Wisconsin Elections Commission

201 West Washington Avenue | Second Floor | P.O. Box 7984 | Madison, WI 53707-7984
(608) 266-8005 | elections@wi.gov | elections.wi.gov

DATE: For the June 1, 2023, Commission Meeting

TO: Members, Wisconsin Elections Commission

FROM: Meagan Wolfe, Administrator

SUBJECT: **Election Systems and Software**
Petition for Approval of Electronic Voting Systems
EVS 6.0.6.0 and EVS 6.0.7.0

Introduction

Election Systems and Software (ES&S) is requesting approval from the Wisconsin Elections Commission (WEC or Commission) for the EVS 6.0.6.0 and EVS 6.0.7.0 voting systems. This approval will allow for the sale and use of these systems in the State of Wisconsin. No electronic voting equipment may be offered for sale or utilized in Wisconsin unless first approved by the WEC based upon the certification requirements laid out in Wis Stat. § 5.91 (Appendix A). The WEC has also adopted administrative rules further clarifying the testing and approval processes in Wis. Admin Code Ch. EL 7 (Appendix B).

Electronic Voting Systems in this Application

EVS 6.0.6.0

EVS 6.0.6.0 is a federally tested and certified paper based, digital scan voting system powered by the ElectionWare software platform. It consists of nine major components:

Component	Function
Election Management System (ElectionWare)	Election management software application that provides election definition creation, ballot formatting, equipment configuration, result consolidation, adjudication, and report creation
EMS Client	A desktop or laptop computer that hosts the election management system
ExpressVote	A hybrid paper-based polling place voting device that provides touchscreen vote capture that incorporates the printing of the voter's selections as a cast vote record to be scanned for tabulation in another ES&S tabulator or central scanner
ExpressVote Tabulator	A polling place device that combines the features of the ExpressVote with an incorporated tabulation scanner in a single unit

ExpressLink	A combination ballot activation application and barcode printer for use with the ExpressVote
DS200*	A polling place scanner and tabulator
DS450*	A mid-range central scanner and tabulator
DS850*	A high-speed central scanner and tabulator
DS950*	A high-speed central scanner and tabulator
*All scanners and tabulators in this voting system simultaneously scan the front and back of an inserted ballot or vote summary card (ExpressVote card) for conversion of voter selection marks to electronic cast vote records. Additionally, all are capable of reading either hand-marked paper ballots or the vote summary cards produced by the ExpressVote.	

Updates to this system include the introduction of the DS950 high-speed scanner, an upgrade of the operating system from Windows 7 to Windows 10, and various performance enhancements to the election management system. A full list of system updates can be found in the United States Election Assistance Commission's (U.S. EAC or EAC) Scope of Certification document, which can be found in Appendix C.

EVS 6.0.7.0

EVS 6.0.7.0 is a federally tested modification to the EVS 6.0.6.0 voting system. The modification provides support for modeming of unofficial election results from a DS200 to a Secure File Transfer Protocol (SFTP) server through wireless telecommunications networks after the polls close on Election Day. The modeming components of EVS 6.0.7.0 cannot meet federal certification standards, but the underlying voting system (EVS 6.0.6.0) is federally certified. While this system has not received federal certification, it was presented for and passed thorough telecommunications testing at an EAC accredited Voting System Test Laboratory (VSTL).

At its May 21, 2013, meeting, pursuant to authority granted in Wis. Stat. § 5.91 and Wis. Admin Code EL 7, the Government Accountability Board adopted testing procedures and standards pertaining to the modeming and communication functionality of voting systems that have not yet received EAC certification. At its September 9, 2021, meeting, the Wisconsin Elections Commission approved an updated version of these testing criteria and protocols. The procedures used by WEC staff to test the modeming capabilities of this system can be found in Appendix E of this report.

Recommendation

WEC staff is recommending approval of both EVS 6.0.6.0 and EVS 6.0.7.0 for sale and use in Wisconsin. Detailed recommendations are listed on pages 18 and 19 following further analysis of the functional testing performed by staff to analyze the voting systems under consideration.

Application Background

On June 20, 2022, WEC staff received an Application for Approval of Electronic Voting System for both EVS 6.0.6.0 and EVS 6.0.7.0. ES&S submitted complete specifications for hardware, firmware, and software related to the voting system. Also included with the submission were technical manuals, documentation, and user manuals necessary for the operation of the components in the two electronic voting systems.

EVS 6.0.6.0 System Overview

The VSTL responsible for testing EVS 6.0.6.0, Pro V&V, issued a Certificate of Conformance and an accompanying Scope of Certification document for this voting system on December 28, 2021. These documents signify that the system has been tested in accordance with current federal certification standards for electronic voting systems and that the system has met or exceeded those standards.

WEC staff conducted state-level certification testing for EVS 6.0.6.0 in the WEC office from April 17, 2023, through April 21, 2023. This period including functional testing, which requires all components of the system to correctly process three mock elections, a meeting of the Wisconsin Voting Equipment Review Panel, which is a body of local election officials and third-party advocates, and a public demonstration of the system.

Hardware and Software Components

ES&S submitted the following equipment for testing as part of EVS 6.0.6.0. This is a list of equipment that is most likely to be used in either a polling place or a central count location. A full list of hardware components may be found in Appendix C. Below, additional information on each type of hardware component identified in the table will be provided.

Hardware Component	Hardware Version(s)	Firmware Version(s)
DS200	1.2, 1.3	2.21.0.0
DS450	1.0	3.5.0.0
DS850	1.0	3.5.0.0
DS950	1.0	3.5.0.0.
ExpressVote HW 1.0	1.0	1.5.4.0
ExpressVote HW 2.1	2.1.0.0, 2.1.2.0	2.6.0.0

Software Component	Version
ElectionWare	5.0.6.0
ES&S Event Logging Service (ELS)	2.0.0.0
ExpressVote Previewer (HW 1.0)	1.5.4.0
ExpressVote Previewer (HW 2.1)	2.6.0.0
ExpressLink Printer	2.0.0.0
Removable Media Service (RMS)	2.0.0.0

DS200

The DS200 is a digital scan paper ballot tabulator for use in a polling place or central count location. After the voter marks a ballot, either by hand or by using the ExpressVote ballot marking device, the ballot is inserted into the unit for processing. The tabulator uses a high-resolution image device to simultaneously image the front and back of the ballot. At the same time, the device interprets a voter's marks and communicates any issues that would require the voter's attention via an LCD display. If there are no issues with the ballot, or if the voter overrides any warning screens, the tabulator will then accept the ballot and deposit it into a secure, integrated ballot storage bin.

The ballot images and disposition of a voter's marks on each ballot are stored on a removable USB drive for later conversion into cast vote records (CVR). This USB drive may be taken to the municipal or county clerk's office, where the ballot images and associated data can be uploaded into an election results management program or transferred to another form of memory device to facilitate storage and appropriate retention. The DS200 does not store any images or data in its internal memory.

The DS200 has a variety of voter information screens that provide feedback to the voter on the status of their ballot. While the 12-inch LCD touchscreen will alert a voter to any issue that could lead to their choices not being counted, e.g., overvotes or crossover votes, it will also display informational screens advising that a ballot was not read properly, that the tabulator is not programmed for a particular ballot style, that the inserted ballot was blank, or that the ballot was accepted by the tabulator. A selection of these screens, along with brief explanations, can be found in Appendix D.

The DS200 uses propriety software called Intelligent Mark Recognition to identify properly marked votes on a hand-marked ballot. Ballots used with this system are laid out with an oval to the left of each candidate name or ballot choice that a voter must fill in to indicate their choice. Tabulators do not read the candidate names or ballot choice to determine voter intent. The tabulator identifies which ovals have been filled by recognizing voter-made marks as coordinates in relation to the timing marks that surround the outside of the ballot. As previously covered, a digital image of both sides of the ballot is captured by the tabulator when the ballot is inserted and the DS200 scans the ballot to determine a voter's choices.

DS450

The DS450 is a midrange digital scan ballot tabulator for use by election officials in a central count location. This device can accommodate a variety of ballot sizes, including both hand-marked ballots and ExpressVote ballot cards, and is capable of processing between 60 and 90 ballots per minute, depending on the length of the ballots in question. As with the DS200, the DS450 captures an image of both sides of a ballot and stores these images to later be incorporated as a cast vote records. Three sorting trays are available for use and can be configured to separate out ballots based on parameters as defined by election officials. For example, officials may program the DS450 to separate out all ballots with write-in votes, overvotes, or crossover votes for manual review. While processing ballots, the DS450 prints a continuous audit log to a dedicated audit log printer, while a separate printer is available to print reports. Voter selections and ballot images are saved to an internal hard disk, which exports those results to a USB drive to be uploaded to the election management system.

DS850

The DS850 is a high-speed digital scan ballot tabulator for use in a central count location. The DS850 shares many of the same features as the DS450, including the ability to sort ballots for write-ins, overvotes, etc., and the ability to export results and ballot images on a USB drive. However, the DS850 is capable of processing up to 300 ballots per minute.

DS950

The DS950 is a high-speed digital scan ballot tabulator for use in a central count location. The DS950 shares the same features as the DS450 and DS850. Per ES&S, the DS950 requires less adjudication of ballots and reduces the potential for ballot misfeeds.

ExpressVote

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

A voter will insert a blank ballot card into the device to begin the voting process. Ballot instructions, contests, and candidates are displayed on the screen and the voter has the option of using the touchscreen or tactile keypad (shown below) to navigate the ballot and make their selections. For any applicable contest, a voter may also write in a candidate in lieu of choosing a listed ballot candidate.

If necessary, the voter may adjust the contrast and size of the displayed text. Each button on the tactile keypad has both Braille and printed text labels that indicate function and use. Additionally, a voter may use headphones to access the audio ballot function that provides a recording of the ballot instructions, contest information, and options for each contest. The volume and tempo of the audio can be adjusted by the voter throughout the voting session.

The ExpressVote provides a ballot summary screen on which the voter can review their selections before the ballot is marked by the integrated thermal printer. This device does not allow a voter to overvote or crossover vote while making their selections. Additionally, the ballot summary screen will advise the voter of any contests in which they have undervoted and give them the opportunity to return to those contests to make a selection. Once a voter confirms their choices in each contest in which they wish to vote, those selections are printed on the ballot card and the card is then returned to the voter.

As previously noted, ExpressVote ballot cards do not utilize the same ovals and timing marks that appear on a hand-marked ballot, but instead record voter choices as both plain text and a barcode. This ballot format lists each contest on the ballot and the choice the voter made in each contest or referendum question. If a voter does not vote in a particular contest, the phrase "No Selection" appears under that contest. After the ballot card is returned to the voter, the ExpressVote clears its internal memory and the paper ballot card becomes the only extant record of the voter's choices. These ballot cards can be processed by the DS200, DS450, DS850, and DS950. Alternatively, the ballot cards may be deposited in a secure ballot box or bin to be hand counted by election officials.

ExpressVote Tabulator

The ExpressVote Tabulator (EVT) features the same base functions as the ExpressVote with the added capability to function as a tabulator. The process for marking a ballot card is largely the same as on the standard ExpressVote ballot marking system. Unlike other tabulators in this voting system, the EVT is not capable of processing both hand-marked optical scan ballots and ExpressVote ballot cards. This device can only accept ExpressVote ballot cards.

As with the base ExpressVote configuration, the voter begins the process by inserting a blank ballot card. They can then use the touchscreen or tactile keypad to navigate the ballot and make their selections. After all selections have been made, the voter is presented with the ballot summary screen that lists all their choices in each contest. In accordance with Commission requirements, the EVT must then return the ballot card to the voter for physical review prior to tabulation.

While the voter is reviewing their ballot, a notification appears on the screen of the EVT advising the voter that they must take additional steps to complete the voting process. The screen is bright yellow in color and advises "YOU ARE NOT FINISHED VOTING." The EVT will stay on this screen until the ballot card has been reinserted.

Following physical review of the ballot card, the voter will reinsert the card into the EVT. The voter is then presented with the option to cast the votes as marked or return to the ballot summary review screen. If the voter opts to cast the ballot, it is processed by the tabulator, which drops it into the affixed ballot bin, and the voter is thanked for voting. If the voter opts to return to the review screen, they will have the opportunity to review their ballot choices on the screen or have their choices read back to them using the audio ballot feature. As the ballot has already been marked at this stage in the voting process, a voter may no longer make any changes to their selections. If they wish to change their vote in a particular contest, they must spoil their first ballot card and request a new one from election inspectors.

Results and ballot images from all ballot cards processed by the EVT are saved to an external memory device which is housed in a secure compartment on the unit. A polling place may elect to operate an EVT in conjunction with another tabulator, such as a DS200, but the results from each will remain separate. There are no modeming components contained within the EVT, so it is incapable of transmitting unofficial election results when the polls close.

ExpressLink and ExpressVote Ballot Style Pre-Printer

ExpressLink is a software application and associated printer that is used to preprint district and ballot style information on ExpressVote ballot cards. Depending on the configuration of the ExpressVote and how many distinct reporting units are served by a polling place, an election worker will sometimes have to select the applicable reporting unit or ward for a voter prior to the voting session beginning. As ExpressLink ballots have this information preprinted on the top in the form of a barcode, an election worker is no longer required to manually select the applicable reporting unit or ward and this information is loaded automatically when the ExpressLink ballot card is inserted into the ExpressVote. This allows for greater independence and privacy for the voter throughout the voting session. It is also important to distinguish between the barcodes printed by the ExpressLink and the barcodes that are generated by the ExpressVote which are a record of voter selections.

WEC staff incorporated these preprinted activation cards into the in-office functional testing of this voting system by marking 100 ballot cards on the ExpressLink printer, with 10 ballots preprinted with district information for 10 fictional wards. As in previous certification tests, this feature worked as designed. A more detailed explanation of the ExpressLink testing can be found in Appendix F of this report.

ElectionWare

ElectionWare is the Election Management System (EMS) for this voting system. As previously detailed, an EMS is the software platform that provides election definition creation, ballot formatting, equipment configuration, result consolidation, adjudication, and report creation. This software is hosted on the EMS client, which is a secure laptop or desktop housed in the County Clerk's office.

