Voting System Examination
EVS 5.2.1.0
Election Systems & Software (ES&S)

Prepared for the
Secretary of State of Texas

James Sneeringer, PhD
Designee of the Attorney General

This report conveys the opinions of the Attorney General's designee from an examination of the equipment listed, pursuant to Title 9, Chapter 122 of the Texas Election Code, section 122.036(b).

Examination Date June 8-9, 2016
Report Date   August 12, 2016

ES&S offers a complete line of products for every aspect of conducting an election, including election setup, ballot marking, optical scanning, tallying, reporting and auditing.

Components Examined	Version	Prev. TX Cert.	EAC/NAESED
AutoMARK Voter Assist Terminal	1.8.6.0	9/2/2014	ESSEVS5210
DS200 Precinct Ballot Counter	2.12.1.0	9/2/2014	ESSEVS5210
DS850 Central Count Tabulator	2.10.1.0	9/2/2014	ESSEVS5210
Election Reporting Manager (ERM)	8.12.1.0	9/2/2014	ESSEVS5210
ElectionWare	4.7.1.0	None	ESSEVS5210
Event Log Service	1.5.5.0	None	ESSEVS5210
ExpressVote	1.4.1.0	None	ESSEVS5210
VAT Previewer	1.8.6.0	9/2/2014	ESSEVS5210
ExpressVote Previewer	1.4.1.0	None	ESSEVS5210
Removable Media Service	1.4.5.0	None	ESSEVS5210

Notice in the table above that some components have been previously certified in Texas and some have not.

Overview

ES&S has taken a new approach -- *all votes on the system we examined are recorded on paper*. Those paper records can be Vote Summary Cards (as they are called) created using ExpressVote, or they can be traditional ballots marked by hand or marked using AutoMARK. In all these cases, the paper (either the ballot or the Vote Summary Card) is the official record.

A strength of this design is that there is always a paper trail. This probably does not increase the security of elections, but it does inspire voter confidence (an important end in itself), because voters actually drop a piece of paper into the ballot box or scanner, and this paper can later be audited. It may also help election workers, because they understand that the paper is the primary record being protected from tampering. With USB drives and the like, both voter and workers may be uncertain about where the results are.

The ExpressVote combines the advantages of paper records with the speed and accuracy of computer tabulation. The results can be efficiently tabulated by computer using the barcodes, but it is also easy to vote and possible to audit the paper Vote Summary Cards. For auditing, the computer-readable barcode on each Vote Summary Card can be verified to correspond to the human-readable text on that same Vote Summary Card. This is a human operation, but note that it is not necessary to audit every Vote Summary Card. Since an attacker cannot control which Vote Summary Cards would be audited, very high confidence can be achieved by auditing a random sample of the cards.

Because the voter has verified that the human-readable text reflects his or her intent, there is end-to-end confidence that the voter's intent has been captured. This provides the efficiency and accessibility of a DRE with confidence of paper.

This is not to say that the ExpressVote is superior to a DRE (Direct Recording Electronic) station. With a DRE, there is no need for a printer at each voting station, and the electronic vote record is at least as well protected from tampering as the paper vote record of the ExpressVote.

Although the details are different, the AutoMark effectively has the same auditability as the ExpressVote. However, the AutoMark requires having printed ballots on hand for each ballot style, since the printing of ballots on demand is not currently supported by EVS 5.2.1.0.

Election Setup

ElectionWare is used to create a database containing all the races, candidates, precincts, and other data required to conduct the election. This data can then be imported into the various ballot scanners and ExpressVote stations, and also used to print ballots.

Voting

With both AutoMARK and ExpressVote, the voter's choices are entered on a touch screen by the voter. Both machines

- prevent overvotes and warn of undervotes (just like a DRE),
- do no tabulation,
- support straight-party and crossover voting, and
- have ADA capability, including audio voting and sip-and-puff.

AutoMARK uses a pre-printed ballot, which determines the races shown to the voter. When the voter approves his or her choices, the AutoMARK then fills in the ovals on the ballot to record those choices, and returns the marked ballot to the voter, who then places it in the ballot box or scanner.

ExpressVote, in contrast, does not use pre-printed ballots. There are two possible means of ballot selection:

1. Use the ES&S ExpressLink software (or any pollbook system that can create a VRAB.bod file) and an ExpressVote Activation Card Printer. With this method, the ExpressLink prints an activation card that permits voting and performs ballot selection on the ExpressVote. Certification of pollbook systems is not required in Texas, so ExpressLink and the printer were not examined, although we did see them.

2. A poll worker determines the proper ballot (using any method the election authority chooses), walks to the ExpressVote machine, enters his or her poll worker security code, enters the voter's precinct and split, and gives the voter a blank activation card. As you can see, this is not very efficient, and would not be the best choice for a large precinct.

Either way, when the voter has made and approved his or her selections, the ExpressVote prints a Vote Summary Card, which is the official record of the vote. It contains a printed list of the voter's selections and a machine-readable barcode with the same information. The barcodes on the Vote Summary Cards can be scanned with any of the scanners listed and then tabulated by machine.

Scanning and Tabulation

- Ballots and Vote Summary Cards may be tabulated using a DS200 precinct scanner or a DS850 central count scanner.
- Either scanner can tabulate Vote Summary Cards from ExpressVote or from preprinted ballots that were marked by hand or with the AutoMARK.
- Results from either scanner are tabulated using ElectionWare.

Examination Procedures

This was a two-day examination. The first day of the exam was dedicated to technical information.

To verify that the software we tested is exactly the same as that certified by the Election Assistance Commission (EAC), the Secretary of State obtained the software images directly from the EAC. The software was then decompressed, loaded, and configured by ES&S personnel under the supervision of the technical examiners, thus maintaining the chain of custody.

Also on the first day, we verified that the version numbers examined matched those on the application, asked technical questions, had some questions and discussion about the technical aspects of the system, and observed the ADA testing by the Secretary of State's office.

On the second day, the entire group assembled. We received a presentation from ESS, ran a test deck of ballots to verify correct tabulation, observed how the system worked, asked questions, and tried out the equipment.

Concerns

1. **Use with older Unity equipment.** When Unity 3.4.1.0 was certified on September 2, 2014, the certification had the following condition: "Unity 3.4.1.0 is certified for use as a stand-alone system. Unity 3.0.1.1, certified in 2008, is also currently certified as a stand-alone system. Any use that involves the interactions of the two systems would constitute a modification of their certified design and would need to receive approval from the Secretary of State prior to use in the State of Texas."

   Conclusion. If EVS 5.2.1.0 is certified, I believe it should have a similar condition to clarify that certification is as a stand-alone system only.

2. ExpressVote Card Bin. During the examination, it was pointed out that the card bin, where Vote Summary Cards can be stored on the ExpressVote, does not have a lock, and therefore does not meet the requirements for a "ballot box" in Texas.

Conclusion. In my opinion, certification should carry the condition that the ExpressVote card bins not be used in Texas.

3. Vote Summary Card. Another question raised during the examination is whether the Vote Summary Card created by the ExpressVote is legal in Texas. However, I understand that a ballot in Texas may comprise two or more parts and the Vote Summary Card is therefore acceptable.

Conclusion. This should not be a barrier to certification in Texas.

Summary

I recommend certification of EVS 5.2.1.0 with the conditions mentioned in concerns 1 and 2.