

**California Secretary of State
Consultant's Report on:**

**SEQUOIA VOTING SYSTEMS, INC.
WINEDS/AVC EDGE/INSIGHT/400C/EAGLE/HAAT**

Including:

**WinEDS, version 3.1
AVC Edge Model I, firmware version 5.0.24
AVC Edge Model II, firmware version 5.0.24
VeriVote Printer
Optech 400-C/WinETP firmware version 1.12.4
Optech Insight, APX K2.10, HPX K1.42
Optech Insight Plus, APX K2.10, HPX K1.42
Optech Eagle, APS 1.52, HPS 1.30
Card Activator, version 5.0.21
HAAT Model 50, version 1.0.66
Memory Pack Reader (MPR), firmware version 2.15**

Prepared February 24, 2006
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Scope of Work and Reporting

This report is prepared as a supplement and attachment to the "Staff Review and Analysis" (SOS Report) as prepared by the California Secretary of State's Office of Voting Systems Technology Assessment (OVSTA) on February 22, 2006.

A large part of the consulting work product was providing assistance to OVSTA in both the planning and conduct of voting system tests. The majority of the findings are reported in the SOS Report. This report will be limited to a description of the tasks performed and findings that are not covered in the SOS Report.

Our expertise is in methodologies for examining computerized voting systems, analysis of systems operation, developing measurements of system compliance with established criteria, identification and analysis of system anomalies, and collecting evidence of system characteristics and compliance.

We are not attorneys and do not offer legal advice. We have assisted the California Secretary of State in the collection of facts and evidence that he will use in reaching certification decisions. However, to advise him on the determination of whether the system complies with California's certification requirements would require an interpretation of law. Accordingly we do not provide recommendations or any opinion as to whether the system can be certified. Recommendations to the Secretary for or against certification are within the duties of the OVSTA and are included in their report.

The work that we have performed and our findings are strictly limited to the specific serial numbered hardware elements and specific software elements tested during the examination. An inventory of those items is included as attachment A to this report. The results described in this report should be reliable and repeatable for those specific items. The decision to apply those results to decisions about other items is solely at the discretion of and risk of the Secretary of State and the purchasers of systems. Although attachment A of this report can be used as part of a baseline for reaching conclusions about compliance of other items, users of this report who wish to arrive at such conclusions about compliance of purchased systems or the compliance of a system in use should conduct appropriate acceptance testing or system validation analysis to support those conclusions. If they do not have a high level of well-founded confidence in their ability to conduct acceptance testing or validation analysis, we strongly recommend that they contract for the assistance of someone with the required knowledge and experience.

Findings

With the exception of specific findings highlighted below the system generally performed to the level expected during testing. With appropriate operating procedures the system appears to be capable of being used to conduct elections producing accurate results meeting the functional requirements of state and federal law, with appropriate security and user friendly interfaces.

Exceptions where the system did not perform to the level expected were:

- The IIP Eagle Precinct Scanner had an unresolved counting error where it did not count a mark that was expected to be counted.
- The implementation of a Sip and Puff device requires the voter to use an audio ballot. The instructions provided to the voter are for the operation of the audio ballot with the audio ballot keypad. Accordingly, the system provides inappropriate and unusable instructions to the voter. The screen is blanked out because the machine is in audio ballot mode. When the ballot is printed, the voter has no option to reject the ballot. The voter using the sip and puff device has no access to the help screens. To navigate the ballot, the voter can only go forward, either through the races or through the candidates within a race. At the end of the races or candidates, the voter can go forward and loop back through the items.
- The poll opening zero tape and the results tape can only be printed on the same paper tape within the VeriVote Printer component. Zero tapes will be at the beginning of the record at the center of the spool. If a jurisdiction wishes to have pollworkers sign the results tape, it must provide a procedure for opening the VeriVote Printer.
- Graphical character based fonts such as Chinese, are not properly displayed in the high contrast mode.

