State of Wisconsin\Government Accountability Board

212 East Washington Avenue, 3rd Floor
Post Office Box 7984
Madison, WI 53707-7984
Voice (608) 266-8005
Fax (608) 267-0500
E-mail: gab@wisconsin.gov
http://gab.wi.gov

JUDGE THOMAS H. BARLAND
Chair

KEVIN J. KENNEDY
Director and General Counsel

MEMORANDUM

DATE: For the September 4, 2014, Board Meeting

TO: Members, Wisconsin Government Accountability Board

FROM: Kevin J. Kennedy
Director and General Counsel
Government Accountability Board

Prepared and Presented by:
David Buerger
Elections Specialist
Government Accountability Board

SUBJECT: Election Systems and Software (ES&S)
Petition for Approval of Electronic Voting Systems
EVS 5.2.0.0 and EVS 5.3.0.0

I. Introduction

Election Systems and Software (ES&S) is requesting the Government Accountability Board (Board) approve the EVS 5.2.0.0 and EVS 5.3.0.0 voting systems for sale and use in the State of Wisconsin. No electronic voting equipment may be offered for sale or utilized in Wisconsin unless the Board first approves it. Wis. Stat. § 5.91 (see attached). The Board has also adopted administrative rules detailing the approval process. Wis. Admin. Code Ch. GAB 7 (see attached).

A. EVS 5.2.0.0

EVS 5.2.0.0 is a federally tested and certified paper based, digital scan voting system powered by the ElectionWare software platform. It consists of six major components: an election management system (EMS) server; an EMS client (desktop and/or laptop computer) with election reporting manager (ERM) software; the ExpressVote, an Americans with Disabilities Act compliant vote capture device for a polling place; the AutoMARK, an Americans with Disabilities Act compliant ballot marking device for a polling place; the DS200, a polling place scanner and tabulator; and the DS850, a scanner and tabulator for a central count location.

B. EVS 5.3.0.0

EVS 5.3.0.0 is a federally tested modification to the EVS 5.2.0.0 voting system. The modification provides support for modeming of unofficial election results from a DS200

to a Secure File Transfer Protocol (SFTP) server through public analog or wireless telecommunications networks after the polls close on Election Day. EVS 5.3.0.0 lacks federal certification. The underlying voting system (EVS 5.2.0.0) is federally certified.

II. Recommendation

Board staff is recommending approval of both the EVS 5.2.0.0 and EVS 5.3.0.0 for sale and use in Wisconsin. Detailed recommendations are listed on pages 20 and 21, following the analysis of functional testing performed by Board staff.

III. Background

On July 2, 2014, Board staff received an Application for Approval of EVS 5.2.0.0. ES&S submitted complete specifications for hardware, firmware, and software related to the voting system. In addition, ES&S submitted technical manuals, documentation, and instruction materials necessary for the operation of EVS 5.2.0.0. At the same time, ES&S requested Board staff approve the EVS 5.3.0.0 voting system. The Application for Approval of EVS 5.3.0.0 was received by Board staff on July 3, 2014. In addition, ES&S submitted technical manuals, documentation, and instruction materials necessary for the operation of EVS 5.3.0.0.

A. EVS 5.2.0.0

The Voting System Test Laboratory (VSTL) responsible for testing EVS 5.2.0.0, National Technical Systems (NTS), recommended that the U.S. Election Assistance Commission (EAC) certify ES&S EVS 5.2.0.0. ES&S provided the NTS report to Board staff along with the Application for Approval of EVS 5.2.0.0. Voting systems submitted to the EAC for testing after December 13, 2007, are tested using the 2005 Voluntary Voting System Guidelines (VVSG). The EAC certified ES&S EVS 5.2.0.0. on July 2, 2014, and issued certification number **ESSEVS5200**.

Board staff scheduled voting system evaluations and demonstrations for EVS 5.2.0.0 July 7-9, 2014. A four-person team conducted this test campaign.

i. Hardware

ES&S submitted the following equipment for testing:

Equipment	***Hardware Version(s)***	***Firmware Version***	***Type***
DS200	1.2.1 1.2.3 1.3	2.12.00	Polling Place Digital Scanner and Tabulator
DS850	1.0	2.10.00	Central Count Digital Scanner and Tabulator
AutoMark Voter Assist Terminal (VAT)	1.0 1.1 1.3	1.86.00	Ballot Marking Device
ExpressVote	1.0	1.4.00	Universal Vote Capture Device

The following paragraphs describe the design of the EVS 5.2.0.0 hardware taken in part from ES&S technical documentation.

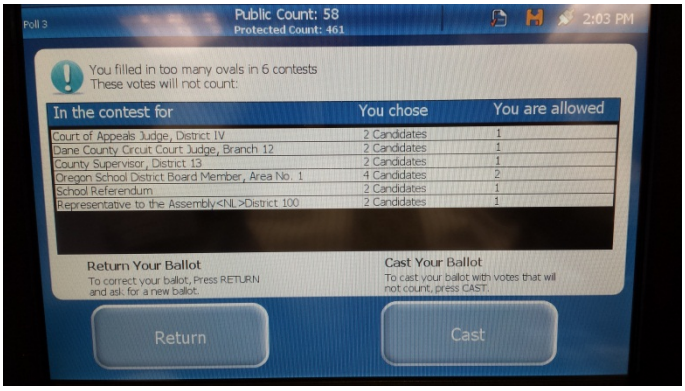
1. DS200

The DS200 is a digital scan paper ballot tabulator designed for use at the polling place level. After the voter marks a paper ballot, their ballot is inserted into the unit and immediately tabulated. The tabulator uses a high-resolution image-scanning device to image the front and back of the ballot simultaneously. The resulting ballot images are then processed by a proprietary mark recognition engine. After the paper ballot is read by the scanner it is deposited into an integrated secured storage bin. The ballot images are stored on a USB flash drive that can be removed. This USB flash drive may be taken to the municipal clerk's office or other central office where the ballot images may be downloaded to be stored for future review, if needed. The DS200 does not store any images or data in its internal memory.

The DS200 features a 12-inch touchscreen display to provide feedback to the voter on the disposition of his or her ballot.

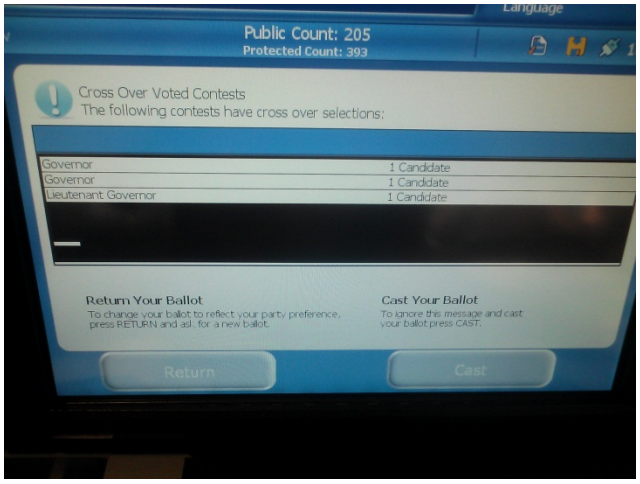
- If the ballot is scanned and accepted by the machine, a message appears that states the ballot has been cast.

- If the ballot contains an overvote, a message appears that identifies the contests with overvotes. The message also tells the voter that these votes will not count.



