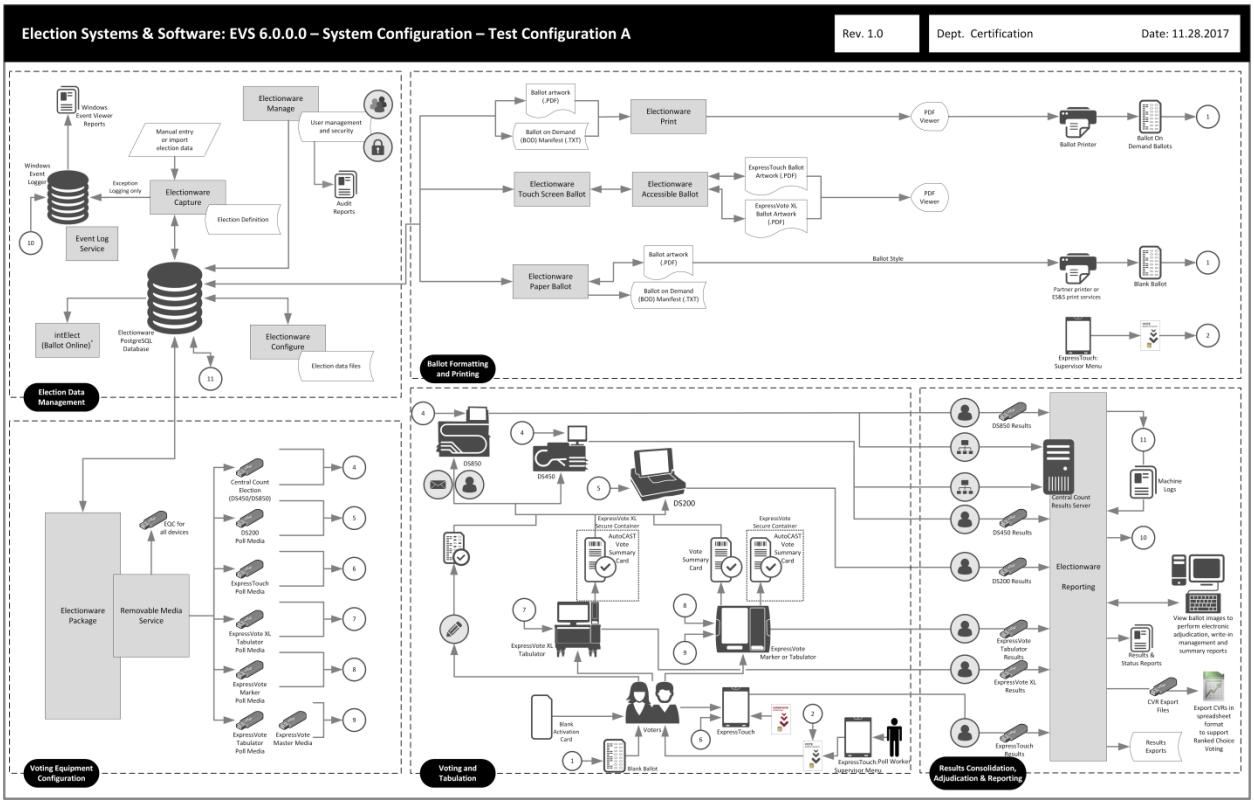
COTS Hardware

Manufacturer	Hardware	Model/Version
EMS Server		
EMS Client or Standalone Workstation		
Innodisk	USB EDC H2SE (1GB) for ExpressVote 1.0	DEEUH 1-01GI72AC1SB
Innodisk	USB EDC H2SE (16GB) for ExpressVote 2.1	DEEUH 1-16GI72AC1SB
Delkin	USB Flash Drive	512MB, 1 GB, 2 GB, 4 GB, 8 GB
Delkin	Validation USB Flash Drive	16 GB
Delkin	USB Embedded 2.0 Module Flash Drive	MY16MGFSY-RA000-D / 16 GB
Delkin	Compact Flash Memory Card	1 GB
Delkin	Compact Flash Memory Card Reader/Writer	6381