- Procedures necessary for production of the Supplemental Statement of Votes Cast Report in a Primary Election are somewhat inelegant and will require careful attention by election administrators during the election definition process.
- There were a small number of instances requiring recalibration of the screen.
- The WinEDS application was less than elegant.
 - WinEDS creates a ballot style for every possible permutation of single member districts. The jurisdiction must then either add header codes for precinct mode or remove redundant districts for efficient use of printing resources in mixed mode. Additionally when ballots are created by BPS it is possible to either import a file from BPS or simply create an election definition to match the ballots.
 - The "Print" button on several menu activities would not work. However, the report option (printer icon) allows printed reports on all database items.
 - The installation does not have a method to save reports to a file. If jurisdictions wish to do so they need to add Adobe Acrobat to capture file copies of reports.
 - During our testing we observed that Microsoft Visio will crash if you close the application without saving the file. If you save first it closes ok, but, if you open Visio without making any change, and attempt to exit without saving, you get an abnormal end to the process.
 - A number of times during the exercise of the system we experienced an abnormal end to the process. It is unclear whether this was an artifact of the testing environment.
- On the Edge units, within the printer test screens, we could not determine the function of the "Reset Printer" button. It appeared to be non-functional. Representatives of Sequoia who were assisting with the test stated they did not know what it did.
- During the initial testing one of the four Edge units (#3) had repeated printer problems. It appeared to have a loose power connection. This was probably an issue of preparation rather than a design defect. The problem did not appear during the volume testing.
- During the volume test, one each of the Edge Model I and Edge Model II machines had one occurrence of a condition where the ballot was not recorded. In both cases, the system properly notified the voter that an error had occurred and that the vote had not been recorded.
- During the volume test on the Edge units only one paper jam occurred in the VeriVote Printer. The machine properly identified the occurrence and shut down. Upon examination, the printer rollers were found to be out of adjustment. Once adjusted, the printer operated without jamming.
- During the volume test, one of the Insight precinct scanners experienced a sensor failure. After the failure it would read no marks in the affected channel.

Summary of System Benchmarking

At the WinEDS WorkStation:

We logged on as administrator and created .txt documents of configuration:

We reviewed and listed the third party software which had been installed. We found:

- Acronis True Image Corporate Workstation
- Acronis True Image Agent
- C-Major Audio
- Conexant D110MDC V.92 Modem
- Dell Wireless Wlan Card
- Intel® Graphics Media Accelerator Driver for Mobile
(A Dell wireless card was found and uninstalled)
- LiveUpdate 2.6 (Symatec Corporation)
- Symatec AntiVirus
- Texas Instruments PCIxxx/x515 drivers
- Windows Installer 3.1 (KB893803)
- Windows XP Service Pack 2

We created hash files on the system and copied the registry.

We then installed software from trusted builds.

Run CheckFiles on:

- C:\
- C:\Windows
- C:\Program Files

Firmware and Hardware was benchmarked as described in Attachment A.

Attachment A.

Hardware Descriptions:

Test Configuration

Optech Insight (Precinct Marksense Scanner) Part # 640-3180-00
Revision Level E
Serial #501445
Firmware HPXK 1.42

Optech Insight Plus (Precinct Marksense Scanner) Part # 640-32910-00
Revision Level A
Serial #504804
Firmware HPXK 1.42

Insight Memory Packs (For the Optech Insight) Part # 460-31816-00
Seven units - No serial numbers
Firmware APXK 2.10
Programmable Logic Chip # 06131874-00 Version 2.8
Memory Chip labeled "Famous SP100"

Optech Eagle (Precinct Marksense Scanner) Part #31690
Revision Level C.07
Serial #420164
Firmware OP3PE HPS 1.30 4/28/98
CPE CPS Modem Firmware H 1.08A 9/14/98

Optech Memory Pack (For the Optech Eagle)
Revision D
Firmware OP3PE APS H 1.52S

Optech Memory Pack (For the Optech Eagle)
Revision E
Firmware OP3PE APS H 1.52S

Edge DRE – Model #096-000011-01012
Serial #21769
FW Version 5.0.24
With:
VVPAT Part #460-32400-00
Revision A
Serial # 03321

Edge DRE – Model #A
Serial #10183
FW Version 5.0.24
With:
VVPAT Part #460-32400-00
Revision A
Serial # 03491

Edge DRE – Model #096-000024-08906
Serial #39348
FW Version 5.0.24
With:
VVPAT Part #460-32400-00
Revision B
Serial # 16021

Edge DRE – Model #096-000024-08906
Serial #39345
FW Version 5.0.24
With:
VVPAT Part #460-32400-00
Revision B
Serial # 17569

Memory Cartridges for Edge ranging from 32 to 128 Meg.

Sycard Technology PCexend Cardbus
Model PCCExtend 70A
CO70-24784

HAAT Model 50 Serial #000001034
Win CE License # X11-15302
Firm Ware 1.0.69L

Card Activator –
Model 096-107011 – 4.1 Rev. D
020399338CM
Firmware 5.0.21

Card Activator –
Model 096-107011 – 2.8 Rev. D
0205239328CM

Firmware 5.0.21

Audio Voting Accessory. – Part 460-32690-00
Rev C
Serial #004593

Audio Voting Accessory. – Part 460-32690-00
Rev C
Serial #004583

Model 400-C (Absentee Scanner) Part #460-29880-00
Version 3.00P
Serial #200270

Memory Pack Reader Programmer
Serial #506411
MPR 2.15 Firmware 2.0.15

As a system workstation:

Dell Latitude D610
Running MS XP Professional Version 5.1 Build 2600
Xpsp_SP2_rtm.040803-2158 SP2
Display MY-0F7170-47603-56AKEY Rev. A00
Running Microsoft Windows Server 2003 Standard Edition.

