

<b>Feature/Characteristic</b>	<b>Yes/No</b>	<b>Comment</b>
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.

## **Attachment B – Accessibility Examination Findings and Recommendations**

### **A) Top problems and Recommendations as listed in the accessibility examiner’s report**



Top problems.pdf

### **B) All observations from Accessibility Examination**



All  
observations.pdf

### **C) Recommendations for Deployment from Accessibility Examiner report**



Recommendations  
for deployment.pdf

# Top problems

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The examination identified three problems that could reduce the ability of people with disabilities to vote independently and privately.

## 1. Automatic selection and deselection

### What happened

- Voters were confused by the automatic selection and deselection that is part of straight party voting.
  - When you make a manual selection to override your straight party, all the straight party choices are deselected automatically. The XL does not completely announce the deselections. Deselections may not be visible onscreen, if happen on a screen.
  - If you want to vote for no one, you cannot deselect all candidates if there's an eligible candidate selected by straight party vote.
  - Touching a straight party candidate (for emphasis or deselection), deselected the other candidates.
- In some cases, this led voters to cast a ballot without knowing all of the candidates that had been selected. This problem is exacerbated by the inability of any of our voters or poll-workers to successfully validate the printed ballot on the XL.
- Voters marking choices manually, with no straight party selection, were *always* clear what was selected and deselected.

### Why this is a problem

The system relies on voters both perceiving the change in selections and understanding why those changes happened.

The effect is that the voting system appears to act in inconsistent ways, forcing voters into time-consuming problem-solving that takes them away from their primary task of voting.

Depending on how easily they can use the technology or how confused they are about what is happening, some voters would have to ask for assistance. This is not only a failure to vote independently, but identifying and solving the problem requires revealing their votes to a poll worker or assistant.

This problem affected voters with a variety of disabilities.

<b>Type of disability</b>	<b>Impact of the problem</b>
Cognitive	Seemingly unpredictable and inconsistent machine response can be confusing and frustrating.
Low vision	Changes to selections may be made out of their view because they are made off-screen or because they are not focused on the part of the screen where the change happens.
Low literacy	Voters with low digital or reading literacy also have a narrow range of focus and can miss cues on different parts of the screen
Blind or very low vision	Because the audio does not announce the deselections, changes to candidates higher on the list are not identified unless the voter cycles back through the list. If they don't cycle back, they may never notice the problem.

## Recommendations

Legally, the machines must comply with the Pennsylvania Method, but that interaction should happen in ways that fully inform the voter of what has happened, and how to express their preferences.

- Put voters in control and do not allow the system to make any automatic selections or deselections after straight-party voting selections are applied..
- Improve the feedback messages to tell voters what is happening – including number and names of the candidates being deselected.

- Provide feedback on the reason for the changes in selections and the interaction with straight-party choices.

## 2. Inconsistency in navigation

In both the visual and audio navigation, there were enough small problems of inconsistency or poor instructions to create a cumulative effect. This issue is most serious for voters using the audio ballot without the visual display.

Every participant had at least one problem, despite relatively high election knowledge and digital experience, suggesting that the issue would be more severe for voters without these personal resources to help them understand what it happening.

### What happened

Small inconsistencies in the navigation patterns or the audio instructions forced participants to stop and figure out what was wrong or how to do something.

Many of these small issues caused them to need to ask for assistance – easy to do in the examination, but much harder in a polling place.

In some cases, their attempts to guess at a solution caused even more problems.

### Example: reviewing and correcting a write-in

An example of this cascading of problems occurred when blind voters tried to write in the name of a candidate. Throughout the system, voters can push the left arrow key to review their previous selection. As a result, two voters used the left arrow to try to review what they'd typed in a write-in. When they pushed the key, they exited the write-in screen and lost the characters they had typed.

This problem was compounded by other challenges of using the tactile keypad for write-ins:

- Using the tactile keypad to enter text is a slow process requiring voters to scan through the alphabet one letter at a time to spell a name.
- When they were not sure of the letters that had been selected, or wanted to check their spelling, they could not find a way to do this.
- All of the participants knew that a misspelled write-in would not be counted, but could not figure out how to review what was typed.
- If they had not listened carefully to the full instructions or had not cycled through all 26 letters, they did not know that there was a backspace key.

### **Example: Overvote messages**

Throughout the system, voters can push the right and up/down arrows to proceed forward. But when the user attempts a selection that would result in an overvote, the error message is shown on a new screen, without audio notification of the change of context. The only way to move forward after the message is using the *left* arrow.

The problem was hardest on people using the audio ballot:

- The instructions on the error message include general instructions for navigating within the contest, so it's not clear that the user must use the left (back) arrow to return to the contest.
- These instructions included using the up and down arrows to move through the contest.
- When voters tried using the arrows immediately a message announced that the up and down arrows did not work here, but then repeated the instructions to use the arrows to deselect a candidate before selecting a new one.

### **Example: Button labeling**

Buttons for different actions in different screens sometimes have the same labels.

- On the XL, the “Cast” button on the review screen prints the ballot for review. The “Cast” button on subsequent screens actually casts ballot into the built-in box.
- The audio narration often doesn’t use the same words as the on-screen buttons. On the XL, it says “print” your ballot instead of “casting it.”

## Why this is a problem

People who use assistive technology rely on quickly learning patterns for basic navigation. An example is this comment from a voter: “If it is true to what it did before, I should be able to push the arrow to move to the next issue.”

Breaking these patterns is a usability problem that is amplified for voters using the audio ballot or with cognitive limitations. In both cases, they have fewer resources to perceive and solve the problem.

These problems often happen in the middle of the ballot where assistance could also violate privacy.

## Recommendations

Many of these problems were relatively easy to find during the expert review, and confirmed through observing voters.

- Examine all audio instructions on messages to be sure critical information is in an order that puts specific information for the current task or screen before general, repeated instructions.
- No destructive action should ever take place without explicit confirmation from the voter. In the example above, the system could save write-in entry until the voter leaves that contest so that moving back to the contest using the left-arrow is not destructive. It could also warn voters when partially completed write-in entries will be discarded.

Review the visual interface to make sure buttons that do similar things have the same label. Also use key words like “cast” and “print” consistently throughout the system. Better usability testing with voters with a range of

disabilities during system development would have prevented many of these problems.

### 3. Verification is possible, but challenging

The move to voting systems with paper ballots provides voters with an opportunity to verify their ballot. We wanted to know whether verification can be part of the normal course of voting for voters with disabilities on systems being examined.

#### What happened

In this examination, we tested systems with two different models for paper handling and verification.

##### **Model 1. Voters can handle the printed ballot**

In this model, tested on the ExpressVote, the system ejects the ballot after printing, so it can be cast in the ES&S scanner. This method requires voters to handle the ballot, but also makes it possible for voters to use personal technology such as magnifiers or text readers to read the paper ballot.

- All our participants were able to verify the ballot if they wanted to.
- 2 blind voters tried using personal text readers and were generally successful, though one with more difficulty.
- Voters with vision were able to read the small text with difficulty.