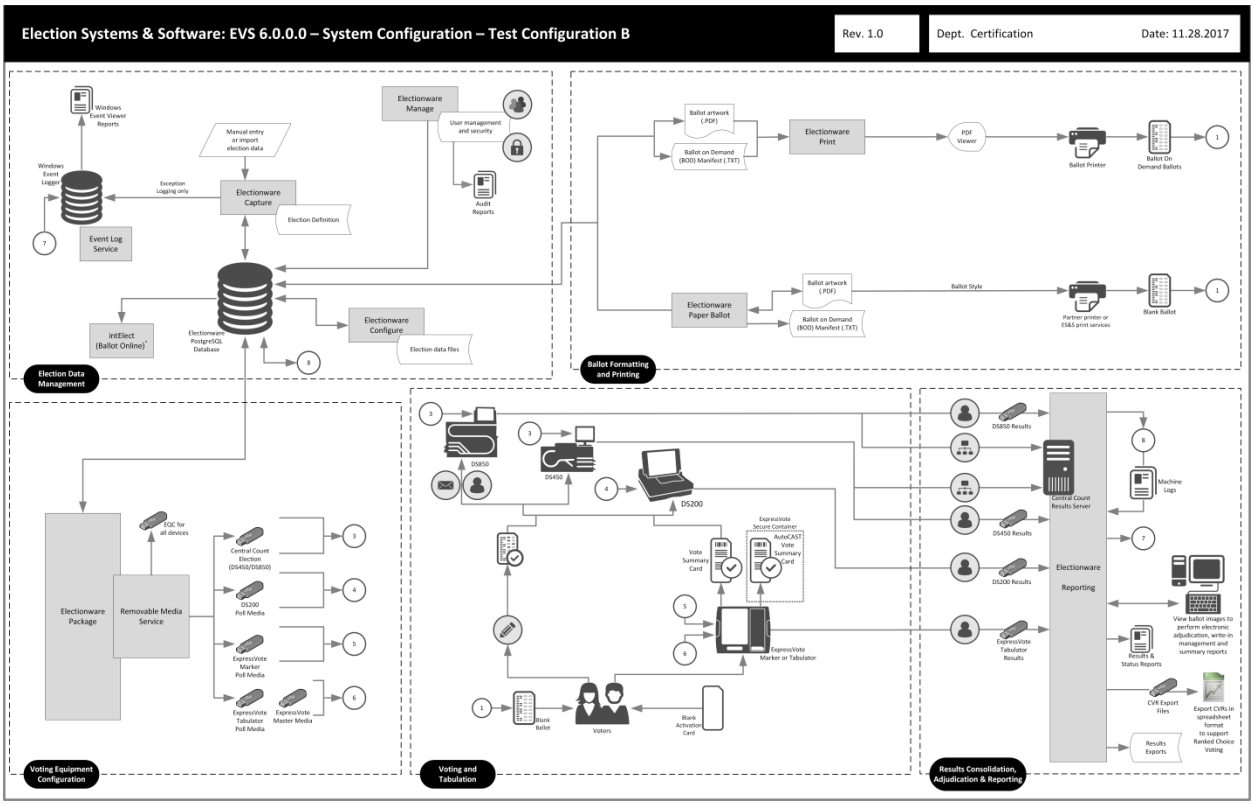
Delkin	CFAST Card	2GB, 4GB
Lexar	CFAST Card Reader/Writer	LRWCR1TBNA
CardLogix	Smart Card	CLXSU128kC7/ AED C7
SCM Microsystems	Smart Card Writer	SCR3310
Avid	Headphones	86002
Zebra Technologies	QR code scanner (Integrated)	DS457-SR20009
Symbol	QR Code scanner (External)	DS9208
Dell	DS450 Report Printer	S2810dn
Oki	DS850 Report Printer	B431dn/B431d
OKI	DS450 and DS850 Audit Printer	Microline 420
APC	DS450 UPS	Back-UPS Pro 1500
APC	DS850 UPS	Back-UPS RS 1500 or Pro 1500
Tripp Lite	DS450 and DS850 Surge Protector	Spike Cube
Seiko Instruments	Thermal Printer	LTPD-347B
NCR/Nashua	Paper Roll	2320
Fujitsu	Thermal Printer	FTP-62GDSL001/ FTP-63GMCL153

