ES&S 6300

The Election Systems and Software (ES&S) release of the EVS 6.33.0.0 election system was examined in Austin on January 25, 2023. There was another in-person examination on March 31 to review a couple outstanding issues.

This release is a modification to the 6.2.0.0 release which was previously certified in Texas. This release was certified by the federal Elections Assistance Commission (EAC) in November 2022. The EAC testing was done by the VSTL, Pro V&V, in Huntsville, AL.

The significant upgrades to the 6.3.0.0 system are: 1) the addition of the new DS300 scanner, 2) the addition of a Brother Laser printer option for the DS450 and DS950 central scanners, 3) a Linux distribution OS change for the DS200 scanner, 4) a multi-language option for the ExpressVote vote summary cards.

The following table lists the modified 6.3.0.0 components used for the examination.

Table 1 - Releases for Proprietary Hardware/Software Components

Hardware/Software	Version/Firmware #	Location
Software		
Electionware (EMS)	6.3.0.0	Central office
Event Log Service	3.0.0.0	Central office
Removable Media Service	3.0.0.0	Central office
Regional Results	1.5.0.0	Regional and Central (both locations required)
Hardware		
DS300 Plastic Ballot Box	1.0	Precinct
Brother Laser Printer - report printer	B6400	Central office
DS200 precinct scanner 1.2 and 1.3	3.0.0.0	Precinct or central
DS300 precinct scanner 1.0	3.0.0.0	Precinct or central
ExpressVote 1.0, 2.1.0.0, 2.1.2.0	4.2.1.0	Precinct BMD
DS450 scanner/tabulator	4.2.0.0	Central office
DS850 scanner/tabulator	4.2.0.0	Central office
DS950 scanner/tabulator	4.2.0.0	Central office

For a detailed listing of all the hardware components and software applications, and the changes from the previous system, please refer to the EAC's Scope of Certification and test report.

Findings

- The responses provided on Form-101 are acceptable.

- The Technical Data Package (TDP) documentation appears to be updated with the new information. However, the documentation for a Regional Results setup is not adequate. It does not clearly spell out the setup and the functionality of the regional EMS versus the primary EMS.

- The system software was successfully built and witnessed by SOS staff. A sample of the programs' hash values were verified to match the values that were generated by the VSTL after the EAC testing was completed.

- The ADA testing went well; no problems reported.

- A mock test election was voted and the test ballots were recorded and tallied correctly.

- The DS200 scanner was upgraded to a new Linux OS version. The new version is a custom build from the Yocto Linux distribution. The previous version was built from the LFS (Linux From Scratch) distribution.

- All the ballot boxes had two locks as required by the election code.

- An ES&S representative said there are no plans to sell the ExpressVote XL in Texas. Therefore, it should not be considered for certification.

- The results from the DS200 and DS300 scanners are now referred to as "Poll Place Count" in the Electionware and Regional Results reports. If a small county uses a DS200 or DS300 scanner for the central count accumulation, "Poll Place Count" would be a misnomer, but should not cause any confusion to the county.

- The internal ethernet cable in the central scanners which runs to the external port on the scanner can be removed. This can be done to eliminate any suspicion that the scanner is being networked to another machine. However, the external port remains intact, but since it is not connected to anything, it does not function.

- The DS450 has a new reverse belt assembly. It makes it easier to re-tension the drive mechanism which moves the ballots through the machine.

- The voting devices can now be configured to allow two write-in candidate names for the same race. For example, a "team" selection like governor and lieutenant governor. This option would not be used in Texas.

- The ElectionWare system precinct limit has been increased from 9900 to 9999.

- Adjudication of write-ins on the vote summary cards is now available in the Ballot Review program of Electionware Reporting.

- The ExpressVote multi-language capability has been extended to the voted ballot summary card. Since there will be at least two languages required for any Texas ballot, the summary card will be printed in two languages. If more than two languages are coded into the election setup, the second language printed will be randomly chosen. English will alway be printed on the summary card.

- The firmware for the ExpressVote was rebuilt successfully on-site at the beginning of the March 31 examination. This was done to verify that it worked on the latest hardware version which was not present during the initial examination. No issues were noted. The hardware release was first used in the 5240 Electionware version, so it was previously examined, and subsequently field tested on previous versions of Electionware.

- The DS300 and central count scanners can imprint RLA #'s (risk limiting audit numbers) on the voted ballots. All ballots are imprinted if the imprinter print cartridge module is installed. It can also be removed by election officials to prevent imprinting.

  There was some discussion about altering (printing) on a voter's ballot after their selections are printed. Since the voting devices are also capable of imprinting the RLA #'s, it is preferable, at least from a public perception standpoint, to have the imprinting done on the voting device and not alter a cast ballot.

  The imprinted RLA #'s are a concatenation of the machine ID and a randomly generated number. The machine ID must be assigned correctly in the election definition setup process to guarantee uniqueness. If the machine ID's were not assigned during the Electionware ballot setup process, ballots from two or more devices could be imprinted with the same RLA #. The best practice is to assign the machines ID's in Electionware to prevent duplicate RLA #'s. The machine ID's are also beneficial for other audit functions.