The ballot can be read back to the screen by reinserting it and reviewing (but not changing) selections.

- Some participants tried reviewing their ballots this way and were happy with it.
- 1 blind voter, who had struggled to enter a write-in and wanted to confirm what was on the ballot, found that the actual text of the write-in is not included in the review because it is not encoded in the paper ballot barcodes.



Although we were not able to test with voters with limited dexterity, we believe:

- Most would be able to move the ballot to a stable surface for examination
- The ballot requires some force to remove it from the system. We did not test the amount of force required, but some voters might require assistance.

### **Model 2. The ballot is presented behind glass**

In this model, tested on the ExpressVote XL, the system prints the ballot, displays it under a glass panel, and then casts the ballot by automatically depositing the paper ballot in a container while it records the vote electronically. This means that voters do not have to handle the ballot, but also makes it impossible for voters to use personal technology such as magnifiers or text readers to read the paper ballot.

Some of the participants were surprised that they did not get the ballot back when they pressed “cast.” As the ballot went into the XL ballot box, one voter said, “It didn’t come out!”

- None of the participants could verify the ballot in the glass cage:
  - Blind voters had no access to the ballot to use personal technology
  - Low vision voters could not position the ballot so they could read the small text
  - Other voters had problems reading the ballot because of glare and because the sides of the ballot were obscured by the cage.
- Although it is possible to have the ballot ejected to handle it while verifying, the procedure is unclear and it requires voters to tell the system they want to “Quit” and call a poll worker.

### **Why this is a problem**

The purpose of accessible voting options is to give people with disabilities the same opportunity to mark, verify and cast their ballot as other voters.

## Recommendations

- Require the paper ballot to include an encoding of write-in text so it can be read back when the ballot is reinserted.
- Change the process for ejecting a ballot on the XL (or the auto-cast option on the ExpressVote) so that it can be done independently by the voter.
- Ensure that the systems with an auto-cast capability are set up so that they can work for people with no use of their hands.

# All observations

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## Positives

Function	Observation	System	Severity
Keypads	The layout of the primary navigation keys was familiar to all participants who use tactile controls.	Both	Positives
Audio	The audio running when the voter approaches the system tells them how and where to insert the ballot making it possible for them to start the voting session independently. This included (on the Express Vote) giving instructions to correct the orientation of the ballot	EV	Positives
Audio	Several participants said the synthesized voices are clear and easy to hear, with enough volume.	Both	Positives
Audio	The range of speech speeds provided was adequate, though some of our voters indicated that they would prefer faster speech.	Both	Positives
Display	Blind voters liked the option to hide the visual display or not at any time. (This feature is not available on the XL.)	EV	Positive
Display	The XL screen can be physically adjusted to change the angle of the screen to make it easier to reach or remove glare.	XL	Positive
Audio / Display	One voter favorably compared the option for simultaneous, synchronized audio and visual display to the system she currently uses, where this is not an option. Note: Synchronized audio and video is required in VWSG 1.0+	Both	Positive

Function	Observation	System	Severity
Audio messages	Some of the messages were helpful and elicited comments. For example, after checking a vote by going from the review screen to the contest and then back to the review screen, one participant liked that the audio confirmed what screen it was on.	EV	Positives
Navigation	The “out-and-back” navigation from the review screen to a contest and back was helpful and made it easy to quickly correct a selection.	Both	Positives
Messages	A blind participant liked the message about not having seen all of the candidates in a contest, so that she didn't miss anyone.	EV	Positives

## Ambiguous issues

Function	Observation	System	Severity
Keypads	<p>The XL keypad is used by poll workers to activate the ballot. Even though ballot activation buttons appear on screen, the poll worker has to use the keypad to continue.</p> <ul style="list-style-type: none"> <li>• The advantage is that every XL system will have a tactile keypad available and working,</li> <li>• The disadvantage is that this means it can be difficult to handle while giving it to a voter.</li> </ul> <p>A longer cord would make it easier to hand the keypad to a voter without having to pass it under the screen and around the support structure.</p> <p>There should be easy to reach racks to place the keypad in between uses, rather than balancing it on the top of the base of the machine.</p>	XL	Set up
Keypads	<p>Both systems have an audio jack that is positioned so a voter can easily plug in their own headset and can be found by feel.</p> <ul style="list-style-type: none"> <li>• On the XL, the jack is on the keypad</li> </ul>	Both	Needs assistance

Function	Observation	System	Severity
	<ul style="list-style-type: none"> <li>On the EV, it is on the front of the device below the screen</li> </ul> <p>However, on both systems:</p> <ul style="list-style-type: none"> <li>The labels are black text on a white strip and not tactilely discernable.</li> <li>The jacks can easily be confused with the similarly labeled jack for the dual switch or other personal technology.</li> </ul> <p>A blind advocate participant suggested that a raised headset icon would be an easily recognized symbol to solve this problem</p>		
Messages	<p>Some of the participants thought a screen required them to take action when it didn't</p> <ul style="list-style-type: none"> <li>Selecting a party. One poll worker asked if it was possible to vote without a straight party when they reached the straight party screen</li> <li>The undervote warning screen led several voters to believe that they were forced to vote the full count. They did not listen long enough to know that they could go forward from that screen.</li> <li>Trying to not vote for anyone, a participant tried putting in a blank write-in. They felt the process seems to be forcing a vote, commenting, "I guess you have to put something."</li> </ul>	Both	Problem solving
Keypads	<p>On the XL, voters felt that the keypad was "busy," containing too many keys. While the Braille labels were easily read their positioning was not always clearly related to the controls.</p>	XL	Annoyance
Keypads	<p>On the XL, the buttons may trigger twice, making them too "responsive." Voters with a mild tremor might, for example, move back two contests, not just one. A small latency in the key response coding would prevent this.</p>	XL	Annoyance

Function	Observation	System	Severity
Messages	<p>Both systems gave users a message if they had undervoted as they left a contest. This is a generic message which inserts the name of the contest, but not how many candidates can be or have already been selected.</p> <ul style="list-style-type: none"> <li>• The message itself was initially confusing, but then easily understood.</li> <li>• Once the message was understood, it quickly became mildly annoying.</li> <li>• The same message is repeated as the voter leaves the review screen. Some of the participants took this as a strong nudge to fully vote in every contest.</li> </ul> <p>However, the EV audio does announce when a multi-select contest is “fully voted,” which participants who heard this message found helpful.</p>	Both	<p>Annoyance Or Problem solving</p>
Display	<p>We have not done a detailed analysis, but we noticed several places where button labels were not consistent between the two systems. This is not a problem for a voter using just one system, but adds to the complexity of creating voter education and poll worker materials across the state, or for voters who move between counties using different systems.</p>	Both	<p>Annoyance Or Problem solving</p>

## Problems

Function	Observation	System	Severity
Display	<p>The EV screen cannot be physically adjusted to change the angle of the screen to make it easier to reach or remove glare. There is a stand on the back of the device, but it is not adjustable.</p>	EV	<p>Potential Show stopper</p>