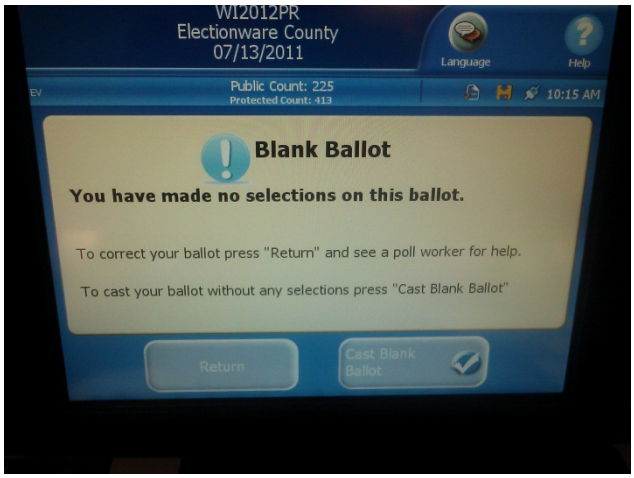
The voter has the ability to return the ballot for review or instruct the machine to accept the ballot and read it as it has been cast. There are instructions above the "Return" button that direct the voter to press "Return" if they wish to correct their ballot. The voter is instructed to ask for a new ballot. There are instructions above the "Cast" button that direct the voter to press "Cast" if they wish to submit their ballot with votes that will not count.

- If the ballot contains crossover votes, a message appears that identifies the contests with crossover votes.



The voter has the ability to return the ballot for review or instruct the machine to accept the ballot and read it as it has been cast. There are instructions above the "Return" button that direct the voter to press "Return" if they wish to change their ballot to reflect their party preference. The voter is instructed to ask for a new ballot. There are instructions above the "Cast" button that direct the voter to press "Cast" if they wish to ignore this message and submit their ballot.

- If the ballot contains no votes, a message appears that states the ballot is blank. The voter is instructed to press "Return" to correct their ballot. They are told to see a poll worker for help. The voter is instructed to press "Cast Blank Ballot" to submit their ballot without any selections.



The screen shots above illustrate the manufacturer's default configuration. The manufacturer may also set the configuration to automatically reject all ballots with overvotes or crossover votes, which permits the voter to correct the error by remaking his or her ballot. This ensures that electors do not mistakenly process a ballot on which a vote for one candidate or all candidates will not count. The

automatic rejection configuration of the DS200, however, creates issues for processing absentee ballots because no voter is present to correct the error.

The DS200 includes an internal thermal printer for the printing of the zero reports, log reports, and polling place totals upon the official closing of the polls.

2. DS850

The DS850 is a high-speed, digital scan ballot tabulator designed for use by election officials at the central count level. Ballots are brought to the scanner and scanned in batches. The DS850 can scan and count up to 300 ballots per minute. It uses cameras and imaging systems to read the front and back of each ballot, evaluate the result, and sort each ballot into trays based on the result to maintain continuous scanning and tabulating. Multiple criteria can be used to segregate ballots for review, including overvotes, crossover votes and blank ballots. Ballots segregated in this fashion are not counted and may need to be remade by the election inspectors. Election officials use a 14-inch touchscreen display to program these features of the DS850. During this process, the DS850 prints a continuous audit log to a dedicated audit log printer. Reports are printed from a second connected printer. The DS850 saves voter selections and ballot images to an internal hard disk and exports results to a USB flash drive for processing with the Election Reporting Manager (ERM).

3. AutoMARK Voter Assist Terminal

The AutoMARK VAT is an electronic ballot marking device primarily designed for use by voters who are visually or physically impaired. It features a touchscreen display and integral printer.

Voters insert a blank paper ballot in the machine and have several options to make candidate selections. They may touch the screen or use an integrated keypad. The display includes various colors and effects to guide the voter. The voter may adjust the display contrast and text size in order to read the screen. Each key on the pad has both Braille and printed text labels designed to indicate function and a related shape to help the voter determine its use. Alternatively, voters may also use headphones to hear a recorded list of the instructions and candidates for each contest and then make selections by touching the screen, touching the keypad, touching a two position switch, or through a sip/puff device. The voter may adjust the volume and tempo of the audio. The AutoMARK VAT stores the choices in in its internal memory. It can be programmed in multiple languages, although languages other than English are not currently required in most Wisconsin municipalities. The machine provides a summary report for the voter to review his or her choice before the ballot is marked by the built-in printer. The print mechanism is a duplex device and can print on both sides of a ballot. When the printing of the ballot is completed, the machine feeds the ballot back to the voter.

Overvotes and crossover votes cannot occur on this equipment and a voter is warned about undervotes prior to the completion of voting.

Once the ballot has been marked and is provided to the voter, the AutoMARK VAT clears its internal memory and the paper ballot is the only lasting record of the voting selections made. The voter may visually confirm his or her selections, or the ballot may be re-inserted into the machine and the voter selections summary report will provide an audio summary for voters with visual impairments. The voter proceeds to enter the ballot into the DS200 or a secured ballot box to be hand tabulated by election inspectors after the polls have closed. Ballots marked using the AutoMARK also may be tabulated using the DS850.

4. ExpressVote

The ExpressVote is an electronic vote capture device designed for use by all electors. It features a touchscreen display and integrated thermal printer.

Voters insert a blank paper activation card in the machine. This is the ballot. Voters have several options to make candidate selections. They may touch the screen or use the moveable keypad provided. The display includes various colors and effects to guide the voter. The voter may adjust the display contrast and text size in order to read the screen. Each key on the pad has both Braille and printed text labels designed to indicate function and a related shape to help the voter determine its use. Alternatively, voters may also use headphones to hear a recorded list of the instructions and candidates for each contest and then make selections by touching the screen, touching the keypad, touching a two-position switch, or through a sip/puff device. The voter may adjust the volume and tempo of the audio. The ExpressVote stores the choices in its internal memory. It can be programmed in multiple languages, although languages other than English are not currently required in most Wisconsin municipalities. The machine provides a summary report for the voter to review his or her choices before the ballot is printed. Only the voter's choices are printed on the ballot. The phrase "No Selection" appears under any contest in which the elector did not vote.

Overvotes and crossover votes cannot occur on this equipment and a voter is warned about undervotes prior to the completion of voting.

Once the ballot has been marked and is provided to the voter, the ExpressVote clears its internal memory and the paper ballot is the only lasting record of the voting selections made. The voter may visually confirm his or her selections, or the ballot may be re-inserted into the machine and the voter selections summary report will provide an audio summary for voters with visual impairments. The voter proceeds to enter the ballot into the DS200 or a secured ballot box to be hand tabulated by election inspectors after the polls have closed. Ballots marked using the ExpressVote also may be tabulated using the DS850.

The ExpressVote is not a tabulator. As tested, it is a ballot marking device similar to the AutoMARK.

ii. Software

EVS 5.2.0.0 offers a new software suite powered by ElectionWare, which integrates election administration functions into a unified application. Its intended use is to define an election and to create the files used by the DS200, DS850, ExpressVote, AutoMARK, and ERM.