Configuration Diagrams

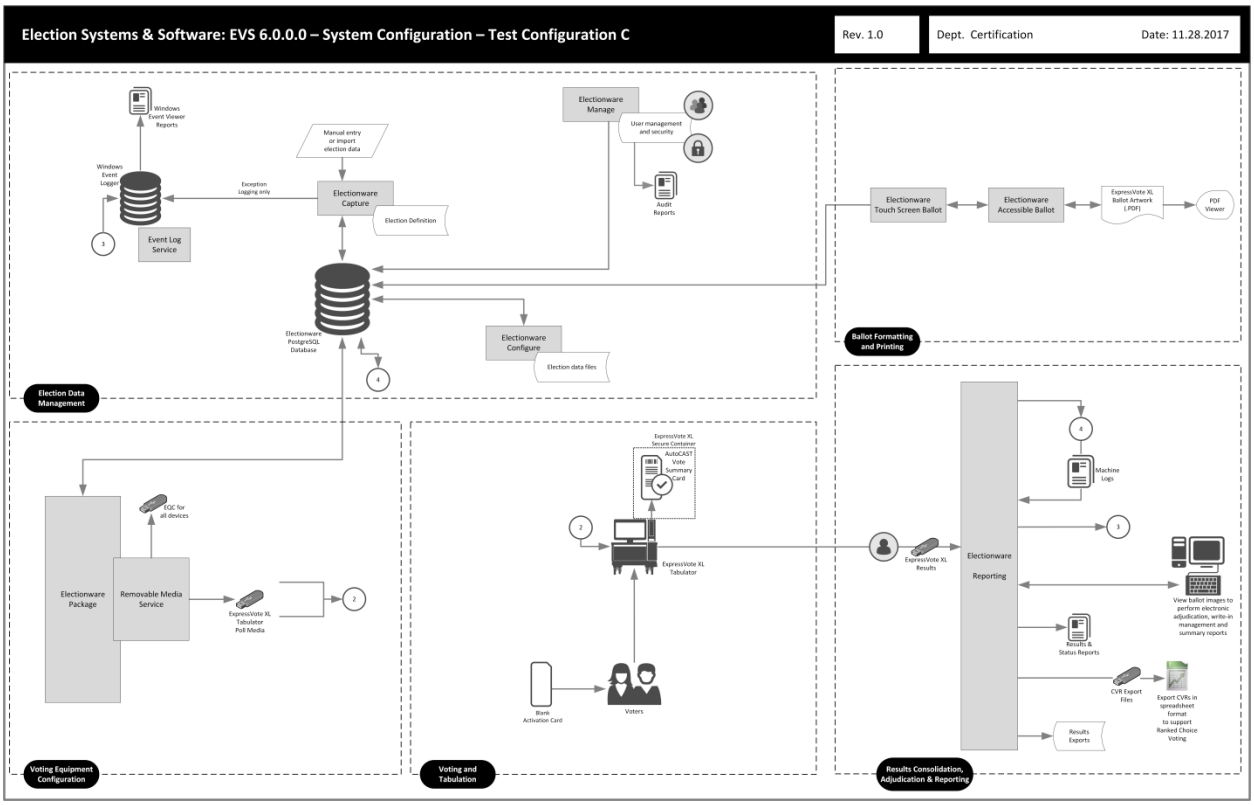
Configuration A



Configuration B



Configuration C



System Limitations

This table depicts the limits the system has been tested and certified to meet.