<b>Function</b>	<b>Observation</b>	<b>System</b>	<b>Severity</b>
Display	<p>The visual cues for the location of the cursor (the indication of what's currently selected) are difficult to interpret, especially for people with low vision.</p> <ul style="list-style-type: none"> <li>• On the XL, the dotted-line perimeter was not visible at all for participants with low vision and difficult to see for others.</li> <li>• On the EV, using the same background color for the cursor location and selected candidates was confusing. Voters thought the item with focus was selected and would try to deselect it, resulting in the candidate being selected.</li> </ul>	Both	Potential Show stopper
Keypads	The labels on the XL tactile keypad are black on black making them almost impossible for anyone to read.	XL	Need assistance
Display	On the XL, the transition between screens was very subtle and participants often changed screens without noticing. Having the contest title in the center of the screen and the contests at the far left added to the problem. A low-vision users said, "I saw some shaded areas here (on the left) but thought that these were from the previous vote. I thought the middle was where I was voting now." (The shaded area is actually the current contest."	XL	Problem solving
Display	In several places, the button labels are inconsistent within a system, especially error messages. These small inconsistencies are magnified for a voter who cannot see the screen, where the position of the button or any icons on them are additional cues.	Both	Annoyance or Problem solving
Keypads	Some of the Braille labels on the EV tactile keypad are abbreviated, making them difficult to	EV	Need assistance

Function	Observation	System	Severity
	understand: "TPO" for Tempo, the label on volume, and "PS" for pause		
Keypads	One participant (P5) was concerned that the controls on the EV tactile keypad are too small for some blind users with limited feeling in their fingers, for example from diabetic-related blindness.	EV	Need assistance
Keypads	Using the XL, a low vision voter tried to follow instructions to press the "square" button. Unfortunately, there are two, and he ended up in the keypad tutorial rather than having pressed select.	XL	Needs assistance or Problem solving
Keypads	<p>The Home key works in different ways, depending on where the cursor is on the screen.</p> <ul style="list-style-type: none"> <li>From the list of selections, it goes back to the contest header to begin reading again from the top of the page.</li> <li>From the contest header, it goes back to the first (straight-party) contest.</li> </ul> <p>For the blind voter (the intended user of this button), there is no clear indication of where the cursor is currently located, so it is not possible to predict the action.</p>	Both	Problem-solving
Keypads	<p>There were some concerns about the number of the keys:</p> <ul style="list-style-type: none"> <li>[P3] Thought the XL pad has too many keys</li> <li>[P6] thought the EV pad had too many keys and was too small</li> </ul>	Both	Annoyances
Keypads	The "Repeat" key only repeats the last action or audio instruction. Several participants wanted to use this to go back to the top of the contest.	Both	Annoyance
Keypads	There is a key to blank the screen on the [EV] but not the [XL].	EV	Annoyance



<b>Function</b>	<b>Observation</b>	<b>System</b>	<b>Severity</b>
Keypads	The Home button on the EV is used like the Info on the XL, so the label is not helpful.	EV	Annoyance
Keypads	Audio instructions are on the initial screen. If the voter decides that they would like audio after they get to the ballot, the audio is silent until the voter changes selections.	EV	Annoyance
Keypads	There is no feedback when the volume or tempo buttons are pressed. A sound or confirmation (such as “volume up” or “tempo faster”) would be helpful.  On the XL, the volume keys announce “Volume up/down.”	EV	Annoyance
Keypads	When the audio is paused, a participant was confused when the audio did not begin again when she navigated to a new contest.  “If I move to another candidate or contest, it should start speaking again without having to press Pause again (to restart it)”	EV	Annoyance
Keypads (Audio)	The audio includes instructions for the dual switch and sip-and-puff, even if no device is plugged into the jack. An ideal system would detect input device and adjust the audio to the combination of controls.	Both	Annoyance
Keypads (Audio)	The audio reads all instructions for using the keypads even if the voter is using the touch screen. An ideal system would detect this and adjust the audio to the combination of controls to avoid the lengthy instructions that are not needed.	Both	Annoyance
Ballot Text size	On the XL, selecting “Large Text” changes the screen to a contest-by-contest display, but does not make the text size very much larger.  This forces low vision users who simply need slightly larger text into using the audio ballot.	XL	Showstopper

Function	Observation	System	Severity
	One participant with very low vision put his face so close to the screen that he accidentally made selections with his nose.		
Ballot Layout	Reading the judicial retention instructions and the referendum question, the line length is so long that participants had to swivel their head to visually track across a line of text.	XL	Annoyance
Ballot Layout	The layout of the contest on the very wide screen meant that the title of the contest (centered on the screen) and the number of selections was very far from the list of candidates(on the left margin).	XL	Annoyance
Ballot (Audio)	The audio on the XL does not announce the party of each candidate. This made it impossible to complete tasks based on party, including confirming straight party selections. "I'd assume that is the Democrat because I picked them for straight party." [P3]	XL	Show stopper
Ballot (Audio)	If a voter attempted to make too many selections on a vote-for-N-of-M contest (overvote), a message informs them of the problem. It was not clear to blind voters that they were on a separate message screen. The audio on the overvote message includes the general instructions for using the arrow keys, even though these keys are not active on the message. The message about how to return to the contest screen comes after the general instructions, where voters missed it They needed either extensive problems solving or support to get back to the contest.	XL Both?	Needs assistance
Ballot (Audio)	In the audio announcement of each contest, the information about how many can be selected is easy to miss, and the information about how many candidates have already been selected is	Both	Problem solving

Function	Observation	System	Severity
	either missing, or placed at the end of the standard instructions where none of the participants heard it. This is especially important if a straight party option was selected. Changing the order of the instructions would make it easier for blind voters to keep track of their progress		
Ballot (Audio)	After returning to the contest from the overvote message, participants were confused that the last candidate was not selected and had to puzzle their way through the problem	Both	Problem solving
Ballot (Audio)	<p>There is no option to ask the system to spell out a candidate name.</p> <ul style="list-style-type: none"> <li>This is not normally a problem, but could make it difficult to distinguish candidates with very similar-sounding names (Smith and Schmidt, for example).</li> <li>This capability is a standard feature of screen readers, so voters who use that technology may expect it.</li> </ul>	Both	Annoyance
Ballot	<p>A candidate endorsed by both parties was only visually identified as being from one of them. The straight party logic, however, selected here for each of the two parties.</p> <p>On the full-face ballot, this was visually confusing because it showed a candidate selected in the "wrong" column.</p>	XL	Problem solving
Ballot (Audio)	<p>Listening to the list of candidates, participants often skipped to the next one as soon as they heard the name, sometimes missing the announcement that the candidate was selected.</p> <p>One voter suggested announcing "You selected" <i>before</i> the name of the candidate in these cases.</p>	Both	Annoyance