HP Printer LazerJet 2300 N
Serial #CNBGG11063

As a system server:

Dell OptiPlex 280
Service Tag (S/N) F7NZZ71
3.00 gigahertz Intel Pentium 4
1016 Megabytes Installed Memory
120.43 Gigabytes Usable Hard Drive Capacity
DELL E173FP [Monitor] (17.1"vis, s/n F717056AAKEY, June 2005)
HID Keyboard and Mouse/Touchpad
PHILIPS DVD+-RW DVD8701 [CD-ROM drive] (Note: no CD/DVD write
software
installed)
3.5" format removeable media [Floppy drive]
Four USB 2.0 ports
Broadcom NetXtreme 57xx Gigabit Controller
(no wireless)

Windows Server 2003 Standard Edition Service Pack 1 (build 3790)
With one SP1 patch and 21 SP2 Microsoft Hotfixes
Microsoft (r) Windows Script Host Version 5.6.0.8827
Microsoft Corporation - Internet Explorer Version 6.00.3790.1830
Microsoft Corporation - PHIME2002A Version 5.2.2906 (supports language interface)
Microsoft Corporation - Windows Installer - Unicode Version 3.1.4000.1830
Microsoft Data Access Components Version 3.526.1830.0
Microsoft IME 2002 Version 8.1.7103.0 (supports language interface)
Microsoft Korean IME 2002 Version 6.2.1830.0 (supports language interface)
Microsoft(R) Windows Media Player Version 10.00.00.3700 *
MS Pinyin, a utility to support use of Chinese character sets.
Symantec AntiVirus Version 10.0.1.1000 *
Symantec Corporation - Client and Host Security Platform Version 103.5.4.3 *
Symantec Corporation - SPBBC Version 1,5,1,3 *
Symantec SAVRoam Version 10.0.1.1000 *
Symantec Security Drivers Version 5.5 *
Wizards to adjust .NET Framework security, assign trust to assemblies, and fix broken .NET applications. Version 1.0.5000.0 *
MS SQL Server 2000

Normally Adobe Distiller or Acrobat is installed to function as a file printer but was not installed in this test. This configuration does not contain the usual unneeded applications installed by vendors from standard MS installation.

Optech 400-C WinETP server:

VIA Technologies, Inc. VT82C694X (no serial number available from onboard info)
1.20 gigahertz Intel Pentium III
128 Megabytes Installed Me
30.41 Gigabytes Usable Hard Drive Capacity
SAMSUNG CD-ROM SH-152A (non writeable)
3.5" format removeable media [Floppy drive] (Primary election load/results transfer)
2 USB 2.0 Ports
SAMSUNG [Monitor] (15.2"vis, s/n HDBY400525, April 2005
Std Keyboard and Mouse
VIA Bus Master IDE Controller (controls Optech scanner drive and optical reads)
Windows 2000 Professional Service Pack 4 (build 2195)
With one MS Hotfix
Cinematronics - 3D Pinball Version 5.00.2134.1

dvdplay Application Version 1, 0, 0, 1
Eastman Software, Inc., A Kodak Business - Imaging for WindowsR Version
5.00.2138.1 *
Microsoft (r) Windows Script Host Version 5.1.0.4615
Microsoft Corporation - Internet Explorer Version 5.00.2920.0000
Microsoft Corporation - Windows Installer - Unicode Version 2.0.2600.1183
Microsoft Corporation - WindowsR NetMeetingR Version 3.01
Microsoft Open Database Connectivity Version 3.520.6200.0
Microsoft Windows Media Player Version 6.4.09.1125
WinETP 1.24.4

Cinematronics, and NetMeeting are not used and should be removed. Not sure about Media Player and dvdplay. I normally leaves these out as irrelevant but there are some security implications with NetMeeting.

WinETP Utilities (uncertified nor tested)
400-C Diagnostics *
Ballot Sorter Version 1.0.0.0 *

System Configuration Audit Procedures:

The firmware on the Insight, Insight Plus and the Insight Memory Packs was verified against the trusted builds with the MD5 Hash.

The firmware in all four Edge units was upgraded to the trusted build of Version 5.0.23. Shortly afterwards, we learned that Version 5.0.23 was to be abandoned because of an anomaly that prevented proper display of graphical fonts. A new trusted build of the firmware, at Version 5.0.24 was received from Wyle Laboratories and installed on the four Edge units.

A benchmark hash was performed on the Optech Memory Pack (for the III-P Eagle), but there was no trusted build available for it. The last trusted build of the III-P Eagle firmware was performed by the State of Florida, Division of Elections in 1998. Sequoia requested a copy of that firmware for California. As of this writing, the firmware has not been received. However, in the SOS Report, the OVSTA is not recommending certification of the III-P Eagle at this time.

Firmware Version 1.0.69L was installed on the HAAT device from the trusted build.

Firmware Version 5.0.21 was installed on the Card Activator from the trusted build.