As the EMS is an integral part of election administration in any electronic voting system, there are security requirements for the client/workstation to which counties and vendors must adhere. The EMS client is required to be deployed on a hardened and air-gapped system, meaning that all software not essential to the proper function of the EMS has been removed and access to the Internet has been restricted. Removing superfluous software and other applications increases the overall security of the system by removing potential access points. As access to the Internet has been restricted, the EMS provides an audit log of all system actions and any connection attempts (such as the transmission of unofficial results) to prevent unauthorized access to the system.

Some important updates in this voting system are an upgrade of the main operating system from Microsoft Windows 7 to Microsoft Windows 10 Enterprise with Bitlocker protection, multi-factor authentication requirements to access EMS computers, and a server upgrade from Microsoft Windows Server 2008 to Microsoft Windows Server 2016. These upgrades increase memory allocation and improve both system performance and overall security.

Functional Testing

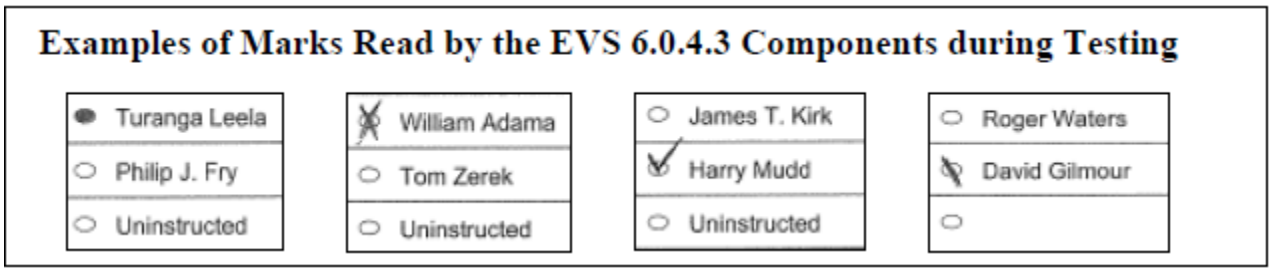
As required by Wis. Admin. Code EL § 7.02(1), WEC staff conducted three mock elections with each component of EVS 6.0.6.0 to ensure the voting system conforms to all Wisconsin requirements. As in every certification, these mock elections included a partisan primary with a special nonpartisan school board election, a general election with both a presidential and special gubernatorial contest, and a presidential preference vote combined with nonpartisan offices and a special partisan contest.

Staff prepared a series of test decks on nearly 2,000 ballots using various configurations of votes, e.g., valid votes, overvotes, crossover votes, etc., across all three mock elections to verify the accuracy and functional capabilities of EVS 6.0.6.0. Using blank ballot stock provided by ES&S, WEC staff utilized a predetermined results set to hand mark 300 ballots for each of the three mock elections. Additionally, 100 ExpressVote ballots were marked in each mock election, bringing the base total for each to 400 ballots. All 400 ballots for each mock election were tabulated using the DS200, DS450, DS850, and DS950.

Separate testing was conducted on both the ExpressVote Printer and ExpressVote Tabulator. The 100 ballot cards marked by the ExpressVote Printer, 10 in each of 10 wards, were then marked by the ExpressVote using a predetermined results set and tabulated using the DS200, DS450, DS850, and DS950. The ExpressVote Tabulator was tested using a third predetermined results set, with 200 ballots being marked and tabulated with the device in each of the three mock elections. In all cases, staff ensured the results produced by each hardware component matched the predetermined results sets before transitioning to the next mock election. A single anomaly, further explained below, was investigated and resolved in real time.

To ensure that the equipment in this voting system was compatible with Wisconsin election law and able to process a variety of marks, the test ballots for each mock election included several ballots purposefully marked in ways not typically recommended by the vendor. In all cases where ballots were intentionally marked with overvotes, all tabulation equipment in this system was able to consistently identify those issues and displayed the requisite warning. The same was true for crossover votes, which require a voter to vote in multiple primaries/cross party lines and are only possible in the mock partisan primary and presidential preference elections. Additionally, each mock election has two separate ballot styles, one of which includes a special contest or referendum question and one that does not. Including two separate styles assesses the ability to program multiple election definitions on each piece of equipment and to produce accurate results. In all instances, the equipment accurately tabulated votes between the separate ballot styles.

Test decks were also marked to determine exactly what constitutes a readable mark by each piece of tabulation equipment in this voting system. A subset of ballots for each mock election included “special marks,” shown here:



The first column shows a "typical" mark, i.e., a completed oval and the most common way a voter will mark a ballot. The following columns show a selection of ambiguous marks, which include less-common ways a voter may complete an oval to indicate their choices. Each piece of tabulation equipment in this voting system was able to identify the ambiguous marks as valid choices in all three mock elections.

Every voting equipment vendor recommends a specific type of marking device that should be used to complete a ballot. In the case of ES&S, the recommended marking device is a BIC roller ball pen with black ink. Staff used this marking device to mark most ballots in each test deck, but also included a variety of other marking devices to ensure the system was capable of tabulating votes marked with green ink, red ink, blue ink, and pencil. While past testing has resulted in issues with ballots marked in specific shades of red and green ink, no such discrepancies were found in this round of testing and the tabulation equipment functioned as expected.

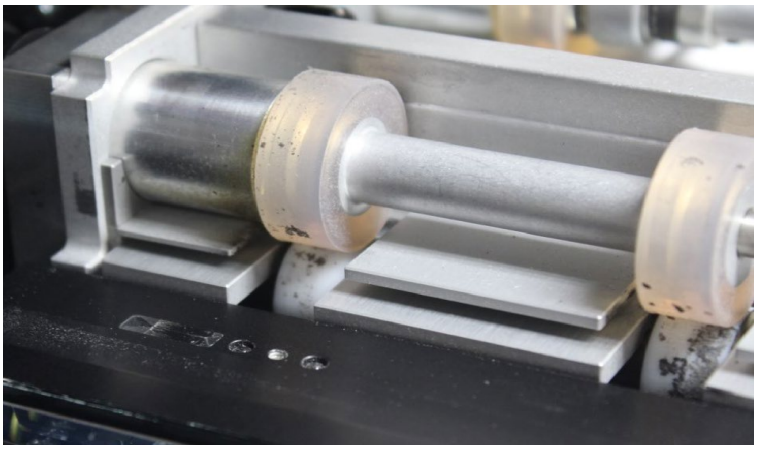
Staff also included several ballots with folds and tears. In some cases, a torn ballot may not be read correctly tabulation equipment. However, this happens much more commonly in instances where the tear goes through the timing marks that surround the outside of the ballot. Folded ballots are included to replicate (as closely as possible) an absentee ballot that will be processed either at the polling place or a central count location. Vendors recommend that all absentee ballots be scored in specific places on the ballot to avoid the potential of a particularly heavy crease reading as a "false positive" vote if the crease goes directly through an oval. Staff folded several test ballots to purposefully place the creases through ovals and no such false positive votes or overvotes were read by the tabulation equipment.

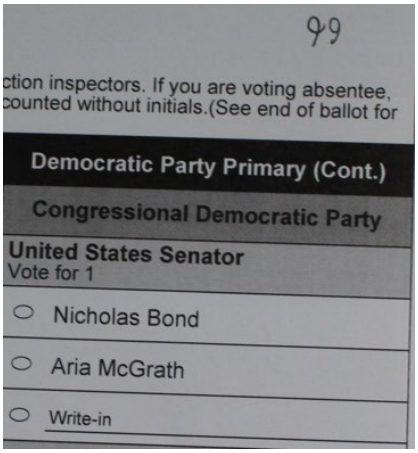
Testing Anomalies

Staff encountered a single issue in this round of testing when reconciling the results of the partisan primary test deck on the DS850 high-speed tabulator. After the test deck was processed by the DS850, the results of the United States Senator contest in the Democratic Party Primary were showing an additional vote for one candidate when compared to the predetermined results matrix. Staff reviewed the ballots, results report, and cast vote records for the election. After pulling all the ballots that should have had a valid vote for this candidate out of the test deck, staff and an ES&S representative used the cast vote records to identify which ballot had the "extra" vote.

The ballot in question, ballot 99, does not have an oval filled in for candidate Nicolas Bond. However, the DS850 showed a vote for that candidate in the final results. After an investigation of the DS850, staff determined the cause of this discrepancy to be a buildup of dried ink flakes and debris in the tabulator itself. One of the sets of wheels that feeds ballots into the scanner, pictured below, had not been cleaned prior to running the partisan primary test deck. When the ballot in question went through these rollers, one of the ink flakes was dislodged from the roller and stuck to the ballot in the Nicolas Bond oval, which caused the scanner to pick up a vote where none should have been. It is important to note that this anomaly only occurred on the DS850, and the results all reconciled correctly on the DS200, DS450, and DS950. After thoroughly cleaning the

rollers on the DS850 as suggested by ES&S as a part of regular maintenance, staff reran the test deck multiple times and the results matched the predetermined results as expected.





EVS 6.0.7.0 System Overview

EVS 6.0.7.0. is a separate system for certification purposes. This system includes the hardware and software components feature in the base 6.0.6.0 system with the added capability to transmit unofficial results from a polling place or central count location via a secure modem. These results are transmitted from a DS200 to a Secure File Transfer Protocol (SFTP) server through public wireless telecommunications networks. All modifications of the system were tested by Pro V&V to the 2005 Voluntary Voting System Guidelines (VVSG) protocols.

In past certification testing, WEC staff tested both analog and wireless results transmission. For EVS 6.0.7.0, only wireless results transmission was tested, as no analog component was submitted for certification. The means of transmitting these results is referred to as a "Zero Tunnel" by Verizon Wireless, the host of the virtual private network utilized by this voting system. As part of this voting system, the results are encrypted and digitally signed before being transmitted via a further encrypted virtual private network (VPN) hosted by Verizon. Without the correct encryption key, the incoming data is prevented from reaching the EMS workstation, the secure laptop or desktop computer hosted at the county that receives results.

At its May 21, 2013, meeting, pursuant to authority granted in Wis. Stat. § 5.91 and Wis. Admin. Code EL 7, the GAB adopted testing procedures and standards pertaining to the modeming and communication functionality of voting systems that have not received EAC certification. The standards were based upon the analysis and findings outlined in a staff memorandum and detailed in the *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin*. At its September 9, 2021, meeting, the Wisconsin Elections Commission approved an updated version of these testing criteria and protocols, which are attached as Appendix E. 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.

WEC Staff conducted functional testing of EVS 6.0.7.0 in Rock, Jefferson, and Sauk Counties. A four-person team of WEC staff conducted testing April 25–27, 2023. Three representatives from ES&S were on hand in each county to provide technical support. ES&S provided three DS200 tabulators in each county, each equipped

with a Verizon wireless modem. Also provided by ES&S was a portable EMS environment, which included an SFTP client, firewall, and ElectionWare EMS software, all configured in the same way they would be in the County Clerk's office on election night.

Rock County – April 25, 2023			
Location	**Modem Type**	**Initial Transmission Results**	**Load Test Results**
City of Janesville	Wireless	10 of 10	20 of 20
Town of Harmony	Wireless	10 of 10	21 of 21
Town of La Prairie	Wireless	10 of 10	19 of 19
Totals		**30 of 30**	**60 of 60**

Jefferson County – April 26, 2023			
Location	**Modem Type**	**Initial Transmission Results**	**Load Test Results**
City of Fort Atkinson	Wireless	10 of 10	22 of 22
City of Jefferson	Wireless	10 of 10	22 of 22
Village of Johnson Creek	Wireless	10 of 10	20 of 20
Totals		**30 of 30**	**64 of 64**

Sauk County – April 27, 2023			
Location	**Modem Type**	**Initial Transmission Results**	**Load Test Results**
City of Baraboo	Wireless	10 of 10	23 of 23
Village of Prairie du Sac	Wireless	10 of 10	23 of 23
Village of Sauk City	Wireless	10 of 10	21 of 21
Totals		**30 of 30**	**67 of 67**

The modem in the DS200 transmits unofficial election night results to a secure server at a central office location, such as the county clerk's office via a virtual private network hosted by Verizon Wireless. A firewall provides a buffer between the network segment, where the server is located, and other internal virtual 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 with the correct encryption key to connect to the SFTP server. The firewall further restricts the flow and connectivity of traffic.

The EMS is required to be deployed on a "hardened system," meaning that all software that is not essential to the proper functioning of the EMS is removed from the computer where the EMS is installed. This procedure is designed to increase the security of the system through the elimination of applications that may provide "back door" access to the system. Access to the internet is also restricted and the EMS provides an audit log of all system actions and connection attempts that can be used to verify unauthorized access to the system while unofficial election results are being transmitted after the close of polls.

While previous versions of the EMS supported modeming through a number of service providers, e.g., Sprint, AT&T, and Verizon, this version of the EMS only supports the transmission of results via Verizon modems. During this test campaign, WEC staff successfully transmitted results in each county using Verizon modems in each municipality. During this test campaign, the strength of service ranged from two bars (lowest indicator level is zero) to five bars (highest indicator level). Election results packets were sent successfully at all service levels.

EVS 6.0.7.0 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 Verizon. 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 modem function of the DS200 nor the Regional Results program impacts the tabulation of official election results.

Wisconsin Elections Commission Voting Equipment Review Panel

To solicit valuable feedback from local election officials and community advocates, the WEC formed the Voting Equipment Review Panel. In accordance with Wis. Admin Code EL § 7.02(2), this panel includes municipal and county clerks, representatives of the disability community, and other advocates for the interest of the voting public.

Members of this panel attended the meeting both in person and virtually via Zoom. The meeting took place at the WEC office in Madison on April 20, 2023, from 2:00 p.m. to 3:30 p.m. ES&S representatives provided a demonstration of EVS 6.0.6.0 and attendees were encouraged to test the equipment themselves by marking ballots and interacting with all the hardware components under consideration. Comments and feedback from the Voting Equipment Review Panel are included as Appendix G.

Public Demonstration

Following the Voting Equipment Review Panel, a public demonstration was held on April 20, 2023, from 4:00 p.m. to 5:00 p.m. The public demonstration was appropriately noticed as a public meeting and was held in person in the WEC offices with ES&S representatives available to answer questions and guide attendees through the functionality of the equipment. There were no attendees.