The software components used during this test campaign were as follows:

Software	***Version***
ElectionWare	4.6.0.0
Election Reporting Manager (ERM)	8.11.00
ES&S Event Logging Service (ELS)	1.5.5.0
ExpressVote Previewer	1.4.0.0
ExpressPass Application*	1.1.0.0
Removable Media Service (RMS)	1.4.5.0
VAT Previewer	1.8.6.0

Board staff visually verified the software version numbers for each component of the EVS 5.2.0.0 by checking the component's configuration display.

* Please note that the ExpressPass application software is used to pre-print activation cards for the ExpressVote with ballot style information such as a code for Ward 1 ballots and a different code for Ward 2 ballots. If blank activation cards are used in these situations, a poll worker or voter will be prompted to select the correct ballot style upon inserting the activation card. Board staff observed ES&S staff pre-print activation cards for this test campaign using this application and the ExpressPass printer. Board staff used a small number of pre-preprinted activation cards as part of the ExpressVote ballot test deck.

This feature worked as designed. However, the ExpressPass application is not federally certified by the EAC. NTS determined it to be outside of the scope of certification, but NTS did review the source code for 2005 VVSG compliance. The ExpressPass printer is not in the scope of certification. NTS tested the equipment to ensure that it functions as stated in the technical data package for this voting system. No other testing was performed on this equipment. ES&S states that these products do not required federal certification. These products are described as ancillary products available to a jurisdiction who may purchase the system. These products are not required for the ExpressVote to function and if not approved, election inspectors will need to activate each ballot on the ExpressVote.

Because it lacks EAC certification and is not a component that can be approved pursuant to the Board's current protocols, the ExpressPass application software is not included in staff's recommendation of approval of EVS 5.2.0.0 and EVS 5.3.0.0.

A. EVS 5.3.0.0

EVS 5.3.0.0 is a modification to EVS 5.2.0.0 (U.S. EAC#ESSEVS5200). The modification provides support for modeming of unofficial election results from a DS200 to a Secure File Transfer Protocol (SFTP) server through public analog or wireless telecommunications networks. All modifications of the system were tested to the 2005 VVSG by NTS.

At its May 21, 2013, meeting, pursuant to authority granted in Wis. Stat. § 5.91 and Wis. Adm. GAB Code Ch. 7, and based upon the analysis and findings outlined in a staff memorandum, the Board adopted testing procedures and standards pertaining to modeming and communication as detailed in the *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin*, which are attached as Appendix 3. These rules apply to non- EAC certified voting systems, where the underlying voting system received EAC certification to either the 2002 Voting System Standards (VSS) or 2005 VVSG, but any additional modeming component does not meet the 2005 VVSG.

At the same time, the Board directed staff to test non- EAC certified voting systems, where the underlying voting system received EAC certification to either the 2002 or 2005 VVSG, but any additional modeming component does not meet the 2005 VVSG, to the criteria contained in the approved *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin.* A properly submitted Wisconsin application for approval is required. Finally, at its May 21, 2013 meeting, the Board clarified that any modem hereafter approved for use in Wisconsin must have been tested to the requirements contained in the most recent version or versions of the VVSG or VSS currently accepted for testing and certification by the EAC.

In accordance with these directives, Board staff conducted testing of EVS 5.3.0.0 in three counties: Rock, Jefferson and Marathon on July 10, 14, and 16, 2014, respectively. Rock and Marathon counties were selected because each county served as a field test location for ES&S Unity 3.4.0.1 in 2013. Jefferson County was selected in part due to its proximity to G.A.B. headquarters in an effort to minimize the amount of time Board staff were in travel status. In consultation with each county clerk, Board staff selected three municipalities in each county to serve as locations for testing.[1] The municipalities were selected in part because of the strength of the wireless networks in the community or lack thereof and the municipal clerk's willingness to host the test team.

[1] Rock County: City of Janesville, Town of Avon, Town of Harmony
Jefferson County: City of Jefferson, City of Fort Atkinson, Village of Johnson Creek
Marathon County: City of Mosinee, Village of Stratford, Town of Hewitt

The modem in the DS200 communicates with the jurisdiction's wireless carrier or a dial-up connection through landline modem to transmit results to a secure server at a central office location such as the county clerk's office. Wireless transmissions rely on public networks from one of these three service providers: AT&T, Sprint, and Verizon. The server hosts a secure file transfer commercial off the shelf software package. A firewall provides a buffer between the network segment, where the server is located, and other internal virtual networks or external networks. The data that is transmitted is encrypted and it is digitally signed. The modem function may only be used after an election inspector has closed the polls and entered a password to access the control panel. The network is configured to only allow valid connections to connect to the SFTP. The firewall further restricts the flow and connectivity of traffic.

The decision on whether the DS200 includes an analog or wireless modem is made at the time of purchase. The EMS supports modeming from a combination of methods in a jurisdiction. For example, a jurisdiction could have two sites with analog modems and three sites with wireless modems. Board staff successfully simulated such a setup as part of this test campaign. This voting system successfully handled simultaneous transmissions from both types of modems. Conversely, a jurisdiction could choose to purchase all analog modems or all wireless modems. Some of the factors that may impact this decision include the strength of service in the jurisdiction and whether the jurisdiction has an existing contract with one of the three service providers. The EMS supports modeming through a combination of service providers. During this test campaign, Board staff successfully transmitted results in each county using AT&T in one municipality, Sprint in another municipality, and Verizon in a third municipality. During this test campaign, the strength of service ranged from zero bars (lowest indicator level) to five bars (highest indicator level). Election results packets were sent successfully at all service levels.

EVS 5.3.0.0 also features a Regional Results program. This stand-alone application allows for the transmission of unofficial election results from a regional location to a central office utilizing a wireless network provided by AT&T, Sprint, or Verizon. Board staff observed this process in Jefferson County. The Regional Results application allows election media containing results from different polling places to be read and then securely transferred to a server at a central office location such as the county clerk's office.

Neither the DS200 modem function nor the Regional Results program impact the tabulation of official election results.

i. Hardware

ES&S submitted the following equipment for testing:

Equipment	***Hardware Version(s)***	***Firmware Version***	***Type***
DS200	1.2.1 1.2.3 1.3	2.13.00	Polling Place Digital Scanner and Tabulator
DS850	1.0	2.10.00	Central Count Digital Scanner and Tabulator
AutoMark Voter Assist Terminal (VAT)	1.0 1.1 1.3	1.86.00	Ballot Marking Device
ExpressVote	1.0	1.4.00	Universal Vote Capture Device

ii. Software

The software components used during this test campaign were as follows:

Software	***Version***
ElectionWare	4.7.0.0
Election Reporting Manager (ERM)	8.12.00
ES&S Event Logging Service (ELS)	1.5.5.0
ExpressVote Previewer	1.4.0.0
ExpressPass Application	1.1.0.0
Removable Media Service (RMS)	1.4.5.0
VAT Previewer	1.8.6.0
Regional Results	1.1.0.0

IV. Functional Testing

A. EVS 5.2.0.0

As required by GAB 7.02(1), Board staff conducted three mock elections with each component of EVS 5.2.0.0 to ensure the voting system conforms to all Wisconsin requirements: a partisan primary, a general election with both a presidential and gubernatorial vote, and a nonpartisan election combined with a presidential preference vote.

