REPORT OF THE SECRETARY OF STATE ON THE EXAMINATION AND EVALUATION OF AN OPTICAL SCAN ELECTRONIC VOTE TALLYING SYSTEM

In July of 2001 Election Systems & Software, Inc. (ES&S) of Omaha, Nebraska requested the review and examination of enhancements to a Washington State certified optical scan/mark sense central count ballot card reader system under RCW 29.33.041 and 29.33.300. The hardware and software for this system is marketed under the name ES&S Model 100 Precinct Ballot Counter firmware version 4.5.5, which is an upgrade of the previously certified version 2.2 and ES&S Model 550 Central Scanner firmware release 5.9.7.2, an upgrade of the previously certified version 5.5.3.3. The Software that integrates the hardware components of the system is called Unity Election System version 1.0.

The Model 100 is a poll-site based, hand fed, optical scan/mark sense ballot card reader. The reader interprets marked ballots and records vote totals onto a credit card sized SRAM memory card. The machine can support the use of memory cards ranging in capacity from 128k to 256k bytes. The Model 100 unit can produce individual precinct reports on-site. The Memory card contains a rechargeable battery that allows storage of vote totals without being plugged into the Model 100. Any Model 100 machine can be used to read any memory card and produce reports.

A PCMCIA reader installed in a personal computer (PC) running UNITY is used to download and program the memory cards. This same reader is also used as the PC's receiver for accumulation of results and report generation. Printers may be attached to the PC for result printing and continuous log printing and/or external printers may be attached to the Model 100 via an RS-232 port. Results and logs may be printed either way using a standard Epson compatible printer driver. The log may also be printed by the Model 100 reader's on-board printer. Each Model 100 can be outfitted with an internal PCMCIA modem or connected via serial port to an external modem for reporting results telephonically to the Unity system.

The Model 100 reader may be mounted on a ballot box. The ballot box has internal moving parts that include a ballot path diverter that directs ballots into two different bins. One bin contains ballots that have been scanned and counted that are considered complete. The other bin is intended for ballots that have write-in votes on them. All offices on ballots deposited in the write-in bin are tallied with the exception of the office with the write-in vote. The ballot box is important to the most effective operation of the Model 100. This ballot box should always be used with the system.

The ES&S model 550 is a tabletop optical ballot scanner designed to be used as a central ballot counting system. The machine has an attached printer that can produce a variety of reports. The machine usually is programmed by the manufacturer through the use of removable program chips or EPROM's. The user sends a description of the election to the vendor, who

programs an EPROM chip and sends it to the user for installation and testing. Alternately, the user may burn the EPROM directly using an EPROM burner attached to a PC running the 'Hardware Programming Manager' module of the Unity Election system.

The UNITY software is menu driven and allows the user to describe all aspects of an election. In preparation for ballot counting, the user enters office descriptions, positions, precinct combinations, ballot types, and any statistical information such as registered voter totals. The UNITY software is used to produce and download the precinct specific programming onto the Model 100 memory card and/or the Model 550 EPROM chip.

A personal computer running the Unity Election System "Data Acquistion Manager" serves as the central accumulator for county wide results. UNITY can accumulate results via reading the Model 100 SRAM memory card or through telephonic communication with the Model 100. The Model 550 stores ballot totals on a floppy diskette which is in turn uploaded to the cumulative tallying database by inserting the diskette in the PC running the Unity Election System. The diskette is also used to restore totals from this reader in order to count additional ballots and produce updated totals.

An electronic vote tallying system must meet the following requirements (as set forth in RCW 29.34.090) in order to be approved for use in Washington State:

1. It must correctly count votes marked on the ballot for any office or ballot proposition;

2. It must recognize and not count overvoted ballots;

3. It must accumulate a count of a specific number of ballots tallied for a precinct;

4. It must accommodate the rotation of candidates' names;

5. It must automatically produce precinct totals in either printed, marked, or punched forms; and

6. It must add precinct totals and produce a cumulative total.

On July 31, 2001 a public hearing was held to demonstrate the Election Systems & Software's Unity Election System with the Model 100 and Model 550. Representing the Office of the Secretary of State was David Elliott, Assistant Director of Elections and Paul Miller, Initiatives Manager. The meeting was also attended by The Honorable Vicki Dalton, Spokane county Auditor, staff members of the Spokane county auditor office, and representatives from ES&S. The vendor made a presentation of the Unity Election system and a test election was conducted using a group of test decks prepared at the direction of the Office of the Secretary of State and other ballots prepared by the observers. The vendor answered questions from the Secretary of State staff and the public.