Statutory Compliance

Wis. Stat. § 5.91 provides the following requirements voting systems must meet to be approved for use in Wisconsin. Please see the text below of each requirement and staff's analysis of the EVS 6.0.6.0 and EVS 6.0.7.0's compliance with the standards.

Wis. Stat. § 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.

Wis. Stat. § 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.

Wis. Stat. § 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.

Wis. Stat. § 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. Referenda included as part of testing were accurately tabulated by all EVS 6.0.4.0 components.

Wis. Stat. § 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. The system can also be programmed to provide a warning screen to the voter that identifies any crossover voted contest. Either one of these programming options allows these systems to meet this requirement. The warning screen provides options where the voter can choose to have their ballot returned to them or they can cast the ballot without correcting the crossover vote. The use of the override function was previously prohibited by statute, but Wis. Stats. §5.85(2)(b) expressly allows for the optional use of the override function in event of an overvote and the WEC has applied the same standard to the use of the override function in the event of crossover vote.

Wis. Stat. § 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 can be configured to always reject overvotes without providing an opportunity for the voter to override. The system can also be programmed to provide a warning screen to the voter that identifies any overvoted contest. Either one of these programming options allows these systems to meet this requirement. The warning screen provides options where the voter can choose to have their ballot returned to them or they can cast the ballot without correcting the overvote. The use of the override function was previously prohibited by statute, but Wis. Stats. §5.85(2)(b) expressly allows for the optional use of the override function in event of an overvote.

Wis. Stat. § 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. Traditional paper ballots utilized by the DS200, as well as the ExpressVote candidate screens, present the two candidates in these contests as a single choice.

Wis. Stat. § 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.

Wis. Stat. § 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.

Wis. Stat. § 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.

Wis. Stat. § 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 can be programmed to provide warning screens to the voter that identifies any problem with their ballot. The warning screens provide an explanation of the problem and allow the voter to have their ballot returned to them to review and correct the error. The systems can be configured to always reject overvotes and crossover votes without providing an opportunity for the voter to override.

Wis. Stat. § 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.

Wis. Stat. § 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.

Wis. Stat. § 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 through the use of hand-marked paper ballots and accessible voting equipment that provides both an electronic ballot review screen and a marked paper ballot that can be reviewed before tabulation.

Wis. Stat. § 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. Traditional paper ballots can be changed and/or spoiled at any point up to being placed in the tabulator. ExpressVote ballots are printed for the voter to review prior to casting in a tabulator and can be spoiled at will by the voter.

Wis. Stat. § 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 can be programmed to provide warning screens to the voter that identifies any problem with their ballot. The warning screens provide an explanation of the problem and allow the voter to have their ballot returned to them to review and correct the error. The systems can be configured to always reject overvotes and crossover votes without providing an opportunity for the voter to override.

Wis. Stat. § 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 is satisfied. However, due to its direct cast feature and the lack of automatic ballot return for voter review on the ExpressVote Tabulator, that specific piece of equipment does not meet this requirement.

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 system components, with the exception of the ExpressVote Tabulator, meet these requirements through the inclusion of options for ADA-compliant voting machines municipalities can choose to employ.

Recommendations

Staff has reviewed the application materials, including the technical data package and testing lab report, and examined the results from the functional and modeming test campaigns to determine if these systems are compliant with both state and federal certification laws. EVS 6.0.6.0 and EVS 6.0.7.0 comply with all applicable state and federal requirements. The components of these voting systems met all standards over three mock elections and staff determined they can successfully run a transparent, fair, and secure election in compliance with Wisconsin Statutes. The systems also allow access to the electoral process for individuals with disabilities with the inclusion of the ExpressVote vote capture system.

1. WEC staff recommends approval of ES&S voting systems EVS 6.0.6.0 and EVS 6.0.7.0 and the components of these systems, set forth in Appendix C. These voting systems accurately completed the three mock elections and were able to accommodate the voting requirements of the Wisconsin election process.

2. WEC staff recommends approval of the ExpressLink application software and ballot style printer as part of the WEC's approval. While this product lacks EAC certification, the component performed successfully when evaluated under a Commission approved test protocol.

3. WEC staff recommends that as a continuing condition of the WEC's approval, ES&S may not impose customer deadlines contrary to requirements provided in Wisconsin Statutes, as determined by the WEC. 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.

4. WEC staff recommends that as a continuing condition of the WEC's approval, that voting systems purchased and installed as part of EVS 6.0.6.0 and EVS 6.0.7.0 be configured in the same manner in which they were tested, subject to verification by the Commission or its designee. Once installed, the configuration must remain the same and may not be altered by ES&S nor by state, county, or municipal officials except as approved by the Commission.

5. WEC staff recommends that election inspectors continue to check both the write-in bin, where applicable, and main ballot bin for validly cast write-in votes after the close of polls in each election, and not rely upon the optional write-in report.

6. WEC staff recommends that any absentee ballot returned by the tabulation equipment with an overvote or crossover vote notification must be reviewed by election inspectors prior to being overridden or remade. If necessary, ballots must be remade pursuant to approved procedures listed in the Election Day and Election Administration manuals.

7. WEC staff recommends that any absentee ballot returned which has been marked with non-black ink be remade by election inspectors prior to any attempt at processing on the tabulation equipment.

8. WEC staff recommends that ballots marked with the ExpressVote in ballot marking mode and ExpressVote Tabulator be included as part of the pre-election public test.

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

    a. Automatic rejection of crossover and overvoted ballots with or without the option to override.
    b. Automatic rejection of all improper ballots except blank ballots.
    c. Digital ballot images shall be captured for all ballots tabulated by the system.
    d. Require the return of ExpressVote Tabulator ballot cards for physical review prior to casting.
    e. Provide visual warning messages, utilizing Commission approved language, to voters when overvotes and crossover votes are detected.

10. As part of US EAC certificate: ESSEVS6060, only equipment included in this certificate can 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 WEC, as this would void the US EAC certificate. If a jurisdiction upgrades to EVS 6.0.6.0, it needs 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 6.0.7.0, it needs to upgrade each and every component of the voting system to the requirements of what is approved herein.

11. WEC 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.

12. The Wisconsin application for approval contains a condition that requires the vendor to reimburse the WEC for all costs associated with the testing campaign and certification process. ES&S agreed to this requirement on the applications submitted to WEC on June 22, 2022, requesting the approval of EVS 6.0.6.0 and 6.0.7.0.

Proposed Motion

MOTION: The Wisconsin Elections Commission adopts the staff's recommendations for approval of the ES&S voting system's Application for Approval of EVS 6.0.6.0 in compliance with US EAC certificate ESSEVS6060 including the conditions described above, and the ES&S voting system's Application for Approval of EVS 6.0.7.0 including the conditions described above.

Appendices

- Appendix A: Wisconsin Statutes § 5.91
- Appendix B: Wisconsin Administrative Code Ch. EL 7
- Appendix C: US-EAC Certificate of Conformance / Scope of Certification
- Appendix D: DS200 Voter Information Screens
- Appendix E: Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin
- Appendix F: ExpressLink Testing Protocol
- Appendix G: Wisconsin Voting Equipment Review Panel Feedback
- Appendix H: Required Submission on EVS 6.0.7.0 non-Certification

Appendix A: Wisconsin Statutes § 5.91

5.91 Requisites for approval of ballots, devices and equipment. No ballot, voting device, automatic tabulating equipment, or related equipment and materials to be used in an electronic voting system may be utilized in this state unless it is certified by the commission. The commission may revoke its certification of any ballot, device, equipment, or materials at any time for cause. The commission may certify any such voting device, automatic tabulating equipment, or related equipment or materials regardless of whether any such item is approved by the federal election assistance commission, but the commission may not certify any ballot, device, equipment, or material to be used in an electronic voting system unless it fulfills the following requirements:

(1) It enables an elector to vote in secrecy and to select the party for which an elector will vote in secrecy at a partisan primary election.

(3) Except in primary elections, it enables an elector to vote for a ticket selected in part from the nominees of one party, and in part from the nominees of other parties, and in part from independent candidates and in part of candidates whose names are written in by the elector.

(4) It 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.

(5) It accommodates all referenda to be submitted to the electors in the form provided by law.

(6) The voting device or machine permits an elector in a primary election to vote for the candidates of the recognized political party of his or her choice, and the automatic tabulating equipment or machine 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.

(7) It permits an 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.

(8) It permits an elector, at a presidential or gubernatorial election, by one action to vote for the candidates of a party for president and vice president or for governor and lieutenant governor, respectively.

(9) It prevents an elector from voting for the same person more than once for the same office, except where an elector casts excess write-in votes upon a ballot that is distributed to the elector.

(10) It 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.

(11) It records correctly and counts accurately every vote properly cast 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.

(12) It 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 device, automatic tabulating equipment or related equipment or materials.

(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.
(14) It does not employ any mechanism by which a ballot is punched or punctured to record the votes cast by an elector.
(15) It permits an elector to privately verify the votes selected by the elector before casting his or her ballot.
(16) It provides an elector with 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.
(17) Unless the ballot is counted at a central counting location, it includes a mechanism for notifying an elector who attempts to cast an excess number of votes for a single office that his or her votes for that office will not be counted, and provides the elector with an opportunity to correct his or her ballot or to receive and cast a replacement ballot.
(18) If the device consists of an electronic voting machine, it generates a complete, permanent paper record showing all votes cast by each 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.

Appendix B: Wis. Admin. Code Ch. EL 7

APPROVAL OF ELECTRONIC VOTING EQUIPMENT

Note: Chapter ElBd 7 was renumbered chapter GAB 7 under s. 13.92 (4) (b) 1., Stats., and corrections made under s. 13.92 (4) (b) 7., Stats., Register April 2008 No. 628. **Chapter GAB 7 was renumbered Chapter EL 7 under s. 13.92 (4) (b) 1., Stats., Register June 2016 No. 726.**

EL 7.01 Application for approval of electronic voting system.

(1) An application for approval of an electronic voting system shall be accompanied by all of the following:

(a) A signed agreement that the vendor shall pay all costs, related to approval of the system, incurred by the elections commission, its designees and the vendor.

(b) Complete specifications for all hardware, firmware and software.

(c) All technical manuals and documentation related to the system.

(d) Complete instruction materials necessary for the operation of the equipment and a description of training available to users and purchasers.

(e) Reports from an independent testing authority accredited by the national association of state election directors (NASED) demonstrating that the voting system conforms to all the standards recommended by the federal elections commission.

(f) A signed agreement requiring that the vendor shall immediately notify the elections commission of any modification to the voting system and requiring that the vendor will not offer, for use, sale or lease, any modified voting system, if the elections commission notifies the vendor that the modifications require that the system be approved again.

(g) A list showing all the states and municipalities in which the system has been approved for use and the length of time that the equipment has been in use in those jurisdictions.

(2) The commission shall determine if the application is complete and, if it is, shall so notify the vendor in writing. If it is not complete, the elections commission shall so notify the vendor and shall detail any insufficiencies.

(3) If the application is complete, the vendor shall prepare the voting system for three mock elections, using offices, referenda questions and candidates provided by the elections commission.

History: Cr. Register, June, 2000, No. 534, eff. 7−1−00; **correction in (1) (a), (f), (2), (3) made under s. 13.92 (4) (b) 6., Stats., Register June 2016 No. 726.**

EL 7.02 Agency testing of electronic voting system.
(1) The elections commission shall conduct a test of a voting system, submitted for approval under s. EL 7.01, to ensure that it meets the criteria set out in s. 5.91, Stats. The test shall be conducted using a mock election for the partisan primary, a mock general election with both a presidential and gubernatorial vote, and a mock nonpartisan election combined with a presidential preference vote.
(2) The elections commission may use a panel of local election officials and electors to assist in its review of the voting system.
(3) The elections commission may require that the voting system be used in an actual election as a condition of approval.
History: Cr. Register, June, 2000, No. 534, eff. 7−1−00; **correction in (1) to (3) made under s. 13.92 (4) (b) 6., Stats., and correction in (1) made under s. 13.92 (4) (b) 7., Stats., Register June 2016 No. 726.**

EL 7.03 Continuing approval of electronic voting system.

(1) The elections commission may revoke the approval of any existing electronic voting system if it does not comply with the provisions of this chapter. As a condition of maintaining the elections commission's approval for the use of the voting system, the vendor shall inform the elections commission of all changes in the hardware, firmware and software and all jurisdictions using the voting system.
(2) The vendor shall, at its own expense, furnish, to an agent approved by the elections commission, for placement in escrow, a copy of the programs, documentation and source code used for any election in the state.
(3) The electronic voting system must be capable of transferring the data contained in the system to an electronic recording medium, pursuant to the provisions of s. 7.23, Stats.
(4) The vendor shall ensure that election results can be exported on election night into a statewide database developed by the elections commission.
(5) For good cause shown, the elections commission may exempt any electronic voting system from strict compliance with this chapter.

History: Cr. Register, June, 2000, No. 534, eff. 7−1−00; **correction in (1), (4), (5) made under s. 13.92 (4) (b) 6., Stats. and corrections in (5) made under s. 13.92 (4) (b) 7., Stats., and s. 35.17, Stats., Register June 2016 No. 726.**

Appendix C: US-EAC Certificate of Conformance / Scope of Certification

Manufacturer: *Election Systems & Software*
System Name: *EVS 6.0.6.0*
Certificate: *ESSEVS6060*

Laboratory: *Pro V&V*
Standard: *2005 VVSG*
Date: *12/28/2021*

Scope of Certification

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

Significance of EAC Certification

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

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

Representation of EAC Certification

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

System Overview

The ES&S EVS 6.0.6.0 voting system is a modification to the previously EAC-certified EVS 6.0.4.0. The DS450 and DS850 components are modifications of the previously EAC-certified EVS 6.1.0.0. The EVS 6.0.6.0 voting system contains modifications to Electionware, ExpressVote versions 1.0 and 2.1, ExpressVote XL, DS200, DS450, DS850, Event Log Service (ELS), Removable Media Service (RMS), and introduces the DS950, a high-speed central count scanner and tabulator. EVS 6.0.6.0 is composed of software applications, central count location devices and polling place devices with accompanying firmware, and COTS hardware and software:

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

ExpressVote XL® is a hybrid paper-based polling place voting device that provides a full-faced touch screen vote capture interface that incorporates the printing of the voter's selections as a cast vote record and tabulation scanning in a single unit.