  The DS950 has a cutout designed into this version to provide a different mounting location to the existing imprinter. In the future the imprinter could be moved from the existing location which is immediately after the cameras, to a new location, just before the sorting gates. This will allow the machine to imprint a number ONLY on ballots that go into counted bins. As indicated before, it is best to have the imprinting done on the voting machine and not the scanner. This is a configurable option.

- A performance gain of the DS300 scanner over the DS200 was featured during the vendor presentation. The DS300 was noticeably faster booting up and closing the polls. Ballot scanning during testing did not seem noticeably faster, but for an election with a large voter turnout, a few seconds saving per voter is good.

ES&S reports the following speed comparison for the DS200 and DS300 scanners:

Equipment	Open Polls	Close Polls	Scanning
DS200	21 seconds	27:39 minutes	11-12 seconds
DS300	8 seconds	05:25 minutes	7-8 seconds

When the polls are closed, the DS200 and DS300 scanners are encrypting, digitally signing, and compressing images for all ballots. A 22 minutes time saving to close the polls is a significant advantage for the poll workers at the end of the day. The time savings should be even greater for an election with a heavy turnout.

The DS200 and DS300 scanners should be distributed equitably to the polling places, as specified by the 12309 election statute.

● When casting a two-card ballot on either a DS200 or DS300 scanner, only the first card increments the Public Counter. This is the correct behavior. The Protective Counter is incremented each time a ballot card is successfully scanned.

● A tester experienced a ballot summary card read error on the DS300 scanner. The tester inserted the second card of a two-card ballot too quickly which caused an error. The pop-up error message displayed was incorrect. It said "*Your ballot has been counted but it didn't drop into the ballot box*". Only the first card was counted.

The tester was able to reproduce the error several times. The problem could not be produced on the DS200 scanner.

Subsequent to the examination, ES&S was able to reproduce the error in their lab. They discovered that the error was related to the paper position during the RLA # imprinting which did not occur when the imprinter module was removed. This was verified during the March 31 follow-up examination. The imprinter was removed from DS200 and the paper-jam could not be reproduced. The imprinter was reinserted and then the paper jam was reproduced. The solution as offered by ES&S is to not use an imprinter in the DS200. Jurisdictions should take care to make sure that the imprinters are removed if they have them on existing systems, and not included on new purchases of the DS200.

Again, it is preferable to have imprinting done by the voting device, not the scanners.

● A pop-up message, "Contact the poll worker and spoil the ballot" was displayed on the screen for some of the ExpressVote ballots when they were reinserted into the ExpressVote to verify the voter's choice on the screen. ES&S claimed that it was a thermal paper problem caused by "speckled" barcodes pre-printed on them. ES&S said it was likely due to improper storage and transportation of the test ballots.

Texas experiences severe weather conditions (i.e. extreme humidity, dust, etc.), so this is a potential problem. The test ballots were supplied by ES&S who saw no obvious problem with the paper prior to the examination. ES&S's explanation seems reasonable in that their representative are traveling around the country with the paper, and so it was not stored properly, as specified in the TDP.

The testing lab which uses thousands of ballots in their testing, did not report any issue with the thermal paper. Jurisdictions need to store and transport their paper stock as required.

During the follow-up examination, there was no problem reading the barcodes on any of the voted summary cards. It might have been just a few bad ballots on the top of the stack.

● A situation in the Dallas county November 2022 election was discussed. Some of the ballots were not tallied because their images were not uploaded into Electionware. Results and images are uploaded from separate files. Atomic programming practice should have been used. A precinct should not be tallied until both the CVR's and their corresponding images are successfully uploaded. The two steps should be treated as one transaction. If either step fails, the transaction raises an error condition. This is a flaw in Electionware which should be easy to correct.

The Dallas election was basically a write-in election. Without all the images (which have the write-in candidates), some of the ballots were not tallied.

● The Regional Results sub-system is used to provide a quicker means to report unofficial results on election night. It seems appropriate for only a few Texas counties. A county has to adjudicate the write-ins on the primary EMS in-order to meet the requirement to report all results within 24 hrs.

The Regional Results sub-system uses a VPN protocol on a county's private network to connect to the central site. Its server and client(s) machines are air gapped from the primary EMS server and scanners at the central site. A precinct must be pre-configured to use the Regional Results sub-system.

Only the results on the backup USB sticks are transmitted to the Regional Results server from the remote sites. Before results are transmitted, the system checks that the precinct was set up for Regional Results and that digital signatures are valid.

The documentation is poor regarding how to set up and run the Regional Results sub-system. Additionally, there is a possibility that a worker may get confused as to which system (regional or primary EMS) they are working on since the EMS's appear identical. If a county uses the Regional Results, they must clearly delineate the two EMS systems and have good media (USB sticks) accounting and control.

Conclusion

The 6.3.0.0 EVS is an incremental upgrade to the previous certified ES&S system. The changes did not cause any loss of functionality or security. The new DS300 scanner performed well, but it should not be equipped with the RLA# imprinter due to the paper jam.

The misreads of the "speckled" thermal ballot stock is something that should be avoided by proper ballot handling and storage.

The EMS software validation on the central-site server continues to be cumbersome. It should be improved.

Other changes to the system were minor or optional.

Overall, I believe the EVS 6.3.0.0 system meets the requirements of the Texas Election Code. I recommend certification.

Tom Watson
Examiner