Board staff designed a test deck of more than 1,000 ballots using various configurations of votes over the three mock elections to verify the accuracy and functional capabilities of the EVS 5.2.0.0. A three-person team of Board staff transferred the markings on the test deck spreadsheet for each mock election to blank ballots provided by ES&S for a total of about 900 ballots. Board staff fed these ballots through both the DS200 and DS850. The ExpressVote was tested by marking 30 ballots with the equipment for each of the three mock elections for a total of 90 ballots. The AutoMARK was tested by marking 30 ballots across all hardware configurations of the equipment for each of the three mock elections for a total of 90 ballots. The votes captured by the ExpressVote and ballots marked with the AutoMARK were verified by Board staff before being scanned and counted by the DS200 and DS850. Board staff determined the results produced by each tabulator matched the expected results from the test plan.

B. EVS 5.3.0.0

Board staff conducted functional testing of EVS 5.3.0.0 in three counties (Rock, Jefferson, and Marathon) based on the *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin.* A four-person team of Board staff conducted this testing campaign. Two representatives from ES&S were on hand in each county to provide technical support. ES&S also provided four (4) DS200s equipped with modems, three with wireless modems and one with an analog modem; and a portable EMS environment, which included a SFTP client, firewall, and ERM software. In each location, ES&S set up the portable environment in a county office to receive test election results from each municipal testing location. In each location, Board staff inserted a pre-marked package of 15 test ballots through the DS200 to create an election results packet to send to the county office. Board staff conducted the test in each municipality. A Board staff member also was present at the county office to observe how the portable EMS environment handled the transmissions.

i. Rock County

On July 10, 2014, Board staff conducted tests on the EVS 5.3.0.0 modem component in three municipalities: City of Janesville, Town of Harmony, and Town of Avon. ES&S conducted pre-testing of the EVS 5.3.0.0 modem component in Rock County July 8, 2014. A DS200 equipped with a wireless modem was tested in all three municipalities. Additionally, a DS200 equipped with an analog modem was tested in the Town of Avon. Board staff were able to transmit election results from each of the three municipalities using wireless modems and, in the case of the Town of Avon, using both DS200s – the one equipped with a wireless modem and the one equipped with an analog modem.

Municipality	**Type of Modem**	**Signal Strength**
City of Janesville	Wireless – Verizon	2-3 bars
Town of Harmony	Wireless – Sprint	0-1 bars
Town of Avon	Wireless – AT&T	2 bars
Town of Avon	Analog	Connected

After seven successful transmissions during the first half of the test script, the analog modem was no longer able to connect to the county office. Based on experiences during the testing of the ES&S Unity 3.4.0.1 analog modems in 2013, Board staff and on-site ES&S staff determined this issue was due in part to the quality of the analog phone line. Board staff experienced no other anomalies.

ii. Jefferson County

On July 14, 2014, Board staff conducted tests on the EVS 5.3.0.0 modem component in three municipalities: City of Fort Atkinson, City of Jefferson, and Village of Johnson Creek. ES&S conducted pre-testing of the EVS 5.3.0.0 modem component in Jefferson County July 9, 2014. Board staff successfully completed the test script with no anomalies.

Municipality	**Type of Modem**	**Signal Strength**
City of Fort Atkinson	Wireless – AT&T	0-1 bar
City of Jefferson	Wireless – Verizon	3 bars
Village of Johnson Creek	Wireless – Sprint	3-4 bars
Village of Johnson Creek	Analog	Connected

iii. Marathon County

On July 16, 2014, Board staff conducted tests on the EVS 5.3.0.0 modem component in three municipalities: City of Mosinee, Town of Hewitt, and Village of Stratford. ES&S conducted pre-testing of the EVS 5.3.0.0 modem component in Marathon County July 15, 2014. Board staff successfully completed the test script with no anomalies.

Municipality	**Type of Modem**	**Signal Strength**
City of Mosinee	Wireless – Sprint	0 bars
Town of Hewitt	Wireless – AT&T	3-5 bars
Village of Stratford	Wireless – Verizon	3-4 bars
Village of Stratford	Analog	Connected

V. Public Demonstration

A public demonstration of the EVS 5.2.0.0 was held July 8, 2014, from 4:30 p.m. to 6:00 p.m. in Madison at the G.A.B. office. Members of the public were invited to use the voting system and provide comment. Ten people attended the public demonstration, with the majority of the attendees being either individuals with disabilities or representatives of organizations that

advocate for the interests of individuals with disabilities. The EVS 5.3.0.0 modem component was not demonstrated for the public. Comments from the public demonstration are included in Appendix 1.

VI. Wisconsin Election Administration Council Demonstration

Seven of the 18 appointed members of the Wisconsin Election Administration Council (WI-EAC) attended an ES&S demonstration of the EVS 5.2.0.0 on July 9, 2014, from 1:00 p.m. to 3:00 p.m. in Madison at the G.A.B. office. The WI-EAC is composed of municipal and county clerks, representatives of the disability community, and advocates for the interests of the voting public. The modeming component of the EVS 5.3.0.0 was discussed during this meeting of the WI-EAC. However, this feature was not demonstrated at the WI-EAC meeting. Comments from the WI-EAC are included in Appendix 2.

VII. Board Staff's Feedback

The EVS 5.2.0.0 and EVS 5.3.0.0 voting systems are not compatible with other ES&S voting systems currently approved for sale and use in Wisconsin. Municipalities using other ES&S voting systems will have to either upgrade older versions of firmware or purchase equipment included within this test. The following is a list of staff concerns regarding each piece of equipment tested in this campaign.

1. AutoMARK VAT

   i. The AutoMARK does not arguably provide absolute privacy and independence for voters with disabilities, especially voters with dexterity or motor disabilities, as voters may need assistance inserting the ballot, removing the ballot and placing the ballot in the ballot box or tabulator. However, it does provide substantial compliance with these objectives.

2. DS200

   i. Although there were no errors with the tabulation of the test deck ballots by the DS200, there were some instances in which the DS200 did not read a marked test deck ballot. Upon visual inspection, ES&S staff determined some of the ballots printed by ES&S were skewed. As such, the timing marks and other notations on the ballot which help guide the scanner and tabulator were not read by the DS200. Board staff transferred the votes on skewed ballots to ballots that appeared to be printed on center. The remarked ballots were scanned and tabulated correctly.

   ii. The DS200 was able to correctly read marks in pencil, black pen, blue pen, red pen, and green pen as well as using markers provided by the ES&S.

   iii. The ability of the DS200 to capture digital ballot images automatically may provide a more cost-effective alternative to groups requesting to conduct post-election audits of the vote by review of the paper ballots.

iv. Write-in votes in the DS200 ballot bin are marked with a small pink circle and depending on the ballot box used, may or may not be separated into a separate write-in bin. This voting system can be easily configured to capture ballot images of ballots with write-ins and store them on the external USB flash drive, which would permit write-in votes to be easily verified within the ElectionWare EMS. However, this would not replace the need for inspectors to manually inspect each ballot to detect write-in votes where the voter did not fill in the target area next to the write-in line.

v. The DS200's ballot input slot may be difficult for individuals with certain types of disabilities to insert a ballot without assistance due to the height and location of ballot input slot. However, it meets the requirements of the Americans with Disabilities Act.

vi. There were a few occasions where a ballot jam occurred while inserting the ballot into the DS200. An error message is displayed on the touch screen directing the voter to contact a poll worker and there is also an audio alert notifying the voter. The ballot is returned back to the voter and can be reinserted to be counted.