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

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

There are two separate versions of the ExpressVote hardware version 2.1: 2.1.0.0 and version

2.1.2.0 (6.4 & 6.8). Please note that all future references to ExpressVote HW 2.1 as used throughout the document refers to both hardware versions.

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

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

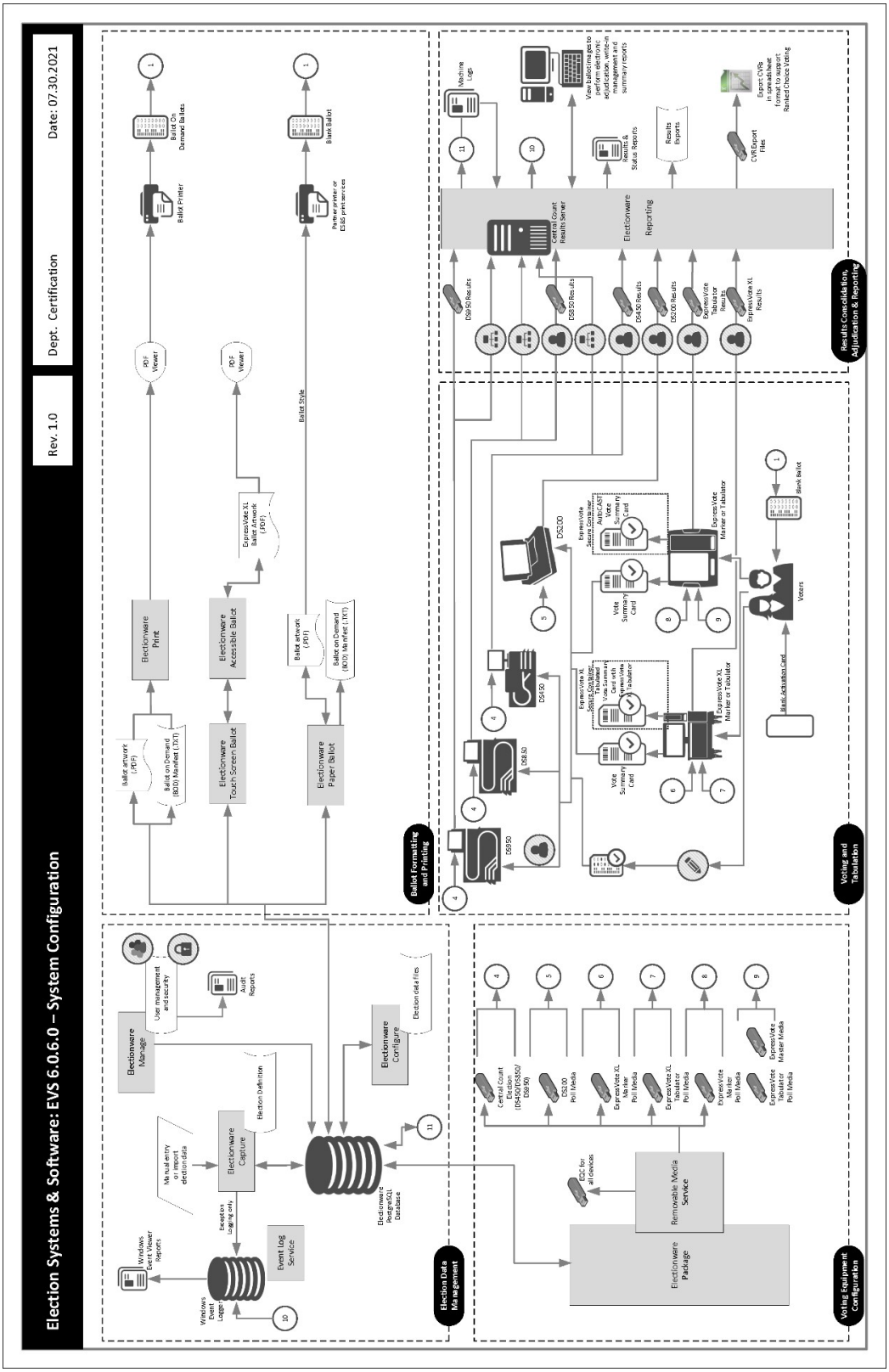
DS850® is a central scanner and tabulator that simultaneously scans the front and back of a paper ballot and/or vote summary card in any of four orientations for conversion of voter selection marks to electronic CVRs.

DS950® is a central scanner and tabulator that simultaneously scans the front and back of a paper ballot and/or vote summary card in any of four orientations for conversion of voter selection marks to electronic CVRs.

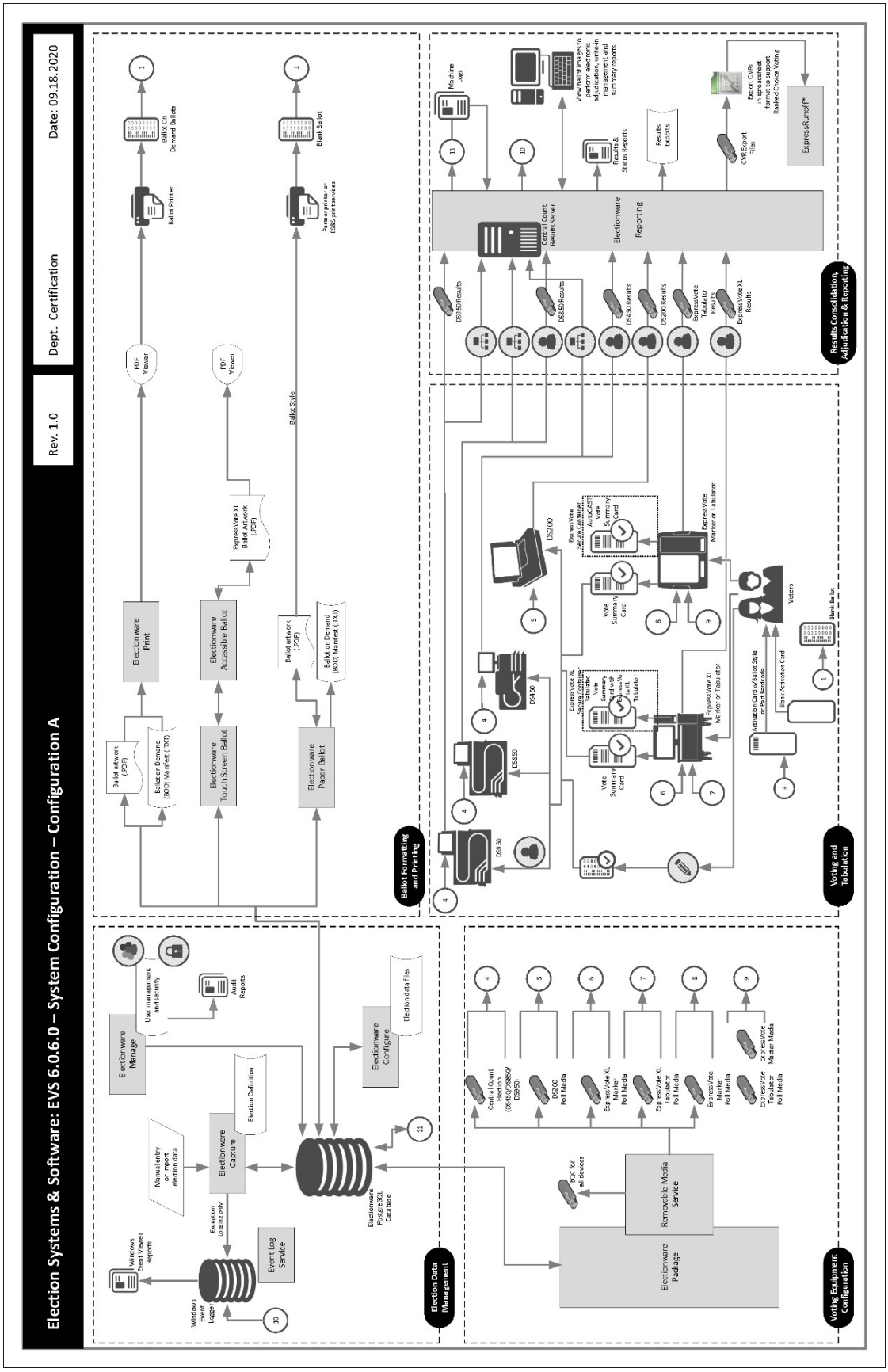
Event Log Service (ELS) monitors and logs users' interactions with the election management system. Events that happen when a connection to the database is not available are logged to the Windows operating system log through the ELS.