Function	Observation	System	Severity
Ballot (Audio)	When the voter has reached the last choice, the audio announces this, but pressing the down-arrow does nothing. A participant suggested that it should repeat "Last choice" or "You have heard all of the choices."	XL	Annoyance
Ballot (Straight Party)	Several participants, including poll workers, hesitated at the screen for straight party, wondering if you had to select a party to continue.  Better instructions or an option for "No straight party selection" would be helpful	EV XL (large)	Problem solving
Ballot (Straight Party)	The interaction with changing straight party selections was confusing in several ways: <ul style="list-style-type: none"> <li>Trying to select just one candidate from a group selected by straight party produced inconsistent results, depending on the exact configuration of the candidates. <ul style="list-style-type: none"> <li>If a participant tries to deselect a candidate, it resulted in that candidate being selected and others deselected.</li> <li>If they tried to select a candidate from another party, all of the straight party selections were deselected, even if the new selection was within the number of options available.</li> </ul> </li> <li>Participants using the audio ballot did not always notice when candidates were deselected, especially if they were higher in the list when the deselection occurred. <ul style="list-style-type: none"> <li>When multiple candidates were deselected by this process, only the first was announced on the XL.</li> </ul> </li> <li>Participants using the audio ballot were surprised to hear that other candidates were deselected and only found that out when</li> </ul>	Both	Problem solving Or Needs assistance

Function	Observation	System	Severity
	they reviewed the contest or were told they overvoted.		
Ballot (Straight Party)	<p>Not being able to clear all selections on a contest with an available straight party option was very confusing.</p> <ul style="list-style-type: none"> <li>• One participant described it as having candidates “popping up” and was unable to figure out why this was so.</li> <li>• One participant did not understand why she was not able to deselect a candidate, not understanding that it was related to her straight party selection.</li> <li>• 2 participants created a write-in for “None” as a way of being able to clear all candidates and vote for no one.</li> <li>• When participants deselected all the straight party options, the resulting alert message was very confusing. Several participants did not figure out that the problem was related to straight party voting. <ul style="list-style-type: none"> <li>○ None of the participants wanted to go back, change their straight party choice and recreate their selections to vote for no one, as the message suggested.</li> </ul> </li> <li>• On the XL, this would be a show-stopper for someone using the audio ballot because party affiliations were not read out. <ul style="list-style-type: none"> <li>○ One voter described her current voting machine as having a clear way to vote for none on each contest.</li> </ul> </li> </ul>	Both	Needs assistance Or Show stopper
Write-in	When trying to enter a write-in, participants paused and had to figure out how to actually select the write-in choice to enter a name, in many cases needing assistance. On the EV, the audio narration does not explain that you must push the select key to enter a write-in.	Both	Needs assistance

<b>Function</b>	<b>Observation</b>	<b>System</b>	<b>Severity</b>
Write-in	One participant did not see where the candidate name was written on the contest screen.	XL	Needs assistance
Write-in (Audio)	Using the tactile keypad and audio, it was not clear how to correct a misspelling because participants did not realize that there were keys for space, backspace and so on. The initial audio instructions don't mention the backspace and space keys.	Both	Needs assistance
Write-in (Audio)	The Info (XL) or Home (EV) button makes the system read what's been entered, but no participants found this even though they wanted it.	Both	Needs assistance
Write-in (Audio + Visual)	When returning to the write-in screen with an entry already made, there is no indication of where the cursor is placed, that is, where the next character will be entered.	Both	Needs assistance
Write-in (Audio)	Participants struggled to find the "Space" button (located after punctuation and backspace buttons in the scanning sequence).	Both	Problem solving
Write-in	On the ExpressVote, the buttons for leaving the write-in are visually opposite to the location of the keys on the keypads: <ul style="list-style-type: none"> <li>• Accept: left on screen, right on keys</li> <li>• Cancel: right on screen, left on keys</li> </ul>	EV	Annoyance
Write-in (Audio)	Participants struggled to find the backspace button to erase a letter. One tried using the left arrow, which took her back to the contest, and destroyed all the text she had already typed.	Both	Problem solving or Show stopper
Review screen	The judicial retention and ballot measures had uninformative headings: <ul style="list-style-type: none"> <li>• The judicial retention contest did not list the name of the judge to be retained.</li> <li>• The ballot measure did not have a short identifier or title, nor show the full text.</li> </ul>	Both	Problem solving

<b>Function</b>	<b>Observation</b>	<b>System</b>	<b>Severity</b>
Review screen	A participant with a cognitive disability was initially confused by the review screen. She had never seen something like this. But after looking at it, was able to explain it reasonably well.	XL	Problem solving
Review screen	Using the audio ballot, a participant went back to the contest to check who she had voted for in a contest, even though it was displayed (and read) on the review screen itself.	EV	Annoyance
Review screen	When voter returns to ballot measure from the review screen to change or confirm a vote, they are always returned to the top measure of the review screen, and have to “down arrow” through the ballot to get back to where they were. Participants assumed they would be returned to the ballot measure they had departed from.	XL	Annoyance
Review screen	Participants were surprised to get a message about undervoted contests after completing the review screen.  For some, it made it feel that they were required to completely vote all contests.	Both	Annoyance Or Problem solving
Print, verify, cast	If you eject the ballot and then reinsert it to verify what has been printed, the content of the write-in is lost, because the text entered is not encoded in a barcode, and the system is not reading the text through OCR. <ul style="list-style-type: none"> <li>• This means that it is not possible for a blind or low-vision voter to completely verify their ballot using just the voting system.</li> <li>• Two participants tried reading the ballot using personal technology. The one who used this technology found it easy. The other struggled, but was successful.</li> </ul>	Both	Show stopper

<b>Function</b>	<b>Observation</b>	<b>System</b>	<b>Severity</b>
Print, verify, cast	<p>Voters used to the Danaher Shouptronics expected to find a “Vote” button available to them at any time.</p> <ul style="list-style-type: none"> <li>Using the XL in full-face mode means that there is no navigation between screens, so that there is a button to print and cast the ballot always available.</li> <li>This is an issue that will require voter education.</li> </ul>	EV	Problem solving
Print, verify, cast	<p>On the XL, blind participants were not sure what was happening during the printing process.</p> <ul style="list-style-type: none"> <li>They understood that something would print.</li> <li>They heard the printer.</li> <li>But they did not know where the ballot was or what to do next.</li> </ul>	XL	Problem solving
Print, verify, cast	<p>On the XL, it was not clear how to get to the print button. At this point in the process, participants wanted clarity and accuracy.</p> <ul style="list-style-type: none"> <li>One participant thought the down arrow should get to the print button, but the correct control is the right arrow.</li> </ul>	XL	Problem solving or Needs assistance
Print, verify, cast	<p>On the XL, it was not clear how participants could get their ballot back so they could verify it. This concern was raised even when the XL was the first or only system they used, so it is not simply a comparison to the EV.</p> <ul style="list-style-type: none"> <li>The process to review the printed ballot requires that the ballot be “cancelled” to eject it from the machine. It can then be read back in after verification, but there is no audio (or onscreen) description of this process.</li> <li>One participant thought “Quit” was how to say she was done voting.</li> </ul>	XL	Problem solving or Needs assistance Or Show stopper