System Characteristic	Boundary or Limitation	Limiting Component
Max. precincts allowed in an election	9,900	
Max. ballot styles in an election	15,000	
Max. candidates allowed per election	10,000	
Max. contests allowed in an election	10,000	
Max. number of parties allowed	General election: 75 Primary election: 30	
Max. District Types/Groups	25	
Max. districts of a given type	250	
Max. Contests allowed per ballot style	500	

System Characteristic	Boundary or Limitation	Limiting Component
Max. Reporting Groups in an election	14	
Max. candidates allowed per contest	230	
Max. "Vote For" per contest	230	
Max. ballots per batch	1,500	

Component Limitations:

Electionware

1. Electionware capacities exceed the boundaries and limitations documented for ES&S voting equipment and election reporting software. For this reason, ballot tabulator limitations define the boundaries and capabilities of Electionware system.
2. Electionware software field limits were calculated using default text sizes for ballot and report elements. Some uses and conditions, such as magnified ballot views or combining elements on printed media or ballot displays, may result in limits lower than those listed in the System Overview.
3. The Electionware Export Ballot Images function is limited to 250 districts per export.
4. Electionware is limited to the language special characters listed in the System Overview. Language special characters other than those on this list may not appear properly when viewed on equipment displays or reports.
5. The Straight Party feature must not be used in conjunction with the Single or Multiple Target Cross Endorsement features.
6. The 'MasterFile.txt' and the 'Votes File.txt' do not support results for elections that contain multiple sheets or multiple ExpressVote cards per voter. These files can be produced using the Electionware > Reporting > Tools > Export Results menu option. This menu option is available when the Rules Profile is set to "Illinois".

Paper Ballot Limitations

1. The paper ballot code channel, which is the series of black boxes that appear between the timing track and ballot contents, limits the number of available ballot variations depending on how a jurisdiction uses this code to differentiate ballots. The code can be used to differentiate ballots using three different fields defined as: Sequence (available codes 1-26,839), Type (available codes 1-30) or Split (available codes 1-40).
2. If Sequence is used as a ballot style ID, it must be unique election-wide and the Split code will always be 1. In this case the practical style limit would be 26,000.
3. The ExpressVote activation card has a limited ballot ID based on the three different fields defined as: Sequence (available codes 1-16,300), Type (available codes 1-30) or Split (available codes 1-18).

ExpressVote

1. ExpressVote capacities exceed all documented limitations for the ES&S election management, vote tabulation and reporting system. For this reason, Election Management System and ballot tabulator limitations define the boundaries and capabilities of the

ExpressVote system as the maximum capacities of the ES&S ExpressVote are never approached during testing.

ExpressVote XL

1. ExpressVote XL capacities exceed all documented limitations for the ES&S election management, vote tabulation and reporting systems. For this reason, Election Management System and ballot tabulator limitations define the boundaries and capabilities of the ExpressVote XL system as the maximum capacities of the ES&S ExpressVote XL are never approached during testing.
2. ExpressVote XL does not offer open primary support based on the ES&S definition of Open Primary, which is the ability to select a party and vote based on that party.
3. ExpressVote XL does not support Massachusetts Group Vote.
4. ExpressVote XL does not support Universal Primary Contest.
5. ExpressVote XL does not support Multiple Target Cross Endorsement.
6. ExpressVote XL does not support Reviewer or Judges Initials boxes.
7. ExpressVote XL does not support multi-card ballots.
8. In a General election, one ExpressVote XL screen can hold 32 party columns if set up as columns or 16 party rows if set up as rows.
9. ExpressVote XL does not support Team Write-In.