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

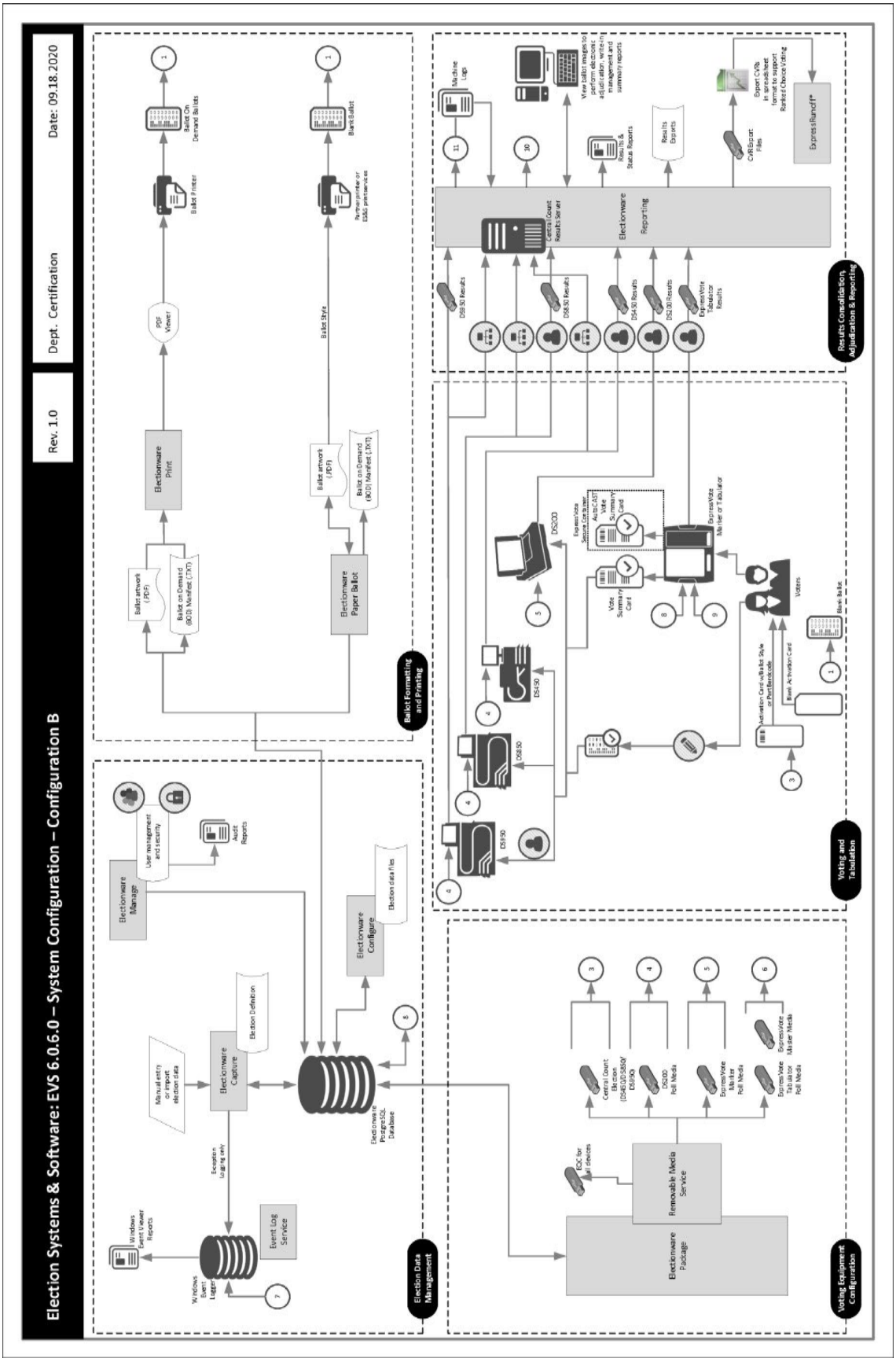
System Diagram



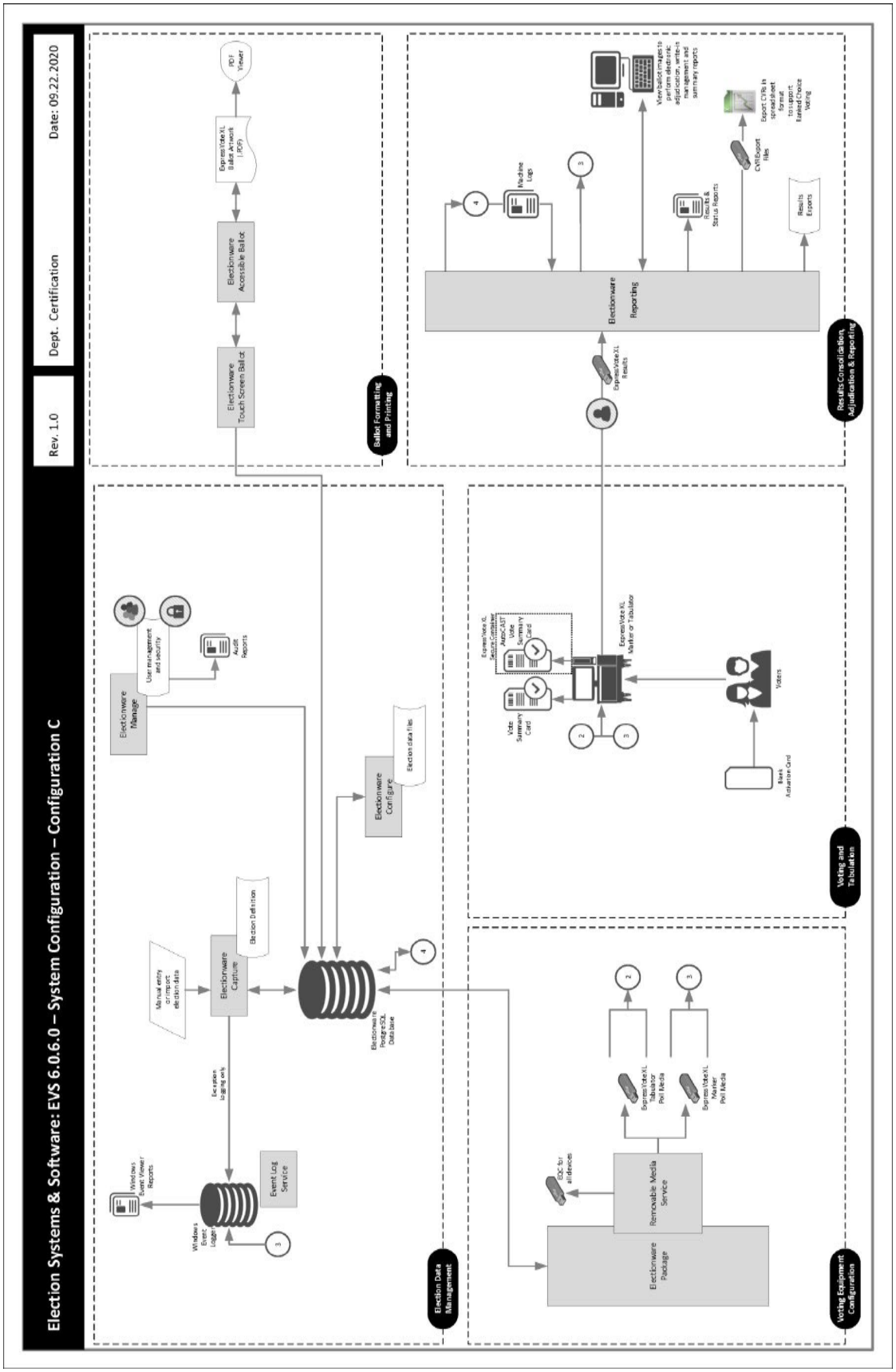
EVS 6.0.6.0 System End-to-End Functionality Overview



EVS 6.0.6.0 System Configuration A Overview



EVS 6.0.6.0 System Configuration B Overview



EVS 6.0.6.0 System Configuration C Overview

Certified System before Modification (If applicable):

EVS 6.1.0.0

EVS 6.0.4.0

Changes addressed by modification

Hardware

New Hardware

- DS950: introduced the new high-speed central count scanner and tabulator.
- USB Flash Drives (USB 3.0): introduced modernized USB capabilities (4GB, 8GB, 16GB, 32BG)
- Introduces a flash drive with high capacity for central count results export capability (256GB).

Hardware Modifications

- ExpressVote HW2.1: updated the following components to replace end-of-life parts: main battery pack, CMOS battery.

New Configuration Options

- ExpressVote Dual Express Cart: The Dual Express Cart is a rolling cart with four locking caster wheels. It is capable of holding up to two ExpressVote units securely in place. One unit is positioned for standing voters while the other is ADA-compliant to accommodate a seated voter. Each of the stations on this cart includes deployable privacy screens.
- ExpressVote Ben Franklin Voting Booth: The ExpressVote Ben Franklin Booth is an ADA-compliant way to deploy the ExpressVote for use as marker. The voting booth can be positioned to accommodate both standing and seated voters.
- DS200 Ballot Trolley: The DS200 ballot trolley is a secure way to transport scanned ballots after the close of voting. The ballot trolley is designed to be used with the collapsible ballot box configuration.
- DS200 Ballot Tote Bag: The DS200 ballot tote bag allows secure transportation of scanned ballots after the close of voting. The ballot tote bag is designed to be used with the plastic ballot box configuration.

Software/Firmware

Cross-Product Changes

- Operating System: Upgraded the operating system from Microsoft Windows 7 to Microsoft Windows 10 Enterprise LTSC and from Microsoft Windows Server 2008 R2 to Microsoft Windows Server 2016. This upgrade moves the voting system to a 64-bit architecture.
- Impacted products: Electionware
- Dual Factor Authentication: implemented YubiKey USB keys for dual factor authentication (optional).
    - Impacted products: Election Management System
- Increased RAM Potential: Provided the option for increased physical RAM on the EMS in the client,

server and/or standalone configurations (optional).
    - Impacted products: Election Management System
- Arial fonts: Included the recommended Arial fonts, which allows states to have better flexibility for ballot/election layout. This font is optional and is obtained via customer purchase.
    - Impacted products: Election Management System
- Add Option to Present Voter Instructions to all Voters: Provide a configurable option to present all voters with voting instructions (on-screen and audio) at the beginning of each ExpressVote vote session in the voter-selected language.
    - Impacted products: Electionware, ExpressVote HW1.0, ExpressVote HW2.1
- Add Option to Present Election Name, Date, and Ballot Style to All Voters: Provide a configurable option to the Election Name, Election Date, and Ballot Style to voter instructions (on-screen and audio) that are available to the voter at the beginning of each vote session or on-demand when the Help feature is invoked.
    - Impacted products: Electionware, ExpressVote HW1.0, ExpressVote HW2.1
- Add option to always front eject cards for review on ExpressVote Tabulator: Provide configurable option for the ExpressVote Tabulator to eject the printed card to all voters for review before casting.
    - Impacted products: Electionware, ExpressVote HW2.1
- Synchronization: Incremented firmware version to remain synchronized with common code stack changes.
    - Impacted products: DS450, DS850
- New USB Flash drives: Added support for new USB flash drives (4GB, 8GB, 16GB, and 32GB).
    - Impacted products: All products
- Windows 10 Flash Drives: Added support for exporting files on a USB flash drive formatted on Windows 10.
    - Impacted products: All products
- Imprinted Ballots: Enhanced the imprinted ballot number with the ability to include the last four digits of the machine serial number.
    - Impacted products: DS450, DS850
- Credentials: Changed log in credentials so all central count equipment uses the same username and password rather than requiring different user credentials for each central count model.
    - Impacted products: DS450, DS850

DS200

- Write-in Snippets: On the DS200 results tape the write in snippets are all grouped together regardless of precinct. The Snippets should be sorted on the tape by precinct.
- Write-in Support: Revised the Write-In Review report to suppress contests with no entered write-in votes. This will save space on the report and avoid wasting report tape.
- Security: Integrated support for Security CF Cards.

DS450

- Threshold Settings: Set the DS450 black threshold default setting to 135 per engineering recommendation.

Electionware

- Performance Improvement: Migrated Electionware from a 32-bit to a 64-bit application. This allows increased memory allocation and improves system performance.
- Performance Improvement: Provided an additional internal Postgres system logging message to enhance the security and performance of the database. This additional logging is included within the internal Postgres logging for analytical, internal traceability and allows for further indexing for added performance. Shortened the ballot finalization process in Touch Screen Ballot.
- Adjudication: Provided an additional user logging message to enhance the transparency and security of the database. This additional logging is included within the Reporting module to assist users during ballot adjudication.
- Security: Updated user rights to require system administrator credentials to access functionality to clear results media.
- Exports: Updated the Enhanced XML export file to handle Party Preference contests.
- Navigator: Updated the Reporting module Load Results Navigator, requiring the user to manually refresh for updates.
- Write-in Snippets: Enhanced ExpressVote and ExpressVote XL write-in snippet loading and display in the Reporting module.

Event Log Service

- 64-bit Architecture: Convert Event Log Service to the new 64-bit architecture.

ExpressVote HW1.0

- Incorrect Copyright Date on Splash Screen: Included the sysload.bmp file on the USB update application in order to properly update the copyright date.

ExpressVote HW2.1

- Audit Log: Addressed a scenario where a log file entry is written to the log file in the USB media before the unit password has been entered.
- Application Update: Addressed an issue that required re-entry of the serial number when doing application updates.

ExpressVote XL

- Ballot Activation: This enhancement enables customers to use ExpressVote XL activation cards pre-printed with a designated party barcode.
- Polls Close Process: Enhanced firmware to prevent ExpressVote XL from automatically printing results reports at poll closing unless the poll worker inserts the removable collection media or manually enters an override code. This enhancement is to encourage best practices by reducing the opportunity to remove the media before the poll collection process is complete.
- Screen Calibration: Overall improvements to the screen calibration feature to address feedback from customer sites and field service technicians. Added a screen calibration test utility to the admin menu.
- L&A Test Data checks: Added additional checks to identify and remove test data from logic and accuracy testing on the election media.

- Access code required to silence media door alarm: Added an access code challenge to silence the alert when the media door is opened in an unauthorized manner.
- Security: Improved device security by updating handling of cards that are the wrong length to require poll worker intervention.

Removable Media Service

- 64-bit Architecture: Convert Removable Media Service to the new 64-bit architecture.

Mark definition:

ES&S' declared mark recognition for the DS200, DS450, DS850 and DS950 is a mark across the oval that is 0.02" long x 0.03" wide at any direction.

Tested Marking Devices:

Bic Grip Roller Pen

Language capability:

System supports English, Spanish, Chinese, Korean, Japanese, Hindi, Bengali, Vietnamese, Tagalog, Creole, Russian, French, Gujarati (one configuration only), Punjabi (one configuration only)

Proprietary Components Included:

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

System Component	Software or Firmware Version	Hardware Version	Model	Comments
Electionware	5.0.6.0			Election management software that provides end-to-end election management activities
System Component	Software or Firmware Version	Hardware Version	Model	Comments
ES&S Event Log Service (ELS)	2.0.0.0			Logs users' interactions with EMS
Removable Media Service	2.0.0.0			Utility that runs in the background of the Windows operating system
DS200	2.21.0.0	1.2, 1.3		Precinct count tabulator that scans voter selections from both sides of the ballot simultaneously
DS200 Ballot Box		1.0, 1.1	98-00009	Collapsible ballot box
DS200 Ballot Box		1.2, 1.3, 1.4, 1.5	57521	Plastic ballot box

DS200 Tote Bin		1.0	00074	Tote bin ballot box
DS200 Ballot Trolley			60	Ballot Trolley Ballot Box
DS200 Metal Ballot Box		1.0, 1.1, 1.2	76245	Metal Tote Bag
DS200 Ballot Tote Bag			212516	Ballot Tote Bag
DS450	3.5.0.0	1.0		Central count scanner and tabulator
DS450 Cart			3002	
DS850	3.5.0.0	1.0		Central count scanner and tabulator
DS850 Cart			6823	
DS950	3.5.0.0	1.0		Central count scanner and tabulator
DS950 Cart			3002	
ExpressVote XL	1.3.0.0	1.0		Hybrid full-faced paper-based vote capture and selection device and precinct count tabulator
ExpressVote HW1.0	1.5.4.0	1.0		Hybrid paper-based vote capture and selection device
ExpressVote HW1.0 Previewer	1.5.4.0			Ballot preview software
ExpressVote HW2.1	2.6.0.0	2.1.0.0, 2.1.2.0		Hybrid paper-based vote capture and selection device
ExpressVote HW2.1 Previewer	2.6.0.0			Ballot preview software
ExpressVote Rolling Kiosk		1.0	98-00049	Portable Voting Booth
Voting Booth			98-00051	Stationary Voting Booth
ExpressVote Ben Franklin Booth			00380	Sitting and Standing Voting Booth
ExpressVote Dual Express Cart			41402	Portable Voting Booth
Voting Booth Workstation			87035	Stationary Voting Booth
Quad Express Cart			41404	Portable Voting Booth
System Component	Software or Firmware Version	Hardware Version	Model	Comments
MXB ExpressVote Voting Booth			95000	Sitting and Standing Voting Booth
ExpressVote Single Table			87033	Voting Table for One Unit
ExpressVote Double Table			87032	Voting Table for Two Units
ADA Table			87031	Voting Table for One Unit
Universal Voting Console (UVC)		2.0	98-00077	Detachable ADA support peripheral
SecureSetup	6.0.6.0			Proprietary Hardening Script
Detachable Keypad		1.0	97-00168, 97-00505	Detachable ADA support peripheral

COTS Software

Manufacturer	Application	Version
Microsoft Corporation	Windows Server 2016	WIN2016_6060.iso
Microsoft Corporation	Windows 10 Enterprise LTSC	WIN10_6060.iso
Microsoft Corporation	Windows Updates (Software updates included in the OS image)	Package date: WIN10_6060.iso-4/19/2021 WIN2016_6060.iso-4/19/2020
Microsoft Corporation	Windows Defender Antivirus (Configured within the OS image)	N/A
Dell	TPM Utility	DellTpm2.0_Fw1.3.2.8_V1_64.exe
Cerberus	Cerberus FTP Server - Enterprise	11.3.4 (64-bit)
Adobe	Adobe Acrobat	11.0.07
Yubico Login for Windows	Dual Factor Authentication YubiKey USB keys for dual factor authentication (optional)	2.0.3
PostgreSQL	PostgreSQL11	11

COTS Hardware

Manufacturer	Hardware	Model/Version
Dell	EMS Server	PowerEdge T430, T440, T630
Dell	EMS Client or Standalone Workstation	Latitude 5580, OptiPlex 5040, 5050, 7020
Dell	Trusted Platform Module (TPM) Chip 1.2 and 2.0 (optional)	5.63.3353.0
Toshiba	EMS Standalone	Tecra A50-C
Innodisk	USB EDC H2SE (1GB) for ExpressVote 1.0	DEEUH1-01GI72AC1SB
Innodisk	USB EDC H2SE (16GB) for ExpressVote 2.1	DEEUH1-16GI72AC1SB
Manufacturer	Hardware	Model/Version
Delkin	2.0 USB Flash Drive (512MB, 1GB, 2GB, 4GB, 8GB)	N/A
Delkin	3.0 USB Flash Drive (4GB, 8GB, 16GB, 32GB, 256GB)	N/A
Delkin	USB Embedded 2.0 Module Flash Drive	MY08TQJ7A-RA000-D / 8GB
Delkin	USB Embedded 2.0 Module Flash Drive	MY16TNK7A-RA042-D/ 16 GB
Delkin	Compact Flash Memory Card (1GB)	CE0GTFHHK-FD038-D
Delkin	Secure Compact Flash Card (2GB)	CE02TLQCK-FD000-D
Delkin	Compact Flash Memory Card Reader/Writer	6381
Delkin	CFAST Card (2GB, 4GB)	N/A

