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

Prepared for the
Secretary of State of Texas

James Sneeringer, Ph.D.
Designee of the Attorney General

This report conveys the findings 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	January 6, 2005
Report Date	January 24, 2005

ES&S offers a complete line of products for every aspect of conducting an election, including election setup, DRE, optical scanning, punch-card reading, tallying and reporting.

Components Examined	Version	NAESED Number
ES&S AutoMARK Voter Assist Terminal	1.0.121	Pending
AutoMark Information Mgmt System (AIMS)	1.0.2	Pending
Microsoft Data Set	1.0.40	Pending
Unity Hardware Programming Manager	5.0.3.0c	N-1-02-21-21-002
Unity Data Acquisition Manager	5.0.3.1a	N-1-02-21-21-002
Unity Election Reporting Manager	6.4.3.0a	N-1-02-21-21-002

Unchanged Components. Unchanged since certification; examined only to be sure they work with the new components, listed above.	Version	NAESED Number
iVotronic DRE Voting Station	8.0.1.0r	N-1-02-21-21-002
iVotronic PEB Smart Ballot Memory	PEB1.07	N-1-02-21-21-002
Model 150/550 Scanners	2.1.0.0q	N-1-02-21-21-002

Ballot Marking: Characteristics of the AutoMark Voter Assist System

Voting	Marks paper ballots based on choices entered on a touch screen by the voter. Prevents overvotes and warns of undervotes, just like a DRE.
Election Setup	Reads the election setup created by Unity. Can also be manually programmed to work with ballots of other vendors.
Tabulating	None. The resulting paper ballots are tabulated by other means, such as a scanner.

Voting: Characteristics of the Votronic and iVotronic DRE

Election Setup	Personalized Electronic Ballots (PEB) and separate flash memory cards are created with Unity software. Nothing is pre-programmed in the terminals; all the election information is in the PEB and flash memory. Anything that is precinct specific goes in the PEB. The flash memory is only required if the election is large or there are image or audio files.
Zero-total report	On the thermal printer in the communication pack.
Authorization to vote / Ballot selection	There are two modes: • At the voting station, the voter inserts a PEB, which was initialized at a Supervisor station using a supervisor PEB. (The supervisor PEB and station are both red, to distinguish them from voting stations and voter PEB's.) The voter's PEB cannot be reused without re-activation. • Poll worker inserts a supervisor PEB into a voting station, immediately removes it, and selects the appropriate ballot. The supervisor PEB is retained by the poll worker and is reusable without re-activation.
View / Vote	LCD display / touch screen
Vote Storage	Three redundant flash memories
Precinct Consolidation	Allowed using PEB's. An audit log of this is kept in memory and can be printed at the precinct.
Transfer Results	PEB transported or data transmitted by modem to Unity software (or a regional site from which data is sent to the Unity software at central counting). The data is protected by a Cyclical Redundancy Check (CRC).
Print precinct results	On the thermal printer in the communication pack.
Straight party / crossover	Yes. A straight-party vote cannot cancel crossover votes that have already been selected, which protects the voter against mistakenly canceling a crossover vote.
ADA	Yes, but ADA capability is verified separately by the Secretary of State's office, so it was not demonstrated to the examiners. Because it is battery-powered, the iVotronic can be taken to the curbside for voting.

Setup & Tabulation: Characteristics of the Unity System

Tamper Resistance	Cyclical Redundancy Check (CRC) on each record in the election files.
OS access	Not permitted during tabulation.
Real-Time Audit Log	Yes.
Data Integrity	There are no special transaction-processing features. According to ES&S, there is no need for such features because all the data is written in a single write statement, making it impossible for partial results to be entered into the database. Also, it is easy to recalculate everything if a problem is suspected, and everything is automatically re-calculated when you request a canvass report. Since a canvass report would always be requested, this is satisfactory. In short, it is nearly impossible to get an incorrect result and not know it.

Notes	• The Data Acquisition Manager is used in regional centers to collect precinct data for forwarding to central counting by modem or by carrying a PEB.
	• The Data Acquisition Manager does not need to know election-specific data or understand the results. It does not tabulate, but merely stores packets and then forwards them.

Follow-up from Previous Exams

1. **Real-time Audit Log Printing Shutdown Problem.** Previously, when the Election Reporting Manager was exited, no entry was made on the real-time audit log printer. This has been corrected and was verified during the exam. (My records show that this was also demonstrated during the May, 2004, exam. However, since it was demonstrated again, I am reporting it again.)

2. **Real-time Audit Log Printing on Data Acquisition Manager.** ES&S addressed the previous concerns about the lack of real-time audit log printing on the Data Acquisition Manger. Since the Secretary of State has decided this is not a requirement, little time was spent on this topic.

3. **Disk read problem.** During the May, 2004, exam, there was a transient problem reading diskettes produced by both the Model 150 and the Model 550 scanners. When the Election Reporting Manager was re-started, the problem went away. ES&S reported that they have investigated the problem and have not been able to reproduce it. They believe it may have been fixed as a side-effect of fixing another bug.

4. **Automatic Printing of Zero Tape.** Several examiners had previously suggested that printing a zero tape and clearing of totals at poll opening should be automatic, to avoid possible operator errors. ES&S said that automatic clearing is not practical because there are situations where totals should not be cleared and that automatic printing of a zero tape is not possible because the tape should be produced only when the last voting station is opened, and the system does not know which station will be last. Therefore the user must decide when to print the zero tape. Their position seems reasonable to me, and no changes are needed in my opinion.

5. **Provisional Voting on iVotronics.** A question was raised at a previous exam about the possibility of two provisional ballots accidentally being assigned the same ballot ID. ES&S has decided not to use the iVotronic for provisional ballots, a solution that is more than adequate.

6. **M150/550 Mark Pen Consistency.** During the May, 2004, exam, both of these scanners failed to read some marks that the examiners thought they should read. ES&S reported that this problem was due to using the wrong type of pen to mark the ballots during the exam.

Concerns

7. When a diskette containing votes counted by a Model 150 or Model 550 scanner is inserted into the Election Reporting Manager (ERM) twice, the data from the second attempt is ignored. Although you can tell from the log that no data was loaded, you must deduce it from the absence of a message. The ERM reports that loading begins and that it

ends, and since nothing is printed between those messages, a savvy user can deduce that the votes were not counted twice.

Recommendation: ERM should explicitly report that an attempt was made to load some votes that were already loaded, but that they were not counted. Provisional certification should be granted, but it should expire after approximately one year. After that time, certification should be denied until this problem is fixed.

8. The AutoMARK system was demonstrated only with ES&S scanners and ES&S setup.

    Recommendation: If ES&S wishes AutoMARK to be certified for use with other scanners or for accepting electronic election setup information from other systems, they should follow the procedure established by the Secretary of State for minor changes, demonstrating proper operation with each type of scanner and with each type of election setup. Alternatively, it would be satisfactory to produce a report from an independent testing lab certifying that AutoMARK was found to work with the appropriate equipment.