Function	Observation	System	Severity
	<ul style="list-style-type: none"> <li>• Another could not figure it out, and ended up casting their ballot without verifying.</li> <li>• There is no indication in the audio that this is an option for blind or low vision voters who don't want to "cancel" their ballot, but just review it manually.</li> </ul>		
Print, verify, cast	<p>None of the participants were able to verify their paper ballot on the XL.</p> <ul style="list-style-type: none"> <li>• The ballot is partially obscured by the cover.</li> <li>• The ballot is behind glass making it harder to see.</li> <li>• The text is too small.</li> <li>• Several participants never saw the ballot to verify.</li> </ul>	XL	Show stopper
Print, verify, cast	<p>On the ExpressVote, most participants simply followed the instructions to complete the printing and verifying process, but a few were confused because it wasn't clear that the ballot would be returned to them.</p>	EV	Problem solving
Scanner	<p>There are no audio instructions to help a blind or low-vision voter insert and cast their ballot</p>	DS200	Needs assistance
Scanner	<p>There is no way for a blind or low vision voter to read any of the messages on the scanner. This is a low-frequency problem when using the EV because there are no overvotes possible on the ballot, and the scanner was programmed to ignore undervotes. However, it is possible to cast a blank ballot.</p>	DS200	Needs assistance
Scanner	<p>There is no audio equivalent to the final screen to communicate that the ballot has been cast. Blind participants heard the ballot drop into the box, but in a noisy polling place or when there is a pile of ballots already in the box this sound would not be available.</p>	DS200	Needs assistance

# Recommendations for deployment

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The participants – and examiners – saw the systems being tested for the first time during the examination. Many voters will also try using a new system for the first time in the voting booth, so our test was realistic for Pennsylvania voters.

The problems we encountered also suggest ideas for how election officials can support voters and poll workers as they introduce the new system and design their processes and procedures.

The recommendations here are based on observations of how both poll workers and voters used the system and direct suggestions they made.

## Advance training and hands-on practice

The need for an introduction and a chance to try out the system before Election Day was the strongest recommendation from every poll worker participant. As an election judge said, when we asked what he would tell his poll workers, “Go to the training!”

Poll workers felt strongly that any new system – particularly these digital interfaces – would be intimidating to voters and fellow poll workers who were not used to computers. They recommended:

- Longer training sessions for poll workers to give them more time to familiarize themselves with a new system.
- Opportunities for hands-on experience, including scenarios for different situations they might have to handle.
- An aggressive voter education program to give voters a chance to try out the new system.
- Outreach to voters with disabilities, including those who regularly vote with assistance to let them know about the capabilities of a new system that might help them.

- Instructions or a practice system in the polling place, especially in districts with many older people.

## Training to support voters with disabilities

Poll workers may not be familiar with how to help people with disabilities. Most of the poll worker participants said that they had no blind or disabled voters in their polling places, although one pointed out that the features on these systems might enable their “assisted voters” to try voting independently.

In addition to a good training module on ways to help voters with disabilities, the training should focus on how to give instructions before and during a voting session to avoid compromising the privacy. For example:

- A “what if” troubleshooting guide could include specific questions to ask and prompts that poll workers can use to help a voter with problem solving without looking at the screen.
- Give poll workers guidance on where to stand while supporting voters. For example, standing behind the ExpressVote and facing the voter would make it clear that they are not looking at the screen.
- Using the procedures for initiating a voting session, including the screens to select a language or acknowledge that assistive technology has been activated, to make sure that the voter has found the basic navigation keys on the keypad. On the ExpressVote, there is a screen with a diagram of the keys that the poll worker can review with the voter (reading the instructions to be sure they are consistent and accurate).

## Poll worker procedures

Poll workers procedures can also help bridge any information gaps for voters, with instructions embedded in the voting process.

- Tell voters how to insert their ballot: identify the corner notch and the location of the slot, and tell them the ballot is inserted directly into the machine, not just slid forward.
- Remind voters to check both the review screen and their paper ballot before casting.
- Tell voters that if they make a mistake, they can get a new ballot.
- Instruct voters to insert their ballot with the corner notch on the bottom right so others can't see their selections. The ballot can be inserted into the scanner in any orientation.

Support for voters using the tactile keypad or dual switch and audio ballot might include:

- A keypad they can try out before entering the voting booth.
- Instructions for how to use the keypad in both Braille and large print. The illustration on the ExpressVote help screen could be the basis for these instructions.

As a voter approaches the voting station, poll workers can help voters adjust the voting system or attach personal assistive technology:

- Help voters get positioned at the voting system so they can reach all controls. The XL screen can be adjusted to change its angle for a closer approach, adapting to standing or sitting postures, and avoiding glare.
- Provide assistance plugging in personal headsets or switches with verbal instructions or by doing it for the voter.
  - A voter with a disability is likely to know how to plug in their personal headset or switch, but they will not know the location of the jacks on the machine.

- Make sure voters are oriented and know where all parts of the voting system are, including the privacy shields. The ExpressVote includes a dedicated key on the tactile keypad to blank the screen.
- Remind voters how to cast their ballot and how to know when they are done.

## Voting booth setup

Voters with disabilities may have assistive technology or personal notes that they need to place within reach. They may also need room to place the printed ballot on a flat surface to use personal technology such as magnifiers or text readers to verify it.

- work well with the printed ballot layout

For the ExpressVote, the path to the scanner should be as easy as possible, ideally a straight line with no obstructions. The path should include ample room to turn a wheelchair if the machine is positioned with the screen facing the wall. The ADA standards suggest a minimum of 60x60 inches for this.

## Attachment C – Implementation Attestation



Implementation  
attestation.pdf



## Voting System Implementation Attestation

System Name: \_\_\_\_\_

County: \_\_\_\_\_

Date Installed/Upgraded: \_\_\_\_\_

*The below hardware/software was installed and verified on the system implemented:*

System Component	Software or Firmware Version	Hardware Version	Model	Comments
Electionware				(Please specify the implementation, single device (desktop/laptop), Client/server)
ES&S Event Log Service				
Removable Media Service				
ExpressVote HW 2.1				
ExpressVote Previewer (2.1)				
DS200				
DS450				
DS850				
ExpressVote XL				

ExpressLink				
Toolbox				

*Further to the key hardware/software components listed above, any of the COTS software installed on the voting system adheres to the EAC certificate of conformance for the EVS 6021 system. Any ancillary components like switches, ballot boxes, charging carts sold on this contract are EAC certified components of the EVS 6021 electronic voting system. (Attach a list of items sold on this contract.)*

*ES&S also has validated that the systems have been installed and hardened following the EAC certified system hardening instructions and no software other than the voting system software has been installed on any of the components.*

**Vendor Representative Signature:** \_\_\_\_\_

**Vendor Representative Name:** \_\_\_\_\_ **Title:** \_\_\_\_\_

**Telephone:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**County Representative Signature:** \_\_\_\_\_

**County Representative Name:** \_\_\_\_\_ **Title:** \_\_\_\_\_



## **Attachment D – Minimum Training Requirements**

ES&S must provide training and training materials as set forth below prior to the first use of the voting system in a primary or general election.

- a) A demonstration of and training on the setup and operation of the Voting System to the purchasing county's board of elections' members and staff and the county's precinct election officials.
  