Delkin	CFAST Card Reader/Writer	DDREADER48
Delkin	USB Flash Drive BitLocker 32.2 MB Storage for Security Key (optional)	Storage for security key (optional)
Lexar	CFAST Card Reader/Writer	LRWCR1TBNA
YubiKey USB drive	Dual Factor Authentication	5A Series
Avid	Headphones	86002
Zebra Technologies	QR Code Scanner (integrated)	DS457-SR20009, DS457-SR20004ZZWW
Symbol	QR Code Scanner (external)	DS9208
Dell	DS450 Report Printer	S2810dn
OKI	DS450, DS850 and DS950 Report Printer	B431dn, B431d, B432DN
OKI	DS450 and DS850 Audit Printer	Microline 420
APC	DS450 UPS	Back-UPS Pro 1500, Smart-UPS 1500
APC	DS850 UPS	Back-UPS RS 1500, Pro 1500
CyberPower	DS950 UPS	OR1500PFCLCD
Tripp Lite	DS450 Surge Protector	Spike Cube
Seiko Instruments	Thermal Printer	LTPD-347B
NCR/Nashua	Paper Roll	2320
HP Inkjet	Ink Cartridge for DS450/DS850 Ballot Number Imprinting	87002
TDS	Ink Cartridge for DS200 Ballot Stamping	2278

System Limitations

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

System Characteristic	Boundary or Limitation	Limiting Component
Max. precincts allowed in an election	9,900	Electionware
Max. candidates allowed per election	10,000	Electionware
System Characteristic	Boundary or Limitation	Limiting Component
Max. contests allowed in an election	10,000	Electionware
Max. contests allowed per ballot style	500 or # of positions on ballot	N/A
Max. candidates (ballot choices) allowed per contest	230	Electionware
Max. number of parties allowed	General election: 75 Primary election: 30 (including nonpartisan party)	Electionware
Max. 'vote for' per contest	230	Electionware
Ballot formats	All paper ballots used in an election must be the same length. Voteable paper ballots must contain the same number of rows	Ballot scanning equipment
Max. ballot styles	15,000	Electionware
Max. ballots per batch	1,500	DS450/DS850/DS950
Max. precinct types/groups	25 (arbitrary)	Electionware
Max. precincts of a given type	250 (arbitrary)	Electionware

Max. reporting groups	13	Electionware

Component Limitations:

ExpressVote

1. Capacities exceed all documented limitations for the ES&S election management, vote tabulation and reporting system. For this reason, election management system and ballot tabulator limitations define the boundaries and capabilities of the ExpressVote system as the maximum capacities of the ExpressVote are never approached during testing.

ExpressVote XL

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

Electionware

1. Electionware software field limits were calculated based on an average character width for ballot and report elements. Some uses and conditions, such as magnified ballot views or combining elements on printed media or ballot displays, may result in field limits (and associated warnings) lower than those listed. Check printed media and displays before finalizing the election.
2. Ballot Images function is limited to 250 districts per export. Support the language and special characters listed above in Supported Languages section. Language special characters other than those on this list may not appear properly when viewed on equipment displays or reports.
3. The Straight Party feature must not be used in conjunction with the Multiple Target Cross Endorsement features.

Electionware Paper Ballot

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

Sequence (available codes 1-16,300), Type (available codes 1-30), or Split (available codes 1-18).

4. Grid Portrait and Grid Landscape ballot types are New York specific and not for general use.

DS200

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

Functionality

2005 VVSG Supported Functionality Declaration

Feature/Characteristic	Yes/No	Comment
Voter Verified Paper Audit Trails		
VVPAT	No	
Accessibility		
Forward Approach	Yes	
Parallel (Side) Approach	Yes	
Closed Primary		
Primary: Closed	Yes	
Open Primary		
Primary: Open Standard (provide definition of how supported)	Yes	Configuration B only
Primary: Open Blanket (provide definition of how supported)	No	
Partisan & Non-Partisan:		
Partisan & Non-Partisan: Vote for 1 of N race	Yes	
Partisan & Non-Partisan: Multi-member (“vote for N of M”) board races	Yes	
Partisan & Non-Partisan: “vote for 1” race with a single candidate and write-in voting	Yes	
Partisan & Non-Partisan “vote for 1” race with no declared candidates and write-in voting	Yes	
Write-In Voting:		
Write-in Voting: System default is a voting position identified for write-ins.	Yes	
Write-in Voting: Without selecting a write in position.	Yes	
Write-in: With No Declared Candidates	Yes	
Write-in: Identification of write-ins for resolution at central count	Yes	
Primary Presidential Delegation Nominations & Slates:		
Primary Presidential Delegation Nominations: Displayed delegate slates for each presidential party	No	
Slate & Group Voting: one selection votes the slate.	No	
Ballot Rotation:		

Rotation of Names within an Office; define all supported rotation methods for location on the ballot and vote tabulation/reporting	Yes	
Straight Party Voting:		
Straight Party: A single selection for partisan races in a general election	Yes	
Straight Party: Vote for each candidate individually	Yes	
Straight Party: Modify straight party selections with crossover votes	Yes	
Straight Party: A race without a candidate for one party	Yes	
Straight Party: "N of M race (where "N">1)	Yes	
Straight Party: Excludes a partisan contest from the straight party selection	Yes	
Cross-Party Endorsement:		
Cross party endorsements, multiple parties endorse one candidate.	Yes	
Split Precincts:		
Split Precincts: Multiple ballot styles	Yes	
Split Precincts: P & M system support splits with correct contests and ballot identification of each split	Yes	
Split Precincts: DRE matches voter to all applicable races.	Yes	
Split Precincts: Reporting of voter counts (# of voters) to the precinct split level; Reporting of vote totals is to the precinct level	Yes	It is possible to list the number of voters.
Vote N of M:		
Vote for N of M: Counts each selected candidate, if the maximum is not exceeded.	Yes	
Vote for N of M: Invalidates all candidates in an overvote (paper)	Yes	
Recall Issues, with options:		
Recall Issues with Options: Simple Yes/No with separate race/election. (Vote Yes or No Question)	No	
Recall Issues with Options: Retain is the first option, Replacement candidate for the second or more options (Vote 1 of M)	No	
Recall Issues with Options: Two contests with access to a second contest conditional upon a specific vote in contest one. (Must vote Yes to vote in 2nd contest.)	No	
Recall Issues with Options: Two contests with access to a second contest conditional upon any vote in contest one. (Must vote Yes to vote in 2nd contest.)	No	
Cumulative Voting		
Cumulative Voting: Voters are permitted to cast, as many votes as there are seats to be filled for one or more candidates. Voters are not limited to giving only one vote to a candidate. Instead, they can put multiple votes on one or more candidate.	No	
Ranked Order Voting		

Ranked Order Voting: Voters can write in a ranked vote.	Yes	Ballots can be formatted for Ranked Order Voting and the system supports export of CVR data for processing of Ranked Order Voting Rounds
Ranked Order Voting: A ballot stops being counted when all ranked choices have been eliminated	Yes	Ballots can be formatted for Ranked Order Voting and the system supports export of CVR data for processing of Ranked Order Voting Rounds
Ranked Order Voting: A ballot with a skipped rank counts the vote for the next rank.	Yes	Ballots can be formatted for Ranked Order Voting and the system supports export of CVR data for processing of Ranked Order Voting Rounds
Ranked Order Voting: Voters rank candidates in a contest in order of choice. A candidate receiving a majority of the first choice votes wins. If no candidate receives a majority of first choice votes, the last place candidate is deleted, each ballot cast for the deleted candidate counts for the second choice candidate listed on the ballot. The process of eliminating the last place candidate and recounting the ballots continues until one candidate receives a majority of the vote	No	
Ranked Order Voting: A ballot with two choices ranked the same, stops being counted at the point of two similarly ranked choices.	Yes	Ballots can be formatted for Ranked Order Voting and the system supports export of CVR data for processing of Ranked Order Voting Rounds
Ranked Order Voting: The total number of votes for two or more candidates with the least votes is less than the votes of the candidate with the next highest number of votes, the candidates with the least votes are eliminated simultaneously and their votes transferred to the next-ranked continuing candidate.	No	
Provisional or Challenged Ballots		
Provisional/Challenged Ballots: A voted provisional ballots is identified but not included in the tabulation, but can be added in the central count.	Yes	
Provisional/Challenged Ballots: A voted provisional ballots is included in the tabulation, but is identified and can be subtracted in the central count	Yes	

Provisional/Challenged Ballots: Provisional ballots maintain the secrecy of the ballot.	Yes	
Overvotes (must support for specific type of voting system)		
Overvotes: P & M: Overvote invalidates the vote. Define how overvotes are counted.	Yes	
Overvotes: DRE: Prevented from or requires correction of overvoting.	Yes	
Overvotes: If a system does not prevent overvotes, it must count them. Define how overvotes are counted.	Yes	
Overvotes: DRE systems that provide a method to data enter absentee votes must account for overvotes.	Yes	
Undervotes		
Undervotes: System counts undervotes cast for accounting purposes	Yes	
Blank Ballots		
Totally Blank Ballots: Any blank ballot alert is tested.	Yes	
Totally Blank Ballots: If blank ballots are not immediately processed, there must be a provision to recognize and accept them	Yes	
Totally Blank Ballots: If operators can access a blank ballot, there must be a provision for resolution.	Yes	
Networking		
Wide Area Network – Use of Modems	No	
Wide Area Network – Use of Wireless	No	
Local Area Network – Use of TCP/IP	No	
Local Area Network – Use of Infrared	No	
Local Area Network – Use of Wireless	No	
FIPS 140-2 validated cryptographic module	Yes	
Used as (if applicable):		
Precinct counting device	Yes	DS200, ExpressVote HW2.1, ExpressVote XL
Central counting device	Yes	DS450, DS850 and/or DS950

Baseline Certification Engineering Change Orders (ECO)

This table depicts the ECOs certified with the voting system:

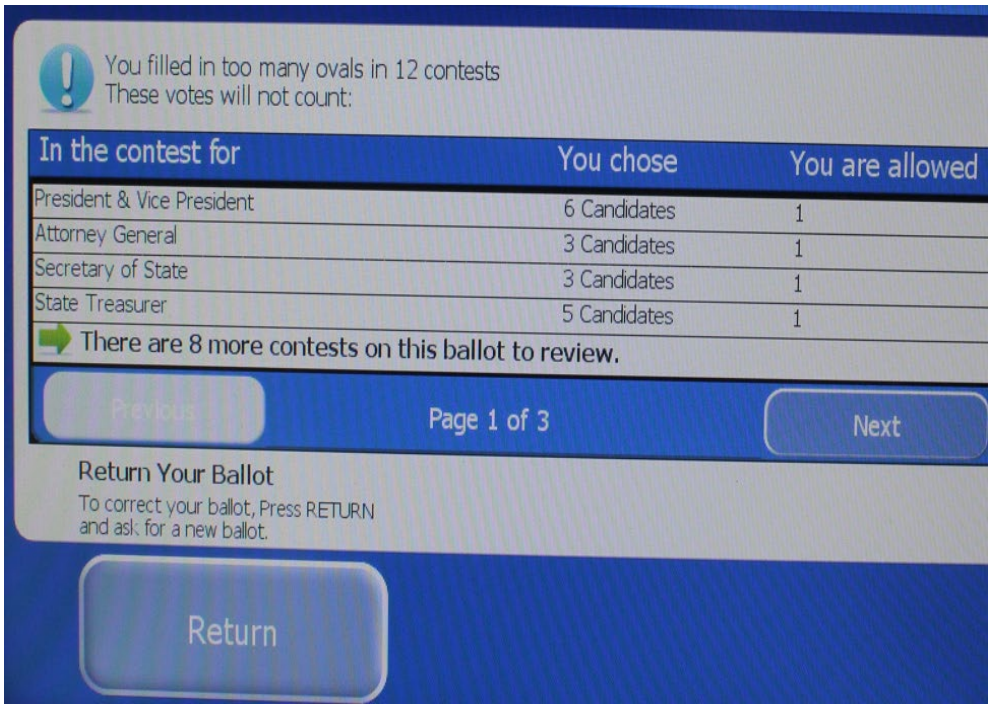
Change ID	Date	Component	Description	Inclusion
ECO 1089	10/08/20	ExpressVote XL	Updated Bios, Assembly and PCB modifications	De minimis
ECO 1100	10/15/20	ExpressVote v1.0	EV 1.0 Copy Right Information	De minimis

ECO 1103	12/22/20	ExpressVote v2.1	Update CMOS battery	De minimis
ECO 1106	02/19/21	ExpressVote 2.1	Add conductive gasketing to exit guide	De minimis
ECO 1110	07/28/21	DS850	Added alternate manufacturer for camera cable	De minimis

Appendix D: DS200 Voter Information Screens

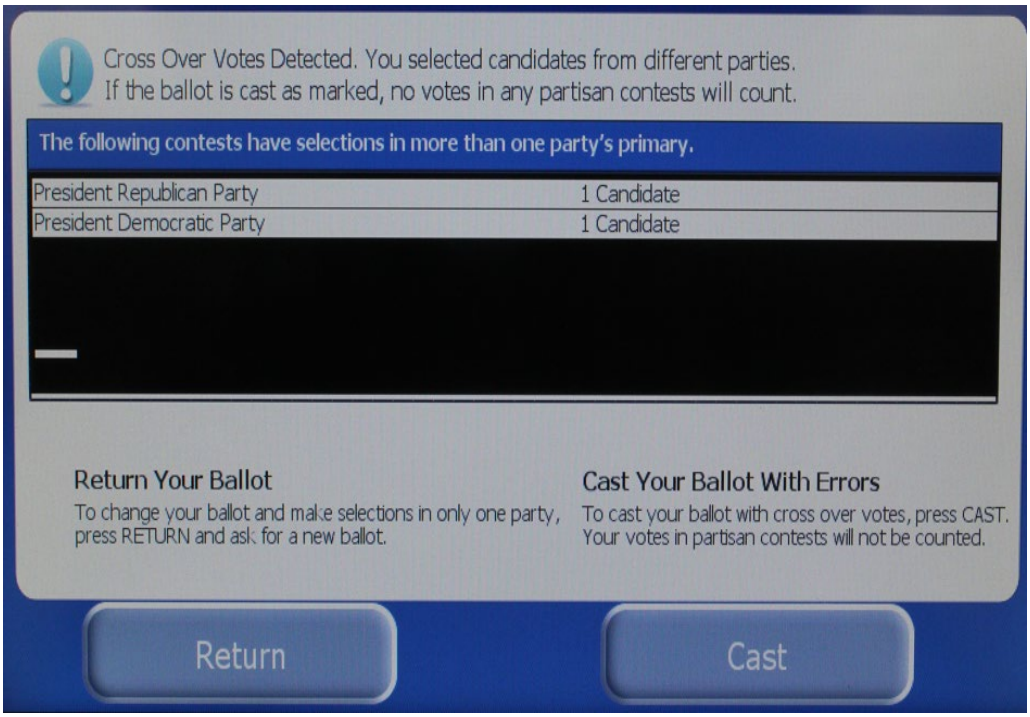
Ballot Counted: This is the only screen most voters will see in any voting session. If there are no issues with the ballot, the tabulator will accept it and confirm that it has been counted. Upon acceptance, the public count number will increase by one.