ExpressTouch

1. ExpressTouch capacities exceed all documented limitations for the ES&S election management, vote tabulation and reporting systems. For this reason, Election Management System limitations define the boundaries and capabilities of the ExpressTouch system as the maximum capacities of the ES&S ExpressTouch are never approached during testing.
2. ExpressTouch does not offer open primary support, which is the ability to select a party and vote based on that party.
3. ExpressTouch does not support Massachusetts Group Vote.
4. ExpressTouch does not support Universal Primary Contest.
5. ExpressTouch does not support Multiple Target Cross Endorsement.
6. ExpressTouch does not support Team Write-In.

DS200

1. The ES&S DS200 configured for an early vote station does not support precinct level results reporting. An election summary report of tabulated vote totals is supported.
2. The DS200 storage limitation for write-in ballot images is 3,600 images. Each ballot image includes a single ballot face, or one side of one page.
3. Write-in image review requires a minimum 1GB of onboard RAM.
4. To successfully use the Write-In Report, ballots must span at least three vertical columns. If the column is greater than 1/3 of the ballot width (two columns or less), the write-in image will be too wide to print on the tabulator report tape.

Functionality

VVSG 1.0 Supported Functionality Declaration

Feature/Characteristic	Yes/No	Comment
Voter Verified Paper Audit Trails		
VVPAT	No	

Feature/Characteristic	Yes/No	Comment
Accessibility		
Forward Approach	Yes	
Parallel (Side) Approach	Yes	
Closed Primary		
Primary: Closed	Yes	
Open Primary		
Primary: Open Standard (provide definition of how supported)	Yes	Configuration B only
Primary: Open Blanket (provide definition of how supported)	No	
Partisan & Non-Partisan:		
Partisan & Non-Partisan: Vote for 1 of N race	Yes	
Partisan & Non-Partisan: Multi-member ("vote for N of M") board races	Yes	
Partisan & Non-Partisan: "vote for 1" race with a single candidate and write-in voting	Yes	
Partisan & Non-Partisan "vote for 1" race with no declared candidates and write-in voting	Yes	
Write-In Voting:		
Write-in Voting: System default is a voting position identified for write-ins.	Yes	
Write-in Voting: Without selecting a write in position.	Yes	
Write-in: With No Declared Candidates	Yes	
Write-in: Identification of write-ins for resolution at central count	Yes	
Primary Presidential Delegation Nominations & Slates:		
Primary Presidential Delegation Nominations: Displayed delegate slates for each presidential party	No	
Slate & Group Voting: one selection votes the slate.	No	
Ballot Rotation:		
Rotation of Names within an Office; define all supported rotation methods for location on the ballot and vote tabulation/reporting	Yes	
Straight Party Voting:		
Straight Party: A single selection for partisan races in a general election	Yes	
Straight Party: Vote for each candidate individually	Yes	
Straight Party: Modify straight party selections with crossover votes	Yes	
Straight Party: A race without a candidate for one party	Yes	
Straight Party: N of M race (where "N">1)	Yes	
Straight Party: Excludes a partisan contest from the straight party selection	Yes	
Cross-Party Endorsement:		
Cross party endorsements, multiple parties endorse one candidate.	Yes	
Split Precincts:		
Split Precincts: Multiple ballot styles	Yes	
Split Precincts: P & M system support splits with correct contests and ballot identification of each split	Yes	
Split Precincts: DRE matches voter to all applicable races.	Yes	
Split Precincts: Reporting of voter counts (# of voters) to the precinct split level; Reporting of vote totals is to the precinct level	Yes	It is possible to list the number of voters.
Vote N of M:		