vii. Ballots marked with a party preference choice selection only, but no individual votes in the partisan primary, are accepted with no feedback provided to the voter on the disposition of their ballot. The DS200 reads this marking as a contest.

viii. With the approval of ES&S Unity 3.2.0.0 Rev 3 in 2012, the Board has required ES&S to configure the DS200 to automatically reject overvoted ballots with no opportunity for the voter to override and to automatically reject crossover ballots with no opportunity for the voter to override. This condition was also applied to the DS200 approved for sale and use in Wisconsin as part of ES&S Unity 3.4.0.0 in 2013 and ES&S Unity 3.4.0.1 in 2014. The DS200 tested as part the EVS 5.2.0.0 and EVS 5.3.0.0 voting systems is powered by upgraded firmware, which includes more detailed messages to voters on the disposition of overvoted and crossover voted ballots. Board staff directed ES&S to configure the mock partisan primary election to display these messages. However, Board staff did not fully test this function. Board staff returned many of the overvoted and crossover voted ballots rather than casting them. Thus, it is unclear if the DS200 would accurately tabulate these ballots. The mock presidential preference and general elections were configured to automatically reject overvoted and crossover voted ballots. Additionally, Wis. Stat. § 5.85(2)(b) 1. requires election inspectors to make a true duplicate ballot of all overvoted ballots. Also, Board staff guidance to election inspectors in municipalities using the DS200 is to remake all ballots with crossovers. This is done either by the voter marking a new ballot or the election inspectors feeding a blank ballot through the tabulator since voter intent cannot be determined. ES&S confirms the DS200 may be configured to automatically reject overvoted ballots, but offer the voter a return or cast option for crossover voted ballots.

ix. Board staff experienced no issues with the wireless modem component. However, questions remain over the reliability of the wired modem component

because of the uncertainty over the quality of analog phone lines. Board staff would recommend any purchasing entity choosing the wired modem option test their analog line and the DS200 prior to each election. These tests should include line specification and quality tests along with operation verification testing of the DS200.

3. DS850

i. Severely torn or ripped ballots may jam the machine. During this test campaign, some ballots torn or ripped by Board staff were processed with no issues by the DS200, but not processed by the DS850 due to the location of the tear or rip and the way ballots move through the DS850. These ballots would need to be remade by poll workers.

ii. Board staff found that the DS850 may be more sensitive than the DS200. Some ballot marks in colored ink were read by the DS200, but not the DS850. Ballots not read by the DS850 are pushed to a separate tray for further inspection by election inspectors. In these situations, these ballots would need to be remade by poll workers .

4. ExpressVote

i. Voters who attended the public demonstration were initially confused on how to use this kiosk. Upon deployment, election inspectors should be prepared to explain how to use the kiosk.

ii. The process to access a specific ballot style in jurisdictions with multiple wards with different contests is cumbersome unless the ExpressPass application and printer is used to pre-print a ballot style code on the ballot.

iii. The processing speed of the kiosk is an improvement over the AutoMARK. It also generates less noise than the AutoMARK terminal.

iv. The movable keypad makes the kiosk more accessible than the AutoMARK terminal.

v. There are no instructions at the end of the voting session that advise the voter must deposit the ballot with their choices into the DS200 or a ballot box. Voters may think the print out is their receipt and walk out of the polling place.

vi. Deciding who a voter voted for is not an issue because the printed ballot lists only candidates who received votes. Moreover, the design of the ballot eliminates ambiguity and stray marks, and therefore has the potential to increase the accuracy of vote tabulation. Additionally, the format of the ballot could aid election inspectors in counting ballots quickly and efficiently in a hand recount situation.

vii. To ensure a private voting session, election inspectors need to take great care in how they situate this kiosk in the polling place to avoid situations in which people passing by an occupied kiosk may be able to view an elector's choices. This feedback is not unique to this kiosk. It applies generally to all voting technology.

VIII. Statutory Compliance

Wis. Stat. §5.91 provides the following requirements voting systems must meet to be approved for use in Wisconsin. Please see the below text of each requirement and staff's analysis of the EVS 5.2.0.0 and EVS 5.3.0.0's compliance with the standards.

§ 5.91 (1)
The voting system enables an elector to vote in secret.
Staff Analysis
The ES&S voting systems meet this requirement by allowing a voter to vote a paper ballot in the privacy of a voting booth or at the accessible voting station without assistance.

§ 5.91 (3)
The voting system enables the elector, for all elections, except primary elections, to vote for a ticket selected in part from the nominees of one party, and in part from nominees from other parties and write-in candidates
Staff Analysis
The ES&S voting systems allow voter to split their ballot among as many parties as they wish during any election that is not a partisan primary.

§ 5.91 (4)
The voting system enables an elector to vote for a ticket of his or her own selection for any person for any office for whom he or she may desire to vote whenever write-in votes are permitted.
Staff Analysis
The ES&S voting systems allow write-ins where permitted.

§ 5.91 (5)
The voting systems accommodate all referenda to be submitted to electors in the form provided by law.
Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (6)
The voting system permits an elector in a primary election to vote for the candidates of the recognized political party of his or her choice, and the system rejects any ballot on which votes are cast in the primary of more than one recognized political party, except where a party designation is made or

where an elector casts write-in votes for candidates of more than one party on a ballot that is distributed to the elector.
Staff Analysis
The ES&S voting systems can be configured to always reject crossover votes without providing an opportunity for the voter to override. It is recommended that the Board continue to require this configuration due to potential voter confusion over the error message and voter's ability to submit a ballot upon which no votes will be counted. Additionally, staff recommends that these voting systems be configured to automatically reject all improper ballots, excluding blank votes, without giving the voter the option to override.

§ 5.91 (7)
The voting system enables the elector to vote at an election for all persons and offices for whom and for which the elector is lawfully entitled to vote; to vote for as many persons for an office as the elector is entitled to vote for; to vote for or against any question upon which the elector is entitled to vote; and it rejects all choices recorded on a ballot for an office or a measure if the number of choices exceeds the number which an elector is entitled to vote for on such office or on such measure, except where an elector casts excess write-in votes upon a ballot that is distributed to the elector.
Staff Analysis
The ES&S voting systems meet these requirements with one exception: where the elector casts excess write-in votes in addition to voting for a named candidate. All currently-certified systems will interpret this scenario as an overvote and reject such ballots and require the voter to make the necessary revisions to the ballot. To meet this requirement, election procedures require election inspectors to inspect all ballots for write-in votes that may not be properly counted and separated into the proper receptacle by the voting system; this ensures all ballots are properly accounted for.

§ 5.91 (8)
The voting system permits an elector at a General Election by one action to vote for the candidates of a party for President and Vice President or for Governor and Lieutenant Governor.
Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (9)
The voting system prevents an elector from voting for the same person more than once, except for excess write-in votes upon a ballot that is distributed to the elector.
Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (10)
The voting system is suitably designed for the purpose used, of durable construction, and is usable safely, securely, efficiently and accurately in the conduct of elections and counting of ballots.

Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (11)
The voting system records and counts accurately every vote and maintains a cumulative tally of the total votes cast that is retrievable in the event of a power outage, evacuation or malfunction so that the records of votes cast prior to the time that the problem occurs is preserved.
Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (12)
The voting system minimizes the possibility of disenfranchisement of electors as the result of failure to understand the method of operation or utilization or malfunction of the ballot, voting system, or other related equipment or materials.
Staff Analysis
The ES&S voting systems meet this requirement if it is configured to automatically reject all overvote and crossover ballots like other optical scan systems currently in use in Wisconsin. Staff recommends that these voting systems be configured to automatically reject all improper ballots, excluding blank votes, without giving the voter the option to override.

§ 5.91 (13)
The automatic tabulating equipment authorized for use in connection with the system includes a mechanism which makes the operator aware of whether the equipment is malfunctioning in such a way that an inaccurate tabulation of the votes could be obtained.
Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (14)
The voting system does not use any mechanism by which a ballot is punched or punctured to record the votes cast by an elector.
Staff Analysis
The ES&S voting systems do not use any such mechanism to record votes.

§ 5.91 (15)
The voting system permits an elector to privately verify the votes selected by the elector before casting his or her ballot.
Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (16)
The voting system provides an elector the opportunity to change his or her votes and to correct any error or to obtain a replacement for a spoiled ballot

prior to casting his or her ballot.
Staff Analysis
The ES&S voting systems meet this requirement.

§ 5.91 (17)
Unless the ballot is counted at a central counting location, the voting system includes a mechanism for notifying an elector who attempts to cast an excess number of votes for a single office the ballot will not be counted, and provides the elector with an opportunity to correct his or her ballot or to receive a replacement ballot.
Staff Analysis
The ES&S voting systems meet this requirement if it is configured to automatically reject all overvoted and crossover ballots like other optical scan systems currently in use in Wisconsin. Staff recommends that these voting systems be configured to automatically reject all improper ballots, excluding blank votes, without giving the voter the option to override.

§ 5.91 (18)
If the voting system consists of an electronic voting machine, the voting system generates a complete, permanent paper record showing all votes cast by the elector, that is verifiable by the elector, by either visual or nonvisual means as appropriate, before the elector leaves the voting area, and that enables a manual count or recount of each vote cast by the elector.
Staff Analysis
Since the ES&S voting systems presented for approval require paper ballots to be used to cast votes, this requirement does not apply.

The Help America Vote Act of 2002 (HAVA) also provides the following applicable requirements that voting systems must meet:

HAVA § 301(a)(1)(A)
The voting system shall: (i) permit the voter to verify (in a private an independent manner) the votes selected by the voter on the ballot before the ballot is cast and counted; (ii) provide the voter with the opportunity (in a private and independent manner) to change the ballot or correct any error before the ballot is cast and counted (including the opportunity to correct the error through the issuance of a replacement ballot if the voter was otherwise unable to change the ballot or correct any error); and (iii) if the voter selects votes for more than one candidate for a single office – (I) notify the voter than the voter has selected more than one candidate for a single office on the ballot; (II) notify the voter before the ballot is cast and counted of the effect of casting multiple votes for the office; and, (III) provide the voter with the opportunity to correct the ballot before the ballot is cast and counted

HAVA § 301(a)(1)(C)
The voting system shall ensure than any notification required under this paragraph preserves the privacy of the voter and the confidentiality of the ballot.
HAVA § 301(a)(3)(A)
The voting system shall— (A) be accessible for individuals with disabilities, including nonvisual accessibility for the blind and visually impaired, in a manner that provides the same opportunity for access and participation (including privacy and independence) as other voters
Staff Analysis
The ES&S voting systems meet these requirements.

IX. Conclusion

To determine whether a voting system should be approved for use in Wisconsin, the following recommendations are based upon three goals.

1. Can the voting system successfully run a transparent, fair, and secure election in compliance with Wisconsin Statutes?

   Staff's Response: Yes. The EVS 5.2.0.0 accurately completed the mock elections and was able to accommodate the voting requirements of the Wisconsin election process. Because the EVS 5.2.0.0 is the base voting system for the EVS 5.3.0.0, the EVS 5.3.0.0 also meets this goal.

2. Does the system enhance access to the electoral process for individuals with disabilities?

   Staff's Response: With the addition of the ExpressVote, the EVS 5.2.0.0 and EVS 5.3.0.0 voting systems enhance access to the electoral process for individuals with disabilities over previously approved ES&S voting systems.

3. Does the voting system meet Wisconsin's statutory requirements?

   Staff's Response: Yes. The EVS 5.2.0.0 complies with all applicable state and federal requirements. However, staff recommends that the system be configured to automatically reject all improper ballots, excluding blank ballots, without giving the voter the option to override. As the EVS 5.2.0.0 is the base voting system for the EVS 5.3.0.0, the EVS 5.3.0.0 also meets this goal.

X. Recommendations

1. Board staff recommends approval of ES&S voting system EVS 5.2.0.0 and components set forth in the tables on pages 2 and 7 above, except for the ExpressPass Application. This voting system accurately completed the three mock elections and

was able to accommodate the voting requirements of the Wisconsin election process. Additionally, Board staff recommends approval of ES&S voting system EVS 5.3.0.0 and components set forth in the tables on pages 9 and 10 above, except for the ExpressPass Application. This recommendation is based on the VSTL report provided by NTS and on this voting system successfully completing a functional test according to the *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin*.

2. Board staff recommends that as a continuing condition of the Board's approval, that ES&S may not impose customer deadlines contrary to requirements provided in Wisconsin Statutes, as determined by the Board. In order to enforce this provision, local jurisdictions purchasing ES&S equipment shall also include such a provision in their respective purchase contract or amend their contract if such a provision does not currently exist.

3. Purchasing entities are reminded Wis. Stats. 5.85(2)(b) 1. requires all overvoted ballots to be remade. The voting system shall be configured to automatically reject these ballots with no opportunity for the voter to override.

4. Board staff does **not** recommend ExpressPass application software as part of the Board's approval. These products are not required for the ExpressVote to function, lacks EAC certification, and is not a component that can be approved pursuant to the Board's current protocols.

5. Board staff recommends that as a continuing condition of the Board's approval, that this system must always be configured to include the following options:

   a. Automatic rejection of crossover ballots with no opportunity for the voter to override.
   b. Automatic rejection of all improper ballots except blank ballots.
   c. Digital ballot images to be captured for all ballots tabulated by the system.

6. Board staff recommends election inspectors shall remake all absentee ballots automatically rejected so that the ballot count is consistent with total voter numbers.

7. As part of US EAC certificate: ESSEVS5200, only equipment included in this certificate are allowed to be used together to conduct an election in Wisconsin. Previous versions that were approved for use by the former Elections Board and the G.A.B. are not compatible with the new ES&S voting system, and are not to be used together with the equipment seeking approval by the Board, as this would void the US EAC certificate. If a jurisdiction upgrades to EVS 5.2.0.0, they need to upgrade each and every component of the voting system to the requirements of what is approved herein. Likewise, if a jurisdiction upgrades to EVS 5.3.0.0, they need to upgrade each and every component of the voting system to the requirements of what is approved herein.