Overvote Notification: If the ballot contains an overvote, i.e., the voter has selected more choices than they are eligible to make in a particular contest, the DS200 will identify the overvoted contest and advise the number of choices a voter is eligible to make. The voter will have the option to either have the ballot returned or override the overvote notification. If the ballot is returned, the voter has the opportunity to spoil their first ballot and vote a new one. If the overvote warning is overridden and the voter chooses to cast the ballot as marked, they are warned that their choices in any overvoted contest will not count. This language reflects the requirements as stipulated by the WEC.

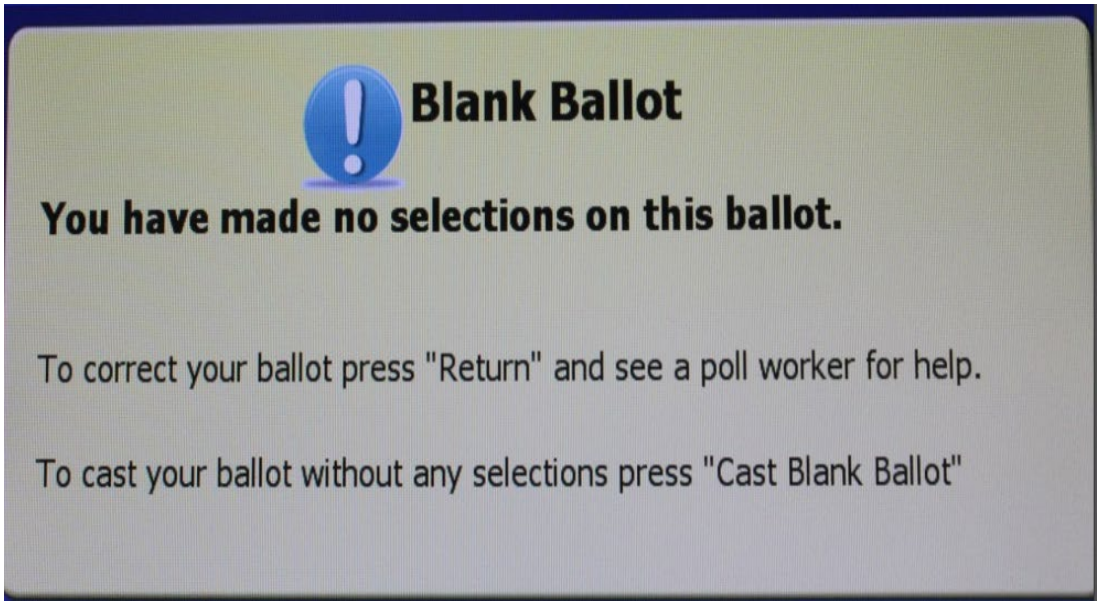


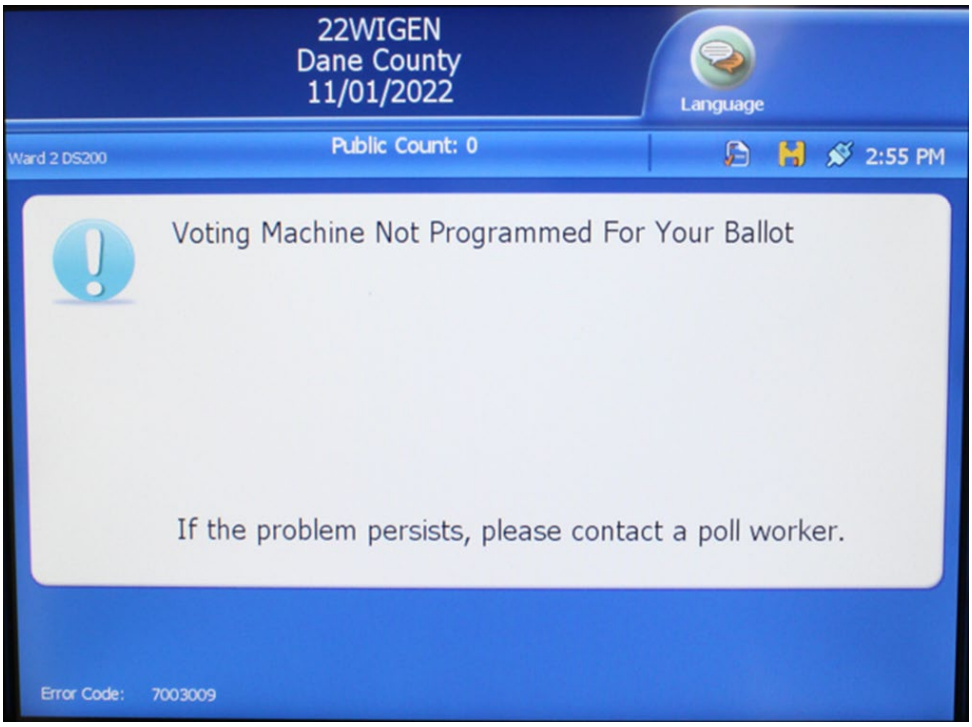
Crossover Vote Notification: if a ballot is inserted on which a voter has made choices in more than one party's primary, a warning message will appear advising the voter of such and identifying the contests with crossover

votes. As with the overvote warning, the voter has the option of either having their ballot returned or casting it with the crossover votes as marked. If the voter chooses to cast their ballot as-is, any choices in contests with crossover votes will not count. This verbiage also reflects the requirements as stipulated by the WEC.



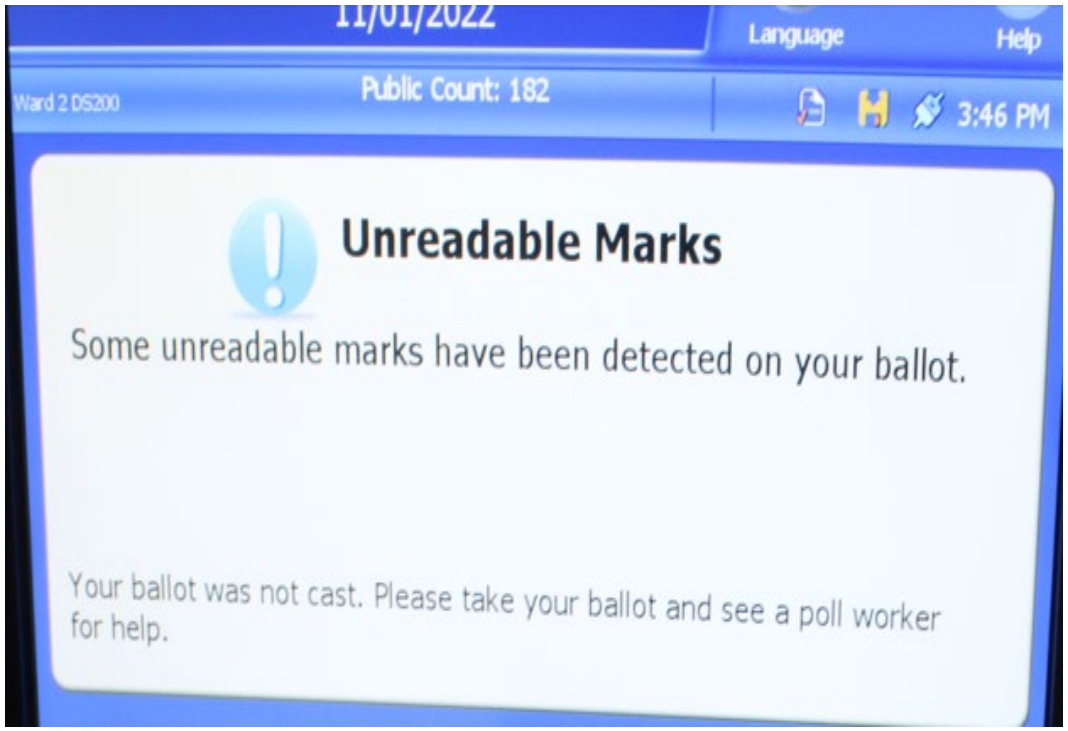
Blank Ballot: if a voter inserts a ballot on which they have made no choices, this warning will appear. The voter has the option of having the ballot returned or casting it as-is.

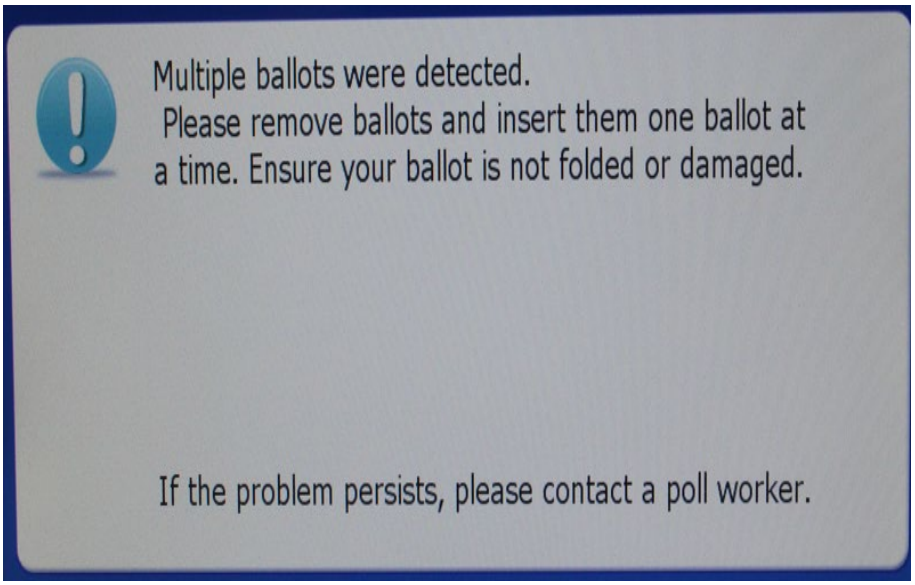




Not Programmed for Ballot: this message will appear if a voter or election official tries to insert a ballot the tabulator is not programmed to accept. This will typically only be an issue in polling places that serve multiple reporting units with tabulators programmed specifically for each reporting unit. For example, if a polling place serves ward 1 and ward 2 with a separate tabulator set up for each ward and a ward 1 voter inserts their ballot in the ward two tabulator, they will be presented with this message and advised to contact a poll worker.

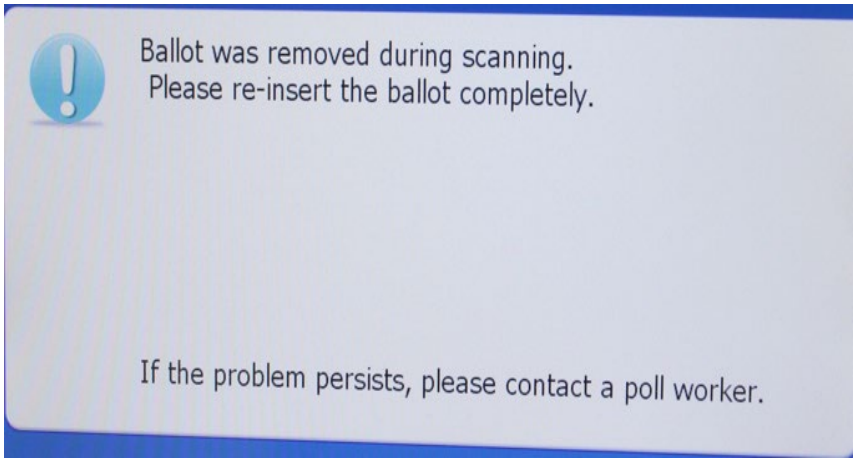
Unreadable Marks: in most cases, this warning will appear if a voter has marked their ballot with a color of ink that is not recommended by the vendor. In testing, staff observed this error on ballots that were marked with red or green ink. This warning may also appear if a ballot contains ambiguous marks, including hesitation marks, i.e., a voter rested their pen in one oval prior to fully marking another oval in the same contest, or stray marks inadvertently made in an oval that are not sufficiently dark/large enough to trigger an overvote warning. The ballot will be returned to the voter for review.





Multiple Ballots Detected: as a voter will only ever have a single ballot to cast, it is extremely unlikely they would encounter this warning. Election officials are more likely to see this while processing absentee ballots. The tabulator will return both ballots without counting either and advise to only insert one at a time.

Ballot Removed During Scanning: this screen will only appear if the ballot is removed during insertion. The ballot will not be counted and, after a few seconds, the voter will be able to reinsert the ballot again.