- b) A training session on the Voting System's election management system and/or EPBs for the purchasing county's board of elections' members and no less than two and no more than six staff members chosen by the board of elections. The training sessions must afford the board members and its staff the opportunity to learn how to setup and program an election, and if applicable design and layout ballots independently of the Supplier's assistance and support.
  
- c) A training session on the following subjects for the purchasing county's board of elections' members and no less than two and no more than six staff members chosen by the board of elections:
  - i. programming of all voting units and ancillary devices;
  - ii. tabulating results during the unofficial and official canvass;
  - iii. ensuring accuracy and integrity of results;
  - iv. preparing polling places and setting up the system for election day operation;
  - v. Training on accessibility options of the voting system
  - vi. Election day operating procedures;
  - vii. auditing procedures;
  - viii. conducting a recount;
  - ix. preserving records;
  - x. printing, designing, and formatting election reports;
  - xi. troubleshooting common issues;
  - xii. safeguarding and preventing tampering and unauthorized access to all parts of the Voting System; and

## **Attachment E – Source Code Escrow Obligations for ES&S**

The Supplier must maintain an escrow agreement covering all source codes of the Voting System and/or EPB for a period of ten years from the date of delivery to and acceptance by a purchasing county board of elections. The Pennsylvania Secretary of the Commonwealth shall have the right to access the source codes in escrow subject to the conditions specified below in Section D(8)(d). The Supplier must pay all costs associated with 1) placing the codes in escrow and 2) verifying that the Supplier has placed the codes in escrow (note: the escrow agent conducts this verification and charges a separate fee for this service).

- a. Source code. Simultaneously with delivery of the Voting System and/or EPB software to purchasing Members, the Supplier shall deliver a true, accurate and complete copy of all source codes relating to the software to an escrow agent.
- b. Escrow. To the extent that Voting System and/or EPB software and/or any perpetually-licensed software include application software or other materials generally licensed by the Supplier, Supplier agrees to place in escrow with an escrow agent copies of the most current version of the source code for the applicable software that is included as a part of the Services, including all updates, improvements, and enhancements thereof from time to time developed by Supplier.
- c. Escrow agreement. An escrow agreement must be executed by the parties, with terms acceptable to the Commonwealth prior to deposit of any source code into escrow.
- d. Obtaining source code. Supplier agrees that upon the occurrence of any event or circumstance which demonstrates with reasonable certainty the inability or unwillingness of Supplier to fulfill its obligations to Commonwealth under this Contract, Commonwealth shall be able to obtain the source code of the then-current source codes related to Voting Systems software, EPB software, and/or any Supplier Property placed in escrow from the escrow agent.

# **EXHIBIT 19**

**2019 Senate State Government Hearing – SB 48  
March 26, 2019**

**Testimony of Acting Secretary Kathy Boockvar  
Pennsylvania Department of State**

Good morning. Thank you, Chairman Folmer, Minority Chair Williams, and members of the Senate State Government committee for allowing the Department of State (Department) to submit written comments and testify at today's hearing. Joining me today is Jonathan Marks, Deputy Secretary for Elections and Commissions.

We are pleased to have this opportunity to speak with you about Pennsylvania's election modernization and certification processes and SB 48.

**Election Modernization**

As you know, last April, the department directed counties to purchase new voting systems that meet current security and accessibility standards, including an auditable paper ballot that voters can review and verify before casting their ballot. We took this action to join the great majority of the country in meeting 21<sup>st</sup>-century standards of security, accessibility and auditability.

In fact, Pennsylvania is one of only 12 states still using Direct Recording Electronic (DRE) voting machines and is the only swing state still doing so. Most if not all of these states are in the process of or planning to upgrade to current paper ballot-based systems by 2020. Several of the states that most recently transitioned or are currently transitioning include Ohio, Louisiana, Georgia, Arkansas, and Delaware (which is replacing its Danaher Electec 1242 systems, the same system used in Dauphin,

Philadelphia, Delaware, and several other PA counties), and most if not all of these states appropriated state funds to be used for the procurements.

Indeed, President Trump's Department of Homeland Security, as well as the Senate and House Intelligence Committees, are urging these upgrades, and there is nearly universal agreement among national security, computer science, and election experts that all voters should be voting on systems with auditable voter-verifiable paper records by the 2020 election.

County commissioners and election directors have been extraordinarily dedicated in their research and review of the new systems available, and in taking the steps necessary to procure voting systems that provide the most secure, auditable, and accessible voting systems to all Pennsylvanians. In fact, in Pennsylvania, about 19 counties (28%) have already taken official action toward acquiring new voting systems through a vote to purchase or lease a system and/or a vote to approve funding. These counties are Beaver, Berks, Bradford, Butler, Centre, Clinton, Crawford, Greene, Lawrence, Lebanon, Lehigh, Mercer, Montgomery, Northampton, Philadelphia, Pike, Susquehanna, Venango and Westmoreland. Approximately 8 to 10 counties report they hope to deploy new voting systems for the May 2019 primary. Officials in more than 30 counties report they expect to deploy new systems for the November 2019 election, and officials in 11 counties expect to deploy machines by the April 2020 primary. Fifteen counties remain undecided about their deployment date.

Because these upgrades involve significant cost, Governor Wolf's proposed budget includes a plan to contribute at least \$75 million — a minimum of \$15 million a year for five years — to help counties pay for these new voting systems. We believe this

plan strikes a fair balance in sharing the cost of this major expenditure with local and federal entities, as all three levels of government benefit from more secure and verifiable elections and greater voter confidence. It is also consistent with the recommendations of the bi-partisan Advisory Committee on Voting Technology assembled by the Joint State Government Commission pursuant to Senate Resolution 394 of 2016. In its December 2017 report to the General Assembly, the Committee recommended that “the General Assembly provide funding to assist counties in the purchase or lease of new voting equipment that complies with the requirements for a voter-verifiable paper record and adequate security measures.”

The Governor has already committed nearly \$13.5 million in federal Help America Vote Act money to the counties that procure new systems by 2020. Included in this budget is \$674,000 for the state’s required 5-percent match, which brings the total funding available to \$14.15 million.

To further assist counties, the department has provided a statewide purchasing COSTARS contract that they can use to cut through procurement red tape and negotiate their best deal, while including specifics that will ensure they have the information required to make an informed decision that best meets their needs. All of the new voting systems’ bids have been approved and posted on COSTARS for the counties to access. We also continue to pursue more federal assistance and explore other funding and financing options to help counties with this critical expenditure.

We held six regional expos in the last year to enable county election officials and the public to try out the available new voting systems. The expos have been well-received and well-attended. In addition, in the last year, Jonathan and I and our

elections team have traveled across the commonwealth to meet personally and individually with dozens of counties' commissioners and election directors, to answer questions, offer assistance on every step of the process, serve as a central hub to help leverage negotiating power, review and give counties feedback on vendor proposals, provide suggested task lists and timelines for implementation, and recommendations for negotiation of terms. We are continuing these visits through the spring and beyond.