FINDINGS OF THE SECRETARY OF STATE

Upon review of the staff evaluation of the Election Systems and Software's Unity Election System (NASED N030200001.0) using the Model 100 and Model 550 vote tallying equipment, the presentation by the vendor, the evaluation of the system conducted by WYLE and METAMOR laboratories in 2000 and 2001 and the results of the tests performed during and following the public hearings on this system, the Secretary of State finds that the system satisfies the requirements of RCW 29.33.300 when used in the manner described below.

A potential problem is the voter that uses an incorrect marking tool to mark the ballot. The equipment was certified by WYLE laboratories for use with a black felt pen and will not read all types and colors of ink. Inspection should be performed on each ballot to insure that black ink, or an ink or pencil that provides high contrast with the ballot color, was used by the voter in marking the ballot.

Additionally, the vote tallying equipment only scans the ovals next to the candidate name looking for votes. If a voter marks the ballot in a manner inconsistent with the function of the machine (for example, they mark the ballot by circling candidate names), the machine will fail to record an otherwise valid vote. A visual inspection of each ballot looking for odd marks will solve this problem.

The design of the Model 100 and Model 550 readers, and the requirements of Washington State law, necessitate the use of one of three special procedures on the part of the user county to assure proper tallying and results.

The procedures are as follows:

1) The system may be used as a central counting system if each ballot is manually inspected before tabulation. The inspection should look for improperly marked ballots, and ballots marked with non-standard marking colors. It is recommended that the canvassing board of any county using this system adopt written procedures governing this process;

2) The system may be used as a poll site tabulation device if the device is set to reject blank-voted ballots and over-voted ballots. Blank-voted ballots are ballots where the device is unable to read any votes cast for any of the contests on the ballot. An over-voted ballot is one where the device registers more votes cast in one or more contest(s) than are valid for that contest. The voter must be given the opportunity to correct the ballot before the ballot is counted. It is recommended that the canvassing board of any county using this system adopt written procedures governing this process; or

3) The system may be used as a poll site tabulation device if all ballots are inspected by election board workers prior to tabulation. The voter would not feed his/her ballot to the Model 100. The voter would place his/her ballot in either a sealed ballot box, the emergency bin on

the front of the ballot box, or other container. Ballots would accumulate this way while the polls are open. After closing the polls for the day the ballots would be inspected as a group, thus preserving voter anonymity. The inspection would search for improperly marked ballots, and ballots marked with non-standard marking colors. The reader would then be activated and all ballots counted. It is recommended that the canvassing board of any county using this system adopt written procedures governing this process.

A county intending to use the telephonic functions of the ES&S Model 100 system must perform a reconciliation of the results prior to certification. This may be accomplished by either performing a direct reading of the SRAM card into the PC, or by proofing the precinct results recorded in UNITY against the printout created by the Model 100 at the close of voting before telephonic transmission.

Under the provisions of RCW 29.33.041, the Unity Election System version 1.0 (NASED N030200001.0) with the following hardware components; the Model 100 Precinct Counter version 4.5.5 and the Model 550 Central Scanner version 5.9.7.2 along with their associated firmware, are approved for use in Washington State, as an optical scan/mark sense electronic vote tabulation system, when used in compliance with the procedures contained in this certification and Washington State law.

It is recommended that the canvassing board of any county using this system adopt written procedures governing these processes. This equipment should be used with a device or devices capable of suppressing current surges, voltage fluctuations, and any other line disturbances.

Certified on this September 10, 2001

SAM REED
Secretary of State