8. Board staff recommends that as a condition of approval, ES&S shall abide by applicable Wisconsin public records laws. If, pursuant to a proper public records

request, the customer receives a request for matters that might be proprietary or confidential, customer will notify ES&S, providing the same with the opportunity to either provide customer with the record that is requested for release to the requestor, or shall advise Customer that ES&S objects to the release of the information, and provide the legal and factual basis of the objection. If for any reason, the Customer concludes that Customer is obligated to provide such records, ES&S shall provide such records immediately upon Customer's request. ES&S shall negotiate and specify retention and public records production costs in writing with customers prior to charging said fees. In absence of meeting such conditions of approval, ES&S shall not charge customer for work performed pursuant to a proper public records request, except for the "actual, necessary, and direct" charge of responding to the records request, as that is defined and interpreted in Wisconsin law, plus shipping, handling, and chain of custody.

XI. Proposed Motion

MOTION: The Government Accountability Board adopts the staff's recommendations for approval of the ES&S voting system's Application for Approval of EVS 5.2.0.0 in compliance with US EAC certificate ESSEVS5200 including the conditions described above and the ES&S voting system's Application for Approval of EVS 5.3.0.0 including the conditions described above.

Attachments

- ✓ Appendix 1: Wisconsin Election Administration Council Feedback
- ✓ Appendix 2: Public Demonstration Feedback
- ✓ Appendix 3: *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin*
- ✓ Wisconsin Statutes § 5.91
- ✓ Wisconsin Administrative Code GAB 7
- ✓ US-EAC Certificate of Conformance / Scope of Certification

APPENDIX 1: Wisconsin Election Administration Council's Feedback

These comments were provided via a structured feedback form.

1. How would you rate the functionality of the equipment?

Very Poor	Poor	Fair	Good	Excellent
		1	2	2

- Like the DS200. Scan is "fast." Voter sees if there is an overvote or undervote. The ExpressVote is good. It could replace the AutoMark.
- Seems to be user friendly. ExpressVote has the ability for specific functions for the diversity of voters.
- Very impressed with the ExpressVote. It is faster than the AutoMark. DS200 has a bigger screen.
- This equipment is light years ahead of our existing Eagles, but I do have some concern they are light years behind modern technology. It would be nice to know what a certification and purchase of this new option would be "guaranteed" a 10-year or more life span, but as fast as technology is moving…
- ExpressVote much quicker and easier to use.
- DS200 does not function well for certain people with disabilities because it is too high for people who use mobility devices. I have this feedback many times over the years on the piece of equipment. It could be easily fixed with a shorter collection box underneath.

2. How would you rate the accessible features?

Very Poor	Poor	Fair	Good	Excellent
		2		2

- Good
- The ExpressVote would require special setup, which could be an issue in small elections
- As someone not in need or challenged for this need, I don't feel qualified to rate. I will say I like the ExpressVote's weight, load time and functionality. It takes one minute and 57 seconds to vote on the AutoMark, compared to one minute and 7 seconds on the ExpressVotes. That's a plus. I like that.
- DS200 does not function well for certain people with disabilities because it is too high for people who use mobility devices. I have this feedback many times over the years on the piece of equipment. It could be easily fixed with a shorter collection box underneath.
- Functionally, the AutoMark is slow and the cost of the ink is high which means in the field on Election Day that some clerks will not turn on the machine. It is hard to insert and remove the ballot from the AutoMark.

- For Express Vote: Some find the screen too sensitive. The removable keypad is great. The fact there is no ink to put in is great. I am not a fan of the different sized ballot because a clerk might be able to identify who voted a particular ballot if there are only one or a few people with disabilities who vote. The write-in component was okay when I tried the audio version, but it took me some time to catch on how to put in a space between the first and last names. Overall, I like the ExpressVote.
- DS850 is much too high
- ExpressVote touchscreen and audio is great, but at times a bit sensitive. AutoMARK is slow and not sensitive enough. I do like the ability to change contrast and zoom.

3. Rate your overall impression of the system.

Very Poor	Poor	Fair	Good	Excellent
			3	2

- Like the screen of the DS200. Like having a paper ballot in case of a recount. ExpressVote would not have to print so many ballots, use only as needed.
- Seems to comply with requirements and standards. ExpressVote is next generation but really isn't a huge difference from the AutoMark.
- I am satisfied with this system although I am more satisfied by digital analog and wireless modem capability. Very pleased G.A.B. is testing and considering certification of that this month. Cost is always the primary consideration for municipalities. Voter trust and security is my primary consideration and I'm completely satisfied ES&S meets that measure.

APPENDIX 2: Public Demonstration Feedback

These comments were provided via a structured feedback form.

1. How would you rate the functionality of the equipment?

Very Poor	Poor	Fair	Good	Excellent
		4	4	2

- The ExpressVote is good
- DS200 needs to tell voter what to do. Example: if the ballot is rejected, tell the voter to seek help. The paper ballot needs to tell the voter to turn it over because most of them won't and will miss races.
- The ExpressVote screen is very sensitive, which was problematic for me to use based on my physical disability.
- Voters with physical disabilities may not be able to use the ExpressVote touchpad. For another voter it picked up not his fingerpad heat but where he leaned on the screen. For my voter, she tried to print and the message for help didn't make it clear enough. She had to start over once the poll person came to help. The "more" to read more options was missed by both voters. Where is the "Help" button for the voter with a disability who is in the booth alone and has these or other issues? Is he/she expected to come all the way out to seek help? Can this booth be placed closer to the poll workers if that is the case?

2. How would you rate the accessible features?

Very Poor	Poor	Fair	Good	Excellent
	1	4	1	4

- DS200 is way too high. I could not reach to deposit my ballot. I needed assistance to record my ballot.
- The only drawback of the AutoMARK is that the keypad is stationary. I like the movable touchpad on the other machine. The touchscreen works well. It is not too sensitive.
- I like the blank screen function option on the ExpressVote
- I did not know that I had to put my hand to the side of the ExpressVote machine and not on the screen in order to touch the candidate to vote.
- The AutoMARK seemed a little more inaccessible due to the button pad being non-movable.
- I would like to see a more accessible keypad for writing in votes, but overall very impressed.
- ExpressVote touchpad was okay for my voter with a developmental disability in terms of touch and getting the machine to record correct person. Not so for the voter with a physical disability. Is that a motion sensor at the top? What does it do? Might

some voters give up if they aren't tripping the sensor to activate the machine? I think a "Help" button is needed and increasing the size of some buttons.

3. Rate your overall impression of the system.

Very Poor	Poor	Fair	Good	Excellent
	1	4	3	3

- If you are going to spend the money, the machine should be accessible. I think you should know better than to approve this machine.
- Keep what works!
- The ExpressVote is a welcome change to accessible voting.
- Keep the classic.
- I liked the ExpressVote pad that I could put in my lap to vote. I could use it easily.
- I like the ExpressVote better than the AutoMARK because it doesn't separate out people with disabilities. It is a bit faster than the AutoMARK.
- I'm glad to another option. My voter balks at getting help and speaking to strangers, and when she got the error when trying to print she just stood there. As is I think voters who have a disability would need some help with this one [ExpressVote]. Not sure what the headphones do but are they speaking the names? If so, can the voter adjust the rate of speed? Will languages offered include more than English and Spanish? Was there a message that directed the voter with what to do with her printed ballot? If so, I missed it and asked as worker. My voter may not walk it over the first time or two without the machine telling her.
- Voters might think that the ballot card printed by the ExpressVote is a receipt, and walk out without putting the ballot card into the DS200. G.A.B. will need to include this in their current ballot layout improvement initiative. Perhaps only one office should appear per screen. Perhaps all candidates for one office should appear on the same page, so there is no need for a "More" button. G.A.B. should develop guidelines for pre-election logic and accuracy testing of the ExpressVote. Perhaps this should include taking ballot cards that the ExpressVote has printed, and inserting them back into the ExpressVote to see if it reads the bar code correctly. Perhaps L&A should include a deck (separate from handmarked ballots) from the ExpressVote that are counted by the DS200. For post-election auditing, there may need to be some audits specific to the ballot cards printed by the ExpressVote. Using the ExpressVote is a new way of filling out and counting ballots, both for Wisconsin and the manufacturer. A cautious approach is indicated.