### **Voting System Certification Background**

It is the duty of the Secretary of the Commonwealth, under the Pennsylvania Election Code, to examine and re-examine voting systems to ensure that they can be securely used by voters. The Election Code also mandates that the Secretary revoke the certification of any voting system that can no longer be safely used. (See 25 P.S. § 3031.5.) For a voting system to be considered for certification in the Commonwealth, it must first be examined by a federally recognized independent testing authority to standards established by the federal government and certified by the U.S. Election Assistance Commission. The voting system must then be examined by the Secretary of the Commonwealth to determine if it meets the requirements of the Pennsylvania Election Code.

### **Department of State Voting System Certification Program**

The Department has invested significantly in the voting system certification program in the last several years. In mid-2015 through 2016, the Department and many of the counties began laying the ground work for voting system replacement. Around

this time, the Department began an effort to improve and strengthen the voting system certification program in the Commonwealth.

The first step was the hiring of a voting system analyst. After a competitive interview process, we selected a candidate with a unique combination of technical, programming, and project management experience, along with a degree in computer science to lead the Department's effort in certifying new voting systems. With her experience and background in computer science, the Department can diligently review all hardware and software components of the voting system and reliably certify systems that are secure and effective.

Additionally, the Department released a statement of work for voting system examiners in 2017. We sought candidates with a deep understanding of computer science and with experience and knowledge in evaluating voting systems. The examiners also needed to demonstrate knowledge in preventing, identifying and mitigating vulnerabilities and security risks in both computer system hardware and software.

With recent voting system certifications, the Department has worked with SLI Compliance as its voting system examiner. SLI Compliance is a qualified and knowledgeable examiner through their experience as an EAC Accredited Voting System Test Lab (VSTL), staff experience with multiple voting system manufacturers, and they maintain certifications from professional organizations such as the International Organization for Standardization (ISO) and the Institute of Electrical and Electronics Engineers (IEEE).



The Department also released a new Pennsylvania Voting System Standard in early 2018. This standard specifically focuses on enhancing our testing process regarding security, usability and accessibility. The PA Security Standard<sup>1</sup> was modeled on proposals received by the EAC for future directions for their voting system certification program, and incorporates tests to ensure confidentiality, vote anonymity, integrity, security, and auditability of the voting systems. The test specifications include but are not limited to:

- Penetration testing that evaluates the security of the voting system by trying to exploit potential vulnerabilities.
- Access control testing to confirm that the voting system can detect and prevent unauthorized access to the system and election data.
- Evaluation of voting system audit logging capabilities to confirm that the system logs will allow auditing, as well as investigation of any apparent fraudulent or malicious activity.
- Tests that ensure every physical access point is well secured and system software and firmware is protected from tampering.

The PA Accessibility Standard aims to provide better information about the usability of voting systems for voters with disabilities. This standard entails expert review by usability and accessibility examiners and feedback from the voters and poll workers who will use the voting systems, identifying areas of concern and level of severity as follows:

- Voters with disabilities use the system, voting a typical ballot, and provide feedback. The examiners facilitate, observe and identify best practices for use.

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<sup>1</sup> The complete Security Standard may be found here:  
<https://www.dos.pa.gov/VotingElections/Documents/Voting%20Systems/Directives/Conduct%20Directive%20Att%20E%20-%20PA%20Voting%20System%20Security%20Standard%20v06122018.pdf>

- Election officials/poll workers test the accessibility features, especially how they are activated during an election, and comment on the usability of the system.
- The expert examiners consolidate the findings into a report, identifying summary measures needed for voters to use the voting system effectively, and poll worker and voter education requirements or guidance, if any.

The Department is also working very closely with the U.S. Election Assistance Commission to identify efficiencies and overlaps in testing to cut down on redundant testing and excessive costs. The Department's testing process currently takes an average of 2 to 3 months, an improvement from the 6 to 12 months (or more) prior to 2018. The testing is aided with the assistance of a DOS employee formerly employed by the EAC who is very familiar with their process, program, standard and timeline, helping the Department identify overlaps and redundancies, as well as improving communication between the state and federal testing authorities.

### **U.S. Election Assistance Commission Testing & Certification Program**

The U.S. Election Assistance Commission was born out of the Help America Vote Act of 2002. The same legislation that provided funding for voting system replacement in the mid-2000s also created the agency that conducts voting system testing and certification at the federal level, which is required for all systems certified in Pennsylvania. The EAC also develops Voluntary Voting System Guidelines – or a federal voting system standard – used for the testing and certification program they manage at the federal level. The EAC accredits test laboratories, conducts manufacturing facility audits, is responsible for certification and decertification of voting systems at the federal level, and holds vendors accountable through an investigative process, to meet testing and certification program requirements. The EAC spent over a

decade setting up and streamlining their certification process. In the early days of the program, it would take years to get systems through certification. Now, it takes 8 to 12 months to get a new system/full system test completed and anywhere from 1 to 3 months to get system modification tests completed.

Prior to the existence of the EAC, the National Association of State Election Directors had a committee that reviewed test reports from Independent Test Authorities, and “certified” systems at the federal level, to standards created in 1990 by the Federal Election Commission. The majority of systems currently in use in Pennsylvania were manufactured to meet these 1990 standards, which were adopted by the EAC in 2002. It took at least a year for systems to get through this process and committee members may or may not have had experience, training and skills needed for this work.

Four new voting systems have been certified under the state’s new security and accessibility standards as well as federal standards. A fifth voting system has successfully completed state and federal testing and official certification will be released shortly. A sixth system is nearing the conclusion of its certification testing.

### **Decertification**

Anyone who has certified a voting system does not take the burden of decertification lightly. At the state and federal level, every effort is made to cure the problem with the system – software, hardware or even vendor support – prior to decertification. But if the Secretary of the Commonwealth, based on the evidence provided by testing, review, and expert analysis in voting system certification, can no

longer affirm the safety, security, or demonstrable accuracy of the system, they have little choice but decertification.

Sometimes decertification must happen very quickly, and it is very important to have a process in place that has the resiliency, knowledge base, and flexibility to study the issues quickly and assess whether changes must be made. For example, in late 2007, the Department was notified of an anomaly with the AVS Winvote system. The Department worked closely with the vendor to develop a plan and timeline to get the needed changes tested by the EAC and in to Pennsylvania for certification. Just as everyone agreed to the plan, the vendor backed out. The Department was left with no choice but to decertify the equipment. This decision was made in December 2007 and communicated immediately to the impacted counties (Northampton, Lackawanna and Wayne). Those counties, with the help of the Department and fellow county election directors, were able to quickly acquire new equipment and train themselves and their poll workers in time for the presidential primary in April 2008. This same equipment was later also decertified in Virginia, two months before an election, and other states have had to make these types of decisions quickly as well.

While the decision to decertify is never taken lightly, it must be done efficiently to safeguard the integrity of our elections. Because primaries and elections occur in the Commonwealth at least twice every year, adding a months-long review process could unnecessarily hamper the ability of the department and the counties to address known threats and deficiencies. Additionally, SB 48's proposal may give the appearance of political influence in the process, rather than relying on a scientific assessment of the security and accuracy of the systems. Last, if the EAC decertifies a system or systems

at the federal level, we are likely to have no choice but to decertify immediately, due to the Pennsylvania Election Code's federal certification prerequisite to state certification.