Feature/Characteristic	Yes/No	Comment
Vote for N of M: Counts each selected candidate, if the maximum is not exceeded.	Yes	
Vote for N of M: Invalidates all candidates in an overvote (paper)	Yes	
Recall Issues, with options:		
Recall Issues with Options: Simple Yes/No with separate race/election. (Vote Yes or No Question)	No	
Recall Issues with Options: Retain is the first option, Replacement candidate for the second or more options (Vote 1 of M)	No	
Recall Issues with Options: Two contests with access to a second contest conditional upon a specific vote in contest one. (Must vote Yes to vote in 2nd contest.)	No	
Recall Issues with Options: Two contests with access to a second contest conditional upon any vote in contest one. (Must vote Yes to vote in 2nd contest.)	No	
Cumulative Voting		
Cumulative Voting: Voters are permitted to cast, as many votes as there are seats to be filled for one or more candidates. Voters are not limited to giving only one vote to a candidate. Instead, they can put multiple votes on one or more candidate.	No	
Ranked Order Voting		
Ranked Order Voting: Voters can write in a ranked vote.	No	
Ranked Order Voting: A ballot stops being counting when all ranked choices have been eliminated	No	
Ranked Order Voting: A ballot with a skipped rank counts the vote for the next rank.	No	
Ranked Order Voting: Voters rank candidates in a contest in order of choice. A candidate receiving a majority of the first choice votes wins. If no candidate receives a majority of first choice votes, the last place candidate is deleted, each ballot cast for the deleted candidate counts for the second choice candidate listed on the ballot. The process of eliminating the last place candidate and recounting the ballots continues until one candidate receives a majority of the vote	No	
Ranked Order Voting: A ballot with two choices ranked the same, stops being counted at the point of two similarly ranked choices.	No	
Ranked Order Voting: The total number of votes for two or more candidates with the least votes is less than the votes of the candidate with the next highest number of votes, the candidates with the least votes are eliminated simultaneously and their votes transferred to the next-ranked continuing candidate.	No	
Provisional or Challenged Ballots		
Provisional/Challenged Ballots: A voted provisional ballots is identified but not included in the tabulation, but can be added in the central count.	Yes	
Provisional/Challenged Ballots: A voted provisional ballots is included in the tabulation, but is identified and can be subtracted in the central count	Yes	

Feature/Characteristic	Yes/No	Comment
Provisional/Challenged Ballots: Provisional ballots maintain the secrecy of the ballot.	Yes	
Overvotes (must support for specific type of voting system)		
Overvotes: P & M: Overvote invalidates the vote. Define how overvotes are counted.	Yes	
Overvotes: DRE: Prevented from or requires correction of overvoting.	Yes	
Overvotes: If a system does not prevent overvotes, it must count them. Define how overvotes are counted.	Yes	
Overvotes: DRE systems that provide a method to data enter absentee votes must account for overvotes.	Yes	
Undervotes		
Undervotes: System counts undervotes cast for accounting purposes	Yes	
Blank Ballots		
Totally Blank Ballots: Any blank ballot alert is tested.	Yes	
Totally Blank Ballots: If blank ballots are not immediately processed, there must be a provision to recognize and accept them	Yes	
Totally Blank Ballots: If operators can access a blank ballot, there must be a provision for resolution.	Yes	
Networking		
Wide Area Network – Use of Modems	No	
Wide Area Network – Use of Wireless	No	
Local Area Network – Use of TCP/IP	No	
Local Area Network – Use of Infrared	No	
Local Area Network – Use of Wireless	No	
FIPS 140-2 validated cryptographic module	Yes	
Used as (if applicable):		
Precinct counting device	Yes	DS200, ExpressTouch, ExpressVote HW2.1, ExpressVote XL
Central counting device	Yes	DS450 and/or DS850

Baseline Certification Engineering Change Order's (ECO)

There are not any ECO's certified with the voting system.

CERTIFICATE OF SERVICE

I hereby certify that on December 20, 2019, I caused the foregoing Defendants' Motion for Leave to File Sur-reply in Opposition to Plaintiffs' Motion to Enforce the Settlement Agreement and memorandum of law in support thereof to be filed with the United States District Court for the Eastern District of Pennsylvania via the Court's CM/ECF system, which will provide electronic notice to all counsel of record.

/s/ Mark Aronchick
Mark Aronchick