APPENDIX 3: Voting System Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices

PART I: PROPOSED TESTING STANDARDS

Applicable VVSG Standard

The modem component of the voting system or equipment must be tested to the requirements contained in the most recent version or versions of the Voluntary Voting System Guidelines (VVSG) currently accepted for testing and certification by the U.S. Election Assistance Commission (EAC). Compliance with the applicable VVSG may be substantiated through federal certification by the EAC, through certification by another state that requires compliance with the applicable VVSG, or through testing conducted by a federally certified voting system test laboratory (VSTL) to the standards contained in the applicable VVSG. Meeting the requirements contained in the VVSG may substantiate compliance with the voting system requirements contained in Section 301 of the Help America Vote Act of 2002 (HAVA).

Access to Election Data

Provisions shall be made for authorized access to election results after closing of the polls and prior to the publication of the official canvass of the vote. Therefore, all systems must be capable of generating an export file to communicate results from the election jurisdiction to the Central processing location on election night after all results have been accumulated. The system may be designed so that results may be transferred to an alternate database or device. Access to the alternate file shall in no way affect the control, processing, and integrity of the primary file or allow the primary file to be affected in any way.

Security

All voting system functions shall prevent unauthorized access to them and preclude the execution of authorized functions in an improper sequence. System functions shall be executable only in the intended manner and order of events and under the intended conditions. Preconditions to a system function shall be logically related to the function so as to preclude its execution if the preconditions have not been met.

Accuracy

A voting system must be capable of accurately recording and reporting votes cast. Accuracy provisions shall be evidenced by the inclusion of control logic and data processing methods, which incorporate parity, and checksums, or other equivalent error detection and correction methods.

Data Integrity

A voting system shall contain provisions for maintaining the integrity of voting and audit data during an election and for a period of at least 22 months thereafter. These provisions shall include protection against:

- the interruption of electrical power, generated or induced electromagnetic radiation
- ambient temperature and humidity
- the failure of any data input or storage device
- any attempt at an improper data entry or retrieval procedure

Reliability

Successful Completion of the Logic and Accuracy test shall be determined by two criteria

- The number of failures in transmission
- and the accuracy of vote counting

The failure or connectivity rate will be determined by observing the number of relevant failures that occur during equipment operation. The accuracy is to be measured by verifying the completeness of the totals received.

PART II: TEST PROCEDURES AND PROTOCOLS

Overview of Telecommunication Test

The telecommunication test focuses on system hardware and software function and performance for the transmission of data that is used to operate the system and report election results. This test applies to the requirements for Volume I, Section 6 of the EAC 2005 VVSG. This testing is intended to complement the network security requirements found in Volume I, Section 7 of the EAC 2005 VVSG, which include requirements for voter and administrator access, availability of network service, data confidentiality, and data integrity. Most importantly, security services must restrict access to local election system components from public resources, and these services must also restrict access to voting system data while it is in transit through public networks. Compliance with Section 7, EAC 2005 VVSG shall be evidenced by a VSTL report submitted with the vendor's application for approval of a voting system.

In an effort to achieve these standards and to verify the proper functionality of the units under test, the following methods will be used to test each component of the voting system:

Wired Modem Capability Test Plan

Test Objective: To transfer the results from the tabulator to the Election Management System via a wired network correctly.

Test Plan:

1. Attempt to transmit results prior to the closing of the polls and printing of results tape
2. Set up a telephone line simulator that contains as many as eight phone lines
3. Perform communication suite for election night reporting using a bank with as many as seven analog modems:
    a. Connect the central site election management system to the telephone line simulator and connect the modems to the remaining telephone line ports
    b. Setup the phone line numbers in the telephone line simulator
    c. Use the simulated election to upload the election results

i. Use at least eight tabulators in different reporting units
ii. Use as many as two tabulators within the same reporting units

d. Simulate the following transmission anomalies
   i. Attempt to upload results from a tabulating device to a computer which is not part of the voting system
   ii. Attempt to upload results from a non-tabulating device to the central site connected to the modem bank
   iii. Attempt to load stress by simulating a denial of service (DOS) attack or attempt to upload more than one polling location results (e.g., ten or more polling locations)

Wireless Capability Test Plan

Test Objective: To transfer the results from the tabulator to EMS via a wireless network correctly.

Test Plan:

1. Attempt to transmit results prior to the closing of the polls and printing of results tape.
2. Perform wireless communication suite for election night reporting:
   a. Use the simulated election to upload the election results using wireless transfer to the secure FTP server (SFTP)
   b. Use at least eight tabulators in different reporting units
   c. Use as many as two tabulators within the same reporting unit
3. Simulate the following transmission anomalies
   a. Attempt to upload results from a tabulating device to a computer which is not part of the voting system
   b. Attempt to upload results from a non-tabulating device to the SFTP server
   c. Attempt to load stress by simulating a denial of service (DOS) attack or attempt to upload more than one polling location results (e.g., ten or more polling locations)
   d. If possible, simulate a weak signal
   e. If possible, simulate an intrusion

Test Conclusions for Wired and Wireless Transmission

- System must be capable of transferring 100% of the contents of results test packs without error for each successful transmission.
- Furthermore, system must demonstrate secure rate of transmission consistent with security requirements.
- System must demonstrate the proper functionality to ensure ease of use for clerks on election night.
- System must be configured such that the modem component remains inoperable until after the official closing of the polls and printing of one (1) copy of the results tape**.**

PART III: PROPOSED SECURITY PROCEDURES

Staff recommends that as a condition of purchase, any municipality or county which purchases this equipment and uses modem functionality must also agree to the following conditions of approval.

1. Devices which may be incorporated in or attached to components of the system for the purpose of transmitting tabulation data to another data processing system, printing system, or display device shall not be used for the preparation or printing of an official canvass of the vote unless they conform to a data interchange and interface structure and protocol which incorporates some form of error checking.
2. Any jurisdiction using a modeming solution to transfer results from the polling place to the central count location may not activate the modem functionality until after the polling place closes.
3. Any municipality using modeming technology must have one set of results printed before it attempts to modem any data.
4. Any municipality purchasing and using modem technology to transfer results from the polling location to the central count location must conduct an audit of the voting equipment after the conclusion of the canvass process.
5. Default passwords provided by ES&S to county/municipality must be changed upon receipt of equipment.
6. Counties must change their passwords after every election.

PART IV: CONDITIONS FOR APPROVAL (VENDOR)

Additionally, staff recommends that, as a condition/continuing condition of approval, ES&S shall:

1. Reimburse actual costs incurred by the G.A.B. and local election officials, where applicable, in examining the system *(including travel and lodging)* pursuant to state processes.
2. Configure modem component to remain inoperative (incapable of either receiving or sending transmissions) prior to the closing of the polls and the printing of tabulated results.