Additionally, several courts, including in PA, have issued decisions in recent months indicating that states and counties that continue to employ paperless voting systems may violate voters' federal constitutional rights. Had we continued to oppose the PA litigation, we faced the risk that the Court could have ordered a much shorter time frame for counties to transition to new machines than the plan currently allows. Without admitting liability and to avoid this outcome, the Department of State entered into a settlement agreement, to continue the path we had already started – replacing all voting systems with new systems meeting current standards by 2020. If we don't upgrade by 2020, we also face the likelihood of a petition for re-examination of the DRE voting machines used in PA. PA's statute allows any 10 registered voters to require the commonwealth to reexamine any voting machine currently in use. We do not believe any of the current machines in use would meet current standards, and DOS would have to immediately decertify the machines, which could cause a shorter time frame for transition to new machines than the plan currently allows.

## **Conclusion**

The existing statutes relating to certification and decertification in Pennsylvania have been working well for decades and include sufficient detail to ensure that these decisions are made only as necessary, based on standards requiring security, safety, and demonstrable accuracy. The statutes ensure that the voters of Pennsylvania will be able to have confidence in the security and verifiability of their vote and the results of our elections, even as technology changes.

Despite the cost, we believe the Commonwealth must continue to move forward with the upgrade to more secure, accessible, and auditable systems without delay, based on the nearly unanimous recommendations of security experts, and consistent with the rest of the country. The Administration is strongly committed to working with the legislature to help fund these necessary upgrades on behalf of Pennsylvania voters, as recommended in December 2017 by the bi-partisan Advisory Committee on Voting Technology assembled by the Joint State Government Commission. Pennsylvania counties are demonstrating great leadership in moving these transitions forward, and we hope to work with the legislature to support them and make this investment in our democracy in a fair and fiscally responsible manner.

Thank you for your time and attention and for this opportunity to appear before you.

# **EXHIBIT 20**

# County: It's Sequoia by a landslide \*\* With lone holdout, council picks new voting machine vendor.

By **Joe Nixon Of The Morning Call**

The Morning Call

JANUARY 18, 2008

**A** new voting system will greet Northampton County voters when they cast ballots in the April 22 primary. County Council on Thursday accepted a recommendation made earlier in the day by the county Election Commission to purchase 300 electronic voting machines from Sequoia Voting Systems. The company provides the same machines in Montgomery County.

The company scored the highest in rankings compiled by county elections staff and others after all five voting machine companies certified in Pennsylvania displayed their wares Tuesday, said John Conklin, the county's director of administration.

The initial cost, including support, training and equipment, is expected to be just over \$1.7 million. The commission, in its recommendation, said the cost can't exceed \$1.81 million, a figure that included a 5 percent contingency for contract changes. Pennsylvania has promised to reimburse the county up to just over \$2 million.

Council voted 7-1 to buy the Sequoia system. Councilman Ron Angle voted against the purchase and Council Vice President Wayne Grube was absent.

"I voted no the last time," said Angle. "I don't think waiting six months hurts anything. Had we waited six months the last time, we wouldn't have gotten into the problems that we did. Based on that, I'm going to vote no again."

Angle sided with local voting activist Alan Brau, who suggested the county wait to see if Pennsylvania would certify a system, like some used in New Jersey, where a voter on an electronic machine also sees and verifies a paper receipt recording the vote. That receipt can't be taken by the voter, but drops into a receptacle, much like a ballot box. The Sequoia machines can be modified to print the voter verified paper trail, but that would cost a minimum of \$450,000, Conklin said.

Earlier in the day, Brau of Hanover Township urged the county to hold off on a decision, and use hand-counted paper ballots or optically scanned paper ballots in April. He told the commission he was concerned that if the decision was rushed, the county could spend a lot of money and get a system it didn't have complete confidence in. "We're not just buying a system for now. We're buying a system for the future," Brau said.



The AVC Advantage machine from Sequoia is a "full face" one, meaning it displays the entire ballot at once. A paper overlay ballot displays candidate names, which are aligned with the buttons of the electronic system. Just over half the units will be equipped with systems, including audio, to accommodate handicapped voters.

Northampton will buy refurbished units for \$4,550 each, saving \$3,000 per unit over the cost of a new unit. County Voting Machine Supervisor Howard Erney said the refurbished units will have all new internal components and a two-year warranty.

The county was forced into power shopping for a new system when certification for its existing electronic touch-screen machines from Advanced Voting Solutions of Texas was revoked by state and federal authorities over testing issues.

The county has sued AVS for breach of contract. Christopher Spadoni, an assistant county solicitor, said the Sequoia contract will require a performance bond from the company, essentially an insurance policy to back up the contract. There was no such bond with AVS, he said.

Northampton saved its old lever machines after purchasing 600 AVS touch-screen machines just before the spring 2006 primary. It used the lever machines this past fall after the state suspended the AVS certification. The lever machines won't be allowed in April, however, because federal offices are being contested and federal rules forbid use of those machines. Half the number of Sequoia machines will be needed because voters can see the entire ballot at once and vote more quickly than the AVS system, where a succession of pages were accessed through a touch screen.

Sequoia, with principal offices in California, Colorado and New York, has two accounts in Pennsylvania, including in Montgomery County. The company's Web site said it currently serves hundreds of jurisdictions in 17 states and the District of Columbia. The company serves most of New Jersey.

Addressing concerns about security and outside access to electronic voting machine records, a Sequoia representative said Tuesday, "There is no network. There is no connectivity." Larry Tonelli was among those making presentations to officials from Northampton, Lackawanna and Wayne counties on Tuesday. Lackawanna and Wayne also used the AVS system and are also searching for a replacement system. "There is no operating system on this device. It's not Microsoft or anything like that," Tonelli said.

Other companies vying to supply machines were Election Systems & Software, Hart Intercivic, Electec Inc. and Premier Election Solutions (formerly Diebold). Diebold electronic touch-screen machines are currently used in Lehigh County.

"I like something similar to what we voted on for decades," Erney told the commission, adding he preferred the write-in function on the Sequoia over one offered on a machine from Electec. Chief Registrar Deborah DePaul said the full-face unit was more convenient for voters, more secure, and had fewer parts than other systems.

"It's going to make our senior voters feel more comfortable," reasoned election commission member Rob Hawke. Commission Chairman Kenneth Kraft said election staff opinion was key. "They have to work with it

every day. I put a lot of weight on what their scoring is here," he said.

Conklin said Sequoia has agreed to supply 50 machines by the end of February. Those would be used to train elections staff and possibly poll workers. The remainder should arrive the week of March 10, he said.

A Sequoia spokeswoman said the Advantage is not the same Sequoia electronic voting equipment used in Colorado, where the company is among several that have had equipment decertified over security and other issues. Sequoia has applied for reconsideration of that decision late last year by the Colorado Department of State.

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