The screens above show both manufacturer default language and, in the case of overvotes and crossover votes, additional language as required by the WEC. At the preference of the municipality, tabulators may also be programmed to automatically reject ballots with overvotes or crossover votes without the option of overriding to cast as-is. In these instances, the voter would be required to spoil their ballot and mark a new one with their choices. This functionality also requires election officials to remake absentee ballots with overvotes or crossover votes to preserve voter intent insofar as they are able.

Appendix E: Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin

PART I: TESTING AND DOCUMENTATION REVIEW 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).

In the event that a system version containing telecommunications components does not receive EAC certification or is not submitted for EAC certification by the vendor, a detailed explanation shall be provided to WEC staff at the time of application listing any deficiencies that would limit the system in question from meeting the certification requirements as stated in the currently accepted VVSG testing standards in both technical and simplified language. If any of the documentation submitted to WEC is proprietary in nature, or contains protected trade secrets, the vendor shall provide an additional redacted copy of all materials. The aforementioned documentation shall be accompanied by the report from an EAC accredited VSTL listing the types of testing conducted on the system in question, the VVSG testing standard utilized, and the results of all said tests. WEC reserves the right to contact the VSTL directly to further inquire about testing of the system and ask for any clarification that may be deemed necessary as part of the documentation review prior to conducting Wisconsin state certification testing. While Wis. Stat. § 5.91 specifies that EAC certification is not required for Wisconsin state certification to be issued to a voting system, WEC staff must be provided with the most detailed information possible during the application process, including but not limited to EAC and/or VSTL report(s), technical system schematics, telecommunications specifications (including network diagrams), system security protocol, and any other documentation as required by Wis. Admin. Code EL 7.01.

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 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:

1. the interruption of electrical power
2. generated or induced electromagnetic radiation
3. ambient temperature and humidity
4. the failure of any data input or storage device
5. 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

1. The number of failures in transmission
2. Accuracy of vote counting

The failure or connectivity rate will be determined by observing the number of relevant failures that occur during equipment operation. During testing, WEC staff shall maintain logs of all connection attempts. Attempts that are both successful and unsuccessful shall be noted in the logs with this information used to compile the connectivity rate. Similar logs shall be kept for calculating the rate of successful data transmissions. The accuracy is to be measured by verifying the completeness of the totals received. All test results received in the county office, whether transmitted via wired or wireless connection, shall be compared to the pre-determined results set by WEC staff to ensure that transmitted results match anticipated results.

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.

Prior to conducting any system test, WEC staff shall thoroughly review all submitted documentation including but not limited to EAC and/or VSTL report(s), technical system schematics, telecommunications specifications (including network diagrams), system security protocols, and any other documents submitted as required pursuant to Wis. Admin. Code EL 7.01.

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/Analog Connection 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. Power up tabulators and generate zero tape
2. Insert test ballots into tabulator. Once completed, close polls and generate results tape
3. Attempt to transmit results prior to the closing of the polls and printing of results tape
4. Set up a telephone line simulator that contains as many as eight phone lines
5. 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
6. Document results on appropriate telecommunications testing data sheet
7. Following the conclusion of testing, staff must confirm the accuracy of the transmitted data by ensuring that the transmitted results match the expected results
8. Following the conclusion of testing, WEC staff shall obtain all transmission logs, ballot images, cast vote records, and results tapes for all testing locations

Wireless Capability Test Plan

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

Test Plan:

1. Power up tabulators and generate zero tape
2. Insert test ballots into tabulator. Once completed, close polls and generate results tape
3. Attempt to transmit results prior to the closing of the polls and printing of results tape.
4. 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
5. 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
    d. If possible, simulate a weak signal
    e. If possible, simulate an intrusion
    f. If possible, attempt to intercept transmission signals
6. Document testing results on appropriate telecommunications testing data sheet
7. Following the conclusion of testing, staff must confirm the accuracy of the transmitted data by ensuring that the transmitted results match the expected results
8. Following the conclusion of testing, WEC staff shall obtain all transmission logs, ballot images, and cast vote records for all testing locations

Test Conclusions for Wired and Wireless Transmission

1. System must be capable of transferring 100% of the contents of results test packs without error for each successful transmission.
2. Furthermore, system must demonstrate secure rate of transmission consistent with security requirements.
3. System must demonstrate the proper functionality to ensure ease of use for clerks on election night.
4. System must provide notification of transmission failure to election inspectors
5. System must be free of any and all remote access software
6. 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**.**
7. System modems located in polling place tabulating equipment shall not be capable of receiving wireless transmissions, only of sending results packets to the central site as described above.

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. Both vendor and county must ensure that there is no voting system internet connectivity at the central site aside from that which is required to conduct pre-election testing and election night results transmission. At all other times, the voting system server must remain disconnected from the internet or any devices connected directly or indirectly to the internet.
4. Any municipality using modeming technology must have one set of results printed before it attempts to modem any data.
5. Any municipality purchasing and using modem technology to transfer results from the polling location to the central site are encouraged to conduct an audit of the voting equipment after the conclusion of the canvass process.
6. Default passwords provided by the vendor to county/municipality must be changed upon receipt of equipment.
7. Counties must change their passwords after every election.
   Counties must take precautions to prevent unauthorized physical access to servers.

PART IV: CONDITIONS FOR APPROVAL

Additionally, staff recommends that, as a condition/continuing condition of approval, the vendor shall:

1. Reimburse actual costs incurred by WEC in examining the system *(including travel and lodging)* pursuant to state processes.
2. Configure modem component to remain inoperative (incapable of sending transmissions) prior to the closing of the polls and the printing of tabulated results.
3. Vendor must notify WEC promptly should any security vulnerability be discovered.
4. Both vendor and county must ensure that there is no voting system internet connectivity at the central county site aside from that which is required to conduct pre-election testing and election night results transmission. At all other times, the voting system server must remain in a non-connected, air gapped state.

Part V: Conditions for continued approval

1. WEC reserves the right to schedule site visits to ensure that system was installed per certification standards to include review of:
   a. Internal and external modems
   b. Chain of custody documentation
   c. Hash validation checks
   d. Hardware and software configuration
2. WEC reserves the right to request election night transmission logs from a random selection of counties

Appendix F: WEC Protocol for Approving the Elections Systems and Software ExpressLink Component

Background

As part of an application submitted on March 17, 2017, Elections Systems and Software (ES&S) requested the Wisconsin Elections Commission (WEC) to certify the ExpressLink component as part of the EVS 5.2.2.0 and EVS 5.3.2.0 systems. ExpressLink was outside of the scope of certification that was granted by the Elections Assistance Commission (EAC) for those systems. The WEC staff review of the application materials for EVS 5.2.2.0 and EVS 5.3.2.0 determined that this component was part of the voting system and should be subject to testing and certification, contrary to the EAC review. This component was not included in the voting equipment system that was certified for use in Wisconsin by the WEC on June 20, 2017. Staff was instructed, however, to create a protocol to test and certify the ExpressLink component outside of the EAC process. Wis. Stat. § 5.91 provides that the WEC may certify any such voting device, automatic tabulating equipment, or related equipment or materials regardless of whether any such system is approved by the EAC and this protocol outlines the procedures for reviewing the ExpressLink consistent with this statutory authority.

Component Information

The ExpressLink is designed for use by election officials in conjunction with the ExpressVote Universal Voting System that was approved as part of the EVS 5.2.20 and EVS 5.3.2.0 systems. This voting system component consists of both the ExpressLink software application and one piece of hardware, the ExpressVote Activation Card Printer. ExpressLink is a Windows application housed on a laptop computer that uses contest and candidate information imported from Election Ware election management system to determine the appropriate ballot style for a voter. The system then prints the activation barcode using the ExpressVote Activation Card Printer. The ExpressVote Activation Card Printer is a small, thermal, on demand printer used to print the ballot activation barcode on the ExpressVote ballot card. A voter would then use the ballot card that contains the barcode printed via the ExpressLink to activate the correct ballot style on the ExpressVote Universal Voting System.

Review and Testing Process

1. WEC staff shall complete a review of supporting documentation provided by the vendor that details the functionality of the ExpressLink before functional testing is conducted. The manufacturer shall provide both a full and a redacted set of the following documentation as part of the process to review the component, if applicable:

    a. Complete specifications for all hardware, firmware and software;

    b. All technical manuals and documentation related to the component;

    c. Complete instruction materials necessary for the operation of the equipment and a description of training available to users and purchasers;

    d. Reports from voting system test laboratories accredited by the US Election Assistance Commission (EAC) demonstrating that the system component functions as described by the vendor in the application materials.

    e. A list of all the states and municipalities in which the system has been approved for use and how long the ExpressLink component has been in use in those jurisdictions.

f. If any portion of the materials provided to the Wisconsin Elections Commission is copyrighted, trademarked, or otherwise trade secret, the application shall include written assertion of any protected interests and redacted versions of the application and all materials consistent with any properly asserted protected interests. Simply identifying the individual item as "proprietary" is not sufficient. Any assertion of proprietary rights must include detailed specifics of each item protected, the factual and legal basis for protection, whether there is anything public within the protected item, and if there is, how to extract it along with a statement whether there are costs to do so.

g. If applicable, provide the WEC with a list of software components, pursuant to Wis. Stat. § 5.905, that "record and tally the votes cast with this system." For purposes of this condition, "software components" include vote-counting source code, table structures, modules, program narratives and other human-readable computer instructions used to count votes with this system.

2. The vendor shall submit the component to the WEC for functional testing. The hardware and software submitted for certification testing shall be equivalent, in form and function, to the actual production versions of the component.

   a. An operational status check shall be conducted on the ExpressLink to determine if it functions as described by the vendor using the following procedures:

      i. Arrange the system for normal operation and power on the system.
      ii. Perform any servicing, and make any adjustments necessary, to achieve operational status.
      iii. Operate the equipment in all modes, demonstrating all functions and features that would be used during election operations.
      iv. Commission staff shall verify that all system functions have been correctly executed.

   b. Compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment, shall be determined through functional tests integrating the voting system software with the remainder of the system and to determine if the software meets the vendor's design specifications.

      i. The election definition file that is created in ElectionWare for use with the ExpressLink shall be verified to determine if the data contained in that file is accurate.
      ii. The ExpressLink will be tested in a mock election to determine if it can print barcodes on ExpressVote ballot cards that access the correct ballot styles.
      iii. The ExpressLink will be tested to determine if it can accommodate multiple ballot styles for an election on a single ExpressVote machine.

<u>Conditions for Approval (vendor)</u>

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

1. Reimburse the WEC for all costs associated with the testing campaign for the ExpressLink, where applicable, pursuant to state processes.

2. Agree to any additional conditions for approval and use that may be identified after the review and testing process is complete.

Appendix G: Wisconsin Voting Equipment Review Panel 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
			2	3

- Overall the functions seems easy to understand.
- Currently on 6050, features of 6070 are the same.
- The DS200 accepted a ballot where I scribbled and cross voted.

2. **How would you rate the accessible features?**

Very Poor	Poor	Fair	Good	Excellent
			2	3

- Added written instructions on the ExpressVote machines is a plus.
- ExpressLink printer would be helpful for someone who has a disability and is working as a poll worker.
- ExpressVote and tabulator is handicap/wheelchair accessible.
- Unfortunately, no one in WI uses the ExpresLink, which printers the ward barcode on the ExpressVote card. Use of the ExpressLink would give voters using the ExpressVote more privacy in polling sites that use one ExpressVote for multiple wards as a poll worker would not need to assist at the ExpressVote station to select the ward.

3. **Rate your overall impression of the system.**

Very Poor	Poor	Fair	Good	Excellent
			2	2

- Ready to move forward. Need to move off of Windows 7 platform is crucial – ASAP!
- Would like to see some progress on connecting Badger Book to interface with the ExpressLink printer.
- Very similar to the system we currently use. Upgrade needed.
- Upgrade to Windows 10 is a good move.
- Prefer 6070 for modem capabilities.

Appendix H: Required Submission on EVS 6.0.7.0 Modem non-Certification

February 28, 2023

Dear Wisconsin Election Board,

This letter sets forth information related to Election Systems & Software's ("ES&S") EVS 6.0.7.0 modem version being submitted to the State of Wisconsin for review and approval.

Please be advised that ES&S has not submitted any of its modem versions to the United States Election Assistance Commission ("EAC") for its review and approval due to a number of factors which are outlined below:

• As a result of the EAC's interpretation that results could be considered "official results" once the polling places were physically closed on election night, voting system manufactures were required to provide a higher level of security for official results rather than unofficial results. This included FIPS 140-2 compliance for all components involved in the modem process. As ES&S' modem systems are designed to transmit results to the Election Management System ("EMS") network via the ES&S Data Comm server, this interpretation extended the FIPS 140-2 requirement to the entire EMS network. This was a higher level of security than otherwise required on normal EMS networks that did not utilize modeming. After reviewing this requirement and completing a cost benefit analysis, ES&S determined that this requirement would be very burdensome and costly to maintain over time, especially given that third party components would inevitably go "end of life" over time and may no longer be FIPS 140-2 compliant. As ES&S has no control over third-party components and when these components would go end-of life, ES&S would be responsible for updating and maintaining compliance to the FIPS 140-2 standard which would be very costly not only to ES&S but our customers as well.

• Further, given that all of ES&S' modem jurisdictions are in states which currently do not require EAC certification, ES&S made the decision to forgo testing its modem versions at the EAC and simply test its modem versions with a Voluntary Voting System Test Lab ("VSTL") in order to ensure such modem versions, meet all applicable requirements. By testing its modem versions with the VSTL, ES&S is able to provide timelier up to date modem versions to its customers while providing cost savings as well. ES&S believes this is the best approach for not only ES&S but its customers as well.

• Lastly, given the adoption of the new Voluntary Voting System Guidelines, Version 2.0, which prohibits voting systems from establishing wireless networking or wireless connections to external networks, it does make sense for ES&S to submit modem versions to the EAC going forward.

ES&S is proud of its modem versions that have been deployed in states which allow for the modeming of unofficial election results on election night. ES&S has put in place many security features to ensure that the transmission of such unofficial election results are safe and secure.